Knowledge Studies in Higher Education 4

Karen L. Webber *Editor*

Building Capacity in Institutional Research and Decision Support in Higher Education

Springer

Knowledge Studies in Higher Education

Volume 4

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Editor

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Editor
Karen L. Webber
Institute of Higher Education
University of Georgia
Athens, GA, USA

Knowledge Studies in Higher Education
ISBN 978-3-319-71161-4 ISBN 978-3-319-71162-1 (eBook)
https://doi.org/10.1007/978-3-319-71162-1

Library of Congress Control Number: 2017963766

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Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

Gina Johnson, Association for Institutional Research

Recently I was invited to give a presentation at the Midwestern Higher Education Compact's (MHEC) Multi-State Collaborative on Military Credit (MCMC) program's annual meeting. The topic was Institutional Research and Military Student Success. In the presentation, I reflected back on my time as a data and policy analyst at MHEC, before I had ever heard of the term "institutional research." Following my work in multiple institutional research offices followed by almost two years on the staff in the executive office of the Association for Institutional Research, I recently shared the ways in which I believed the *Duties and Functions of Institutional Research* (2017) can be utilized to measure and increase the success of miltary-connected students in higher education. The exercise could be repeated for other categories of students and many aspects of the higher education experience. I am pleased to say the presentation was well received, and, in fact, I may have made IR professionals out to be heroes who can save the day with data and information. The only dark cloud in the otherwise sunny response from the attendees following the presentation came from those who shared that they lack access to their institution's IR team because they are so busy with the many other duties that draw their attention. And so, like so many conversations in higher education and IR circles these days, we returned to capacity. Imagine what we could accomplish if only we could expand the institutional research capacity across higher education!

The authors of the chapters in this volume, *Building Capacity in Institutional Research and Decision Support in Higher Education*, outline the challenges inherent in expanding the ability of students, staff, faculty, and administrators to make decisions informed by the data and information collected, analyzed, interpreted, and reported by institutional researchers. With rare exceptions, global higher education is facing a situation in which there are fewer resources coupled with more demands. As the field of institutional research continues to evolve in higher education and as a profession, how do we respond to these demands and build capacity if, at the same time, we experience reduction in human and budgetary resources? Thankfully these

same authors who outline the challenges offer solutions that we in the higher education and IR community can embrace.

Purpose and Organization of This Book

In her introduction to this volume (Chap. 1), Webber outlines the changing landscape of higher education that impacts the method and speed with which institutional researchers can accomplish the duties and functions of IR, including massification of higher education, technology's role in decision support, and various external drivers that prompt the conducting of more institutional research. Institutional research professionals are both impacted by the speed at which the higher education landscape is changing and solutions to dealing with this changing landscape. When faced with rapid change and a need to react quickly and intelligently, it is precisely the duties and functions of institutional research that can help leaders and others involved in the pursuit and provision of higher education. As previously cited, these duties and functions include:

- Identify information needs
- Collect, analyze, interpret, and report data and information
- Plan and evaluate
- Serve as stewards of data and information
- Educate information producers, users, and consumers

These duties and functions must occur across an institution, system, or organization to ensure successful data-informed decision-making. And institutional researchers play an essential and central role in ensuring this occurs.

While this book necessarily presents the rapidly changing circumstances in which higher education finds itself reacting to often negative forces, it also provides hopeful and helpful suggestions for surviving, and thriving in, such a rapidly changing, demanding environment. Indeed it is institutional research itself that can best help IR professionals help their colleagues make the types of decisions that must be made for their institution to succeed. And the knowledge, skills, and tools possessed by institutional researchers, along with the ability to prioritize needs and leverage technology and other resources to further expand IR capacity, will assist institutions in expanding other capacities to better utilize the shrinking pool of resources available.

To assist the reader in accessing these strategies for expanding the capacity of institutional research in his or her setting, this book is organized in a way that guides the reader through the challenges to the opportunities for capacity expansion. The book begins with an introduction to the text to provide context and background. This introduction is followed by a series of chapters, specifically two through eight, that outline the challenges facing higher education and institutional research and the necessary background about the field of IR to understand the chapters to follow. Chapters 9 through 15 explore IR capacity building with a global lens, highlighting

the development of, challenges facing, and opportunities for growth in institutional research in various regions around the world. The book concludes with a chapter expanding on ways in which institutional research can develop capacity and a vision of where the field is headed in the future.

Overview of the Chapters

In Chap. 1, the introduction to this text, Webber outlines the difficulty in defining institutional research due to many factors, including variances in organizational structure and diffuse roles of IR practitioners due to the increasingly interdisciplinary role of higher education, the influences of technology on higher education and the work of IR, the preferences for team work, and the commitment to widening participation in higher education in the USA and internationally.

In Chap. 2, The Impact of Global Forces in Higher Education on the Development of Institutional Research, Botha describes six forces acting on higher education, including massification, globalization, the advent of a knowledge society, the development of information and communication technology, accountability, and competition and rankings. Each of these forces has particular impacts on institutional research and its evolution as a field. To assist institutions in responding to these forces, Botha reminds IR professionals to focus on the big picture while conducting their detailed work.

Knight provides Conceptual Models for IR and Organizational Intelligence in Chap. 3 of the volume. Models explored include organizational intelligence, the golden triangle, the four faces of IR, and others. As the field of institutional research matures, it is moving from a more specialized and independent model to a more integrated one. The chapter ends with an exploration of institutional effectiveness as an umbrella term and field that encompasses institutional research, assessment, planning, program review, and accreditation. Knight suggests that institutional effectiveness works to actively move an institution toward a culture of evidence.

In Chapter 4, The Need for and Value of Scholarship in Institutional Research, Borden's explanation of the evolution of the field from research centers of faculty members focuses on scholarly research to inform institutional decision-making to the professionalization of IR as administrators and staff with technical data storage and retrieval skills. The shift occurred for numerous reasons, including an expansion of IR into institutions beyond research universities, an expanded client base for IR, and the expansion of tools and for- and non-profit providers of IR—like tools and products. Borden calls for the continued focus on applied research knowledge and skills in IR to help inform institutions as they incorporate predictive analytics and conduct institutional research in a collaborative environment to interpret and analyze implications to complex issues in higher education.

Briner and Rome, in Chap. 5, The Need for and Value of Data Management, outline how institutional researchers can play a role in development and coordination of data governance programs in their settings. Data management through

appropriate governance allows institutions to assign responsibility for specific data assets, formally define the responsibilities for these assets, and allow for data use by individuals who can benefit from access to the data for informed decision-making. Involvement in data governance by institutional researchers ensures consideration of data use in the process.

In Chap. 6, Let Me Paint You a Picture: Utilizing Visualizations to Make Data More Accessible, Drake, Pytlarz, and Patel highlight the ways in which data visualization tools can build institutional research capacity by allowing more people to interact with data and, after an initial investment of time to create the visualization systems, freeing up institutional research professionals to conduct more advanced analyses. They further discuss the benefits of using data visualization tools, such as an increased ability to identify patterns that inform decision-making, and deeper insights from exploration of data. Tips for successful creation of data visualization tools are also presented.

Mathies, in Chap. 7, Uses and Misuses of Data, calls out institutional research as one of the few units in an institution that views the organization at both the micro and macro levels and, with this unique set of views, is able to use data in engaging ways. To reduce the instances in which data are misused, in the ways detailed in the chapter, a set of guidelines are outlined, including connecting data and context experts, ensuring strong data governance and access rules, and providing guidelines for use and development of analytics and metrics.

In Chap. 8, The Finance Conundrum for Higher Education, Hillman and Kindschy encourage readers to consider the finance conversation to include not just price but cost and subsidy as well. Institutional researchers, as consumers and producers of financial information, can leverage finance questions to help an institution define, measure, and assess quality. The chapter ends with a set of resources for IR professionals interested in using finance data.

Chapters 9 through 15 explore professional development for the institutional research professional throughout the world. In Chap. 9, Bramblett and Broderick review Institutional Research and Decision Support in the United States and Canada. The authors make note of the diversity of educational backgrounds of IR professionals and the diversity of IR practice in settings across the two countries while highlighting the similarity of principles in the educated IR workforce, with its requisite analytical and technical skills.

In Chap. 10, Williams and Kane focus on institutional research and decision support as practiced in the UK, Ireland, Germany, and the Netherlands. The authors note that, while decision support as a practice informs decisions made by university leaders in areas such as teaching and learning, and services and facilities, IR is not conducted by a central office focused solely on this activity, but rather is conducted in a decentralized manner. Professional development and coordination will strengthen IR and decision support in these settings.

Chapter 11 turns its focus on IR in Latin America. In it, Pita Carranza outlines the ways in which IR is performed in South American universities, though the term

institutional research is not commonly used to describe such work, and the profession of IR is not well established there. The chapter describes IR-like quality improvement functions in Argentina and Chile, the process that led to the implementation of these activities in higher education in these countries, and future challenges for the field in South America.

Calderon describes the transformation of Australia's higher education system and the role of planning and institutional research in these reforms in Chap. 12. As a major contributor to the Australian GDP, higher education is important to the economic health of the nation, and its success is therefore well worth researching. Australian IR focuses on planning and has evolved rapidly since the 1980s with national, comprehensive data collections that shape university decision-making. The chapter considers current and future challenges for the field of IR and planning and outlines strategies for developing IR and planning capacity in higher education.

In Chap. 13, Chetty and Muller outline the evolution of IR in South Africa within the pressures of an ever-changing national context and higher education landscape. While not unique to South Africa, IR professionals in the country are adapting their work and embracing change as government spending on higher education decreases, completion rates remain lower than expected, and calls for accountability increase. The chapter focuses on ways to build IR capacity in this rapidly changing environment that has parallels globally and from which IR professionals in other settings can learn as they build capacity in their institutions and organizations.

The Middle East and North Africa (MENA) are the focus of Cinali's Chap. 14. In it, the author describes a fast-growing higher education sector in which liberal arts institutions and US accreditation highlight the need for accurate and timely data and a subsequent increase in hiring of IR personnel. The focus of this region is on well-trained IR professionals who have the skills and abilities to perform tasks that ensure data-informed decisions can be made in the rapidly changing and expanding environment of higher education in the MENA countries.

In Chap. 15, the final chapter in the section on global IR capacity building, authors Lin, Fu, and Ko focus on the development of IR in China, Korea, Japan, and Taiwan. Commonalities across Asian countries exist related to the development of institutional research; at the same time, cultural and institutional differences shape IR in each setting. Like other countries across the world, increased competition for financial resources and accountability demands are pushing the evolution of IR to strengthen institutions' abilities to ensure data-informed decision-making. The chapter outlines the growth and expansion of IR in selected universities in these four Asian countries.

Webber closes out the text in Chap. 16 with a summary of The Future of IR and Decision Support: Ensuring a Seat at the Table. In it she highlights the growth of the IR profession globally and an increased recognition of the function of IR in evidence-informed collaborative improvement processes in higher education. Highlighting the knowledge and skills that are critical to successful institutional

research, Webber focuses on building IR capacity by ensuring a central role for the function within an institution. She also asserts that increased staff and professional development for those in IR, particularly focused on the social science training, a strength of many in this profession, is critical to building IR's capacity and strength in higher education.

Denver, Colorado, USA Gina Johnson

Reference

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Acknowledgments

Kind appreciation is extended to Springer editor Natalie Rieborn and series editors of the knowledge studies, J.C. Shin and Hugo Horta, who promptly responded with encouragement to my initial inquiry about this possible volume. I also express my thanks to the production team at Springer.

To my colleagues around the world who contributed to this volume, I extend my sincere gratitude. Without you, this book would not be possible; your experiences in regions across the world helped me gather full and meaningful information. Readers of this book will have a much better understanding of how institutional research has grown in our globalized, changing, but always exciting world of higher education. I also thank my IR colleagues who reviewed parts of the chapters and offered insights that strengthened the discussion. Special thanks to Deb Teeter, Christine Keller, Leah Ross, Gerry McLaughlin, and Meihua Zhai.

I also thank my work colleagues at the University of Georgia's Institute of Higher Education, who kindly offered their support and assistance. I thank IHE Director and Miller Distinguished Professor Libby Morris for her continued positive support of my work projects, and I thank doctoral candidate Samantha Rogers for her assistance with manuscript preparation.

I also thank my ever-patient and always-optimistic spouse who went for long periods of time seeing me little as I huddled in my quiet space working through seemingly endless drafts and edits to the chapters. I believe he now sees more clearly the many hours that a faculty member devotes to her work, fully unseen by most. Mark and I are a good team, and I hope he knows that I appreciate his support.

Contents

Part I
The Context for IR and Decision Support in Today's Higher Education

Chapter 1
Institutional Research and Decision Support in Higher Education: Considerations for Today and for Tomorrow

Karen L. Webber

1.1 Introduction

Decisions that are informed by data have become the norm for higher education officials today, and institutional research practitioners have, in many instances, played a pivotal role in providing data that has been transformed into useful information for decision making. Although the need for information about higher education institutions has existed for many more years in history, institutional research (IR) has been an active part of the modern university, particularly after World War II. Although some practices that are associated with decision support have existed for many years and in many parts of the world with established higher education, most scholars agree that the roots of IR reside in the United States, where its practice is clearly identified in terms of its roles, functions, and professional endeavors (Rice et al. 2011; Saupe 1990).

According to Lasher (2011), a research study done by the founders of Yale is often considered the first piece of IR in the US; this 1701 study by W.H. Crowley examined the organizational structure of Harvard. This study was significant because the organizational structure adopted by Yale was different from the only other two colonial colleges at that time, Harvard and William and Mary. This initial study was followed by more reports on governance structures and curriculum, but this early, first period of IR in the US was characterized by individual higher education scholars and was not generally labeled institutional research (Tetlow 1973).

In 1960, a gathering of approximately 20 individuals attended the first "seminar on institutional research" which was the precursor to the National Institutional Research Forum (NIRF) held the next year (Lasher 2011). These events and the insightful individuals in attendance were instrumental in building what is known

K. L. Webber (✉)
Institute of Higher Education, University of Georgia, Athens, GA, USA
e-mail: kwebber@uga.edu

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K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1_1

today in the US as Institutional Research. Following the initial gathering, five more annual NIRF meetings took place and in 1966, the first annual meeting of the Association for Institutional Research was held. Having grown and matured over the past 50+ years, AIR has provided significant assistance in professional development, networking for those working on tasks related to IR. Those interested in details about the growth and development of the field in the US may wish to review details in Rice et al. (2011), including Fig. 1.1 shown here that illustrates significant events for and noteworthy contributors to AIR that attest to its growth and maturity.

Many of the functions attributed to IR have evolved in parallel to the evolution and transformation of institutions of higher learning across centuries. The term 'institutional research' has only been in vogue since the late 1950s, when IR offices began to be established across institutions in the US (Reichard 2012). It is frequently used in the US, South Africa, Australia, and in some European countries; but it is increasingly recognized in other regions of the world. In the US, the term 'Decision Support' is becoming more common, as it broadens the scope of IR activities and, most importantly, signals the value of the information that IR officials contribute to institutional decisions.

1.2 Institutional Research: Defined

As defined by Saupe (1990), IR is "the sum of all activities directed at empirically describing the full spectrum of functions (educational, administrative, and support) at a college or university, which are used for the purposes of institutional planning, policy development, and decision making" (1). It is the sum of activities that aim to explore the intricacies of an institution, including its origins, where it is and where it is going, and understanding its sets of relations within the wider social, economic, and geographical context in which it operates.

Fincher (1985) described IR as a specialized administrative function and fittingly styled its practitioners as organizational intelligence specialists. In considering the existing literature on the foundations and practice of IR, IR offices are seen as the engine rooms of the university; developers of policy-related research and research-led policy; and catalysts for institutional change. Fincher's work prompted Terenzini (1993, 2013) to consider the forms of personal and professional competence, institutional understanding, and knowledge needed for effective IR practice.

Dressel (1981) defined IR as the administrative function that facilitates the links between decision makers and institutional purposes, objectives, and processes, while Volkwein (1999, 2008) and Serban (2002) defined IR on the basis of its functions or faces of IR. Terenzini's forms of organizational intelligence and some of the other models for understanding what is meant by IR are further discussed in the models for practice by William Knight in Chap. 3.

While there may be common aspects of IR (such as institutional reporting, data analysis, and interpretation), the range of activities that IR and planning offices

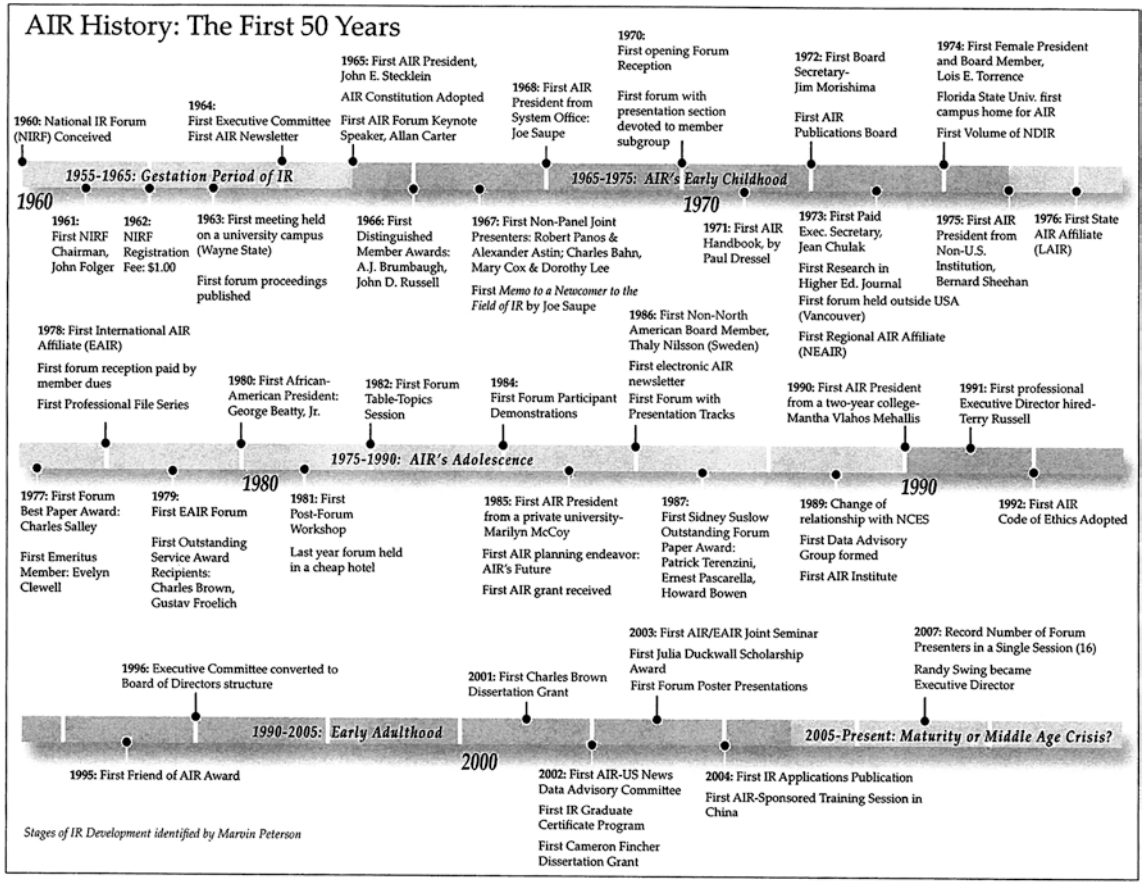

Fig. 1.1 AIR History: The First 50 Years Timeline (Reproduced from Rice et al. 2011)

perform may depend on the institutional type (e.g., research intensive, regional-focused, community- or world class-oriented), or whether the organization is private, for-profit, or public (Delaney 2009; Leimer and Terkla 2009). Ultimately, the purpose, functions, activities, services, roles, and mission of IR is determined by institutional decision makers. IR is what serves best or fits the purpose of institutions and this is what then defines IR within an institution. The intrinsic measures of relevance and success of IR is by its service delivery and capacity in supporting decision making at the institutional level, and its impact within the institution and its operational jurisdiction (either within a region, nation or across-borders). One can see that there is not an easy way to describe what the typical IR office generally does, nor what it is expected to perform. However, there is a blend of tasks, roles, and functions that come together to define institutional research in today's higher education.

Decision Support is a term used to describe the larger set of activities and tasks that include the collection, analysis, and reporting of data as information, collaborating with data stewards, and educating others on the proper use and interpretation of data. With decision making seen as a core process (Chaffee 1983), decision support signals the collective activities and often, a set of campus colleagues that bring subject matter expertise to the solution of an issue under study. IR practitioners are key to campus-wide decision support solutions; the IR staffer may be primary, and in some limited circumstances the only campus member working to address a needed topic, but answers to most of today's daunting questions in higher education planning usually require multiple people, each having knowledge and expertise that when combined, achieve a stronger solution. With these ideas in mind, I frame many comments around the broader term ***Institutional Research andDecision Support*** to signal the collective activities and set of campus colleagues that bring subject matter expertise to the solution of an issue under study.

The depth and breadth of IR and decision support and the manner in which it is carried out depends on the environment that prevails within the institution and within the boundaries where institutions operate (Webber and Calderon 2015). Across the globe, government legislation and funding seek to improve individuals and society as a whole. In many educational systems, and increasingly so in many parts of the world, the central role of IR has been cemented through these legislated requirements for institutions to provide information on the evidence of effectiveness. Historically, IR and decision support offices have been charged with responsibility of extracting, validating, and reporting institutional data. Having access to information, data tools, and methods for analysis has underpinned the foundation for IR to undertake a range of studies to better understand institutional performance as well as provide foundation for institutional repositioning and setting strategic directions. These are a but a few of the many common threads that define the practice of IR and planning whether it is undertaken in an institution based in North America, Europe, Latin America, South Africa, or Asia.

1.3 What Is Building Capacity in Institutional Research and Decision Support?

Building capacity in IR, for me, is informed by some previous discussions on capacity building in organizations (e.g., Cooper 2007; Dill 2000; Lancrin 2004; Marginson 2006). With increasing requirements on organizational efficiency, performance-based accountability is an important factor in higher education planning (Alexander 2000). Academic planning in today's complex higher education sector requires senior leaders to consider the drivers that shape higher education today, particularly the external environment (Pfeffer and Salancik 1978). Integral to capacity building in an organization or in a unit such as IR is an understanding of how organizational elements interact with each other and with the environment, known as systems thinking (Birnbaum 1988). Individuals engaged in capacity building, particularly at the organizational level, must be aware of and strategic in its interactions with individuals within and across organizational units. As well, specifics of the environment, relationships, and indirect authorities across organizational units can contribute to the assignment of responsibilities and the effectiveness of collaborative work.

An organizational capacity-model proposed by Morley (2005) at NACUBO (National Association for College and University Business Officers) developed a model called BOC (Building Organizational Capacity), and defined it as "the capability of individual higher education institutions to anticipate, plan for, and respond effectively to institutional challenges in ways that have continuing impact." NACUBO's BOC framework encourages college and university leaders to view an organization and its many parts as a complex system with many subsystems such as administrative and academic departments. Systems are characterized by flows of information and actions and feedback loops that affect the flow of information. Morley (2005) reports that when institution or unit leaders consider how BOC elements interrelate, strategies, and decision making tactics can be aligned, thereby increasing the likelihood that a given initiative will be effective and lasting.

Toma (2010) extended the work of Morley (2005) and further described building organizational capacity (BOC) in higher education institutions as the administrative foundation that is necessary to plan, implement and sustain a campus initiative. He developed a web-like model (see Fig. 1.1), acknowledging the interconnections between organizational units and institutional processes. Toma's model places *purpose* (one of the eight elements) at the center of the model, and by interconnecting each BOC element. Defining organizational capacity as the necessary foundation to successfully execute strategy, these changes reflect Toma's idea that capacity building emanates from a shared understanding of 'why we are here, and where we are headed.'

Although they were not thinking specifically of IR, I believe Morley's (2005) and Toma's (2010) ideas are relevant to building capacity in IR. Today's IR practitioners have a tall order in front of them. They must have technical and analytic skills, they must understand the foundations and practice of higher education, and they must be

able to seamlessly use their knowledge and skills to provide good and useful information for decision making. IR directors must balance proactive and reactive reporting and information needs, and articulate it in a way that can be heard by the stakeholder. As Bramblett and Broderick (Chap. 9) point out, building capacity in IR includes a deep understanding of the organizational structure, how information flows, and how one's specific college or university is interconnected. Importantly, it requires a plan for short-term and a vision for long-term goals related to professional development. AIR's *Duties and Functions of Institutional Research* (2017) and the *Statement on Aspirational Practice* (Swing and Ross 2016b) may serve some institutions and IR officials well in offering ideas and perhaps a template for professional development that can help lead to greater IR capacity.

Professional development for individuals who perform IR tasks is a primary way in which we can build capacity. Through annual face-to-face conferences and seminars as well as online and video workshops, IR practitioners have access to formal and informal opportunities to increase their knowledge and skills. For example, AIR offers a professional development activity, the *Holistic Approach to IR* (http://www.airweb.org/EducationAndEvents/OnlineLearning/Pages/A-Holistic-Approach.aspx). Valuable to professionals who are new to IR, this program is offered online as well as in a hybrid version of face-to-face and online work to ensure transmission of important information for those new to IR and an opportunity to build collegial relationships with others. There are many good opportunities for IR and decision support professional development occurring across a number of countries and some examples are mentioned in Chaps. 9 through 15.

Chetty and Muller (Chap. 12) remind us that capacity building is about growth. Better institutional research and decision support will benefit from growth in practitioner knowledge, skills, and experience, and broader capacity development ideally takes place within a framework of three interrelated levels - individual, organizational, and an environment that facilitates growth and change. In some regions or countries of the globe, IR and decision support are well-known concepts to higher education leaders. However, in some regions, capacity building will be easier once senior leaders are well informed about the practices broadly included in IR and the value that IR can bring to decision making.

As higher education addresses change in the new millennium, IR practices and collaborative relationships with others on campus must change as well. Swing and Ross (2016a) propose an expanded 'federated' role of IR, distributed across campus. Although this model was developed in concept and not yet tested, I remain wary of any possible distribution that lets IR leaders lose control of the much-needed central guiding structures. I discuss this issue more in Chap. 16.

Importantly, Calderon (2012) argues that IR practitioners are now playing an active and visionary role in developing strategy and assessing the long term positioning for institutions and national systems. This seems critical as we seek to strengthen the practice of IR. In this book (Chap. 12), Calderon astutely reminds readers that some new skills will be needed in order to remain relevant and valued. Some of these skills include the ability to adapt and change as emerging trends in the labor market arise, the capacity to consider implications for higher education in

an increasingly global world, and good communication skills that enable the practitioner to engage with a variety of stakeholders.

1.4 Massification of Higher Education

Participation in higher education across the world has expanded considerably over the past century, and more countries transition from elite to mass to universal access Trow (2007; original chapter 1973). Calderon (2012) reports that from 2000 to 2030 growth is predicted to be higher than that experienced between 1970 and 2000. The number of students enrolled in higher education by 2030 is forecasted to rise from 99.4 million in 2000 to 414.2 million in 2030 – an increase of 314%.

Prior to the new millennium, the majority of enrollment in higher education was in North America and Western Europe. However, in the new millennium, greater growth is occurring in other parts of world, particularly East Asia and the Pacific. Calderon (2012) reports that the East Asia and the Pacific regions are expected to exceed 100 million students between 2020 and 2021 and over 200 million between 2033 and 2034. By 2035, 42% of global enrollments (or 212.9 million enrollments) is predicted to be from this region, a sharp contrast to the 25% it attained back in 2000. While greatest growth may occur in the Pan Asian regions, other parts of the world have seen and will continue to see great growth as well. India continues to expand, as do the Latin American and Caribbean higher education systems.

There is general consensus that tertiary education broadly assists a country or region with economic and social progress, and most countries are focused on encouraging greater participation in higher education. According to the OECD World Data (OECD Education at a Glance 2016), tertiary education participation rates for 25–34 years olds range widely, with a high in Korea of 69% and a low in Mexico of 21%. Even with an average baccalaureate completion rate of 41% (OECD Education at a Glance 2016), we see higher education continuing to expand across the globe.

Although Trow (2000) points to the value of higher education's expansion, he also warned of problems that have been experienced through its rapid expansion. Included among those problems are escalating costs, adaptations needed to structures of governance to accommodate the move to mass higher education, and the impact of information technologies on traditional forms of higher education. All of these have a large impact on IR and also offer an important opportunity for IR practitioners to step in and provide valued and needed decision support.

Shin and Teichler (2014) believe that looking to the future in higher education means developing scenarios for a "post world-class university" higher education system and a "post-massified" higher education system. They also ponder the possibility of a future higher education system that is not the servant of the most powerful current political ideology but, rather, can serve a multitude of approaches through a creative balance. They suggest that this requires both a realistic and an idealistic discourse, and more projects like HELF (Higher Education Looking Forward),

sponsored by The European Science Foundation (ESF). This project concluded that "forward-look" projects are a promising way to explore the possible futures of technology and society, as well as possible futures of research in the respective areas (Shin and Teichler 2014).

1.5 Technology's Role in IR and Decision Support

Technology is ubiquitous in nearly every facet of the higher education enterprise. Although some might argue that its prediction to make our lives easier and more efficient may not have been fully realized (Borgmann 1992), it is indeed a part of our work that will remain and likely expand even further. As Zheng (2015) astutely notes, the increasing importance of data analytics is acknowledged by higher education leaders who face a multitude of challenges, including increasing operating costs, dwindling state support, limits to tuition increases, stagnant research funding growth, and increasing competition from the for-profit sector and on-line education. To navigate their institutions through these challenges, higher education leaders have placed more emphasis on the use of data to support decisions. Advanced statistics techniques ensure easier and more precise analytic solutions to challenges in higher education. Vendor products for monitoring student success along with enrollment and strategic planning, and daily communications are frequent with many examples of and opportunities for predictive analytics.

Data management is fundamental to effective IR and decision support and business intelligence offers the integrated way to provide effective decision support. As detailed by Zheng (2015) decision support systems (DSS) and business intelligence (BI) are interconnected. As a computer-based information system that supports business or organizational decision making activities, a DSS system provides the data, analysis, reporting, and projection capabilities to facilitate operations and planning. DSS systems introduce the use of models and analytic techniques to supplement conventional data storage and retrieval, should have built-in features that empower analytic features to a variety of user levels, need to be designed to handle semi-structured and unstructured decisions (Zheng 2015). Importantly, Zheng mentions that DSS systems should be designed to support and enhance managerial decisions, but cannot replace human judgment and experience.

As a relatively new concept, business intelligence (BI) is an extension of DSS that combines data gathering, data storage, and knowledge management with analysis to in the decision process (Negash and Gray 2008). BI environments enable workers to use large databases as a source of information, and can allow for simple or more complex analyses and forecasting. The key difference between the concepts of BI and DSS is that BI is a **data-driven** DSS while DSS is a broader concept that includes non-data-driven and heuristic based DSS systems (Zheng 2015). Most decision support practices by today's IR professionals strive for BI, mindful of the need to place the data within the unique context of the specific institutional environment.

1.6 External Drivers that Prompt More IR and Decision Support

There are a number of significant external drivers that have contributed to changes seen in today's higher education systems around the world. Even though its effects were felt more strongly in some regions, the economic downturn of 2008 affected higher education in every corner of the globe. The economic recession substantially affected funding allocated to higher education institutions (HEIs) and that in turn affected services to students, staffing employed in HEIs, and the facilities used for teaching and research. Although innovations in instruction were already underway, the economic downturn greatly prompted HEIs to rethink instructional delivery, particularly the balance of face-to-face instruction in traditional 'brick and mortar' campuses compared to online instruction delivered from a distance. As higher education grow in demand around the world, increasing diversity challenges some traditional services, but the benefits outweigh the efforts needed. In the US, ongoing debates about liberal arts/humanities and expansion of STEM fields (Science, Technology, Engineering and Math) will continue. Across the world, calls for quality assurance and accountability will remain if not further increase. All of these drivers of change that impact higher education provide explicit opportunity for professionals who engage in tasks that are related to institutional research and decision support.

1.7 Broadening and Strengthening the Practice of IR and Decision Support

Although a number of individuals in state and national government systems may perform IR tasks, the broad scope of IR and decision support has generally been confined to the boundaries of an institution (Maasen and Sharma 1985; Webber and Calderon 2015). In the past, the focus of IR has been to provide information for institutional improvement and effectiveness, often through specialized research. Sometimes that information is collected in a less formal way providing basic descriptive trends, but also important is empirical data analysis, mindful of appropriate methodological rigor. This blend of action-based and possible policy-affected scholarly research investigates relevant issues having an impact on institutions. However, this broad scope is being redefined as there is a growing number of institutions globally that operate beyond and across multiple national borders. Additionally, institutions are part of national systems of education and respond to varying national policy imperatives, and interests by sector or institution type, plus institutions have formal strategic alliances with like institutions (either within region or within national borders or even internationally).

There is also a growing trend for IR practitioners to undertake studies within and across industry sectors that may require specialized knowledge residing outside IR

offices. This requires that IR practitioners be aware of the wider spectrum of institutional activities, strategic intent, and policy implications within the education industry and across industries over multiple jurisdictions. Further, traditional models of university governance are progressively being transformed so that universities are becoming not only strategic actors competing in decentralized markets in a comparable manner to private companies (Slaughter and Rhoades 2004; Cantwell and Kauppinen 2014), but are also knowledge production actors supporting public policy goals of government, with an ever increased public accountability and scrutiny but with shrinking government financial support (Whitley and Gläser 2014). These reforms in HE are changing the nature and characteristics of institutional management and the way activities are planned, implemented, and assessed. These changes are invariably having an impact on the roles, functions, service and purpose of IR. IR practitioners are not only required to adapt and embrace new forms of work, but need to respond by broadening and deepening their skills so they can be effective in the emerging workplace models resulting out of ongoing reforms taking place worldwide.

IR practitioners operate across several functional units and perform various roles within the university, including admissions, marketing, quality, assessment, and strategic planning. This means that IR professionals must be knowledgeable of institution functions and practices broadly. Blended professionals (Botha and Hunter-Husselman 2016; Carvalho et al. 2015; Whitchurch 2009), may have something less of a defined identity within the realm of the institutions. According to Whitchurch (2013), the increasing interdisciplinary nature of higher education, influences and implementations of technology, manager and learner preferences for team work, and ideological commitments to widening participation in higher education prompt more diffuse roles. These conditions may create 'blended' knowledges, contextual cross-boundary knowledge that transforms *information* into *knowledge.* 'Blended' relationships emphasizes partnerships and credibility is based on social and professional capital. It requires that individuals to know the campus and higher education issues well, to think about their role more broadly, and to develop new language to communicate with partners. For the IR professional, this less-constricted sense of identity (or redefined identity!) can be advantageous, as it can be an incentive for innovative work practices and for pursuing exploratory and speculative research to advance the institution's mission and play an active role in shaping higher education policy generally.

1.8 The Roles of IR and Decision Support

As I mentioned in a previous writing (Webber 2015), the need for general knowledge about higher education remain the foundational dimension for the work IR practitioners and planners perform, and the need for attention to detail and technical expertise is often underestimated. The more information that is collected, the greater the complexities in managing it; and yet it exponentially widens the scope for

Table 1.1 Full-Time Equivalent (FTE) Staff in IR Offices (Swing et al. 2016)

	Two-year institutions	Four-year institutions
Director and professional staff	%	%
Fewer than 1 FTE staff	1	1
1 FTE to fewer than 2 FTE	17	18
3 FTE to fewer than 5 FTE	28	26
5 FTE to fewer than 10 FTE	12	17
10 FTE or more	1	3

analysis and it provides an opportunity for exploring new possibilities and for fostering institutional innovation.

College rankings schemes (*USNews, Times Higher Education (THE)*, *Quacquarelli Symonds (QS)*, etc.) and other external survey requirements, including recent efforts such as the US College Scorecard (https://collegescorecard.ed.gov/) help provide data for state and government decision support, but certainly increase burden on IR reporting. It is no secret that much of the data required for external reporting can be useful to internal decision support. We should indeed capitalize on the use of this data, yet I believe that IR leaders should be actively involved in meetings that discuss and mitigate reporting burden so that it does not get out of hand. Large institutions typically have a larger IR staff that can more easily handle a higher volume of ad hoc and external reporting, while small IR staffs have limited capacity. A recent study by the US AIR office found a bi-modal correlation between IR office size and number of staff members, as shown in Table 1.1. The distribution of staff members again points out that many IR offices need to build their capacity for doing good decision support. Very often that includes additional staff members, but it also requires staff members who are well versed in the content knowledge and skills that are needed for good organizational intelligence. That is the underlying premise for this book.

The AIR *Statement of Aspirational Practice* (2016) recommends that the practice of IR be distributed "to form a federated network of managers and consumers" (Swing and Ross 2016b, p. 8). This recommendation seeks to take advantage of existing faculty and staff members across one's campus who have skills in statistics and data visualization. While there are typically a number of colleagues across one's campus that have skills in data analysis and perhaps reporting, I believe it is unlikely to find a large cadre of colleagues that have the needed skills in deeply understanding the data, knowledge of what the data mean in higher education, and how it affects or pertains to the specific issues at one campus. It is typically only the skilled IR practitioner, after a number of years in graduate training and hands-on experience in the practice of IR that have these Tier 3 skills of organizational intelligence (Terenzini 2013).

At present, the field of IR, particularly in the US, appears to be at a crossroads. Too often, IR directors report a high workload and the challenge to accomplish all needed tasks each day. Senior leaders and external stakeholders request information frequently, and most often accompanied with a short response time. To add to the challenge, budget shortfalls may also minimize the addition of more staff that could

help manage the workload. It might be tempting to provide data access to colleagues on campus without structured training or guidance, and who may not understand the nuances of varied data definitions or incorrect uses of data or statistical analysis of that data. Such temptations to offer unstructured data use or access should be avoided. Subsequent chapters in this book expand on the value of collegial collaboration with other son campus, but also the need for IR leaders to remain deeply involved in data management, analysis, and governance, to ensure correct use and understanding of the data that leads to high quality decision support. Armed with the training and years of on-campus experience to understand the nuances and the need to examine within context, IR leaders are the professionals who can most efficiently and effectively provide coherent decision support.

Too often, the collection of vendor products publicized to higher education senior leaders and IR officials market the products with great sophistication, and portray the product as a way to accomplish many tasks quickly, efficiently, and with seemingly little effort. In addition, leaders of campus IT units may offer to ease the burden to IR. To this end, the proliferation of vendor products for data collection, analysis, and visualization have proliferated across campus. While Central IT units typically have oversight and responsibility for campus technology and data security that support broad-based business practices, some CIOs may argue that their office can also be the logical unit to oversee the campus data management, analytics, and data reporting. Indeed, this trend may take some of the initial burden off the central IR office, but it will likely not provide consistency nor accuracy in data that is reported. Today's IR practitioners, replete with graduate level training that ensures an understanding of technical and analytic skills (Terenzini's Tier 1-technical/analytical intelligence), deep knowledge of higher education broadly and an understanding of the daily business practices (Tier 2-issues intelligence), and long-term hands-on experience in the understanding of campus-specific data and ways to effectively consider the implications of that data for decision making purposes (Tier 3-contextual intelligence) have an important role to fill in today's higher education setting. The broad set of knowledge and skills is not learned overnight, nor can be effectively accomplished when given minimal time and effort. Effective practice requires IR practitioners to have a very good understanding of the data as well as the ability to interpret and draw inferences about a variety of internal and external data sources. Furthermore, it also requires that decision makers provide support, vision, and commitment in resources for the objectives institutions seek to achieve. IR practitioners need to develop and enhance their skills so they are effective in combining qualitative and quantitative approaches in the fulfillment of their professional duties.

As detailed by Gina Johnson in the preface, the chapters ahead seek to engage the reader in a set of discussions about the institutional research and decision support as it is currently practiced across the world and more importantly, what is needed to ensure its growth and value within higher education. Through six global forces, author Jan Botha examines how and where IR fits in to various higher education systems around the world in Chap. 2. The practice of academic scholarship and the use of conceptual models to situate and organize IR are important and discussed

by Bill Knight in Chap. 3 and in Vic Borden Chap. 4. Authors of Chaps. 5 through 8 discuss important concepts, strategies, and tools that are integral to the success of practitioners in IR and decision support. Data Management, its distribution, and how it is used is supremely critical to good IR and decision support. A thorough and thoughtful plan for data management is discussed in detail by Kelly Briner and John Rome in Chap. 5. Bent Drake, Ian Pytlarz, and Monal Patel share some exciting examples of data visualizations that can help IR practitioners communicate important information to stakeholders, and Charles Mathies reminds us of the distinct possibilities of misuse or misunderstanding that can come from use of data. It is critical that IR practitioners appreciate the importance of placing data within the context of a particular institution and be sure to account for unique events and/or policies that are specific to the setting. To round out this section of chapters on fundamental information related to effective IR, Nicholas Hillman and Adam Kindschy share their comments on the challenges of finance in higher education and how it impacts the IR practitioner. Finance is a critical issue that will challenge higher education for many years to come, and Hillman and Kindschy offer a discussion that equips the IR practitioner to engage with campus colleagues and policymakers with information and strategies on the challenge of college affordability.

Chapters 9 through 15 examine specific applications of work tasks across the world that broadly fit in to the work of IR practitioners. Although IR may not be the descriptor used in all locations, it is clear that there is great overlap in the tasks, strategies used, and the goals for IR professionals around the world. Sandi Bramblett and Michelle Broderick cover the breadth of professional development offerings in the US and Canada; James Williams and David Kane cover Western Europe; Pita Maria Carranza shares insights on some beginning IR in Latin America; Angel Calderon speaks to the broader planning dimensions in Australia; Yuraisha Chetty and Nicole Muller describe actions and events that occur in South Africa; Gina Cinali describes the growth of IR in the Middle East and Northern Africa regions; and Ching-Hui Lin, Yuan-Chih Fu, and Jang Wan Ko address the growth a excitement for IR in Asian countries, China, Korea, Japan, and Taiwan. In the final Chap. 16, I bring together concepts shared throughout the previous chapters, and argue that IR and decision support leaders must strive to seek or remain valued colleagues who provide critical information to senior decision makers on a daily basis. Having this ‘seat at the table’ enables IR officials to use their skills in analytics and data management, deep knowledge of higher education, considerations for the future, and ability to situate the information within the context of the particular institution or setting. I hope you will read the book from cover to cover, and I hope the discussions will excite you or reignite a passion for IR and decision support in our global world of higher education today.

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Chapter 2
The Impact of Global Forces in Higher Education on the Development of Institutional Research

Jan Botha

2.1 Introduction

While the robustness of higher education institutions has been noted by many observers, higher education did not remain unchanged or unaffected by the impact of a range of interrelated global forces in recent decades. To the contrary, Altbach et al. (2010) argue that the dramatic global academic revolution of the last fifty years or so was even more extensive than the impact of the German research model on universities during the first part of the nineteenth century. Trow (2000) and Altbach et al. (2010) discuss the impact of four global forces on higher education and explain how these forces served as building blocks of this academic revolution, namely, massification, globalization, the advent of the knowledge society, and the development of information and communication technology. Related to these forces, I believe at least two other global forces affecting higher education can be added, namely, accountability (see Stensaker and Harvey 2011b) and competition and rankings (see Hazelkorn 2015).

Along with the impact of these global forces on higher education came the need for more institutional data and information about higher education institutions and systems. Institutional Research (IR) is the work done by staff members employed by higher education institutions (HEIs) to collect, organize, and report institutional data. It is also about how leaders at different levels in institutions and higher education systems use this data and information in decision making.

The aim of this chapter is to illustrate the how these global forces serve as drivers for the development of IR. The manner in which institutions respond to global forces is influenced by local circumstances (Marginson and Rhoades 2002). The combination of global and local conditions gives rise to the organizational forms,

J. Botha (✉)
Stellenbosch University, Stellenbosch, South Africa
e-mail: JB3@sun.ac.za

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K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1_2

institutional locations, and combinations of focus areas and duties allocated to IR offices. This chapter presents a high-level overview of the impact of these six global forces on IR. More detailed discussions of the local circumstances in each region and their impact on the development and organization of IR follow in part two of this book.

The six global forces used to frame this chapter are broad and complex phenomena. Whole fields of study are devoted to these phenomena and vast bodies of literature have been produced on each of them. To attempt a comprehensive and nuanced overview doing justice to all the different theories and views is beyond the scope of a single chapter. Therefore, the definitions and comments on the global forces considered in this chapter are at a generic level in order to provide the context for comments on the impact of these forces on the development of IR in higher education. Considering a range of broad themes (such as these six global forces) at such a high level runs the risk of stating the obvious. Another risk with such a discussion is that the generic (the global forces) and the specific (how they drive the development of IR in institutions) are in terms of proportion too far removed (too generic versus too specific) to be plausible. Notwithstanding these risks, it is illuminating to locate IR in such a broad framework of high level concepts. I do so because I maintain that it is important for IR officials to understand that their work (whether it is high level conceptual and contextual work or narrowly focused analyses of institutional data) is influenced by and fits into this big picture.

2.2 A Global Functional Typology for Institutional Research

There are significant differences in the maturity levels of IR in different regions. IR Associations in different regions range in size, scope of responsibilities, and maturity. One indicator of the maturity level of IR in a region is the duration, extent, and sophistication of collective action by institutional researchers as expressed in the history and activities of the professional organizations. This is a formal indicator; it is not a substantial one (for a substantial model of IR maturity, see Taylor et al. 2013, pp. 69–70). In Table 2.1 the IR associations in different countries and regions are listed in chronological order based on their year of establishment (for more information on these associations see Lasher 2011; Reichard 2012; Huisman et al. 2015; Hanlon and Rotherty 2012; Mahat and Coates 2015; Chetty et al. 2016; McLaughlin et al. 2015; Woodfield 2015; Ko 2015; Nauffal 2015; Lange et al. 2013).

IR across the world is quite diverse, too diverse to propose a plausible global classification of focus areas, duties, and organizational arrangements. If such a classification is attempted, it will have to take as point of departure a classification of higher education systems and, based on that, a classification of higher education management systems. However, Jungblut and Maassen (2017) point out that while "[t]he 1980s and 1990s were a vibrant and productive period for system-level studies in the field of higher education research … this system interest faded away in the second half of the 1990s." This is partly due to what Teichler (2008, p. 354) called

Table 2.1 Associations for Institutional Research in different regions and countries in the world

Name of association	Abbreviation	Established
Association for Institutional Research	AIR	1966
European Association for Institutional Research	EAIR	1979
Australasian Association for Institutional Research	AAIR	1988
Southern African Association for Institutional Research	SAAIR	1994
Canadian Institutional Research and Planning Association	CIRPA	1994
Southeast Asian Association for Institutional Research	SEAAIR	2001
China Association for Institutional Research	China AIR	2003
Middle East and North Africa Association for Institutional Research	MENA-AIR	2007
British and Ireland Association for Institutional Research (established in late 1990s) evolved into the UK & Ireland Higher Education Institutional Research Network	HEIR	2008
In Latin-America an IR association does not yet exist, but talks have been initiated in 2013 in Argentina and Ecuador to establish an association.	–	–

the "bewildering variety of classifications" resulting from system level studies. Furthermore, at an institutional level, the organizational arrangements related to IR functions are usually unique to that institution.

Given its long history of development, its level of maturity and its influence on the understanding and organization of IR in other parts of the world, it is illuminating to begin with a consideration of the development of IR in the USA. In their report on the *Duties and Functions of Institutional Research,* the Association (AIR 2016) lists the work of a number of American scholars who proposed definitions of institutional research and a classification of focus areas and duties of IR often found in the USA. Those studies include the earlier work of several theorists, as well as the influential work of Terenzini (1993, 2013) with his suggestion of three types of institutional research "intelligences" (analytical intelligence, issues intelligence, and contextual intelligence) and the work of Volkwein (1999) and Serban (2002) who identified "five faces" typically associated with institutional researchers (namely, the IR worker as information authority, as spin doctor, as policy analyst, as scholar, and as knowledge manager). In addition to these studies, the comprehensive *Handbook of Institutional Research* edited by Howard et al. (2012) and the many editions of the AIR's monograph series, *New Directions for Institutional Research* over the years, were consulted by the AIR team. Based on these studies, AIR (2016) proposes the following typology of IR functions in the USA:

(a) Identify information needs;
(b) Collect, analyze, interpret, and report data and information;
(c) Plan and evaluate;
(d) Serve as stewards of data and information; and
(e) Educate information producers, users, and consumers.

Although American developments in IR have influenced the organization of IR in other regions in the world, the other regions are not simply copying the American

style and practices of IR. Historical developments, policies, governance structures, and institutional types differ dramatically. As mentioned in Chapter One, the term "institutional research" is also not as widely used in other regions in the world as in the USA and even where it is used, it differs in focus areas (Huisman et al. 2015). Based on their study of IR in Europe and Australasia, Taylor et al. (2013) propose the following functional typology for IR in those two regions:

(a) Routine institutional management, including formal internal and external reporting and operations support;
(b) Strategy formation, including modeling and scenario planning;
(c) Quality assurance and quality enhancement; and
(d) Marketing and competitive data analysis.

Other functional typologies for IR can be proposed for other regions. Taylor et al. (2013) point out that:

> there is no single community of practice in institutional research existing at an international level. Instead, there are many variations reflecting the type, age, and size of the institution, its management structure and culture, and the external context, especially in terms of accountability and competitive forces. This heterogeneity within the meanings, priorities, and practices of institutional research is further extended by significant national differences of approach. (p. 62)

But, be that as it may, it can still be argued that the development of IR in the USA (and to a lesser extent, Europe, and Australasia) has been a significant influence on the development of IR in other regions. This was illustrated in the essays in the volume on global perspectives in IR collected by Webber and Calderon (2015).

I maintain that a combination of three interrelated influences served as drivers for the development and organization of IR in different regions, namely: (1) global forces; (2) local circumstances; and (3) the examples set by the practice of IR in the USA, and more broadly in the Western world. In the rest of this chapter, these influences will be explored, with an emphasis on the impact of global forces on higher education, and more specifically, on IR in higher education.

2.3 The Expansion of Higher Education

The term "massification" was coined by Trow to refer to the transition from an elite to a mass system of higher education that took place since the middle of the twentieth century in the USA and later also in Europe, Japan and other countries (Trow 1974, 1999). Trow proposed that an "elite system" is one in which less than 15% of the traditional age cohort (18 to 23 years old school leavers) participate in higher education (in those times it was practice to think of young people in the years after leaving school as the only relevant age group for higher education studies), whereas a "mass system" is one with up to 50% participation and a "universal system" with more than 50%. Despite the rapid increase in enrollments almost everywhere in the world, not all countries have achieved mass higher education. In low and middle

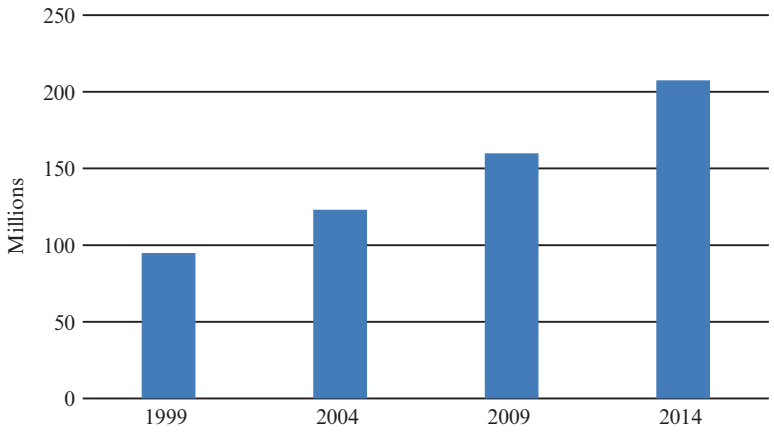

Fig. 2.1 World Tertiary Enrollments 1999–2014 (From UNESCO Institute for Statistics)

income countries the participation rates are nowhere near mass levels. But the process of massification is under way in many countries in the world.

From 1999 to 2014 the total number of student enrollments in tertiary education (as defined by the UNESCO Institute for Statistics) has increased world-wide by 119% (from 94.8 million in 1999 to 207.5 million in 2014), at an average annual growth rate of 5.4% (see Fig. 2.1).

As shown in Fig. 2.2, UNESCO statistics reveal that the biggest increase in enrollments from 1999–2014 was in Asia (208%), South America (137%), and Africa (129%). Over the same period, enrollments in Europe increased with 26% and in North America with 48%. In Asia the average annual percentage increase in enrollments during this period was 7.8%, in South America 5.9%, and in Africa 5.7%.

The increase in student enrollment numbers serves as an important driver for enhancing the awareness of policy-makers and institutional leaders at all levels that data is needed for a host of strategic and operational reasons. Growing enrollments led to increased awareness of the need to inform the public and other stakeholders about higher education, including state stakeholders (for regulatory and funding purposes). Stakeholders require not only data on student numbers, but also on the other dimensions of higher education systems and institutions affected by increasing student enrollments. Reliable and comprehensive student enrollment data (in all its different dimensions) is a *sine qua non* for higher education governance and management. Emanating from the expansion of higher education are a number of crucial issues requiring the expert inputs of institutional researchers. I mention five issues here:

1. the complex and sensitive challenges related to access to higher education, with inequalities in access sharper delineated (due to the increased student numbers and the fact that a broader cross-section of society became stakeholders in higher education);

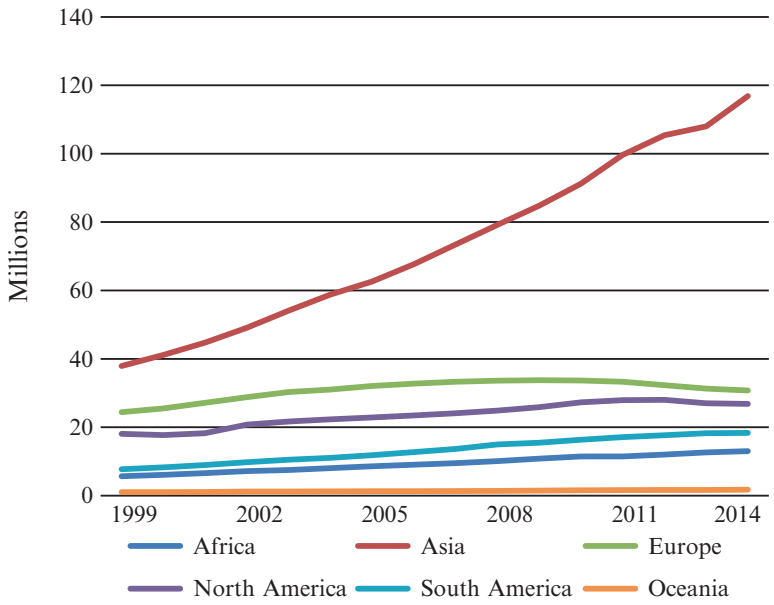

Fig. 2.2 Tertiary Enrollments per Continent 1999–2014 (from UNESCO Institute for Statistics)

2. enrollment management (covering the whole student life cycle);
3. the challenges related to the levels of preparedness/under-preparedness of increasingly larger numbers of students, including the design and provision of curricula and teaching and learning interventions and the provision of appropriate – and increasingly better customized and needs-based – support to enhance student success;
4. the design and implementation of funding systems to enable institutions to accommodate the growing student numbers and to remain sustainable as institutions; and
5. increased accountability (financial and otherwise) to a larger group of stakeholders, due to the larger expenditure from the public purse on the higher number of students, particularly in the case of public universities.

There is hardly any dimension of the activities of HEIs not affected by rapidly increasing enrollment numbers. The responsibility for many of the issues listed above is located in IR offices. (See also the contribution of Webber in Chap. 1 of this book for a more detailed discussion of the impact of massification on IR.)

2.4 Globalization and Internationalization

The impact of globalization on higher education, and the related but different concept of the internationalization of higher education, is very important for IR. Both these phenomena have been studied extensively. In this section I will first provide short descriptions of globalization and internationalization in general (illustrating how they differ) and then consider their impact on higher education and specifically on IR.

Steger (2009) emphasizes that a complex phenomenon such as globalization cannot be reduced to a single domain (e.g., a particular theme taken to be at the core of globalization, such as economic processes, the political, cultural or ideological aspects, or environmental processes) but he says that we need to keep sight of the "interconnected whole" of it all. Without prioritizing any domain or theme, Steger goes on to discuss four qualities or characteristics which he considers to be at the core of globalization, namely, the creation of new, and the multiplication of existing social networks and activities that cut across traditional political, economic, cultural, and geographical boundaries; the expansion and stretching of social relations activities and interdependencies; the intensification and acceleration of social exchanges powered chiefly by the rapid development of information and transportation technologies; and, at subjective level, the consciousness that "the global" is the frame of reference for human thought and action. He then provides the following definition: "Globalization refers to the expansion and intensification of social relations and consciousness across world-time and world-space" (2009, p. 15). This definition is, of course, one among many, and not to be taken in any way as a definitive definition. It does not make sense to think of a "definitive" definition of such a broad and complex phenomenon (Baumert 2014, pp. 11–20).

Scott (2000) explains that it is important to distinguish between globalization and internationalization because they refer to different phenomena. Globalization refers to networks and activities cutting across the borders of nation states enabling intensified competition as well as collaboration that are not only economic but also cultural, educational, scientific, and so forth. Internationalization refers to the world of nation states. This assumption underpins the definition of internationalization of higher education proposed by Knight (2004) and De Wit (2012) as "an intentional process to integrate or infuse intercultural, international, and global dimensions in higher education to advance the goals, functions, and delivery of higher education and to enhance the quality of education and research." In short, therefore, the term globalization suggests that the increasing cross-border activities in higher education indicates a blurring of borders, while internationalization is based on the assumption that national systems continue to play a role in the process of increasing cross-border activities.

Marginson and Rhoades (2002) maintain that higher education today in every corner of the globe is influenced by global economic, educational, and cultural forces and higher education institutions themselves (as well as units and constituencies in them). Further, they posit that HEIs themselves are increasingly global

actors, extending their influence across the world. If this is the case, what does this say for IR? At the very least we can say that the scope and use of higher education data and information has expanded significantly. A number of examples are mentioned here. Institutions need reliable data and information on the growing number and the academic activities and achievements of international students and academics. Data is required on strategic partnerships and collaborations (between universities, within international consortia, with business and industry in other countries, etc.) and on the political, economic, and social exigencies of the countries where partners are based. Data is required on joint or shared teaching and learning programs, curricula, and qualifications. Data is required on international performance rankings and benchmarking schemes. And so forth. However, as it is argued in various chapters in this book with reference to the notion of "a seat at the table for IR," the provision of data is only a first step. Mature IR units are expected to provide the full range of IR services (at all five levels proposed by Taylor et al. 2013) related to these continuously expanding dimensions of higher education. The implication of this conclusion for capacity building for IR is clear. In additional to their technical expertise in data management and analytics, IR practitioners have to be knowledgeable and have insight in the global, social, political, and economic currents shaping societies at large as well as global trends in higher education.

2.5 The Knowledge Society

While opinions differ about the time when the industrial society changed into the knowledge society (generally considered to be at the beginning or at the middle of the twentieth century) and whether it is at all possible to delineate such a clean transition, the notion that such a shift had taken place in contemporary society, is widely accepted (Stehr 1994). As Stehr explains, the economy of the knowledge society is largely driven and governed not by 'material' inputs into the productive processes, but by symbolic or knowledge-based inputs. An off-shoot of the positioning of knowledge as the foundation of economic, social, and political power was the development of "production of knowledge" as a new sector.

As providers of human capital through education and training and as a primary source for knowledge production, HEIs occupy an important place in the knowledge society (Hazelkorn 2015). Research universities in particular, functioning at the pinnacle of the academic system, are a key driver of the global knowledge network and the share of higher education expenditure on R&D is raising across the world (Altbach et al. 2010). Research production by universities is important for the development agendas of countries and regions. This is evident in the key role allocated to higher education in national vision statements and developments plans such as *Brain Korea 21*, the EU's Lisbon Agenda claiming 'to make Europe the most dynamic and competitive knowledge-based economy in the world,' *Malaysia's Vision 2020*, *Building Ireland's Smart Economy*, the South African National

Development Plan 2030 entitled *Our Future Make it Work*, the *Abu Dhabi Economic Vision 2030* and India's National Knowledge Commission (Hazelkorn 2015).

So, what does this say for IR? Academic leaders responsible for research management expect high quality institutional research to support decision making in their portfolios. Research-related information includes information on researchers (human resources information), publication outputs (journal articles, book chapters, conference proceedings), master's and doctoral student information (enrollments, graduations), post-doctoral fellows, funding and grants, research contracts (number, source of funding, partners, duration, agreement details, conditions, outputs, legal clearance), information on research facilities and equipment (buildings, laboratories, register of expensive equipment), ethics approvals/information related to research integrity, intellectual property and technology transfer, information on the institution's research focus areas, initiatives, flagships, centres of excellence, research chairs, partnerships, research collaborators, institutional strategic management indicators, benchmarking information, and rankings information.

The research management functions related to the management and use of research data are often based in the university's research support office and not in the IR Office. Good coordination and cooperation between these offices are therefore needed to counter a silo effect. However, not all higher education institutions are research intensive institutions. So, while this information is crucially important for IR units in research universities, it may have less of an impact on IR in other institutional types. Nevertheless, even in non-research intensive institutional types, there is usually also some research activities to be recorded and reported. But given the lower intensity of the research activities, dedicated research support offices are not often established and the reporting of research activities is also be allocated to the IR office. This presented these (smaller) IR offices with the challenge of taking responsibility for a wider range of (specialized) tasks.

2.6 Information and Communications Technology

Castells (2000) points out that the creation of what he calls the "global network society" required a technological revolution. This revolution has been powered primarily by the rapid development of new information and transportation technologies. One of the main drivers of the knowledge society is digital information and communication technologies, which resulted in an information explosion which has and continue to change all aspects of social organization, including education. Information and communications technology (ICT) covers any product that store, retrieve, manipulate, transmit, or receive information electronically in a digital form. The Internet is the global system of interconnected computer networks used to link devices worldwide. The Internet carries an extensive range of information resources and services, such as the inter-linked hypertext documents and applications of the World Wide Web (WWW), electronic mail, telephony, and peer-to-peer

networks for file sharing. Related to these technological advances has been the explosion of digital data in terms of volume, velocity, and variety leading into the big data phenomenon. There are many different understandings of the nature of "big data," its potential and its pitfalls (Daniel 2015; Kitchin 2014).

The Internet and WWW have changed contemporary society in a pervasive sense, and it is obvious that it has influenced higher education profoundly and that it will continue to do so. The Internet has revolutionized how knowledge is communicated, including the use of e-mail and other modes of electronic communication, electronic publications (including e-journals), and the blended and online modes of interaction used in teaching and learning, student support, and all other functions and operations of higher education institutions (Altbach et al. 2010).

Narrowing down these broad definitions and observations on ICT and its influence on higher education to the topic of this chapter, the question is how ICT served as driver for the development of IR. Zheng (2015) explains the importance and value of data analytics for higher education with reference to the notions of decision support systems (DSS) and business intelligence and its role in IR. Visser and Barnes (2016) consider the impact of technical advances at all three the tiers of organizational intelligence distinguished by Terenzini. What these discussions also bring to the fore is the vexing question of the IR-IT relationship in higher education institutions. Given the interdependence and many overlapping needs and interests in the work of information technology and institutional research, the delineation of the responsibility areas of IT and IR and the collaboration arrangements between them are complex but crucially important.

A decision support system (DSS) can be defined as "a computer-based information system that supports business or organizational decision making activities. Decision support systems provide the data, analysis, reporting and projection capabilities to facilitate operations and planning" (Zheng 2015, p. 160). A DSS can be found in every functional area of higher education (students, teaching and learning, HR, facilities, research, engagement, business operations, etc.). A good DSS can be so pervasive that higher education institutions take for granted that their systems of management relies on human-computer interfaces that tap into servers and databases. As "data-driven DSS that combines data gathering, data storage and knowledge management with analysis to provide input into decision-processes" (Zheng 2015, p. 162), Business Intelligence (BI) systems have evolved from content structured in database management systems, to unstructured web-based content to mobile and sensor-based content (Chen and Storey 2012). Chen and Storey point out that BI has passed a tipping point as it shifted from IT-centric reporting-based platforms to modern BI platforms that enables sharper analytics and greater agility, evolving into more sophisticated forms of predictive analytics and prescriptive analytics.

It is beyond the scope of this chapter to go into any detail related to the highly technical, influential, and valuable impact of ICT on IR. What needs to be emphasized is that managers in higher education can know much more about so many aspects of institutions because of big data and that this knowledge can potentially contribute to improved decision making and performance. Institutions have the capacity to collect, analyze, and use data of an unprecedented breadth and depth.

This also calls for IR practitioners to take on an advocacy role to raise awareness among higher education decision makers of the potential value (and pitfalls) of (big) data (Visser and Barnes 2016).

2.7 Accountability

Although each of the global forces discussed so far have a demonstrable impact on higher education and, more specifically, on IR in higher education, the global force that has perhaps the biggest influence on the development of IR is the global "audit culture" characterizing contemporary society, or, in short, the rise of accountability in public and private spheres of society. In terms of scope and impact, it stands to reason that accountability as a global force is in many respects as broad and pervasive as the four forces discussed thus far.

Power (1999) maintains that the "audit explosion" - the demands for governance and accountability in the public sphere associated with the New Public Management - has resulted in what he calls an "audit society," a pervasive and systematic condition of our times way reaching far beyond financial auditing. The rise of New Public Management (NPM) in higher education associated with the rise of the "evaluative state" is well documented (Neave 1998; Brennan et al. 2008). Brennan et al. (2008) argue that the NPM narrative relies on a) markets (or quasi markets) rather than planning, b) strong performance measurement, monitoring and management systems, with a growth of audit systems rather than tacit or self-regulation, and c) empowered and entrepreneurial management rather than collegial public sector professionals and administrators. It is influenced by ideas in organizational economics, such as the principal/agent theory, which stress incentives and performance. There is a concentration on goals of efficiency, value for money and performance rather than on democracy or legitimacy. It [NPM] suggests an increase in the strength of hierarchy, either directly through line management or indirectly through strong contracts within a principal/agent framework.

The introduction of these new corporate-style governance and management practices in higher education led institutions to rely more and more on strategic plans, situational analyses, environmental scanning, and marketing – and all of this enhanced the need for institutional and environmental data and business intelligence capabilities in institutions.

In a collection of essays entitled, *Accountability in higher education: Global perspectives on trust and power,* Stensaker and Harvey (2011a) purport that new external and national schemes were developed in recent decades across the world "with the aim of making higher institutions take responsibility for providing information to the public on performance and effectiveness, often combined with the establishment of national regulative framework and independent agencies with a particular responsibility for accountability of the higher education system." The implications for IR as the provider of information are clear. In the essays on IR in different regions of the globe collected in the book of Webber and Calderon (2015),

several authors explain how evaluation and accountability schemes responsible for assessment, accreditation, and quality assurance have been set up and how they pose new challenges to IR to feed these systems with information. A list of quality assurance agencies in the world (currently more than 300) is maintained by the International Network of Quality Assurance Agencies in Higher Education (INQAAHE). A few examples are listed here as illustration.

- In the USA "institutional accreditation" is the primary means of assuring the public and funding agencies (including the states) of the quality of institutions. Accreditation processes are managed by the US Department of Education (USDE) and/or the Council on Higher Education Accreditation (CREA) (McLaughlin et al. 2015).
- In Europe – as a result of changing government views on institutional autonomy since the 1980s - national governments have granted more autonomy to institutions in exchange for various forms of accountability (Huisman et al. 2015). These accountability arrangements have been formalized, inter alia, through the *Guidelines for Quality Assurance in the European Higher Education Area* adopted by ministers in the framework of the Bologna Process. External and internal quality assurance processes and evaluations have become a norm across Europe. Higher Education Institutions strengthened their internal QA systems by establishing units responsible for quality assurance and accreditation. These units have in many cases effectively taken on the role of institutional research (Klemenčič et al. 2015).
- In the UK the list of drivers related to accountability leading to a strengthening of organizational intelligence mentioned by Woodfield (2015) includes "internal requirements for enhanced efficiency and effectiveness; institutional improvement and positioning; and external requirements to control and benchmark costs, publicly demonstrate value for money and enhanced productivity, monitor access and participation, supply more sophisticated information about quality to different constituencies, and demonstrate accountability to a variety of stakeholders" (p. 92).
- Mahat and Coates (2015) explain how various phases in the development of government policies in Australia since the late 1980s have impacted upon IR: from the Dawkins Reforms that lead to the development of several national data collections (developed in the context of accountability to government and other agencies), through the use of ever more sophisticated data sets for performance funding and external quality reviews (conducted by the Australian Universities Quality Agency), the rapidly increasing numbers of international students, to the Bradley Reforms initiated in 2008 that changed the fundamentals of how institutions relate to each other and to various government and other agencies and the new commercial opportunities.
- In South Africa a national qualification framework was implemented in the mid 1990s and national frameworks for program accreditation and institutional audits were developed by the Council on Higher Education (CHE) and implemented since the early 2000s and the increasingly more elaborate reporting and planning

regime of the national government have drastically increased the demand for various kinds of institutional data and information (Botha 2015).

- Lange et al. (2013) explain how the expansion and privatization of higher education during the 1990s in Latin America (against the backdrop of globalization, and the concomitant concerns about the quality of provision and the extent to which democratization in the access to higher education was taking place), have led to the introduction of quality assurance systems focused on assessment and accreditation of institutions and/or programs in many Latin-American countries. Saavedra et al. (2015) lists the agencies for Quality Assurance in Argentina, Brazil, Chile, Colombia, Ecuador, and Mexico.
- In the Middle East and North Africa several countries have established national commissions for accreditation and quality assurance, such as the Commission for Academic Accreditation (CAA) in the UAE, the National Commission for Assessment and Academic Accreditation (NCAAA) in Saudi Arabia, and the National Evaluation, Quality Assurance and Accreditation Authority in Tunisia (Nauffal 2015). A significant feature of the landscape of external accountability structures in this region is the extent to which universities have sought institutional and program accreditation by accreditation bodies in countries such as Germany, the UK, and the USA. Nauffal's characterization of the impact of accountability structures on IR in the Middle East and North Africa, also hold for many other regions in the world, namely that "the influence of quality assurance agencies on the development of institutional research is substantial at the institutional and, in some instances, at the national level between institutions. They have acted as a vehicle disseminating concepts such as quality assurance and institutional effectiveness among higher educational professionals and governing bodies based on their norms and standards thus typifying the quality assurance and IR experience accordingly" (Nauffal, 2015 p. 150).
- Quality assurance agencies were established in many Asian countries. IR professionals in Asian countries mainly conduct the evaluation of institutional performance or performance indicators, quality management, and accreditation roles (Ko 2015).

2.8 Rankings

The ideal to build world class universities in China as well as concerns about the quality of higher education in China (Liu 2015) led to the development of the Academic Ranking of World Universities (ARWU) in 2003. This ranking system, popularly known as the Shanghai Rankings, turned out to be a game changer. It was followed by the *Times Higher Education* and QS *World University Rankings* in 2004, the Leiden Ranking in 2007 and since then many others. Global rankings immediately attracted the attention of policy-makers and leaders in higher education, the media and many other stakeholders. In high income countries it was seen as a measure of global competitiveness and a barometer of the (re)distribution of

(economic) power relationships (Hazelkorn 2015). In low and middle income countries (where only a few universities have been placed in the top 500), the appropriateness of the criteria used in the major ranking systems for the conditions of higher education in these countries has been criticized, exemplified by Marginson and Van der Wende (2007) and Badat (2010, p. 117) calling global rankings a "perverse and present burden."

Despite criticism and ambivalence about many aspects related to world rankings, if not to the idea of rankings itself, world rankings have taken an important place in higher education. Through a survey conducted in 2011, Hazelkorn (2015) established that most higher education institutions continue to monitor their position in the rankings and that 84% of the institutions surveyed have a formal mechanism to review their institution's rank (and in 40% of the cases this mechanism is led by the Vice-Chancellor, President, or Rector). Whether or not the institutional responsibility for monitoring the ranking position – often combined with the responsibility to provide institutional data to the various ranking organizations – is located in the office of the Vice-Chancellor, President, or Rector or in the office of another high-ranking official in an institution, rankings are regularly discussed in strategic planning sections of most universities across the world (including universities in low and middle income countries). Many universities have allocated to their IR offices the responsibility to collect and report institutional data to the ranking organizations, to analyze results about the institution's performance in the rankings, and to monitor the performance of peer institutions (nationally and increasingly also internationally).

Hazelkorn (2015) maintains that the growth and increasing importance of IR offices is not only a response to the audit cultural in general, but also more specifically to rankings, in addition to the responsibilities of IR offices with regard to the public accountability to government and independent agencies. She goes so far as refer to an institutional "accountability to ranking organizations" (Hazelkorn 2015). Given that ranking organizations are mostly media organizations or independent research organizations, this is not a mandatory and formal form of accountability. But the fact that she mentions the ranking organizations in the same breath as accountability to governments and quality assurance and accreditation agencies is an indication of how pervasive and established the rankings have become. Hazelkorn writes, "rankings have taken the function of data collection and analysis out of the back-office and placed it at the center of decision making and performance measurement" (2015, p. 110).

2.9 Conclusion

A point of departure for this chapter was the observation that three interrelated influences served as drivers for the development of IR in higher education in different regions of the world, namely a number of high-level global forces, the

pioneering role of IR in the USA and in Europe, and the local circumstances in different countries. The focus of the chapter was on the first of these three influences, namely the impact of six global forces on higher education, and more specifically, on IR in higher education. These six global forces are the massification of higher education, globalization (and the related but different phenomenon of internationalization), the development of the knowledge society, the impact of information and communications technology, the global culture of accountability in the private and public spheres, and enhanced competition, in particular as it manifested in international rankings in higher education. These six forces are in many ways interrelated. Taken together, however, they serve as a framework in terms of which the development of IR across the world can be explained.

Emanating from this framework a number of general observations can be made on its impact on IR, although the extent to which these impacts materializes in different regions in the world differ. I make three observations:

- The ***rationale*** for the work of IR in institutions and national and regional higher education systems has deepened and the stakes have raised significantly due to massification, accountability and international rankings.
- The ***scope*** of IR work has been broadened by the impact of globalization and internationalization and the development of the knowledge economy.
- The ***volume*** of available data and information on higher education institutions and the capability to collect and manage large volumes of data and to ***transform*** it into meaningful business intelligence have been enhanced significantly by the development of ICT and the application of ever more sophisticated analytical approaches and instruments.

These opportunities for IR bring new challenges and responsibilities for IR officers and for institutional leaders and policy-makers alike. IR officers need to be alerted to the big picture when they do their detailed work. The capabilities and attitudes of high level researchers and scholars need to be developed and nurtured among IR officers, including the curiosity and interest to read widely, to reflect on the big picture and to interpret and translate those insights into useful information and intelligence for decision making at institutional level. IR officers are an important resource for higher education institutions to help them to achieve their outcomes. IR officers have a responsibility to speak up and take appropriate initiatives to enhance the *use* of this important resource by institutional leaders and policy makers.

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Chapter 3
Conceptual Models for IR and Organizational Intelligence

William E. Knight

3.1 Questions at the Beginning of the Profession

As noted by Reichard (2012), questions existed during the earliest years of IR about whether it was a new theoretical discipline, related to the also new discipline of higher education administration, concerning higher education generally or if it should be about operational issues of specific institutions. Dressel (1964) bridged both perspectives when he characterized IR as a function existing within individual institutions that objectively studies all functions of institutional strategy and operations. Dressel later stated:

> The basic purpose of institutional research is to probe deeply into the workings of an institution for evidence of weakness or flaws which interfere with the attainment of its purposes or which utilize an undue amount of resources in so doing. In the search for flaws, no function, individual, or unit should be regarded as off limits (Dressel and Associates 1971, p. 23).

Some of the initial literature about the profession also grappled with the identity and purposes of IR. Lins (1963) highlighted 29 examples of IR studies. Fenski (1970, p. 10) quoted Russell who described an IR office as:

> ... an agency attached directly to the office of a president or executive vice president; it is assigned specific responsibility for carrying out studies needed for making of important decisions about policies and procedures, and it works toward the primary goal of finding out how to save money that can be used to better advantage.

Lyons (1976) framed IR as a planning and management system providing information used to guide the allocation of resources. He expanded and updated Saupe's (1967) earlier *Memo to a Newcomer in the Field of Institutional Research* and

W. E. Knight (✉)
Ball State University, Muncie, IN, USA
e-mail: wknight@bsu.edu

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K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1_3

included listings of higher education professional associations, other organizations and agencies, and publications useful for IR. Lyons also commented upon an issue affecting IR to this day: less time available for the widespread critical examination of all facets of institutional strategies and operations due to more time devoted to responding to data requests. Saupe and Montgomery's (1970) *The Nature and Role of Institutional Research* set out to examine several key questions. Those questions and a summary of the answers were as follows:

- What is institutional research?

Institutional research involves the collection of data or the making of studies useful or necessary in (a) understanding and interpreting the institution; (b) making intelligent decisions about current operations or plans for the future; (c) improving the efficiency and effectiveness of the institution. (Dressel 1966)

- How pure can institutional research be?

The authors acknowledge that IR is different than basic research, but indicate that it should be objective, systematic, and generally follow good practices of research.

- What can institutional research do for the institution?

Eight IR activities are discussed, including preparation of operating reports, development of analytic and summary reports, conducting analytical or modeling studies, design of management information systems, special studies, studies in support of educational development, related staff work, and responding to questionnaires.

- Should institutional research be administratively or educationally oriented?

The authors conclude that it should be both depending on the nature of the IR work.

- How should institutional research relate to long-range planning?

The two functions were described as related and mutually dependent, but distinct.

- How should institutional research be organized?

The variety of structures and their associated costs were discussed. Organization should relate to the responsibilities of IR.

- What are the requirements for effective institutional research?

This section emphasized the importance of campus leadership and faculty members understanding what IR is, the need for the IR director to be trusted and respected, the necessity for collaborative working relationships, the IR officer needing to be well versed in campus issues and problems as well as anticipate issues and problems, the importance of IR professionals to be aware of higher education issues

and research generally, the necessity for objectivity in IR work, and the need for IR practitioners to have well-developed technical and communication skills.

Suslow, in his 1971 Association for Institutional Research Forum presidential address, stated that

> [IR] is an attitude of critical appraisal of all aspects of higher education, which has as its primary purpose the assessment and evaluation of the expressed goals of the institution and the means to achieve those goals.... IR will remain viable in the future only if it retains its critical nature.... IR will have failed in its function if it does not devote a significant proportion of its time and effort to evaluation of the programs which constitute the means for achieving the institution's goals. We will not remain viable if we devote all of our time to mastering electronic gadgetry and stockpiling massive amounts of data. (pp. 1–2)

Saupe's (1990) *The Functions of Institutional Research* provides what may be the single most often-quoted definition of IR: "research conducted within an institution of higher education in order to provide information which supports institutional planning, policy formulation, and decision making" (p. 1). He describes several purposes for IR, including applied research carried out in response to specific planning, policy, or decision situations; evaluation of programs or units in order to inform judgments about their effectiveness or quality; basic research about the institution and its environment; identification of problems affecting the college or university; and policy analysis. He also listed responsibilities of an IR office, including federal and state reporting and responses to external surveys; "orienting others to the nature and sources of institutional data and their use" (p. 8); serving as a point of contact with state agencies; occasionally engaging in basic academic research; and providing advice to leadership on planning and policy issues.

3.2 IR as Organizational Intelligence

Terenzini's (1993) seminal article entitled *On the Nature of Institutional Research and the Knowledge and Skills It Requires* continues to influence thinking about the profession and the training and professional development needs of its practitioners. Terenzini viewed IR as "organizational intelligence" within colleges and universities (Fincher 1978) and as "a professional, technical specialty with strong resources and capabilities for policy-related research in institutions of higher education" (Fincher 1985, p. 34). In thinking about organizational intelligence as "the data gathered about an institution, their analysis and transformation into information, and the insight and informed sense of the organization that a competent institutional researcher brings to the interpretation of that information," Terenzini (1993) describes "three forms of personal competence and institutional understanding" (p. 2).

Terenzini's first tier of intelligence—technical/analytical—concerns factual knowledge, methodological skills, and proficiency with information technology. Factual knowledge includes understanding terms, definitions, and the structure and functionality of information systems. Examples of methodological skills include the

ability to carry out quantitative and qualitative studies, design and administer surveys, and develop tracking systems and projections. Information technology knowledge and skills concerns effective use of computer applications and various technological tools. This level of intelligence is foundational to the others.

Issues intelligence—Terenzini's second tier—is comprised of understanding key management issues in higher education (particularly those most relevant to one's institution), developing a deep understanding of decision making processes on one's campus, and honing skills in the area of working with and through others to accomplish goals. Examples of important management issues that institutional researchers should understand in order to be effective might include faculty workload, facilities planning, assessment, and budget development. Understanding decision making processes and working with and through others require political acumen, the ability to develop and maintain effective relationships, understanding the arts of compromise, appreciating the importance of prior consultation, and demonstrating professional courtesy.

Terenzini's highest level of organizational intelligence, known as contextual knowledge, involves a rich understanding of the culture of higher education, both generally and at one's college or university. "It includes knowledge of how business is done in this particular college or university and who the key players are in both organizational and governance units" (Terenzini 1993, p. 5). Understanding the institutional mission, history, and governance processes are examples of contextual knowledge. It also concerns understanding and appreciating the perspectives of all constituencies, including those external to the campus.

Terenzini (1993) explains the reciprocal nature of the three levels of intelligence. He notes that technical/analytical intelligence itself consists of "processes without content and answers without questions" (p. 5). Conversely, issues intelligence by itself represents "content without processes and questions without the tools to answer them" (p. 5). He refers to contextual intelligence as "the crowning form of organizational intelligence, dependent upon the other two tiers but lifting them out of a preoccupation with topically relevant data and specific analytical tools." (p. 5).

Terenzini (1993) notes that while many aspects of technical/analytical knowledge and skills and issues knowledge can be gained through formal coursework and professional development opportunities, other parts of these tiers as well as contextual intelligence can only be learned through experience in an IR office. He states that all three tiers of organizational intelligence are found in truly effective IR units. His ideas have retained their relevance over two decades (Terenzini 2013); his reexamination of his ideas after 20 years affirmed, and drew increased attention to, the understanding of the external political environment.

3.3 The Golden Triangle of IR, an Ecology of IR, an IR Maturity Model, and the Four (or Five) Faces of IR

Over the past half century as the profession has expanded, it was important to more accurately describe the profession's roles, functions, and its location within the institution's organization. On several occasions information was gathered through surveys to better describe the IR profession and its members. Information gathered from the 2008–2009 National Survey of Institutional Research Offices, Volkwein et al. (2012), furthered Volkwein's (2008) thinking as he described the organization and responsibilities of IR units. From the data, Volkwein et al. (2012) learned that, at most institutions, there are strong connections, if not formal organizational arrangements, between the people who perform analytic functions in: 1) institutional reporting and policy analysis; 2) strategic planning, enrollment, and financial planning; and 3) outcomes assessment, program review, accreditation, and institutional effectiveness. These relationships can be graphically represented as the *Golden Triangle of Institutional Research*. The functions in each leg of the triangle represent most of the practice of institutional research in the United States, although their relative emphasis varies across campus and within a campus over time.

The 2008–2009 National Survey also collected information about IR reporting structures and functions. By far, academic affairs was the most common reporting line for IR, followed by the president or chancellor, with business or administrative affairs third, and only small percentages reporting in other areas. It is not surprising that offices reporting within academic affairs tended to emphasize research on faculty members and academic programs in addition to assessment, program review, and accreditation. Offices reporting to the campus CEO tended to spend a larger portion of their time on planning and policy analysis, while those reporting in business or academic affairs often engaged in studies related to resource management and enrollment and revenue projections. All offices gave substantial attention to reporting.

3.4 An Ecology of IR Units

Building upon both past scholarship (e.g., Peterson 1999) and Volkwein's (1990, 2008) previous work, Volkwein et al. (2012) posit an ecology of IR units. Craft structure is the term used to describe one- to two-person offices that primarily do routine reporting and respond to ad hoc requests. These structures are most often found on small (less than 5000 student) campuses, but they also appear at large institutions where the IR function is fragmented across divisions and colleges. Their specific activities are highly related to the responsibilities and interests of their supervisors. They include about 1/3 of all IR units in the study.

Small *adhocracies* are two- and three-person offices in an intermediate stage of maturity. Tasks of the office and backgrounds of the staff members vary substantially

across campuses. In addition to routine reporting they may carry out some applied research projects and modest policy analysis. They often carry out analyses in cooperation with other administrative offices. Volkwein et al. (2012) indicate small adhocracies also constitute about ⅓ of all IR units.

Professional *bureaucracie*s tend to be found in larger institutions. They include at least 4 staff members (and as many as 22 as shown in the national study). These offices have modest internal reporting structures and degrees of staff specialization. Such offices are typically headed by persons with doctorates and several years of IR experience. They also often include graduate assistants and entry-level professionals (e.g., analysts). These units tend to carry out the most sophisticated research projects, which are centralized in one office rather than collaboratively across offices. Volkwein et al. (2012) indicate that professional bureaucracies are most people's model for IR, yet they constitute only about ¼ of units.

The elaborate profusion model tends to dominate at research universities, particularly private ones. Numerous small offices with various IR-type responsibilities report to various vice presidents and deans. They are decentralized and often fragmented with little or no coordination.

The authors state that not all offices fit neatly into the ecological framework; some share characteristics of multiple structures and some are in transition. Nevertheless, this ecology seems to resonate with many IR professionals. They suggest that growth in the size of IR offices may relate to some shifting away from craft structures towards more complex models. Volkwein et al. (2012) favor professional bureaucracies as the most effective and efficient model, emphasizing customer service, shared expertise, cross-training, and skill diversity.

Volkwein et al. (2012) discuss the results of a translation of the 2008–2009 national survey for use by members of the Middle East and North African Association for Institutional Research. Findings suggest that although most IR offices in this region are very new, many of them demonstrate features of the professional bureaucracy model. In Chap. 15 of this volume, Gina Cinali mentions additional findings from this survey and goes into greater detail on the activities related to IR currently practiced or planned.

The authors have developed an IR maturity model where larger offices reporting more highly within their institutions and staffed by more experienced and highly-credentialed professionals represent a more mature IR function. IR maturity is a linear function of staff size, reporting level, years of experience, and educational level. Interestingly, IR maturity is not strongly associated with institutional variables such as institution type and enrollment.

Volkwein et al. (2012) also collected information about the types of tasks carried out by IR offices in the 2008–2009 national study. Their findings largely matched those of the more recent AIR-sponsored studies discussed later in this chapter. Each IR office in the study had a task hierarchy score computed that was the product of its task complexity and degree of centralization for each its tasks. The national survey results revealed a common core of centralized, lower-complexity tasks (e.g., maintain a fact book and responding to federal and state requests). A second cluster of centralized tasks involved a greater degree of task complexity; examples included

student retention/graduation analyses and studying student engagement. Additional clusters of tasks of various degrees of complexity were often shared with other offices.

When IR maturity and task hierarchy measures were associated, the authors found that offices rated lower on maturity tended to carry out tasks lower in the hierarchy. This held true across each category of IR activity. The most mature IR offices had significantly higher task hierarchy measures than other offices. Volkwein et al. (2012) conclude that, while there remains substantial variation in office structures and tasks, the profession is slowly evolving to a state of greater maturity.

3.5 Tensions that IR Officials Must Balance

As a framework for strengthening the understanding of the role and functions of IR, Volkwein (1999) discussed two tensions in the role of IR. The first tension is between the administrative role, which emphasizes acting as a member of the leadership team, and the professional or academic role, which emphasizes objectivity. The second tension is between the formative internal role, which emphasizes the role of IR in improving the institution, and the summative external role, which emphasizes demonstrating accountability. He has combined these two dimensions of the IR role to form a two by two grid known as the *Four Faces of IR*.

The first face, *IR as information authority*, represents the administrative role for formative improvement. Tasks in this face of IR include describing the institution (in terms of enrollment, faculty members, graduates, academic programs, etc.) to its own constituents. Tasks in this quadrant tend to require the least preparation and experience and requirements for this role correspond to some extent to Terenzini's technical-analytical intelligence.

The second face, *IR as policy analyst*, represents the professional and internal dimensions. IR staff members work with institutional leaders, serving as internal consultants to provide feedback about programs, services, resource allocation decisions, salary equity, student enrollment flow, etc. These tasks require greater levels of education and experience and utilize both technical-analytical and issues intelligences.

The third face, *IR as spin doctor*, represents the intersection of the administrative role and the purpose of external accountability. Examples of tasks in this quadrant include support for accreditation self-study, fundraising and governmental relations efforts, and responses to rankings surveys. Institutional researchers are expected to provide information that shows favorably for the campus. It can be a challenge to act within this role without carrying it to an unethical extreme. These tasks require substantial professional and institutional experience and call upon all three levels of organizational intelligence.

The fourth face, *IR as scholar and researcher*, represents the professional role and the external accountability purpose. These tasks produce evidence so that compliance, goal attainment, and effectiveness can be demonstrated to external

audiences. Examples of tasks include outcomes studies and performance reports. They also require a high level of professional and institutional experience and call utilize all three levels of organizational intelligence.

To further the discussion, Serban (2002) introduced a fifth face to Volkwein's construct: *IR as knowledge manager*. This role involves transforming data into information and knowledge and collaborating in the institutional management of knowledge as a resource. It sits at the nexus of the existing four faces.

While some IR tasks span the categories of the four or five faces of institutional research and boundaries may blur, the construct nevertheless demonstrates the diversity of IR roles and purposes. It also provides a useful framework for managing the IR function and for professional preparation.

3.6 Decision Support and Maturity Models

While the practice of institutional research as a decision support function is newer in some regions of the world, it has become deeply embedded in other regions such as the US, Canada, Australia, and South Africa. With age comes the ability to think more deeply about models of IR practice and how that can grow and deepen in value. Taylor (2015) considers IR within the context of information systems and decision support systems. An information system converts data to information, while a decision support system "will use such information, with other inputs, to identify and analyze problems that lead to decisions" (p. 215). Business process maturity models can be applied to information and decision support systems as well as to IR. As IR matures, it changes from a specialized, independent function to one that is more integrated throughout the institution.

Another type of maturity model can be borrowed from Fisher (2004) to consider the status of IR. This model is comprised of five levers of change—strategy, controls, people, technology, and process—and five states of process maturity: siloed, tactically integrated, process driven, optimized enterprise, and intelligent operating network. Combining the two dimensions into a five by five grid results in Taylor's Maturity Model for Institutional Research based on Business Process Maturity (2015). Moving from the siloed to intelligent operating network states within the strategy dimension involves IR maturing from being reactive within the campus and overall higher education environments to being focused on continuous adaption, being organized around processes, and focusing on predictive capabilities; IR represents a competitive advantage to the college or university. Maturity along the controls dimension concerns IR moving from local-level authority, no institution-wide standards, and no formal performance measurement to responsibility resting within process teams and process metrics used to measure performance. Processes at the siloed level are static and departmentally-based, while at the intelligent operating network level there is total process integration throughout the institution and key processes flow seamlessly across firewalls. Maturation within the people lever constitutes a change from subject matter experts, adversarial interactions, distrust, and

no formal change management procedures to all staff members pursuing process and cultural attributes and ongoing training processes for employees and partners. As institutional research matures along the technology dimension, it evolves from independent and duplicated systems with limited automation and little integration to using business process management solutions to automate and monitor processes across the institution.

A fresh perspective is often helpful for deepening understanding and enriching insights. The decision support perspective borrowed from for-profit organizations gives institutional researchers a lens through which to view their work as a set of activities that offer competitive advantage to their institutions and offers a framework for reflecting upon the maturity and effectiveness of their efforts. There are clear relationships between Taylor's (2015) ideas and those of Terenzini (1993) and Volkwein et al. (2012) in terms of requisite knowledge and skills, including interpersonal and leadership skills, for optimizing IR.

3.7 Recent Publications by the Association for Institutional Research

Following the earlier *Primer for Institutional Research* (Knight 2003), four recent publications by AIR and individuals affiliated with AIR have provided contemporary thinking about what IR is and how it might best be structured. These works affirm many previously-cited conclusions, but also provide fresh perspectives about IR's consultative role with campus decision makers, the lack of relationship between resources and reporting relationships with IR activities and the impact of IR work, who are among the decision makers that IR should serve, a networked or matrix approach to the IR function, and student success as an underlying fundamental goal of IR.

The National Survey of IR Offices (Swing et al. 2016) was designed to collect "information on the tasks, staff, organization, and resources of offices of institutional research as they exist in 2015" (p. 3). Survey results revealed that one-half of respondents' offices reported to the chief academic officer and 25% reported directly to the president. The average number of professional staff members in IR offices was 3.6, with about 8% having two or fewer full-time equivalent staff members and about 18% having five or more. These findings did not vary substantially between two-year and four-year institutions.

The scale and scope of responsibilities was more variable. Offices of institutional research (OIRs) "report[ed] a relatively small set of tasks for which they are primarily responsible, and a far broader set of tasks in which they participate[d] with other units in shared responsibilities" (p. 6). Not surprisingly the majority of offices listed state, federal, fact book, and college guide/rankings reporting and benchmarking with other institutions as primary responsibilities. Offices typically reported sharing responsibilities for accreditation studies, strategic planning, program accreditation, and student learning assessment. Most responding offices reported no involvement

with financial and financial aid modeling, and class demand, space utilization, and salary equity studies. The survey report concluded that "The major contribution of OIRs to decision makers across institutions is provision of routine and ad hoc reports, analyses, alerts, and forecasts" (p. 8). It also indicated

> Beyond the technical aspects of reporting and providing data, OIRs often *seek* [emphasis added] to make higher order contributions by consulting with decision makers to interpret reports, translate evidence into action, and engage in the "use" side of IR products. The results of this study show only minimal activity for OIRs in the consulting role. From a list of 26 offices and functions (e.g., president, faculty senate, human resources, admissions), less than half of respondents report that OIRs provided any consulting services to those units in the last year. Even with reporting lines to presidents and chief academic officers, fewer than half of OIRs provided consulting (interpreting reports, translating evidence into action, and helping in the use of IR products) to their supervisors. Boards of trustees were among the least likely to receive consulting services from OIR with only 18% of respondents reporting that they provide such services. (p. 8)

One interesting implication of the 2016 survey is that:

> ... reporting lines are not very predictive of how OIRs relate to senior leaders and the rest of the institution (e.g., services provided and consumed, tasks assigned, level of responsibility for tasks). (p. 9)

Another surprise in the survey results is lack of a strong relationship between number and type of IR tasks and size of the IR staff:

> These findings illuminate common beliefs about reporting burden being a function of mandates rather than efficiencies. In terms of the range of tasks accomplished by OIRs—in addition to basic reporting functions—some small staff OIRs appear to outperform their peers, and some large staff OIRs appear to underperform compared to their peers. That is, some offices appear to be more productive based on number of tasks and FTE staff. (p. 9)

A concluding point in the survey results was that:

> Except for a small set of outliers, there is more consistency in size, resources, and task assignments across OIRs than is popularly believed. **It is time to focus on more than just resources as the way OIRs fit into the data ecosystems of institutions....** Office size and reporting lines do not explain why or how the various "office personalities" develop.... The highest degree earned by the director of the OIR and the years of experience in the field do not explain the various "office personalities" either.... There are several potential explanations for why and how OIRs vary in institutional impact and workload capacities. Testable hypotheses are that the management/leadership styles of senior IR officers, the comfort of senior institutional leaders in using data in decision making, and/or institutional data cultures shape the degree to which IR "plays well with others," is trusted by the academic community, and has skills and capacities to contribute decision support in addition to acumen for reporting tasks. (p. 10)

The increased existence of institutional data and increased access to them by a broader array of persons across institutions have led AIR to facilitate what it hopes to be a broad conversation within the profession about IR offices working collaboratively with other units to produce an organization-wide IR function. The *Statement of Aspirational Practice for Institutional Research* (Swing and Ross 2016a) was developed through brainstorming, structured discussions, pilot testing, and review among members of the IR community and senior campus leaders. Its first tenet is

expanding the definition of decision makers from senior leadership to students and faculty and staff members and supporting them in making decisions about educational pathways; developing curricula, pedagogy, and governance; and fostering student success. The second is leveraging talent across the institution to activate a networked institutional research function that is larger than any single IR office. The third is recognizing and supporting the position of Chief Institutional Research Officer that

> ... requires a significant focus on building relationships with individuals throughout the institution, understanding data and information structures and capacities, and connecting disparate pieces of information. (p. 6)

The last major concept within the *Statement* is grounding all IR efforts within an overarching core goal of enhancing student success.

AIR's *National Study of IR Work Tasks* (Lillibridge et al. 2016) resulted from an analysis of IR job descriptions and position advertisements, a survey of AIR members, and grouping of identified work tasks into categories. The report of the results focused on the extent to which senior IR leaders focused upon various categories. Examples of tasks that most/all senior IR/IE officers perform to a high degree included maintaining current knowledge in the field of institutional research, directing responses to information requests from key internal constituents, ensuring appropriate data are available for institutional decision making, and aligning resources to meet office/institutional priorities. Examples of tasks that some senior IR/IE officers perform to a high degree included analyzing applicant trends, developing program evaluation plans, providing information to program directors for their annual reports to the president's cabinet, and ensuring effective use of software applications, systems, or programs. Examples of tasks that few senior IR/IE officers perform to a high degree included analyzing institutional budget data, communicating institutional student learning/achievement strategies, conducting assessments of students' parents/families, and preparing reports of results from staff orientation surveys. Results were disaggregated by number of IR office staff members.

Swing and Ross (2016b) synthesized much of AIR's recent analysis and self-reflection within the profession into *A New Vision for Institutional Research* that appeared in *Change* magazine. The article calls upon IR to break out of its cycle of endless reporting demands upon offices with small staff numbers by recognizing that IR typically is seen as a service unit supporting a small set of campus leaders with other clients relegated to a lower tier of service and little time and resources available to devote to developing a capability for self-service analytics. Alternatively, the authors call for moving away from the traditional service model of institutional research to a campus-wide institutional research function with what they term a "federated network model" or "matrix network model." The federated network model retains a strong centralized IR office, but views IR as a campus function that redirects others within the institution to serve as producers and users of IR as needed and harmonizes efforts through strong communication, common technology, and strong data management. The matrix network model represents a further maturation

of the federated network model where knowledge and skills are routinely and seamlessly shared across organizational divisions.

3.8 Integrated Institutional Effectiveness

Over the last few years the concept of integrated institutional effectiveness (IE) has become increasingly visible at institutions and in the professional literature and has spurred the development of a new professional association. The IE structure highlighted here has been studied exclusively within the United States to date, but it may exist more broadly and might represent a model that will develop further as the IR function matures. The concept of IE directly affects IR and has been spurred in major part by both accreditation requirements (especially within the Southern Association of Colleges and Schools Commission on Colleges accreditation region) and institutional leaders' interest in evidence-based decision making.. Leimer (2012) focused the attention of a wide set of academic leaders on the issue of organizing for evidence-based decision making and the IE structure. She noted that the number of institutional effectiveness units in institutions listed in the *Directory of Higher Education* increased from 43 in 1995 to 375 in 2010. By 2015 it had grown to 501 (Knight 2015). Leimer's (2011) study of IE units revealed that while some are simply rebranded IR are some primarily deal with assessment of student learning outcomes, a growing number view IE as an umbrella structure that encompasses responsibility for traditional IR along with assessment, planning, program or unit review, and accreditation. Knight (2015) notes that IE units may sometimes also have additional responsibilities such as institutional budgeting, analysis and allocation of space, and development of new academic programs.

Leimer (2012, p. 47) provides the following distinction between IR and what she terms Integrated Model IE (IM):

> The IM model is a solution to a need for culture change that exceeds the capabilities of conventional IR offices to support. While they still analyze data, IM offices take more of a leadership role than conventional IR ones do. IM personnel educate and advocate for the use of evidence in decision making. They may also bring their knowledge of external trends and issues affecting higher education and their institutions into presentations, analyses, and discussions in ways that can help challenge assumptions, deepen questioning and exploration, and prompt reflection that can lead to change.
>
> Personnel in these offices advise and consult with executives, middle managers, and faculty. They coordinate, facilitate, and develop processes, procedures, and structures that help make data use part of the culture, such as workshops, blogs, research review teams, or linkages between assessment and planning. They monitor and document progress toward strategic planning goals and play a key role in program review or accreditation. Evaluating initiatives and programs or partnering with operational managers to do so is common.

Successful IE units represent not simply a restructuring, but a true integration of what Leimer (2012, p. 47) terms the quality functions that fills "both the leadership and infrastructure gaps that impede data-informed decision making." The leader of the IIE unit works to actively move the institution towards a culture of evidence.

Leimer (2012) explains that successful leaders of IE units must demonstrate leadership skills such as sensitivity, objectivity, creativity, patience, and the ability to motivate others, to build trust, and to "use data to tell a compelling story" (pp. 49–50). These capabilities for the personal, and particularly the leader, of an IR unit seem to strongly parallel elements of Terenzini's (1993) issues and contextual intelligence.

Recognizing the need for networking and professional development, particularly leadership development, among IE professionals, the Association for Higher Education Effectiveness (AHEE) was established in 2013 with the goal of "helping to develop integrated institutional effectiveness offices/divisions that better serve institutions, and, in the process, help to develop the professionals that staff these offices." (www.ahee.org).

AHEE has carried out two studies concerning the development of IE. They serve to illustrate that when IR and the other component functions are effectively integrated and supported by strong leadership they can enjoy a greater impact that can transform institutions. The first (Bartolini et al. 2015) consisted of interviews with institutional leaders concerning the pervasiveness of the IE model, its perceived advantages and disadvantages, the staffing and capabilities needed to ensure the success of the IE model, and possible future directions. As also found by Leimer (2012), IE units were essentially developed by presidential initiative, either in response to a critical issue (typically accreditation) or generally from a desire to facilitate evidence-based decision making. Participants in this study identified several advantages of the IE model, chiefly including improved institutional decision-making and accountability.

AHEE's second study (Knight and Tweedell 2016) provided a profile of vice presidential IE leaders (VPIEs). It focused upon the backgrounds of these IE leaders, the institutional circumstances that led to the VPIE position being established, the knowledge and skills critical for performance as a VPIE, how leadership of IE at a vice presidential level is different than at a lower (director, associate vice president) level, participants' ideas about the future of IE and the position of VPIE, and how a professional association such as AHEE can best support them. Among the results was recognition that it is crucial for persons in the role to have strong technical-analytical skills, deep institutional knowledge (or the ability to quickly acquire it), leadership skills and experience, and several dispositions or personality characteristics.

3.9 IR Models in Global Contexts

As mentioned in previous writings as well as in Chap. 1 in this book, IR is becoming more deeply embedded across the globe in response to massification, financial constraints, new technologies, global competition, and a government-institutional compact that provides greater autonomy in exchange for increased accountability (Knight 2016). Despite different terms used to describe the offices or primary set of tasks endeavored, Webber (2015) concluded that international IR activities

nevertheless generally fit Volkwein's (2008) Golden Triangle of IR. She notes that while IR is in the early stages of development in Latin America, Asia, and the Middle East and North Africa, it has matured much more rapidly in some regions, with the associated expansion of roles and responsibilities. Webber suggests that the different demands upon IR as it develops in different places requires practitioners to demonstrate different types of knowledge and skills as framed by Terenzini's (1993, 2013) three tiers. Successful application of these forms of organizational intelligence depends upon the specific contexts of higher education across the world and also varies over time in the same locale. The following chapters of this volume provide several worldwide examples of decision support within higher education institutions and systems and the requisite capabilities of its practitioners.

In all nations and regions including the US, the nature of IR will continue to change as it responds to evolving demands and interests within higher education. While data visualization, "big data," and predictive analytics are among the most salient issues facing IR within North America at the time this volume is being written, emerging topics of interest may include IR's role in diversity and inclusion issues in higher education, equity in student achievement, and discussions concerning return on investment for higher education, as well as leadership development within the profession. It is unclear exactly what the future holds, but we can be sure that IR in all regions will continue to evolve in order to support and improve evidence-based decision making in postsecondary institutions.

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Chapter 4
The Need for and Value of Scholarship in Institutional Research

Victor M. H. Borden

4.1 Introduction

The current practices of institutional research were shaped in large part by its historical development first within the United States and then internationally. The forces shaping that development generally include the professionalization of higher education administration and management and the expansion of the applied social sciences, including scientific management, both within and outside the academy (Borden and Webber 2015; Peterson 1999; Reichard 2012). These same forces were invoked in slightly different forms and contexts throughout Europe, and in South Africa and Australia in the late twentieth Century, and more recently in most other developed and developing countries (Calderon and Webber 2013). Altbach (2004) recognized these trends as components of the inevitable globalization of higher education. He noted how developments in information technology and scientific communication, facilitated by the higher education sector, created the need for a more highly educated citizenry, internationally. The increased capacity needs for higher education, in turn promoted the decentralization of authority from State control to autonomous institutional management. As higher education administration and management continued to mature, staff and units were deployed to support planning, decision-support, and quality assurance activities as specifically shaped by national and institutional contexts, but also shaped by the broader IR profession through professional networks and the literature that emerged from IR development internationally (Taylor et al. 2013).

The individuals and units that served these needs for information and analysis emerged within the academy from scholars with relevant training, interest, and knowledge (Borden and Webber 2015). By virtue of applying their analytic abilities

V. M. H. Borden (✉)
Indiana University Bloomington, Indianapolis, IN, USA
e-mail: vborden@iu.edu

© Springer International Publishing AG 2018

K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1_4

to the largely behavioral and organizational issues related to higher education operations, these applied researchers originated most often from psychology and social science disciplines (largely sociology and economics). With the expansion of applied social sciences into the professions, more IR practitioners received their advanced training within such disciplines as business, public administration, and higher education.

Volkwein et al. (2012) track changes in field of highest degree among IR practitioners from1980 through the first decade of the twenty-first Century, noting a decline from about 40 to 30 percent in those having a degree in the social sciences, and increases in Education (from 26 to 30 percent), Business and Accounting (from 11 to 16 percent), and Science, Technology, Engineering and Math (STEM) disciplines (from 14 to 23 percent). Despite considerable variation in the conceptual underpinnings and methodological approaches, most of these disciplines hold a common value in the development of theory and conceptual models as a basis for the design, conduct, and interpretation of research and inquiry.

Although the profession includes a majority of practitioners with traditional and applied social science backgrounds, it has also been influenced by several other epistemological traditions. The reliance of the profession on data that originates within complex management information systems requires skill sets most often associated with information management, information technology, and computer science. Recent trends in data mining and information analytics have increased the need for and presence of practitioners with such backgrounds (Zilvinskis et al. 2017). The recent increases in Business/Accounting and STEM training among IR practitioners noted by Volkwein et al. (2012) support this trend. Perhaps more importantly, advances in information technology have expanded the support staff community with which institutional researchers work to serve a more diverse array of clients and users. Traditionally, senior administrators and other staff involved in strategic and tactical management of the university comprised the primary client base for IR practitioners. The growth of analytics in its various forms (academic, student, learning, and so on) has expanded the client base to include academic and student support providers, course instructors and instructional support staff, and the students themselves.

In the remainder of this chapter, I explore how the scholarly approach to institutional research has been shaped by these developments, with a focus on that development in the United States. Specifically, I will examine how the values related to their scholarly training were manifest in the approaches that IR practitioners adopted with successful results; how these approaches helped to legitimize IR practice and the profession; how theory and scholarship serves the expanding role of IR practitioners into the realm of institutional effectiveness and program quality assurance; and opportunities for and challenges to the “IR voice” in the current wave of development related to “Big Data” and analytics of all sorts.

4.2 Traditional Approaches to Institutional Research

One of the most commonly cited purposes of institutional research (IR) was offered by Saupe (1990) in the publicly available primer: "to provide information which supports institutional planning, policy formation and decision making" (p. 1). Although this purpose does not directly implicate scholarly foundations, Terenzini (1999) subsequently noted that various characterizations of the definition and purposes of IR relate the conduct of research and analysis to the administrative and broad decision making activities required to manage higher education programs, institutions, and systems.

Tracing the historical development of institutional research, Reichard (2012) associated the emergence of systematic efforts to the rise of scientific management often associated with Taylor's (1911) treatise Principles of Scientific Management. Leadership within the academy had available resources within the faculties to engage such research at the highest levels of rigor. Experts in applied economics, sociology, and organizational psychology could be assembled through ad hoc committees and task forces to provide academic leadership with analytic support and thoughtful insight into current and prospective challenges facing the academy. Borden and Webber (2015) described how such efforts resulted in the emergence of applied higher education research centers within the leading research universities such as the University of Minnesota, the University of California, University of Michigan, the University of Georgia, and Teachers College of Columbia University. They also note that these research centers served as the origins of both institutional research as an administrative support function, and academic programs and departments devoted to the study of higher education and the development of master's and doctoral programs training future generations of IR practitioners and higher education faculty.

By the early 1960s, higher education professionals and academics devoted to the development of institutional research held a series of gatherings and formal meetings, resulting in the incorporation of the Association for Institutional Research in 1965. Although the individuals involved in these early meetings were not all tenure track faculty, they were primarily doctorate-trained researchers who approached applied research and analysis from the scholarly traditions in which they were trained and steeped. They also remained active in the broader scholarship of the field by publishing through existing research journals, as well as starting new venues, like the New Directions in Institutional Research monograph series.

4.3 Management Information, Accountability Demands and the Modern US IR Operation

The systematic use of data and information to guide decision making, was further stimulated by the development of more accessible means for gathering, extracting, synthesizing, and analyzing data. Even before the advent of desktop technologies, university as well as state-level systems began to exploit the systematic collection of data for developing management information systems to guide decision making as related to resource allocation and budgeting systems. The National Center for Higher Education Management Systems (NCHEMS) was established in 1969 to improve the management effectiveness of American colleges and universities (Ewell and Jones 1982). Focusing on data and information management, they developed a set of services, computer applications, and publications, related to facilities planning and management, academic unit planning and management, and higher education system resource allocation schemes.

In the United States, the development of large, system-level management systems marked a turning point in the demand for data-driven accountability, first within state-level systems and subsequently at the federal level with the emergence of national data collections deemed necessary to monitor the growing role of federal monies for student financial aid associated with the 1964 Higher Education Act. Several waves of higher education reform initiatives developed in the United States, including those stimulated by the periodic review of the Higher Education Act, as well as other governmental and nongovernmental initiatives.

The increased demand for accountability reporting was not unique to the United States. Salmi (2009) described the growing concern for higher education accountability internationally, as related to required regulatory frameworks, global competition for students, and stewardship of public funds. These demands led to the creation of a wide range of reporting and data submission requirements. Within the United States in particular, institutional research offices and practitioners were often given the responsibility for such accountability reporting requirements, which led to an increase in staffing to manage the induced information administration and reporting requirements. Administrative IR units, especially at larger universities, were often then layered with senior leadership, most typically trained as applied social science researchers and analysts and technical support staff with training and backgrounds related to information management and report writing.

The specific shape and focus of formal institutional research and related operations in U.S. higher education institutions varies by institutional sector, and the organizational location of the operation. Volkwein et al. (2012) describe four general arrangements, including a craft structure, typical of smaller institutions, employing one or two individuals who were “highly burdened by mandated routine reporting and a modest amount of number-crunching for the institution” (p. 27). Slightly larger operations are characterized as small adhocracies, where two or three staff members are able to add to their workload some modest higher level research projects related to institutional needs and priorities. Yet larger institutions, or

institutions that otherwise place a high priority on a strong centralized IR capacity, establish professional bureaucracies, which Volkwein and colleagues found to employ between 6 and 22 staff that engage in a full range of information development, reporting, and more rigorous research and evaluation projects. The final arrangement, labeled elaborate profusion, was typical at large, decentralized research universities, where IR practitioners are distributed across various academic and administrative areas, either specializing in research pertaining to a general domain (for example, finance, facilities, academic budgeting, enrollment management, and so on), or providing broader IR support to relatively autonomous academic divisions (typically labeled as colleges or schools in the US, or faculties in other countries).

In sum, several factors have helped shape the current modes of operation most common in US colleges and universities, which entail varying combinations of more basic business functions (information management, data provision, accountability, and internal use descriptive reporting), with the kinds of applied research and analysis that connect institutional research with its academic and scholarly roots. The annual forum for the Association for Institutional Research (AIR) has evolved in parallel fashion, moving from a relatively small operation, where the elected President and one administrator worked to engage volunteer members in developing the annual forum program, creating modest publications, and developing some professional development activities, to an organization that in 2017 employs 22 professional and support staff, now supported and steered by a member-elected governing board.

4.4 The Association for Institutional Research and Scholarly Practice

The Association for Institutional Research (AIR) has evolved its purposes, organizational arrangements, and programs with the growth and maturation of IR practice throughout the US postsecondary landscape. Although many of AIR's activities are focused on the application of skills, a number of AIR's activities have emphasized or encouraged the value of scholarship and have sought to help members make the cognitive connection between scholarship and practice. The earliest efforts of AIR focused on the annual forum and a few publication efforts (Lasher 2011). The annual forum provided members with a venue for sharing information about their developing practices and the application of research methods to institutional policy and decision support activities. Members also proposed and delivered preconference workshops, providing "hands-on" instruction on the application of a range of research and analytic methods.

The dissemination of applied research studies and methods was further supported through AIR publication activities. The Association self-published a few original monographs, such as Saupe's (1990) primer, The Functions of Institutional

Research, a Resources in Institutional Research series, as well as a series of single study reports under the AIR Professional File series. In collaboration with several publishers, Association members served as editors and editorial boards of the New Directions for Institutional Research monograph series and, what was considered the Association's flagship journal, Research in Higher Education. AIR also produced a series of professional development institutes for which intensive workshop curricula were developed by senior members. These Institutes spanned basic, foundational skills as well as more specialized and advanced training related to statistics, research methods and information technologies. Institutes also focused on more specialized areas of application, such as enrollment management. Although some of these publications are not active at this time, there is hope that they will be revived, in part because they enable IR practitioners additional sources of knowledge about the scholarly writings that are very relevant to the field of IR.

In the late 1990s, a new activity for AIR further reinforced the nexus between scholarship and practice: the development of contractual and grant programs with two federal agencies, The Department of Education's National Center for Education Statistics and the National Science Foundation. The arrangements involved two general focuses: grant funding to engage researchers in advancing the scholarship and practice of the field; and the development of educational and training opportunities to improve the reliability and accuracy of information provided by higher education institutions to the federal government as part of the accountability requirements created through the various iterations of the Higher Education Act, as well as other congressionally mandated accountability rules and regulations.

4.4.1 Graduate Level Education

One of the funded activities that spanned the research and education domains solicited proposals for developing five graduate certificate programs in institutional research. Five such programs were funded at Arizona State University, Florida State University, Indiana University, Penn State University, and the University of Missouri. These programs were developed by higher education faculty and IR professionals with "adjunct" affiliations to the higher education programs at these institutions. The faculty affiliated with these programs met annually for five years to share with each other the curricula developed and experiences with providing such advanced training to both traditional graduate students and working professionals. Currently, the AIR web site lists 15 graduate training programs related to institutional research (https://www.airweb.org/Careers/GraduateEducation/Pages/default.aspx), including programs at the five original institutions that have evolved from the originally government-subsidized efforts.

4.4.2 IR Networks Outside the US

The central role played by AIR in fostering the scholarship of institutional research was adopted by the network of affiliated organizations in other parts of the world. The European AIR (now known as EAIR: The European Higher Education Society Linking research, policy and practice), established in 1979, manages an annual forum featuring peer-reviewed papers, publishes a monograph series, and a journal, Tertiary Education and Management. EAIR also collaborates with other European associations and organizations to promote professional development opportunities related to higher education administration, management, policy development, and research. The Australasian Association for Institutional Research formed in 1988 holds annual fora and, from 1991 through 2014 published the Journal of Institutional Research.

The Southern African Association for Institutional Research, founded in 1994, describes its purposes as related to the development and utility of the practice of institutional research and the quality of IR practitioners. These purposes are expressed succinctly through four bullet points (http://www.saairweb.co.za/aboutsaair/)

- To advance research and analysis leading to the production of improved management information for understanding, planning, management, and operation of higher educational institutions and agencies.
- To encourage the development and application of appropriate methodologies and techniques from many disciplines to further such research, analysis, and planning.
- To encourage the collection, interpretation, exchange, and dissemination of information with respect to higher education and its institutions.
- To further the professional development and training of individuals engaged in institutional research and analysis or interested in its utilization in planning, management, and resource allocation and in the improvement of higher education.

Similar objectives and activities have been adopted by the other international regional (Middle East North Africa) and national affiliated organizations (Canadian, Philippine, and Taiwan), as well as through US regional and state organizations. This continually expanding network of affiliated organizations serves the profession broadly through the dissemination of effective and reliable practices through a community of practice. However, due to its roots in the academy and continuing connections with academics who devote their time and attention to related issues (higher education management; institutional effectiveness; student experiences, etc.), there remains a close tie between research, scholarship, and practice, although one that is challenged by the competing demands among those who focus primarily on practice and those who focus primarily on research and scholarship.

4.5 The Expanding Domain of IR-Related Scholarship

As noted in this developmental narrative, institutional research practitioners initially came out of the academy in the form of tenured or tenure-track faculty who were called upon to provide research and analysis to inform administrative leadership. However, the growth of accountability demands and the rapid expansion of information technology capacities introduced a core set of foundational activities that brought into the IR staffing domain individuals responsible for basic technical, descriptive report writing and data assembling activities.

The individuals who wrote about the profession and who contributed to the growing empirical literature tended to be cut from the academic mold. Borden and Webber (2015) described how the leading scholars that stimulated the growth of institutional research as a higher education administrative support function, were also instrumental in the development of higher education as a research discipline. Goodchild (1991) noted that the growing need for professional administrators stimulated the development of higher education master's and doctoral programs through the latter half of the twentieth Century. The thought leaders of the IR profession who were responsible for the formation of the Association for Institutional Research included both higher education faculty members and senior IR administrators many of whom maintained adjunct affiliation with related academic departments. The large IR shops at major research universities often provided applied graduate assistantship opportunities for students in these higher education doctoral programs or other relevant fields. Indeed, I started my institutional research career as a graduate assistant in the Student Affairs Research office while pursuing a doctorate in social psychology.

As institutional research offices developed across the US higher education landscape, the growth spread to institutions that did not have doctoral programs and, in more recent years, to institutions that confer mostly or entirely associate's degrees (the public community colleges within the US). The membership of the professional association expanded in both number and diversity, and the professional development needs for IR practitioners varied across the spectrum from very basic training and support to the highest levels of professional and scholarly practice. The staff hired to provide IR support within such institutions required support from their colleagues in the larger institutions (largely through the Association for Institutional Research), as well as from consultants and services available outside the academy through both nonprofit and commercial organizations.

4.5.1 IR Connections to Academic Associations

Over this same time period, higher education expanded as an academic discipline, supported by two academic associations. The Association for the Study of Higher Education (ASHE) formed in 1976 and Division J (Postsecondary Education) of the

American Educational Research Association formed in 1980. The broader disciplinary researchers in the higher education domain included several with interests overlapping with the practice of IR and, more generally, information and analytic support for higher education institutional management and development. In addition, several individuals moved from positions as IR professionals into faculty positions as their careers developed (including the author of this chapter and the editor of this volume).

Connections between the practice of IR and related research conducted through the academy was further served by higher education research centers that provided institutions with research and consulting services and, most notably, national student surveys that could be used for assessment and benchmarking purposes. Indeed, there had been a long tradition in applying surveys developed by academic scholars to the needs of institutional research, as evident in a 1937 report by the Carnegie Foundation for the Advancement of Teaching that identified over 200 surveys developed to assess higher education institutions and the student experience (Eells 1937).

Ongoing national surveys include those developed and administered by the Higher Education Research Institute (HERI) at the University of California Los Angeles (https://heri.ucla.edu/). The HERI Freshman survey has been continuously administered since 1966, providing participating institutions with a comparison of their income students to national benchmarks across a range of attitudes and experiences. HERI staff subsequently developed surveys for ongoing students and for higher education faculty. In 1979, the College student Experiences Questionnaire (CSEQ) was made available by Professor Robert Pace to assess the quality of effort among undergraduate students. The CSEQ survey subsequently moved to the Indiana University Center for Postsecondary Research, where it became part of a set of surveys including the National Survey of Student Engagement (NSSE) that US higher education institutions could use as part of their institutional research and assessment efforts. The NSSE instrument was also adopted for use in other countries and regions (Coates and McCormick 2014). The CSEQ and NSSE surveys are notable for their theoretical underpinnings. CSEQ was developed to reflects Pace's (1982, 1984) core concept related to the quality of student effort. NSSE further grew out of a line of theory development that was underpinned by theories of student integration (Tinto 1975, 1987); student involvement (Astin 1984); and principles for good practice in higher education (Chickering and Gamson 1987).

4.5.2 Expansion Aided by Tools and Support Services

Externally available institutional research tools and support services increased in number substantially at the end of the twentieth Century and especially in the first decade of the twenty-first Century. Borden and Zak Owens (2001) produced an inventory of 26 instruments available through academic institutions, other nonprofit organizations (e.g., The College Board), and commercial providers that were available for institutional research and assessment purposes. The instruments included

student experience and satisfaction surveys, as well as a growing number of learning assessment instruments, such as critical thinking inventories and major field tests. Ten years later, Borden and Kernel (2012) developed a web-based system to update the inventory (http://apps.airweb.org/surveys/). In that short time, the inventory grew from just over 25 items to over 250 items. In addition to over 130 surveys and assessment instruments, the updated inventory included other types of resources, such as extant data sets, technology platforms to support learning outcomes assessment, and initiatives in which institutions could participate to develop institutional research and assessment capacities.

The expansion of available surveys, assessments, technology platforms, and other tools to support institutional research and related activities reflects further the expanding demand for accountability and transparency in the evaluation of higher education institution and program effectiveness. Hutchings (2009) noted the expansion of for-profit providers in the domains of institutional research and especially learning outcomes assessment, which she characterized as, "…an influx of for-profit assessment providers offering tools and services that promise, variously, to make assessment easier, faster, less intrusive, more useful, and/or more cost effective" (p. 28). This expansion also reflected how the sources of scholarship related to IR practice was distributed more broadly. In addition to the scholarship developed by IR practitioners and the growing number of academic higher education researchers, a number of nonprofit organizations and for-profit companies developed products and services that reflected the scholarly work of current and former IR professionals and higher education researchers.

4.5.3 Trend in Predictive Analytics

The expansion of support for institutional research into first nonprofit and then for-profit organizations outside the academy has become even more notable in recent years with the advent of predictive analytics. The long standing relationship between the academy and commercial Information Technology organizations, as related to operational information system development and deployment, has more recently entered into the institutional research realm, as institutions learn about the promise of new technologies for predicting the difficulties that students might confront in their studies, before they confront them.

The social science tradition that strongly influenced IR practice includes both deductive and inductive theoretical reasoning. IR practitioners engage in a priori theory-guided analysis and a posteriori, exploratory analysis, followed by inductive interpretation. In contrast, predictive analytics are typically a theoretical approach, in which the goal is accurate prediction regardless of how that prediction is obtained. Indeed, many of the data mining procedures employed in predictive analytics do not provide clear guidance as to how the included factors contributed to the resulting prediction.

Zilvinskis and Borden (2017) provide a review of emerging issues related to the rapid infusion of learning analytics into the crowded realm of initiatives through which higher education institutions seek to assess their impact on student development and learning, and compete regionally, nationally and internationally among a more crowded marketplace of traditional colleges, universities, as well as new forms of distance and distributed education providers. They conclude, similar to Hutchings (2009), that there are no simple solutions to the complex issues that higher education institutions face in educating an increasingly diverse student population, with significant pressure to contain costs and demonstrate quality outcomes. Although new tools and technologies provide more powerful supports, they require more expert application and, more importantly, more integrated collaboration among the academic and administrative units within a higher education institution.

Zilvinskis and Borden (2017) also argue that, within the academy, analytics should be embedded within a broader culture of inquiry that promotes organizational learning and development. This culture is commensurate with the values of scholarly IR practice, in which higher education staff and students seek answers to questions regarding how and why things happen as they do. Just knowing that a student has a high risk of failing does not provide actionable information regarding how to help the student and may, in fact, increase the likelihood that the student will fail as suggested by labeling theory (Becker 1973/1963; Link et al. 1989). Scholarly IR practice can therefore play an integral role in helping institutions constructively develop and adopt analytics applications to improve student success.

4.6 Challenges and Opportunities Ahead

Although this chapter is written largely from the perspective of the US experience, the forces shaping institutional research and related institutional capacities are more commonly shared internationally than ever before. As Altbach (2004) and Altbach and Knight (2007) and others have noted, higher education is becoming both international and global in nature. Global forces create converging interests and strategies, as evident in increasing autonomy and accountability of higher education institutions internationally, including the adoption, for example, of student tuition fees across more countries and systems. World-class higher education institutions now compete internationally for academic staff and students. Even though systems still predominantly serve domestic students and employ domestic staff, the expansion of international competition for students and staff has shaped the policies and practices of colleges and universities across the world.

Similarly, the global forces that shape the emergence of a knowledge society create demands for a more highly educated workforce. Higher education has already become “massified” in many countries and is heading toward “universal” status in the United States and elsewhere. Governments at all levels, as well as nongovernment agencies, now push for broader access with the realization that a postsecondary credential will be required for the vast majority of productive work in the

remainder of the twenty-first Century, especially with the continuing automation related to manual forms of labor and, more recently, service provision.

4.6.1 Shifting Environments Over Time

Peterson (1999) described how IR practices helped US higher education institutions adapt to the shifting political environment, supporting growth and expansion in the 1950s through largely descriptive analyses; responding to the disruptions of the 1960s with comparative analyses; coping with the economic recession of the 1970s through evaluative analysis of institutional efficiencies; and responding to the increased press for accountability and improvement starting in the 1980s with planning and policy analysis. He suggested that the new millennium would require a broader focus on the institution in the global knowledge economy, employing increasingly powerful and accessible information technologies. As most IR practitioners would testify, as needs shift, prior challenges do not disappear, and so the approaches and skills required to respond remain relevant.

As a result, successful IR practitioners require a very broad understanding of the societal forces that have shaped higher education historically, the current political contexts at the institutional, regional, national, and now international levels. IR practitioners also require an understanding of and appreciation for how applying various epistemological and methodological lenses can help them communicate effectively with colleagues within and outside academe to deal with ever-evolving complex issues within even increasingly interconnected contexts. While it would help for the IR practitioner to be not just a scholar, but a polymath, the most important skill sets and dispositions relate to the ability of the practitioner to assemble relevant information and intelligence and bring together constituents with diverse perspectives to interpret and analyze the implications of the information in relation to these complex issues and environments.

4.6.2 The Value of Interconnections

The scholarship to which institutional researchers and higher education researchers have contributed to and drawn from over the years has evolved from an application of disciplinary thought to largely provincial issues related to the education of academics and elite professionals, to far more complicated and broadly shared issues related to the education of the twenty-first Century mobile, global workforce. The IR practitioner and colleagues throughout the academy exist within a highly interconnected and increasingly interdisciplinary knowledge system, where it becomes increasingly important, possible, and also difficult to amass the information and intelligence required to guide effective decision making among what must be an increasingly collaborative effort. Individuals employed in units devoted to

institutional research, assessment, program evaluation, policy, planning, and related functions may continue to find work as long as they can contribute to the increasingly collaborative demands.

Given its history as a practice emerging from and guided by scholarship, IR practitioners can contribute to their institutions and systems by adding value well beyond providing data and analysis. Like manual labor and service provision, data provision is becoming increasingly automated and readily available to those who lead academic institutions, units, and programs. The future of institutional research capacity lies in the ability of administrative and academic managers, as well as faculty members and students, to interpret and act upon evidence and data. The future value of institutional research is thus related to the creation of new knowledge which, by definition, requires scholarship.

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Chapter 5
The Need for and Value of Data Governance

Kelly Briner and John Rome

5.1 Data Governance: What's the Problem?

Higher education leaders feel like they have a data problem. It may not be a new problem, but it feels like it is a growing problem, an accelerating problem. There is so much more data now, everywhere. Units across the institution are daily implementing specialized applications it seems. Internet enabled things — doors, cameras, parking meters, you name it, are by the second generating ever-expanding amounts of data. The university's data architecture is becoming more and more complex. Where's the data? In the Cloud! Who's Cloud? What Cloud? It feels out of control.

And maybe it is.

Vendors will certainly tell you it is and will readily sell you their solution — but you have to buy now before the quarter ends! Is this more hype and fear?

Before we succumb to the fear and buy into the hype, let's step back, take a slow breath or two, and ask: what do university leaders perceive their data problem to be? What do university leaders want from their data? It depends on who you ask.

5.2 The Analytics Perspective

If you asked Institutional Research (IR) leaders or those from other units performing enterprise analytics what they want from data you might hear:

K. Briner (✉) · J. Rome (✉)
Arizona State University, Tempe, AZ, USA
e-mail: kelly.briner@asu.edu; john.rome@asu.edu

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K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1_5

- We want to maximize the analytic value of the data to meet mandated reporting requirements and to provide decision makers with the information they need to achieve the university's objectives;
- We want to establish a data-driven culture where decisions are supported by facts not conjecture;
- We want the broadest possible access to data. In fact, we want access to all the data so we can decide if it is useful or not;
- Even if we are not using the data now, we might have a use for it in the future, so keep it; don't delete any of it;
- We don't want to waste a lot of time finding the data or figuring out how to use it, so we would like to have a complete data catalog that is searchable and allows us to understand the data from top to bottom, from start to finish. We need to know what the data means; we need to know its provenance;
- We don't want to waste any time deciding whether the data can be trusted or not either. We want clean, consistent, high quality data — verified and validated. We want a single version of the truth!;
- We do not want to waste time fiddling with ad hoc joins. We want well-designed relationships between the different data sources. All the data for the enterprise should seamlessly work together;
- If perchance any of these are missing or incomplete, if there is a problem with the data or the data documentation, we want to know who we need to contact to get it fixed and if they do not correct the problem to our satisfaction, we want to know who we can tell to make them fix it. We're tired of cleaning up other people's data messes!

5.3 The Security Perspective

If you asked the Chief Information Security Officer and other security officials on campus, you might hear a different perspective. The CISO's probably will start with the need to minimize the risk to the university from its data. More data, more data access, means more risk for the university. From a security perspective, users should have the least possible access to data that still allows them to do their job. It doesn't take long to realize that "what if" means something entirely different to the security staff than it does to enterprise data analysts. Security staff consider items such as:

- What if bad characters get access to a widely-accessible data catalog? They would know exactly what data there is and where it can be found;
- Security needs to know where all the data is stored and what security classification the data falls into. Is it highly sensitive? Is it public? What if someone accidentally shared highly sensitive data without realizing it?;
- Data that is not being actively used should not be retained, for fear that it will get exposed;

- Security officials need to know who is responsible for the data, for granting access to it and removing that access when appropriate. What if there is a problem, a breach? Security officials need to know who to contact to resolve the issue and who it impacts.

5.4 The Finance Perspective

In addition to considerations for analytics and security, there is the money perspective. Like the CISO's, the Chief Finance Officer wants to minimize the potential costs associated with data risks. But CFOs also recognize the criticalness of data for making management decisions, for making decisions for the university. While both the enterprise analytics perspective and the security perspective are valid, the CFO and other financial analysts want to achieve these goals with the minimum of costs. However, protecting, creating, documenting, and storing data costs money. Further, completing these functions inefficiently by having duplicate copies of data scattered across redundant applications is wasteful and costs more money.

CFOs want to know about the applications that are using all this data. What services are being provided by these applications? How much is it costing? How much is it going to cost over the next five years? Who made the decision to do this and who is going to pay for it? Can anyone even tell us exactly what data we have, where it came from, where it is stored? Who is responsible?

5.5 Building the Enterprise Perspective

The first point that is noteworthy about the CFO perspectives is that the Information Technology perspective is absent. Universities don't create or manage data for the sake of their Information Technology units. Universities are not in the information technology business. Universities are in the education and research business. Information Technology is a means not an end.

Secondly, these perspectives can be conflicting. The enterprise data analysts are all about open access. They want as much access as they can get. They want to use the available data to the maximum possible extent. They see sharing of data as a good thing, a necessary thing. On the other hand, the security folks are all about limiting access, limiting exposure. They see sharing of data as a risky thing.

The third noteworthy point is that while there is conflict, there are also common goals. Everyone wants to know what data there is being captured, to understand the data, how it is classified, and what it means. Everyone wants to know who is responsible for the data and who they can contact to resolve issues and who wants incorrect data or to waste university resources?

The fourth item of note is recognition that achieving these common goals requires cooperation. Enterprise data analysts will not be able to get, understand, and

effectively use data without cooperation. In an enterprise fashion, the data has to be shared by student administration (including admissions and registration), academic planning, by the finance office, human resources, and facilities. Similarly, the CISOs cannot achieve their goals without the cooperation of everyone that has access to the data. One weak link is all it takes for the security chain to break.

Finally, it should be clear that cooperation requires consensus because cooperation isn't free and the cost of cooperation often is not always borne by those that benefit from it. What is the motivation for units to do the extra work when it doesn't directly benefit their unit? How can this consensus be achieved? If not voluntary, can coercion be used?

Conflict resolution.

Finding common goals.

Building cooperation.

Finding consensus.

Using coercion.

It sounds quite political, doesn't it? It doesn't sound much like an IT problem that can be solved by purchasing a new application. It sounds more like an organization problem. It sounds more like a management problem — like a data management problem. It is.

The importance of cooperation comes as no surprise to IR departments. IR departments have always been dependent on other units for data, meta-data, and the quality of the data that they receive. IR departments generally have no direct control over the raw transactional data generated by operational ERP systems. Instead, IR departments have taken the approach of performing their own, often extensive, data clean up processes of frozen snapshots extracted from operational systems. A formal data governance program provides IR departments with a mechanism for improving data quality at the source of the problem rather than repetitively cleaning of the data after the fact.

5.6 What's the Solution?

To address this data management problem, many institutions are implementing formal data governance programs. However before we go further, let's address some terminology.

Data management, data governance — they sound like the same thing. Other terms include information management, knowledge management, insight management, data administration, as well. It can be confusing.

It is a lot like picking something to watch where the categories are trending movies, popular movies, or favorite movies. How many ways can be found to say the same thing? You just want to find a good movie to watch without a lot of work. Analysis and discussion of the differences between the "popular movies" and "trending movies" categories isn't going to advance you to your goal of finding something to watch. We don't want to fall into that common trap here.

We're going to stick with two just two terms: Data Management and Data Governance.

5.6.1 Data Management

The general consensus today is that "data management," "information management," and "data administration" are all synonymous and that the scope of these terms is broad, as broad as information technology itself.

Data Management's concern is the direct management of all aspects of the data asset life cycle including the design and operations of security, of development processes, of information technology infrastructure and architectures. Data Management tends to be information technology centric, although it existed before the first computer appeared on campus. If you have information technology at your university, you are doing data management. You may be doing it poorly. You may be doing it haphazardly and inefficiently, but you are doing it. If you want an exhaustive description of Data Management, the go-to resource is the Data Management Association's (DAMA) *Guide to Data Management Body of Knowledge* (technicspub.com/wp-content/uploads/2015/02/DMBOKFactSheet.pdf).

5.6.2 Data Governance

Data Governance is a part of Data Management and it ensures the data management efforts are in line with the goals of the enterprise. Data Governance provides control over the other data management activities so that they work together to provide the enterprise the most valuable data assets with the least risk and the least cost. In the DAMA circular diagram of data management functions (https://technicspub.com/dmbok/), Data Governance is the hub in the middle that ties the other functions together. While Data Management is very much in the information technology bailiwick, Data Governance is not.

Here are two definitions to consider:

- DAMA defines Data Governance as "The exercise of authority and control (planning, monitoring, and enforcement) over the management of data assets." p. 19
- Gwen Thomas of the Data Governance Institute (datagovernance.com) provides this definition of Data Governance: "Data Governance is the exercise of decision-making and authority for data-related matters."

What do these two definitions have in common? Data and authority. That is what Data Governance boils down to: *authority over data*. Good data governance, like so many other things, is efficient and effective authority over data. Bad data governance is ineffective and inefficient authority over data.

Authority can take many shapes. Authority can be centralized or decentralized. Universities are typically more decentralized than other organizations due to their size and complexity. The more decentralized a university is, the more necessary and valuable data governance is. In a perfect bureaucracy, data governance would be unnecessary. Authority and decision making would roll neatly up to the top of the organization chart. If two nodes of the organization could not agree on an issue related to the management of enterprise data assets, they would submit the issue up the organization for resolution. Unfortunately, actual universities are not perfect bureaucracies and even if they were, the decision makers at the top of the organization would not have the time or energy to resolve all the potential data management issues that could arise. Another approach is required.

The approach that most organizations have developed for data governance, or the authority over data, is a combination of individual responsibility and shared decision making.

5.7 Common Aspects of a Data Governance Program

Enterprise data governance programs typically have four major components. Variations on these roles exist depending on local circumstances and complexities, but most programs have these basic pieces: executive sponsorship; data stewards; an oversight group; and a data governance program office. Of these, the data governance program office is by far the least important and is typically the smallest in size. These components are discussed from the perspective of the Arizona State University data governance program which are fairly typical for postsecondary institutions.[1]

[1] The interested reader may wish to review McLaughlin, Howard, Balkan, and Blythe's (1998) monograph on *People, Processes, and Data Management* as a precursor to contemporary concepts and roles related to data management in higher education today. Similar to today's roles that are needed for data management, McLaughlin et al. discussed the roles of data users of institutional data, and optimum ways to assign roles and responsibilities to various users and units on campus. Although these authors use slightly different terms, they discussed the need for data custodians, data brokers, and data stewards as a way to assign various levels of responsibility that ensure efficient accuracy checks and a structure that enabled all officials on campus to have a clear understanding of who was responsible for select data, and at what point in the semester. The concepts in the McLaughlin (1998) text have a number of points that parallel the ideas put forth in this chapter.

5.7.1 Executive Sponsors

Data Governance requires authority, and the executive sponsors are where a data governance program gets its authority. As an example, Arizona State University has established a formal executive sponsor role within the data governance program and have tied it to the existing organization chart of the university. This is the ASU definition of the Executive Sponsor role:

Executive sponsors are senior university officials that report directly to the president. Executive sponsors assign data stewards responsibility for segments of data within their functional area from their direct reports. Executive sponsors appoint selected data stewards to represent their functional area on the Data Oversight Council.

There are several benefits of tying the data governance roles to the university's official organization chart rather than creating a separate, stand alone organization for the data governance program:

- First, it gives automatic legitimacy to the data governance program.
- Second, it re-enforces the idea that responsibility for data is a part of the job description for executives and other leaders. Responsibility for data assets isn't a specialized separate responsibility that can be shifted to someone else.
- Third, it tends to ensure that the Executive Sponsors are peers with more or less equivalent authority so that if issues arise that need to be resolved the parties involved are more or less equal.
- Fourth, the data governance program doesn't have to spend much time re-inventing the wheel. The organization chart already exists. The data governance program just needs to adopt it and adapt to any changes that occur.
- Fifth, it provides a natural and understandable way to do the initial segmentation of the university's data. The provost is in charge of academic data. The head of research is responsible for research and research administration data. The dean of students is responsible for non-academic data related to students and so on.

Executives that report to the president are busy people. A goal of the data governance program should be to keep the time requirements on this group to a minimum. The primary responsibility of Executive Sponsors at ASU is to appoint Data Stewards.

5.7.2 Data Stewards

For the reasons outlined above, ASU has chosen to tie Data Stewards to the university organization chart and restrict Data Stewards to the direct reports of Executive Sponsors. The formal definition of a Data Steward is:

A senior university official that report directly to an executive sponsor and have been assigned data stewardship responsibilities for a segment of data by the

executive sponsor. Data stewards have planning and policy-level responsibility for data. Data stewards work with the Data Oversight Council and ensure that appropriate resources are made available to support the data governance needs of the university.

Data steward responsibilities include:

- Assigning, training and overseeing deputy data stewards;
- Determining legal and regulatory requirements for data within their area;
- Supporting the Data Oversight Council in the establishment and implementation of data policies, standards and procedures; and
- Promoting appropriate data use and data quality.

In recognition that Data Stewards, like Executive Sponsors, are busy and may not be able to perform data steward responsibilities unassisted, ASU has created a deputy data steward role to assist the Data Stewards. Unlike the Executive Sponsor or the Data Steward role, the Deputy Data Steward is not linked to the organization chart. The Deputy Data Steward can be anyone that the Data Steward selects. This allows total flexibility for the Data Stewards to assign whoever is necessary to help them fulfill their stewardship responsibilities. Data Stewards and their deputies form a data governance team and jointly share the responsibility for their assigned segment of the university's data. While the deputies can assist the Data Steward, ultimately the Data Steward is still responsible for the data.

The formal definition for the Deputy Data Stewards:

Deputy Data Stewards are university officials with direct operational-level responsibility for the management of one or more types of university data. Deputy Data Stewards are delegated this responsibility by a data steward.

Deputy Data Stewards responsibilities in support of the data steward may include:

- Developing and maintaining data classification according to the ASU Data Classification standard;
- Implementing and managing data access;
- Interpreting and ensuring compliance with regulations and policies regarding the use of university data'
- Resolving data quality issues;
- Developing data definitions for data that is shared across multiple functional areas; and
- Educating data users on the appropriate use and protection of university data.

5.7.3 Oversight Council

The Data Oversight Council is a working group composed of representative data stewards and other expert stakeholders. Data stewards on the council are appointed by executive sponsors. The council is chaired by the Chief Information Officer and

facilitated by University Technology Office staff. The council oversees data governance for the university. Data Oversight Council responsibilities include:

- Understanding the strategic university data and data architecture requirements;
- Developing and maintaining the data strategy for the university;
- Ensuring regulatory compliance;
- Developing and approving data related policies, standards and procedures;
- Resolving data governance issues including questions of stewardship, access and appropriate usage of data;
- Sponsoring and overseeing university data management projects and services; and
- Serving as the liaison between the council and the data stewards within their functional area.

The number of data stewards at ASU prohibits the Oversight Council from including all data stewards. Instead, The Oversight Council includes representative data stewards from the various executive sponsor area to keep the council size reasonable. For institutions with fewer data stewards, full data steward participation may be an option.

Expert stakeholders are university officials who serve on the Data Oversight Council but are not data stewards. These individuals provide expert technical knowledge relevant to data governance to the council. University legal counsel, the university FERPA and HIPAA officers, and the Chief Information Security Officer are examples of expert stakeholders.

5.7.4 Data Governance Program Office

The mission of the Data Governance Program Office is to facilitate the data governance program by assisting the other components — the executive sponsors, data stewardship teams, and oversight council — fulfill the responsibilities of their roles as effortlessly as possible.

This does not need to be a large group of people. Words like “invisible” and “non-invasive” have been used to describe the ideal Data Governance Program Office. The goal is not to build a central data governance empire, but to build an all inclusive data governance culture.

The core tasks of the Data Governance Program Office are:

- Maintain an inventory of data segments and their assigned data stewards;
- Request executive sponsors to assign data stewards to data segments without data stewards; and
- Facilitate issue resolution at the appropriate level, either at the data steward or the oversight council.

5.8 Implementing Data Governance

Three steps are needed for implementing successful data governance. After authority for the program has been granted, a data governance program framework must be established. In this framework, it is important to define roles and responsibilities, to divide the data assets into logical segments, and to assign responsibility for data asset segments. Once these steps have been completed, the data governance program can be used to identify and resolve issues. Let's detail each of these steps.

5.8.1 Get Authority

The first critical requirement for establishing a data governance program is to acquire authority for the program. Recall the DAMA definition of data governance: "*The exercise of authority and control (planning, monitoring, and enforcement) over the management of data assets.*" A data governance program needs to be given some power by the university. Without power, the program will not succeed. It will be ignored. To acquire this authority, university executive leadership needs to be convinced first that there is a problem and second that the data governance program can be an effective solution to that problem.

Common wisdom would be to write a formal business case that defines the problem and the data governance program solution in terms of dollars and cents; this is what the lack of a data governance program is costing the university. One of the difficulties in building the case for data governance is that the problems it addresses are not obvious.

This starts with the characteristics of data itself as an asset. Buildings and equipment are visible and clearly valuable and deserving of control, and no one needs to justify protecting assess to cash in the university's bank account. But data assets are largely invisible and are easily copied and easily transferred from location to location. Data assets are inherently easy to take for granted.

Furthermore, the inefficiencies that poor data quality creates are distributed to all downstream users of the data, either as repetitive after the fact data clean up or perhaps even worse, to the unaware use of incorrect data (see Chapter Eight of this volume for examples of data in accuracies and/or misuse). It is likely that no one is tracking the amount of time analysts spend cleaning data, too often a necessary task for staff members in IR or BI departments. Similarly, the risks associated with data assets — privacy and security tend to be abstract notions. How much security is enough is a difficult question to answer.

Quantifying the cost and risks associated with not having a data governance program can be attempted. Universities can estimate the time spent cleaning up data quality issues. The risk and cost of potential data breaches can be quantified. With that said, building a business case for a data governance program can be an uphill task if university executive leadership is pre-inclined not to invest in such a program.

More administrative overhead is never an easy sell and now with increasing pressure to reduce the cost of higher education the sale is harder than ever.

However, the characteristics of the problem that it difficult to quantify also can be applied to the solution. While it is true that the cost of the data related problems are dispersed and not obvious, the same can be said for the costs of the data governance solution. One doesn't need to sell a large new organization nor buy new applications or computer hardware. Start building a data governance program by getting agreement on the overall situation at the highest levels possible:

- Data is a valuable asset and the successful operation of the university depends on data;
- There are also risks associated with data;
- We have some problems with our data assets. (Enter local problems here: data quality, conflicting information, disjointed data…);
- Effective governance of data requires some individual to be responsible for the data;
- There is too much data and too much variety of data for one person or one department to be responsible for all of it. Therefore the data needs to be divided into segments and different individuals made for responsible for parts of the data assets;
- Much of the value of data assets is in the ability for the entire enterprise to share the same data. Therefore there needs to be a way to coordinate this sharing. There needs to be some mechanism for ensuring that the data segments work together;
- While we may be doing much of this work already in an informal manner, the university would be better served doing this work in a more formal, structured manner; and
- Establishing a small data governance program office, maybe only one individual is a cost-effective way to implement data governance.

Convincing university leadership that a data governance program is worth the expense, is easier now than it has ever been in the past. Many universities are in the process of implementing a formal data governance program. Data governance is a current trend.

5.8.2 Define the Roles

- A first step in establishing a data governance framework is to define the roles and the responsibilities for your institution. Begin with the data steward. Then, consider several next steps:
- Determine how disagreements between data stewards will be handled; define the role and responsibilities of an oversight group;
- Establish who will be responsible for the data governance program; define the role and responsibilities for a data governance officer;

- Determine how data stewards will be appointed?; and
- Decide who will select and supervise the data governance officer.

5.8.3 Divide the Data Assets into Logical Segments

Most institutions already have a framework for dividing the data assets in place. Again, as always, the goal is to build from what already exists. Start with the large ERP systems: Student, Finance, HR, etc. The goal is to keep the segmentation manageable rather than to develop the most extensive taxonomy possible. In general, fewer segments are better. Fewer data areas means fewer data stewards, less training, less communication overhead, less questions about whether the data is the responsibility of this or that data steward.

5.8.4 Assign Responsibility for Data Asset Segments to Specific Individuals

An individual means one person. Give them the support to allow them to succeed for the responsibilities you have defined.

5.8.5 Use the Data Governance Program to Identify and Resolve Issues

Now you have the data divided; you have individuals assigned responsibility for data segments; you have defined their responsibilities. What next? Don't try to boil the ocean. Attach your nascent data governance program to an initiative that is starting at your institution. Maybe it is a security initiative. Maybe it is an analytics initiative, maybe it is the implementation of a new application or a new environment. Perhaps your data center is moving to the public cloud.

5.9 Institutional Research's Role

Although the majority of points made in this chapter apply most directly to IR units in research universities, many points also apply to data governance models and IR professionals in other institutions. Institutional Research departments are typically charged with doing enterprise level reporting and analysis, externally mandated reports as well as internal management information reports.

As a user of a wide variety of enterprise data assets, IR is in a position to see the need for an enterprise data governance program. IR, like other units performing enterprise level analytics, directly knows the difficulties there is finding the right data sources and the hurdles that sometime must be overcome to get access to some another unit's data. And that is just the start. Once obtained, the data needs to be understood and validated. Oh for a data dictionary! Oh for clean data! IR knows first hand the data quality issues that exist, both data quality issues internal to a particular data source such as missing values, and data quality issues preventing multiple sources of enterprise data from being effectively used together such as different coding schemes.

Beyond seeing the need for an enterprise data governance program, IR leaders are also in a position to provide objective justification for the program. IR knows and should track the work that is required to overcome these problems that exist because of the lack of data governance. IR professionals can translate this work into dollar and cents metrics justifying the business case for an enterprise data governance program. IR spends X hours every year cleaning up data quality problems. This effort costs $Y. IR needs to perform this work year after year in order to provide these mandated reports. A data governance program could be instrumental in solving these problems at the source once and for all rather than everyone having to continually cleaning them up after the fact downstream.

As a primary beneficiary of a well-run data governance program, IR can be a force for ensuring that a data governance program, once initiated continues to develop. Examining the common elements of enterprise data governance programs, there are two primary roles IR could fill. The senior IR leader should be a part of the data governance oversight group. IR has the need for enterprise data to be well managed so is motivated to contribute to the success of the program. Additionally, having a broad perspective rather than a narrow one would benefit IR practitioners in the execution of the oversight role. If appropriate for the circumstances, the IR unit could also take responsibility for enterprise data governance program office itself and facilitate the oversight group and the data stewards.

5.10 Conclusion: Can Technology Save us?

Changing technology is a factor in accelerating the need for universities to devote more attention and energy to data governance and data management. The sheer volume of data is increasing, as are the places where university data can be stored. Applications hosted on the public cloud and provided to the university as services present new data management challenges. Such applications are easily purchased by individual units, perhaps without going through the normal enterprise procurement process. University data can be stored outside the control of university IT. Often this data extends beyond the data related to the individual unit using the service to include common enterprise reference data like bio-demographical data, charts of accounts, building and room data. Can technology solve the problem as

well? Is there a technology silver bullet that universities can purchase to solve all their data management and governance problems? The short answer is no.

As far as we know, there isn't a single tool available for sale that universities can purchase, install, and use to "do" data governance and data management. That's the bad news. The good news is you probably have many tools available already that can be used to help establish and maintain a data governance program. Some, like email, Word, Excel, and a database management system are ubiquitous. Others, like workflow or collaboration software, are commonplace. In reality, a specialized data dictionary application is not going to advance the development of a data glossary for your university more than a spreadsheet. The work is in developing the definitions, agreeing on the definitions, defending the definitions from degradation. The work is not in digitally capturing the definitions or sharing them.

With that said, maybe there will be some technology in the future that will be even better. Metadata tools that streamline data discovery tasks or data virtualization tools that eliminate some of the complexities of the data architecture and the resulting data management overhead. Finding the data and knowing where how it moves is a first essential.

Remember data governance is more about people and process than it is about information technology and data. From an IT perspective, good data and bad data are not different. Data management and data governance are about managing and governing people. It's about policies and processes: roles and rules.

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Chapter 6
Let Me Paint You a Picture: Utilizing Visualizations to Make Data More Accessible

Brent M. Drake, Ian Pytlarz, and Monal Patel

6.1 Introduction

Today's higher education leaders come from an increasingly diverse background. Traditional academic professors as well as college presidents coming from a corporate background have taken the dive into highly visual and graphically-rich information. Regardless of their background, college and university leaders always juggle multiple needs each day and thus prefer compressed information. The need for highly accurate and context-specific information is always present, but technologic changes continue to make it possible to create high quality data visualizations to explain data in a more digestible fashion. Institutional research (IR) offices are in a particularly opportune position to utilize their skills to produce superior data visualizations. Well-designed visualizations that are easy to interpret and that incorporate the facets of good organizational intelligence are an important component in building IR capacity.

In his chapter on business intelligence's role in institutional research, Henry Zheng (2015) discussed the necessity for IR offices to expand their capabilities around data visualizations. He correctly pointed out that good visualizations can help convey complex data sets in simple and effective summaries to support better data-driven decision making. Additionally, if we are to ever function in the new federated environment proposed by Swing and Ross (2016) IR practitioners need to provide easier to use tools for our consumers to explore and answer questions while maintaining the high data governance standards established by IR offices. Effective

B. M. Drake (✉)
University of Nevada Las Vegas, Las Vegas, NV, USA
e-mail: brent.drake@unlv.edu

I. Pytlarz · M. Patel
Purdue University, West Lafayette, IN, USA
e-mail: ipytlarz@purdue.edu; patel@purdue.edu

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K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1_6

data visualizations are an important addition to those tools. As with all tools available to IR officers, the key to good data visualizations is the IR analyst's ability to make informed decisions based on their knowledge of the underlying data and the question they are trying to answer.

Data visualization consists of the tools, technologies, techniques, and methodology to display, explore, and communicate quantitative information in a graphical format. It continues to be a rapidly growing and evolving discipline (Rom 2015). Data visualization is becoming ever more prominent and plays an expanding and critical role in the continuing evolution of institutional research and business intelligence. It allows our constituents, from the leadership of our institutions down to the functional operational offices, to make better data informed decisions (Diamond & Mattia 2015). Visualizations can allow data to be presented in a manner that highlights patterns that can greatly inform decision making. In addition, visualizations allow users significantly greater interaction and exploration of the data (SAS 2014), allowing for deeper insights.

Technical advances are having a strong impact on how the IR practitioner collects, analyzes, and presents information. Highly interactive visual data dashboards are one of the tools in an effective institutional research office's kit to allow for high quality interaction between our end users and our data. In addition, today's software provides tremendous ease for users to create visually appealing charts and graphs to allow our users to connect with and greater understand our data. One prime example is the institutional fact book. Today, many institutions are moving away from static pages in a fact book to provide graphical views of relevant information about their institution, and with the advancements in technology they are able to provide dashboards of visualizations that also allow their consumers to interact and easily explore deeper layers of information. A few examples include Cornell University (http://irp.dpb.cornell.edu/university-factbook), Indiana University Purdue University Indianapolis (http://irds.iupui.edu/Institutional-and-Strategic-Planning/IUPUI-Data-Link), Purdue University (https://www.purdue.edu/datadigest/), University of New Mexico (http://oia.unm.edu/facts-and-figures/data-visualizations/index.html), and University of Texas at Austin (https://reports.utexas.edu/spotlight-data).

Visual representations can provide a modality for our consumers to more easily understand, explore, and be informed by the data we produce. However, a poorly designed visualization can be as difficult to interpret for an end-user as a large scale table of numbers (Stofer 2016). It is important for IR analysts to choose the right visualization to answer their question and provide enough scaffolding techniques to allow for meaningful interpretation of the data. This chapter will provide some tips on producing quality visualizations as well as some examples of how modern tools allow for greater interaction with data. For those desiring a more in-depth reading of procedures and methodologies in creating high quality data visualizations we recommend the work of Tufte (1983, 2006) and Wong (2010).

6.2 Start with the Question

Before we can figure out how best to visualize our data, as with any quality research, we must start by asking the right research question (Evergreen 2017; McMillan & Schumacher 2001; Sanders & Filkins 2012). The same holds true in data visualizations, as the first and most important step is asking yourself "What question am I trying to answer with my data?" There are subsets to your overall question that will help you reach the optimal answer including:

- Who is the audience for my view?
- What types of questions do they most commonly ask?
- What are the follow up questions that generally occur after the first answer?
- What conversations am I trying to spark with my data? (Tableau 2013)

It is important to note that these are subsets of the overall question. You will notice that the overall visualization question has been phrased as asking a singular question. This is intentional and important. While a good research study might answer multiple research questions, it is difficult to create a quality visualization that can clearly answer more than one type of question in a single view. When one attempts to answer too many separate overarching questions in one view it can create confusion, and defeat the purpose of the data visualization in the first place. As discussed later in the chapter it is important to keep visualizations clear and simple to convey the necessary information to the consumer.

6.3 Choosing the Visualization

Once the primary purpose of the visualization has been determined, the next step is to choose the right method for presentation. There are a few primary categories of visualizations: Comparisons; Distributions; Flows; and Diagrams of Unstructured Data. The visualization that best meets the need case depends on the specifics of the question that lead to that category of visualization. Here, we will focus on some of the questions that might lead you to a category of visualization and what to think about as you choose a specific visualization.

6.3.1 Comparisons

There are many types of questions that might lend themselves to a comparison visualization. "What are the differences between these groups/geographies/variables?" and "How does this variable change over time?" are prime examples. As with any traditional analysis, once the IR analyst has ensured proper understanding of data definitions, any question that can be answered by simply comparing one set of

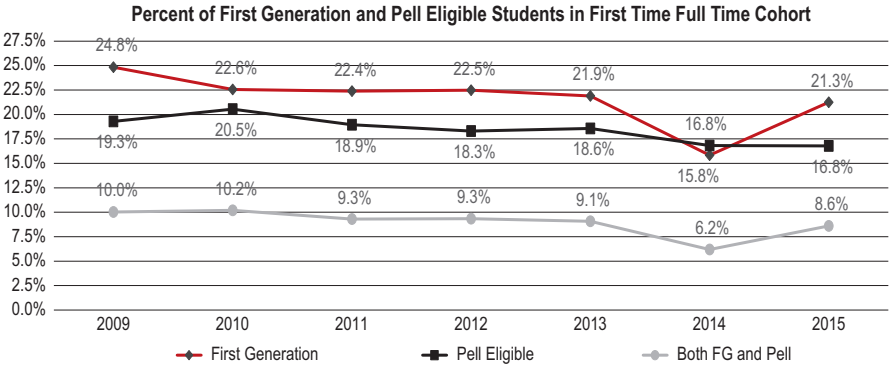

Fig. 6.1 Line Graph (Reproduced from Drake 2017)

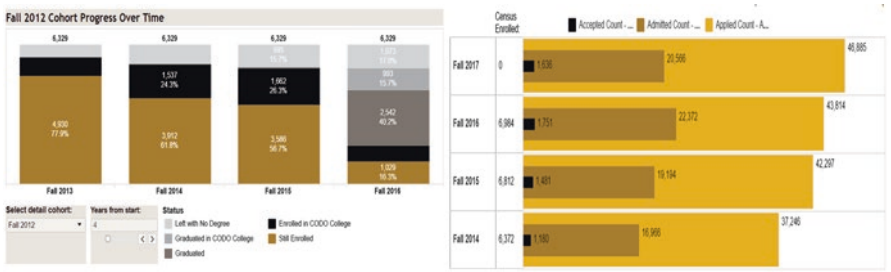

Fig. 6.2 Bar Charts (Reproduced from Drake et al. 2017)

numbers to another falls into this category. Numeric comparisons are common and easily achieved in data visualizations, and also present the analyst with many options with which to visualize their data. When the IR analyst is interested in displaying the trend of change for data over a period of time, a line graph, such as shown in Fig. 6.1 often works best (Groebner et al. 2014). Bar charts can also convey data trends over time, but generally are best used if one is attempting to convey a comparison of quantity (Groebner et al. 2014). Bar charts are particularly useful when using stacked bars to indicate sub quantities between categories (Fig. 6.2). Bar charts can be used both in horizontal and vertical bar forms and should be placed in the manner that allows the viewer to most easily read and interpret the information. In general, if a comparison can be done with a line or bar chart, it should be, given the ease with which these charts convey information.

For displaying data about a geolocation in comparison to other geolocations, many current statistical and visualization software packages provide simple and effective mapping options as can be seen in Fig. 6.3. This allows for the display of quantitative differences by geolocation, such as comparing student enrollment by geolocation or relative usage of services by campus location.

Pie Charts can also be used for displaying quantity differences. However, as a good rule of thumb it is generally best to avoid the use of pie charts (Tableau 2013).

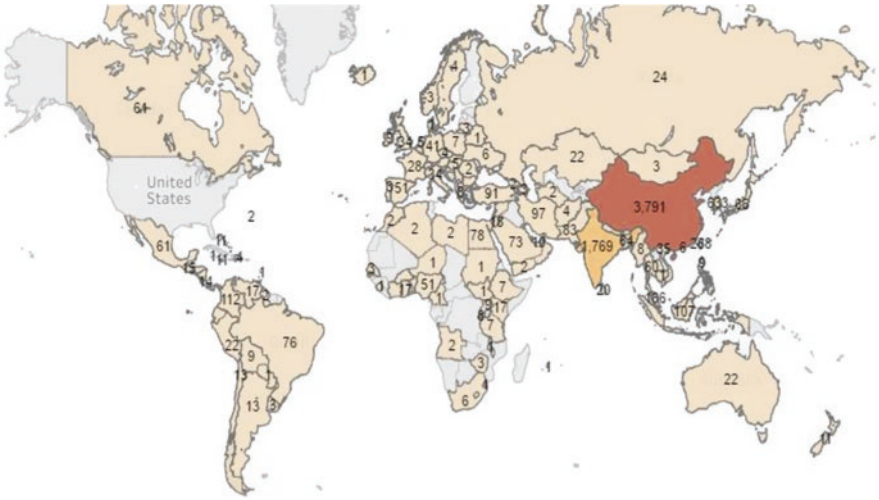

Fig. 6.3 Geolocation Chart (Reproduced from Drake et al. 2017)

This is because human vision is not very good at estimating area, something that pie charts rely upon. Additionally, if you are showing quantities for multiple categories you, generally, can only compare slices that are right beside each other, otherwise it is too difficult to distinguish the differences (Tableau 2013).

Scatter plots are excellent for displaying the relationship between two variables. They are particularly useful when working with large quantities of data as they provide an effective view of the strength and direction of the relationship (Groebner et al. 2014). Bubble charts are a specific form of scatter plots that are uniquely effective when there are a lower number of data points, and you want to display the magnitude of each of the data points. An example is found in Fig. 6.4, where the IR office wanted to convey the relationship between the grade distribution and attendance as well as the magnitude of students in each grade.

6.3.2 Distributions

Histograms and ogives are highly effective in showing the distribution of data. Histograms not only have the benefit of displaying the range of data, but they provide the modality, as well as the overall shape and potential skew of a variable (Groebner et al. 2014). However, when you want to display the overall dispersion of data it is hard to beat a box and whisker plot, such as the distribution of undergraduate time to degree found in Fig. 6.5.

The box and whisker has the advantage of not only showing information about the distribution of data, but provides data on the median, quartiles, and outliers inherent in the data (Groebner et al. 2014; Tableau 2013). These outliers are

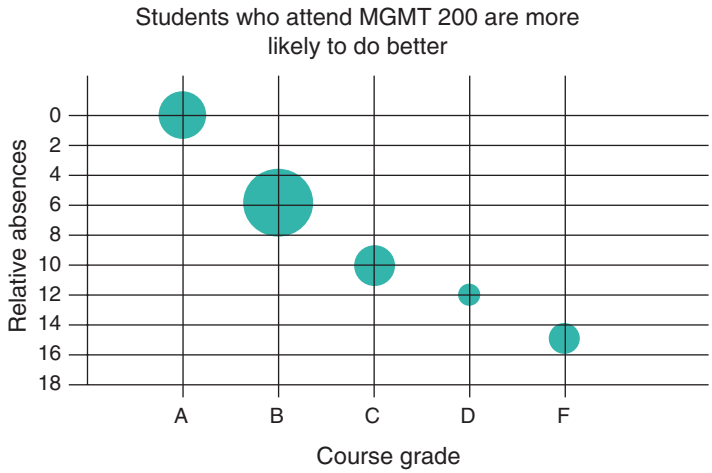

Fig. 6.4 Bubble Chart (Reproduced from Pytlarz et al. 2017)

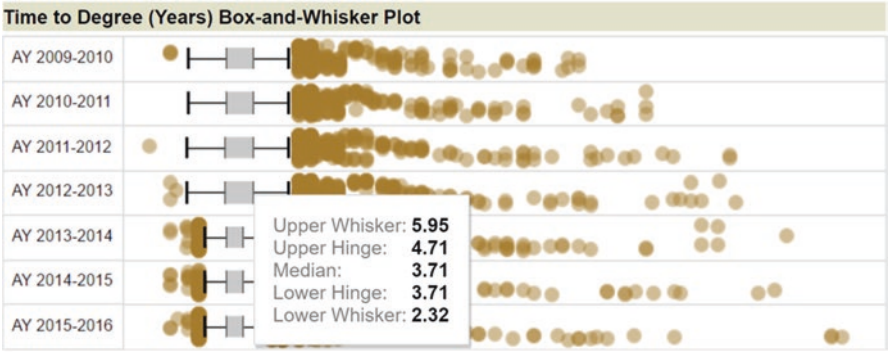

Fig. 6.5 Box and Whisker Plots (Drake et al. 2017)

informative to point out potential business process improvements. It is also highly beneficial when one has a large amount of data with many unique values. However, consider your audience when using a box and whisker plot. It is a chart type that is not easily understood by those without a statistics or visualization background.

6.3.3 Flows

There are several common options for displaying both the direction and the quantity of flow data. These include Sankey charts, chord charts, sunburst charts, and tree diagrams. Chord charts have the added benefit of displaying the interrelationship of data in a set while tree diagrams and sunburst charts (Fig. 6.6) have the added

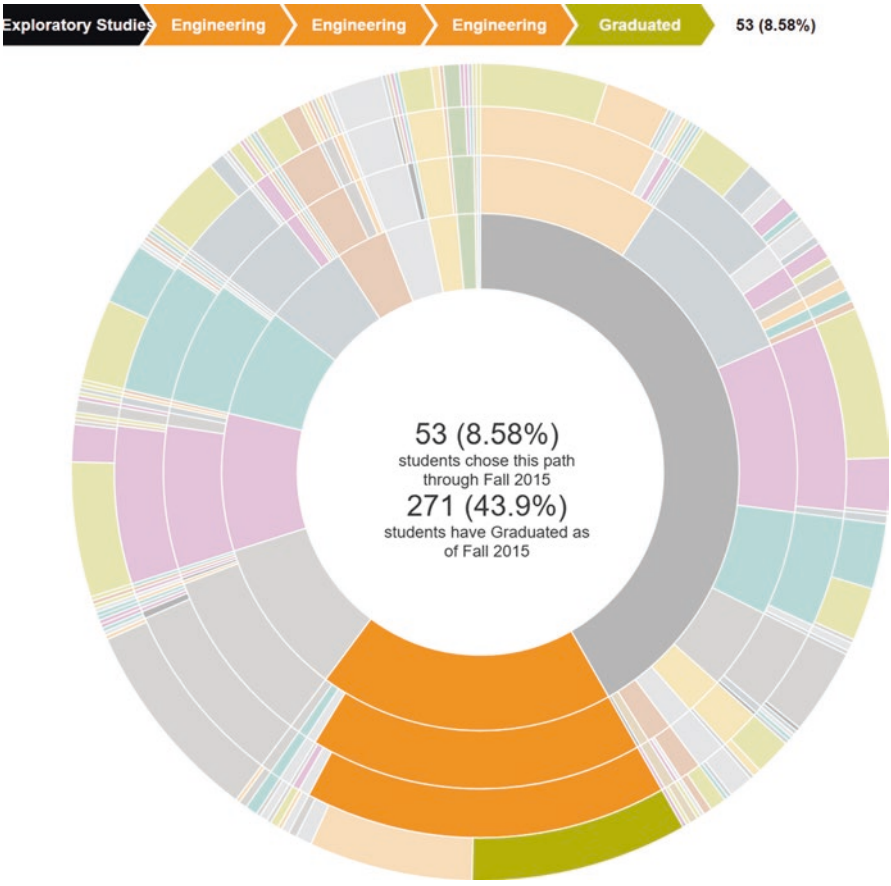

Fig. 6.6 Sunburst chart (Reproduced from Drake et al. 2017)

benefit of displaying the hierarchical flow of the data (SAS 2014). For instance, the sunburst chart in Fig. 6.6 shows the flow of a population over time represented by bursting out to the edges of the circle. Displaying student migration patterns, like this, is a common use for flow charts in IR offices.

Chord charts, such as the one displayed in Fig. 6.7, can provide a highly interactive visualization. This one focuses on the flow of students through various academic units. The exploration of that data is a complex concept, and therefore should involve user commitment to spend time conducting the exploration. The chart displays the movement of student between academic colleges in one year at Purdue University. The initial view conveys the absolute totality of student movement on campus in one academic year, but does not allow for a greater insight into the nature of student movement beyond the initial reaction of "my gosh, students move

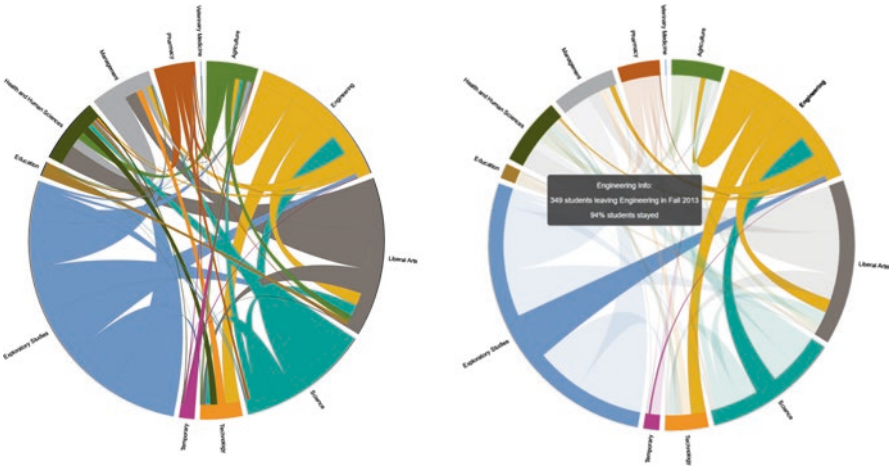

Fig. 6.7 Chord Chart of Student Movement (Reproduced from Drake et al. 2017)

everywhere in massive numbers." However a simple click through and hover allows a user to see all of the areas that one academic college exports students to in one year as well as all the academic colleges that import students to the college of interest.

6.3.4 Diagrams of Unstructured Data

Often when working with large sets of unstructured data, such as massive strings of text files, displaying the data in quantitative form is neither ideal nor sometimes feasible. As the volume of IR offices' data expands, conveying meaningful information about the underlying data becomes an even greater challenge. This becomes an even larger task when conveying information about large sets of text-based data. New technology packages offer the benefit of examining unstructured data sets of primary text output in a visually meaningful way. These can be displayed effectively via word clouds (Fig. 6.8) or network diagrams to provide a general sense of the frequency of specific sections of text as well as the amount of possible strings (SAS 2014). A typical word cloud presents key words that appear multiple times in the data. The size of the word indicates its frequency of mention. This provides the institutional research analyst the capability of providing a meaningful visualization that conveys more information about the density of a set of data than a pages long frequency distribution would. A prime example of when IR offices might use a word cloud is when summarizing the results of open ended items on surveys or responses from focus groups.

Fig. 6.8 Word Cloud Chart (Reproduced from Drake 2017)

6.4 Additional Considerations

Simply providing the data in a visual format will often not be enough to convey the important information by itself. It is beneficial to end-users to utilize scaffolding techniques that help with interpretation (Stofer 2016). Otherwise it is possible that a visualization can lead to a misrepresentation of the data by the end-user. It is not enough for an institutional researcher to simply produce a visual display of their data, they must provide the proper scaffolding information to help avoid misinterpretation of the information that the institutional researcher is attempting to convey. These scaffolding techniques can include methods such as embedded data labels, quality label of axes, legends for groupings, and highlighting of key factors (SAS 2014; Tableau 2013). Scaffolding can also be provided by emphasizing the most salient data by placing it on the axes while relaying less important information via size, shape, or color differences, or by utilizing the organization and orientation of views (Tableau 2013). Sometimes, to allow for ease of interpretation by the viewer, the best scaffolding technique is to add additional exploratory text as context with the visualization that is often not embedded directly in the visualization itself (Stofer 2016).

However, a balance needs to be struck in both scaffolding and the sheer amount of information contained in a graphic. It is also important to avoid overloading the consumer with too much extraneous information in a data visualization. Instead of stacking all of the information into one view, it can be helpful to break measures down into multiple smaller views. Also, avoid overloading a visualization with far too many shapes and colors. While color and shape can both be effective scaffolding techniques to highlight and understand patterns, too many will defeat the purpose. The end-user has to be able to distinguish between patterns and areas, and with too many colors or different shapes in one chart it becomes incomprehensible

(Tableau 2013). As Tufte (1983) admonishes, one should always seek to minimize "chart junk," or in the more common vernacular it is best to apply the "KISS" principle and remember to keep one's view simple.

6.5 Software Tools and Capabilities

In recent years, data visualization software has emerged, which vastly simplifies both the process of creating data visualizations for the analyst as well as the distribution of and interaction with those visualizations for the end user. Tableau, SAS visual analytics, Microsoft Power BI, Business Objects Lumira, and d3.js are just a few of the software tools and programming languages that allow analysts and users to have better experiences with data visualization. Through use of data filtering, tooltips, and click through interaction an analyst can empower an end user to explore deeper aspects of their data without trying to embed all of the information in one chart. This allows the user to not only see the most salient information but to dig in, explore, and answer what-if questions on their own. An analyst no longer has to provide a second set of data runs to answer follow up questions, freeing them to conduct higher order data analysis to benefit their institution. These packages also allow for multiple views of the most relevant information to be presented in an interactive dashboard for clients (Fig. 6.9).

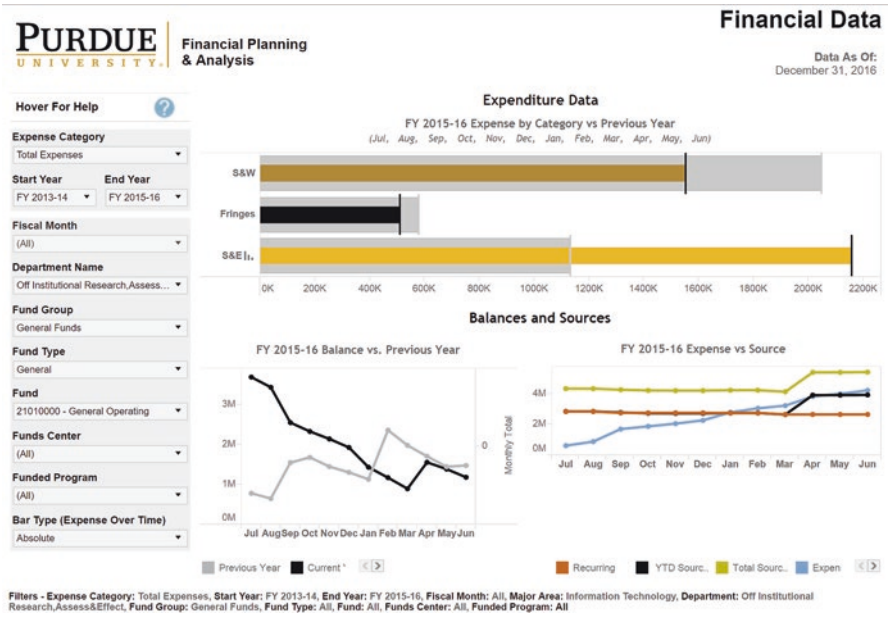

Fig. 6.9 Management Dashboard for Financial Data (Amstutz & Drake 2017)

Additionally, these software capabilities also allow an initial chart that is meant to display something fairly complex like the high level of interdependency and movement in data, to be drilled into at progressively more finite levels, such as the chord chart displayed in Fig. 6.7. These innovative tools allow for a leap forward in institutional research and business intelligence by allowing IR departments to place actionable data insights into the hands of their customers in a user friendly and visually appealing environment that facilitates interaction.

Regardless of the software package the underlying principles of a good visualization must always remain salient, however. The IR analyst must know the underlying data well enough to present the right information to answer their question. The visualization should focus on one primary question to avoid overload. The analyst should select the right visualization type to properly answer the question, and they must provide the proper amount of scaffolding to allow for the end user to understand what is being presented. Regardless of the high end capabilities existent in the current software packages an IR analyst asking the right questions and making the correct informed decisions is still the key driver to high quality data visualizations.

6.6 Institutional Research's Role in Data Governance

With the expansion of tools to make data more readily accessible to end users, such as data visualization and dashboard tools, expansions of business intelligence suites like COGNOS and SAS analytics, and the rise of so called intuitive analytics tools like IBM's Analytics, it becomes even more imperative for IR offices to lead efforts in data governance. While the ease of use of many of the new software packages makes the probability of Swing and Ross's (2016) federated data environment ever more likely, without proper maintenance of data standards and definitions the possibility of creating an environment of erroneous reports and findings expands. It is imperative that IR offices lead collaboration with other affiliated campus offices in development of new tools, such as data visualizations, to ensure that both the single source of truth is maintained through data governance standards and that the proper context is provided with the tools to allow for correct interpretation of results.

6.7 Expanding Institutional Research Capacity with Data Visualizations

The utilization of high quality data visualizations greatly expands an IR office's capacity to convey meaningful information to our clients. Presenting data in visually meaningful ways can help ease interpretation of information for end users. Well done interactive visual tools can help demonstrate the value of IR services to our customers, including senior leadership. However, as discussed throughout this

chapter it is important for IR practitioners to approach the production of data visualization tools in the same disciplined fashion they approach all research matters.

The proliferation of useful software suites for data visualizations can certainly assist IR offices in expanding their efforts. As with all new tool sets, IR leaders must balance cost, training, and implementation time for any newly purchased or developed software with the benefit of expanded capabilities. However, it is essential that IR offices continue to evolve to expand their capacity to provide useful information that helps their institutions achieve their strategic goals.

Data visualizations provide one of those opportunities for IR offices to expand their capacities. IR analysts interested in pursuing these types of efforts should review the work of Tufte (1983, 2006) and Wong (2010). Additionally, some of the primary software tool providers in the space such as Tableau and SAS provide useful resources at their web sites as well as hosting conferences that provide professional development opportunities. IR practitioners should also investigate the work of existing IR shops that are pushing forward in this space. Several are named in this chapter, but a simple web search of institutional IR offices will provide many instances of where colleagues are providing these types of services. This means that there is a broad community of IR colleagues to collaborate and share approaches and efforts with, which is ultimately the best source of development for an IR practitioner.

6.8 Conclusion

The goal for every institutional researcher, ideally, is to present information to their consumers in a way that allows for the greatest exchange of knowledge. Data visualizations can aid this transfer immensely, and IR practitioners replete with a high level of organizational intelligence are positioned to contribute greatly. Advancements in available software allow a thoughtful analyst to create visual tools that not only provide clarity about relevant data, but allow end users to interact with, explore, and ask the next layer of questions. Institutional research offices are embracing these capabilities to allow consumers to gain greater insight. However, as with all research endeavors, an individual must be thoughtful about what question they are trying to answer and the best methodology to use in order to convey the answer in a useful manner.

Note: All graphics shown in this chapter were developed by the authors and are used with their copyright permission.

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Chapter 7
Uses and Misuses of Data

Charles Mathies

7.1 Introduction

"Evidence-based" or "data-driven" decision making are popular current buzz words in higher education and reflect a growing trend to collect, develop, and use data and analytics in assessments, policy-making, and planning. Stakeholders, both internal and external, are pushing for information and "want to see the data." Higher education has become more data-driven and will continue to move in this direction in the near future (see Chap. 5 & 6). When a new senior executive comes to campus, they arrive with "new" ideas and push to make a mark. In recent years, the arrival of a new senior executive is usually accompanied by distinct ideas of how data should be used. They and their team will often pour through reports and analyses looking for patterns and outliers. Seeing opportunities, they will make new policies or recommendations intending to improve student or institutional performance. But is this actually a good use of institutional data? Or could the data have been used more effectively, or in some cases, could the misuse of data been avoided?

While the use of data and analytics has allowed more insights into students, staff, and institutional achievements, it has simultaneously raised critical questions on how it is used. The example above is one small but powerful example that illustrates the desire that exists for collection and use of data, most often officials simply wanting to improve institutional or student success. However, the use of that data can have unintended consequences and there are significant concerns over its misuse. Specifically, there are concerns over the power, legitimacy, ideology, transparency, intentionality, and relevance of data (Calderon 2015). Whether data is used improperly or unethically, past occurrences of misuse have tended to cast a negative shadow over an institution long after an incident (see University of Oregon case from 2014

C. Mathies (✉)
University of Jyväskylä, Jyväskylä, Finland
e-mail: charles.f.mathies@jyu.fi

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K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1_7

as example) (Gray 2016; New 2015; Read 2015). Institutional research (IR) has been in the middle of this data evolution as it regularly manages, synthesizes, and transforms data into useable information. This chapter explores the way data is used and has been misused by institutional officials (and some external stakeholders) and concludes by offering suggestions to improve the use of data and hopefully minimize its misuse.

7.2 What Is Data?

Perhaps the best place to start is to examine what is meant when the term "data" is invoked. The Oxford dictionary (Oxford University Press 2017) defines data as "facts and statistics collected together for reference or analysis." However there are often misconceptions that data and information are one and the same as "data" often takes on a dual meaning; in a plural form (as a fact/statistic) as well as in singular mass form (outcome from analysis - as information). While they have similarities, there are distinct differences. Paul Beynon-Davies (2011, 2013) uses the concept of a sign to differentiate between data and information; data is a series of symbols while information occurs when the symbols are used to refer to something. In other words data refers to the actual symbols (data in raw or processed form) while information refers to the interpretation or understanding of said symbols (data). Spillane (2012) argues that simply giving data reports to colleagues is not enough for effective data-driven decision making; it requires translating data into information and actionable knowledge which can be applied to current and future problems.

Much of the core activities of IR, especially in North America, directly involve the use of data; its collection, analysis, reporting, and governance (AIR 2017). This includes the technical aspects of working with data as well as serving in roles of data stewards and educators to the larger institutional community (AIR 2017). Having multiple roles with data is something IR has been historically known for, as illustrated in the surveys of AIR membership and their duties over the years (Knight et al. 1997; Lindquist 1999; Swing et al. 2016; Volkwein 1990, 2011). The increasing complexity of data interactions though, coupled with the continuing evolution of institutional (organizational) structures, has amplified the reliance on and need for the experience and expertise with data that IR (professionals and offices) possess (Possey and Pitter 2012). In short, "data is the lifeblood of IR," and the effectiveness of an IR office and professionals is often measured by how well its practitioners understand and manage data (Ronco et al. 2012, p. 678).

7.3 How Data Is Used in Higher Education

Regardless of the name used to identify the unit, IR offices or similar units, sit in a unique place within institutions. They are one of the few, if the only unit, that views the institution at the macro (institution-wide), as well as the micro (departments and individuals) level due to their extensive interactions with institutional data. Institutional data can be thought of as a matrix; when there is a change in one area, it impacts other units as it flows through the institutional data system. For example, when a professor receives and accepts an external research grant, this single act impacts multiple offices (data) across the institution. Typically, the research office oversees the grant application and operations, financial affairs manages the finances, and facilities provide and administer the research space (labs), while either academic affairs or the department of the professor are tasked to hire replacements (instructors) for the courses to be filled while the professor focuses time on the grant. All of these actions impact institutional data and create continuous updates from the initial submission of the grant through its completion. As such, IR staff have an institution-wide perspective (macro level), but are able to see the inner workings of an institution (micro level) due to their knowledge of and ability to see the data as it moves through the institution.

Coburn and Turner's (2012) "The Practice of Data Use" is a useful paradigm to understand how data is used. "The Practice of Data Use" seeks to understand what happens when people engage with data in their normal work day (Coburn and Turner 2012, p. 102). Spillane (2012) argues that to understand the use of data requires consideration of the situations it is used (context); e.g. how users notice and interpret new information in their daily practice. Understanding how data is used in practice and it's the context surrounding it helps explains not only the outcomes of its use, but also the interrelationship between macro structures (social or organizational) and micro action (projects, reports, analysis) involving data. Coburn and Turner (2012) contend that there are three distinct types of studies describing the practice of data use. All three help in conceptualizing what happens when IR professionals engage with data in their everyday roles and how it relates to organizational learning (in the case of IR, the institution learning about itself).

First, data is conceptualized as an interactive endeavor that involves understanding how data flows into streams of ongoing action and interactions as they occur (Coburn and Turner 2012). IR professionals are often integral members of the institutional management; particularly with how data is used on campus (ex: institutional assessments of students and staff). IR is also regularly tasked to provide either direct or indirect oversight of institutional data (in the role of data stewards) and often asked by senior leadership to provide leadership and commentary on data and it is use throughout the institution. These regular, or routine, interactions with data create a pattern or recurrent way (i.e., role) for how IR professionals interact with data within an institution.

Second, the role of the environmental, organizational, and larger context influences how data is used (Coburn and Turner 2012). This is in-line with Terenzini's

(1993, 2013) tiers two (issues intelligence) and three (contextual intelligence) of his "organizational intelligence," which has long been one of the standards in understanding the skills and competencies of IR professionals. Coburn and Turner (2012) argue that there are shared languages and common frames of reference by those using data which have developed over time and multiple interactions. Within IR offices, this is seen with how IR is often involved in establishing and managing data protocols, definitions, and reporting. Quite simply, the culture of working with data normalizes its use and meaning across an organization; within an institution IR is usually a leading unit in shaping how data is collected, used, and in general, perceived. It should be noted that institutional culture(s) and norms will shape the action with and meaning of data not only by IR, but also the entire institution.

Lastly, data use is viewed as a "situated phenomenon" that examines how data is used in real time and practice (Coburn and Turner 2012, p. 103). Within IR, this is done through observations of practice as well as surveys and interviews of professionals in the field. The multiple surveys of AIR membership over the years (Lindquist 1999; Swing et al. 2016; Volkwein 1990, 2011) are clear accounts of professional practices (norms) as well as the tasks of IR professionals and their role with data. These surveys show that historically, IR has had multiple roles with data which have helped guide institutional leaders managing their institutions.

When IR professionals engage with data, their first step is often to determine the general purpose of its use; is it to describe something or an activity, or is it to infer something (McLaughlin et al. 2012)? The outcome desired from analysis will often dictate not only the methodology involved in the analysis, but also key facets (amount, scope, definition, date collected, etc.) of the data used. IR professionals need to use care in their choices of how they use data as there is a need for data to be used in a clear, thoughtful, and objective (impartial) way to allow IR to remain as neutral and apolitical as it can be.

Leaders within AIR, the Association for Institutional Research, identified five categories of IR work in their *Development of the Duties & Functions of Institutional Research* (2017) and directly link each category to data. The first category is to *identify information needs*. This is the iterative process of identifying relevant stakeholders and their decision support needs (AIR 2017). This is a proactive function where IR staffs anticipate the future informational needs of the institution through reviews of data and policies to assist stakeholders in defining or framing what information is needed. The second category is to *collect, analyze, interpret, and report data and information*. This involves an understanding of the data available and how it was collected to the processes of analyzing and reporting it. This category reflects the technical tasks undertaken by IR to provide data, information, and analyses (AIR 2017). Some specific examples in this category include enrollment management analyses, assessments of student learning, and assessments of faculty teaching and research. The third category is to *plan and evaluate*. These are formative and summative evaluative processes conducted within an institution directly for planning and decision-making purposes (AIR 2017). Often budgetary, strategic planning, and governance tasks for compliance, accreditation and program review fall within this category. The fourth category is to *serve as stewards of data and information*. IR has

a direct role of insuring an institute wide strategy on data governance and its analytics (AIR 2017). Tasks and roles in this category involve key performance indicators (KPIs), data warehouse, and business intelligence (BI) tool(s) development to oversee the integrity of the data used. The fifth category is to *educate information producers, users, and consumers*. This encompasses the training and coaching related to the use of data, analyses, and information to inform decision-making (AIR 2017). This is often in a collaborative role as IR and information technology (IT) have overlapping leadership and support responsibilities in advancing data-driven decision making an institution (Dahlstrom 2016).

Over the last few decades, the volume, velocity, and variety of data handled by IR has greatly increased (Taylor et al. 2013; Visser and Barnes 2016). This in turn created increased expectations of what data can provide (Calderon and Mathies 2013). Two of the larger increases in recent years have been in the form of data metrics and analytics. Both involve combining multiple pieces of data together to provide an understanding of institutional performance (see also Chap. 6). While they have many overlapping features and are often used interchangeably, data metrics and analytics though, are not the same (Patterson 2015).

Data metrics are more informational in nature and are standard measurements derived from past organizational operations. Examples include credits generated by faculty FTE, efficiency of resources used, and admission yield rates. Data analytics, though, are more strategic and future focused, which applies statistical techniques and models on past performance data to see patterns in the data or predict a future outcome. Examples here include forecasting the number of students to admit in an admissions cycle, predict target enrollment numbers (based on historical acceptance rates, student persistence and graduation rates, and institutional changes such increasing faculty within a department), deriving the locations of focused admission recruitment (based on historical acceptance and persistence rates and the amount of previous resources expended in an area), and gaining insight into the student experience (ex: mapping student activities and practices online to when they use the dining halls). Both data metrics and analytics look to provide data in singular mass form (as information) allowing institutions to take action and improve the student experience and institutional performance.

7.4 Examples of Data Misuse

There have been multiple ways data has been misused in higher education (i.e., by colleagues on campus, legislators, media) and, unfortunately, sometimes directly by IR professionals. Often these misuses cast a large negative shadow over an institution (or unit) well after the incident is over (see University Oregon example below) (Gray 2016; New 2015; Read 2015). Below are four general categories or groupings of how data has been misused in recent years. While these categories or groupings are fairly comprehensive, it is not exhaustive and do not cover every instance of data misuse. It is important to note that in most cases, there is no distinction between

intentional or unintentional misuse of data. Both cause essentially the same problems, though intentional could create additional issues (legal, financial, security) that would need to be addressed.

7.4.1 Data that Provides Inaccurate Information/Misreporting

Inaccurate reporting of data is becoming a frequent occurrence within higher education. When data (or information from the analysis of data) provides false information, it creates situations where resources (time, human, and financial) are needed to correct the inaccuracies and mitigate the consequences of its misuse. In many ways, inaccurate information or misreporting is similar to a type 1 (false positive) or type 2 (false negative) error in statistics. They make a data consumer believe something is true when in fact it is not.

One of the more recent and notable occurrences of inaccurate reporting of data comes from the U.S. Department of Education's College Scorecard. The College Scorecard is an online tool allowing students (and their families) to compare institutions on a series of data points. In January of 2017, the Department of Education admitted it had been publishing inaccurate information about repayment rates on its College Scorecard website (Mahaffie 2017). The Department of Education disclosed the loan repayment rates for many institutions was inaccurate due to a coding error leading to the undercounting of borrowers who failed to pay down any of their undergraduate student loan balance (Mahaffie 2017). There was roughly a 20 percentage point decline in the national rate of repayment after the adjustment (Fain 2017). Many advocacy groups and politicians (from both sides) have argued for more reliance on loan repayment rates than on loan default rates as metric of accountability (Fain 2017). This is not the only criticism the College Scorecard has faced over its data and calculations (particularly with the *salary after attending* data, as it is only based on students who received federal financial aid), and it has clear challenges to its long-term viability with the lack of a stewardship plan (Whitehurst and Chingos 2015).

Providing inaccurate information or misreporting data has also been used as a form of propaganda. In this way, the inaccurate information is used to encourage a particular viewpoint to alter the attitude and perception associated with an institution, agenda, or issue. It is not objective and is often displayed by presenting facts selectively. Perhaps the most notorious misreporting of data in this manner is with the admissions data of incoming students. Institutions face a great deal of pressure to improve their academic profile, which in turn raises their prestige (and ranking). Some institutions have been publicly outed for inflating the admissions data of their first-year students in recent years as part of efforts to raise their academic profiles. Specific examples in the Emory University and Claremont McKenna College (two of the more well-known recent examples) cases include overstating the average test scores by excluding specific students (ex: bottom 10 percent) from its calculations,

inflating the average class rank of incoming students, and deflating admission (acceptance) rates (de Vise 2012; Jaschik 2012; Strauss 2012).

7.4.2 Flawed Data Governance

As mentioned in chapter one, IR's involvement in institutional-wide data governance is important, as flawed data governance can lead to multiple misuses of institutional data. Chapter 5 provides a more in-depth overview of data governance, but in brief, data governance encompasses the people responsible for data quality (data stewards) and the policies and processes associated with the collecting, managing, storing, and reporting of data (Koltay 2016; Young and McConkey 2012). The misuse of data through flawed data governance typically occurs when institutional data is allowed to be used in way it is not intended (e.g., the next grouping of data misuse listed below - *data used as it was not intended)* or when it is accessed by outside entities (data breaches).

When data is allowed to be used as it is not intended, it is often through a lack of data protocols, definitions, and structures, or a breakdown in their use (data mismanagement). Knowledge of the data, definitions, and structures are precisely the knowledge that IR professionals possess and thus should be central to policies and procedures of institutional data. The consistency in application and accessibility of protocols, definitions, and use are key factors in limiting the misuse of data (Young and McConkey 2012). Koltay (2016) suggests adopting clear data governance is advantageous to institutions, as it standardizes data, enables increased transparency of its use, and reduces costs (financial, time, and human resources). The regular monitoring and reviewing of an institution's data governance promotes a culture of improvement, which in turns increases the level of consistency of data use within an institution (Young and McConkey 2012). Having good data governances improves the overall quality of institutional data and provides assurances that institutional data can be trusted.

Data breaches are becoming more common in higher education, just as they are in industry and government. However, higher education institutions likely have a larger number of reported breaches, because of their open and transparent culture, than organizations in industry who typically report data breaches only when they are legally required (Grama 2014). Three high profile cases in 2016 illustrate different ways data breaches are occurring within higher education. First, the University of Central Florida (UCF) informed 63,000 current and former students and staff that hackers had comprised personal information (primarily names and Social Security numbers) (Binette 2016). This was undertaken by a direct intrusion (hack) into the UCF's computer network (Binette 2016). A second example at The University of California, Berkeley occurred when its financial system was breached by hackers and exposed social security numbers and bank accounts of 80,000 current and former students and employees (Sposito 2016). The data breach occurred when a sensitive piece of commercial software was being updated and connected the financial

system to the Internet (Sposito 2016). Lastly, over 3000 current and former employees of Tidewater Community College (TCC) in Virginia had their names, earnings, and social security numbers stolen in a phishing scam (McKinney 2016). The breach occurred when a TCC employee responded to a data request from a fake TCC email account and supplied the requested data (Mckinney 2016). While good data governance cannot eliminate all possibilities of data breaches, it can help institutions protect their data and mitigate security risks.

7.4.3 Data Used as It Was Not Intended

Data, when it is used as it was not intended, primarily happens when either data is not used as it was defined or when it does not measure what it intends (or claims) to measure. In many ways, it is either a definitional or a misapplication issue. Two of the more well-known examples involve measurements from external organizations to higher education institutions.

A first example is the use of standardized test scores in the admissions process. In the admissions of undergraduate students, the misapplication of standardized test scores has been known and documented for some time (Beatty et al. 1999; National Association for College Admission Counseling 2008; Wightman 2003). Over the years the use of standardized tests in undergraduate admissions been used as a mechanism to evaluate applicants efficiently but has evolved from a tool of inclusion to one of exclusion (Wightman 2003). Wightman argues (2003, p. 83) that "despite extensive evidence to the contrary, test scores are being portrayed as an accurate, objective indicator of merit" which results in pitting the concepts of merit and academic standards against the benefits of diversity and educational opportunity. Graduate admissions are not immune to misuse of standardized test results, as Posselt (2016) argues there is frequent misuse of GRE scores. Specifically, most graduate programs create GRE cutoffs or minimum requirements and use this as a primary strategy to quantify applicants' quality (National Association for College Admission Counseling 2008; Posselt 2016). Educational Testing Services (ETS), the company overseeing the GRE, however does not advise departments or institutions to use cutoffs.

Standardized test scores are intended to be one of many factors in admissions, not the primary or sole criteria. More appropriately, they are designed to be used as a direct evaluative measure of a student's achievement in course work or overall secondary school performance (National Association for College Admission Counseling 2008). In undergraduate admissions, they are often misused because of the amount of applicants is so great that standardized tests are used to handle the volume and sort through the applicants efficiently (Beatty et al. 1999). Posselt (2016) contends that most graduate departments use the cutoffs and minimum GRE scores because they are pressed for time and need to be speed up the graduate admissions process. By creating cutoffs, departments are able to "throw-out"

applicants, thus reducing their applicant pool and the time needed to decided which candidates are worthy or admission or not.

The over reliance on standardized test scores in the admission process is a misapplication, and raises questions of bias and the validity of the admissions process itself as there are concerns about the validity and bias of the tests themselves. However empirical research generally does not support that there is bias against test takers who are not white and male nor that the validity of the tests for the limited purpose for which they were designed (Wightman 2003). While the evidence supports the validity of standardized tests as predictive measures of student performance, their utility for admissions should not be simply accepted without question (Wightman 2003). The technical question of whether test scores are statistically related to an outcome of interest (e.g. student success) is not enough to determine how a standardized test should be used in the admission process (Wightman 2003). The standardized tests were designed to measure reasoning, critical thinking, and analytical writing skills of applicants and to be used as supplements to transcripts, recommendation letters, and other qualifications as deemed important by an institution (ETS 2017; Wightman 2003). The last part is perhaps the key point, "qualifications which are deemed important by an institution." Institutions make admissions decisions but when they do so, they need to recognize how standardized tests fit within their institutional culture and admission process and should not use standardized tests to simply increase efficiency.

A second example of data used as it was not intended is with university rankings. University rankings are often viewed, primarily by external stakeholders, as a way to gauge institutional quality and benchmark institutions against one another. However, university rankings, both global and national, have received a significant amount of criticism for their methodology and data quality. In general, university rankings are primarily shaped by the availability of data, and many have subjective, as well objective, issues in their metrics (Hazelkorn 2015b). For most rankings the primary measures of quality are student and staff characteristics, bibliometric outcomes, and reputational surveys (Hazelkorn 2015a). Things like the value added from attending a particular institution (teaching and learning outcomes), the impact or benefit of research in society, or student experiences are usually not included in rankings (Hazelkorn 2015b). However these are things that can perhaps tell us the most about the quality of the teaching and learning within an institution. Rankings metrics create a very narrow perspective of what is quality in higher education and of the construction or organization of academic disciplines themselves (Marginson 2014; Robinson-Garcia and Calero-Medina 2014). Marginson (2014) argues that this creates a situation where institutions are measured through either flawed data and methodologies or have been subjected to a misapplication of measures, which were meant to express an outcome different than institutional quality (i.e., the criteria evaluating quality are wrong).

Why have rankings increased in prominence in recent years when there is such strong criticism of their data and methodologies? In general, there is strong desire for institutions to obtain the highest ranking possible because it bestows academic prestige. This can, in turn, lead to an increase in student applications and more

extramural funding for faculty research. Rankings are not new as they been around for over 100 years (Hazelkorn 2015b), but the social-political effectiveness or power associated with them is (Teichler 2011). The status bestowed onto institutions by rankings, however, becomes a circular game in which power makes itself (i.e., the higher ranked institutions are often the benchmark for excellence, so when compared to themselves they perform and rank well) (Marginson 2014). Additionally, rankings popularity is derived from their simplicity (Hazelkorn 2015b) as they are easy to understand, especially by external stakeholders. This is perhaps the key point as rankings are increasingly used by students in their selection of choice of enrollment (particularly international students) and governments and industry partners to compare and benchmark institutions against one another (Hazelkorn 2015a). In many ways though, rankings are merely a measure of quantifiable pieces of institutions and many indicators are of wealth, not educational quality (Hazelkorn 2015b).

7.4.4 Violation of Privacy

Institution officials have a duty to protect the confidentially of student and employee data. When an individual's data is collected, accessed, or used not in-line with institutional policy, this constitutes a violation of privacy. In the United States, the Family Education Records Privacy Act of 1974 (FERPA) governs the access and dissemination of student records. There are similar laws in other countries governing access to institutional data that prohibit disclosure of personal identifiable information derived from educational records. Often times FERPA, and similar laws in other countries, are used as the legal base to form institutional policies on data protection for community members (students and employees). While FERPA allows the U.S. Department of Education to enact a penalty of removing all or part of federal funding when there is a violation, the likelihood of this occurring is not high. In most cases, the Department of Education will notify the institution of the violation(s) and then require specific changes to be made to bring the institution into compliance. Only if an institution refuses will the removal of federal funding occur. However, in today's digital world, privacy concerns are no longer limited to legal implications of laws (like FERPA), as there are many ethical and policy concerns in a networked society with increasingly new technologies.

Perhaps the most common way that data is misused within this category is when an employee views specific student records for whom they have questionable or no right to do so. An institution's policies governing student privacy often forms the base of what is legal, but employees are still often left with ethical choices of what they should or should not do in relation to accessing students' records. A recent case (2014) at the University of Oregon illustrates this issue well. The university was facing a lawsuit by a female student in relation to its handling of a legal case involving the student and members of the university basketball team (New 2015). The university's lawyers accessed the student's mental health (counseling) records in the process of

defending itself (Gray 2016; New 2015). While ultimately considered legal at the time (the case subsequently caused significant changes in how student health records are protected in the state of Oregon), the release was in violation of the health center's policy and became public when two employees became "whistleblowers" as they notified state regulators at the state legal and psychologist Bar associations (Read 2015). The "whistleblowers" notified state regulators primarily over ethical concerns of providing the student's health records without notification nor consent to members of the university's legal affairs office (Read 2015).

Another regular occurrence of violation of privacy occurs when students opt out of their personal information being able to be disclosed, but it is nevertheless revealed. The most typical occurrence here is when a student's demographic information is published in a directory even though the student requested that it not be published. Unfortunately, personal information being disclosed without consent is becoming more of a concern, as personal data (student and employee) are increasingly networked within data repositories allowing individuals who may be unaware of the privacy and legal considerations to engage with personal data. The confusing part, particularly for those not up to date on the laws, is there are many legal exceptions that allow personal information to be disclosed (U.S. Department of Education 2015). One of the more commonly used exceptions is for "school officials" to use student data for "legitimate educational interest." However institution leaders are required to define who is considered a "school official" and what constitutes a "legitimate educational interest" while at the same time notifying students of their definitions and processes (U.S. Department of Education 2015). While neither students nor parents can directly sue an institution for a (FERPA) violation, a complaint can be filed with the U.S. Department of Education, which can spur an official investigation into the conduct of the institution in question. Most institutions want to avoid a complaint being filed and, as such, have a tendency work with students (and families) to remedy the situation as best they can.

7.5 Parting Thoughts and Recommendations to Minimize Misuse

We are living in "post-truth" society where lies and the questioning of facts has become a common occurrence (Higgins 2016). The increasing misuse of data coupled with the current environment is threatening higher education's community values of scientific truth, openness, and transparency. This has left many institutions (and academics individually) wondering how they fit in and operate, as data and information (i.e. evidence) is no longer valued as much by the community it supposedly serves. Below are three suggestions of what institutions can do to reduce the likelihood of the misuse of data and (hopefully) improve its use.

First, there needs to be an acknowledgement for not only the need for data and technical expertise, but also context expertise. One constraint of effective data-driven

decision making in higher education is the fact that many academics lack formal training and/or expertise with educational data (Horta et al. 2017). This creates a reliance on experts, such as IR professionals, to provide needed context and understanding of data; whether in its plural form (as a fact/statistic) or in its singular mass form (as information). The need for context expertise is critical as there are many questions around the legitimacy, intentionality, and even ideology of how data is used within institutions (Calderon 2015). Without context expertise, there is no questioning the motives, source, and relevance of how data is used which impacts the overall stability of an institution (Calderon 2015).

While the data analytic gap within senior management is improving, the increasing sophistication of analysis is outpacing their increased abilities (Ransbotham et al. 2015). The result is it often leaves a need for senior managers to become comfortable applying analytic results they do not fully understand or comprehend how they were developed (Ransbotham et al. 2015). Swing and Ross (2016) argue that perhaps the best way forward is for staff and subunits to not only have significant access to institutional data through a federated system, but also have formal training to develop data expertise. As discussed in Chap. one (briefly) and in Chap. 16 the notion of federated data is, on first blush, a seemingly possible solution to ease the data reporting often required of IR professionals. While IR professionals should and must collaboratively work with other colleagues at one's institution, the use of data (through a federated system or not) without it being managed and supported by data and context experts leaves it vulnerable. Specifically, the use of data without the proper context increases the likelihood of the wrong conclusions to be drawn from data and analyses. As such, the distribution of data should only occur after there are comprehensive plans in place complete with data definitions and documentation. Without the integration of data and context experts, the misuse and misapplication of data is likely resulting in increased poor academic planning and decision support.

IR and IR professionals, as a profession and individually, need to make the case for context expertise within institutions. If they do not, IR offices will be reformed and likely absorbed into another institutional operation like IT services or strategic planning (Calderon and Mathies 2013). This is where another dimension is worth discussing; the ethics involved with data use. Value judgement(s) over the appropriate use of data while providing data, drawing inferences about data, or acting as a data custodian is essential. This is where IR can step up and provide leadership on this issue within institutions. The old adage "information is power" is very appropriate in this context. As Calderon (2015) argues that:

> having access to data and controlling the way it flows contains also an element of power, as data in an aggregated or as a value-added form can be used to allocate scarce resources, impose demands for accountability, and drive calls for improvement or reform at all levels. (p. 300).

Without questioning the power and legitimacy of data and its use, there cannot be a truly ethical use of data. Put another way, without the proper context and questioning its use, the use of data is simply functional. This is not a good thing as data

used just functionally limits its potential effectiveness as well as its relevance. Without the ethical use of data, then there can be no achieving a truly effective and legitimate evidence-based decision making within an institution.

Second, institutions need to create, strengthen, and monitor data governance and the access to their data. It is important that IR professionals be deeply involved in the institution's data governance and management process as these are professionals who can provide subject expertise (ex: assessment of student success) and engage with the institution's data over its entire lifecycle (from capture/creation to use through the final archiving and destroying). This is critically important when an institution is trying to make meaning out of an analysis of data, as the deeper an individual's knowledge about an issue, the less likely they are to misunderstand the high level (aggregate) data that is generally presented in institutional reports. Conversely, the more superficial understanding an individual has, the more likely they are to confuse observed associations with casual considerations. As Calderon (2015, p. 302) states "… the fact that something is counted or measured does not make it right or relevant".

In regards to data access, the use or development of policies following the principle of least privilege is a good starting point: access to all data is restricted by default, unless it is specifically allowed. In terms of data governance, require institution officials to have clear data definitions and rules of use, definitions, and collection. These data definitions and terms of use should be regularly updated and widely accessible for entire campus community. This promotes the holistic usage of data and supports a community wide understanding, appreciation, and use of data in agreed upon manners. This also increases the visibility of data and its likelihood of being seen as a good source or a reference and ultimately being used in institutional (policy, programs, etc.) development.

Third, with the increasing use of data analytics and metrics, there is a need for clear institutional principles and guidelines for their use and development. In particular, there are significant concerns over the use of third-party analytic tools. Many institutions do not have the resources to have in-house analytic capabilities (staff, hardware, etc.) and these third-party options offer a way to use analytics without incurring the associated long-term costs. The main issue with most third-party analytic tools is their core algorithms are proprietary and not shared with clients (Alamuddin et al. 2016). This creates situations where institutions receive an analysis from a third-party analytic tool, but have no way to replicate or gauge the integrity and flexibility of the algorithms (Alamuddin et al. 2016). In short, it "raises questions about the ethics of making decisions … based on a black box that administrators, instructors, and students do not understand" nor control (Alamuddin et al. 2016, p. 22). "The Leiden Manifesto" (Hicks et al. 2015) offers suggestions on some the best practices for metric-based research assessments. While originally focused solely on research metrics, the 10 principles are applicable in a broad sense for institutional data. Some of the principles include keeping data collection and analytical processes open, transparent, and simple, allowing those evaluated to verify data and analysis, and scrutinize indicators recurrently with regular updates (Hicks et al. 2015). Having clear institutional guidelines on the use and development

of data analytics and metrics will reduce the misapplication of data and promote sound data-driven decision making.

Data should and will be used in higher education decision support. But it is difficult to assess the appropriateness of data, from the information it conveys to its actual use, without a clear understanding of the context and purpose it was collected and used. Technological advances, along with the increasing accountability pressures and decrease in public resources, is boosting the use of data and data-driven decision making within institutions. IR leaders have an important opportunity to contribute to this conversation through guiding their institutions to properly use data and help build preventative practices. IR professionals can be an influential voice in what data and performance measurements are valid, suitable, and relevant for their institutions (Calderon 2015). Institutional decision making should be based on quality processes which are informed by the highest quality of data. But like with any tool, data and its analytics needs to be used appropriately and with care. If it is not, it will continue to be misused, and institutional decision making will not be as informed as well as it could.

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Chapter 8
The Finance Conundrum for Higher Education

Nicholas Hillman and Adam Kindschy

8.1 Introduction

Few topics in U.S. higher education receive as much public scrutiny as rising college prices. Tuition has steadily outpaced inflation, student loan debt has tripled over the past decade, and college is becoming less affordable on nearly any metric one chooses to use (Baum 2016; GAO 2014). These trends are occurring at the same time as family incomes are flagging, resulting in growing public anxiety that college is becoming farther from reach for low and middle-income families (Busteed and Kafka 2015; Pew Research Trusts 2011). When policymakers and campus leaders discuss higher education finance, they are likely to focus on these trends in college prices – and for good reason. However, focusing so narrowly on college *prices* can distort our view of finance and limit our ability to understand a wider range of financial challenges facing students and colleges.

In this chapter, our goal is to widen the finance conversation beyond price and into other fundamental areas related to the underlying costs of delivering higher education and how taxpayers (and philanthropists) subsidize those costs. The late Gordon Winston wrote prolifically and persuasively in these areas, encouraging researchers to think about finance in terms of *cost*, *price*, and *subsidy* (Winston 1999). We follow this wisdom here since the price a student pays is simply the cost minus subsidy; therefore, if we want to understand why college is becoming less affordable, we must understand the changing nature of higher education costs and subsidies.

In so doing, institutional researchers will be even more equipped to engage campus leaders and policymakers with strategies to address affordability challenges in creative and effective ways. This chapter aims to help build that capacity by focusing

N. Hillman (✉) · A. Kindschy
University of Wisconsin – Madison, Madison, WI, USA
e-mail: nwhillman@wisc.edu; adam.kindschy@wisc.edu

© Springer International Publishing AG 2018

K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1_8

on recent finance trends, offering strategies on how to analyze them, while also weighing some of the tradeoffs and consequences of these trends. We identify and describe a number of the most challenging conundrums in higher education finance and provide institutional researchers with conceptual lenses, research summaries, and data sources to help navigate these challenges.

Institutional researchers are not expected to be financial accountants, so the purpose of this chapter is not to discuss business office functions or accounting standards used in higher education finance. Similarly, each campus or system has its own unique budget model for allocating financial resources – this chapter is not an overview of financial management strategies. While both accounting and budgeting are important components of higher education finance, this chapter focuses more broadly on the underlying "awkward economics" of higher education finance and serves as a guide for discussing common finance topics that will be used in campus planning and institutional improvement efforts (Winston 1999). Our emphasis is on undergraduate education, though some examples may be applicable to graduate or professional programs as well. We write from the perspective that institutional researchers will be both consumers and producers of financial information, so our treatment of the subject engages both in practical guidance for using finance data, and conceptual frameworks for thinking creatively about finance.

8.2 College Costs

To achieve its educational mission, every college or university must spend money. But where does this money go? That question is at the heart of understanding college costs, where we seek to know how much it costs to deliver a high quality education consistent with the institution's stated mission. Most of these expenses are tied to labor since colleges employ faculty, administrators, and staff to deliver the education. These costs include salaries, wages, and benefits to ensure colleges hire the most qualified candidates for the job. But costs are also tied to non-labor expenses like facility operations and maintenance – the buildings, pipes, and wires in constant need of maintenance, repair, or renovation to ensure a high quality education. Labor and operating expenses are the two primary cost drivers in higher education, but colleges also spend money on student financial aid, research labs, public outreach programs, and auxiliary enterprises (e.g., residence halls, hospitals, clinics, athletic programs (Archibald and Feldman 2010; Weisbrod et al. 2008).

Using data from Delta Cost Project (2016), total operating expenditures per full-time equivalent (FTE) student ranges from a low of approximately $15,000 in public community colleges to approximately $44,000 within public research universities. Public masters and bachelor's institutions have similar total operating expenses, approximately $22,000 and $23,000 per FTE student, respectively. These figures are rising between one and two percentage points higher than inflation over time, as displayed in Fig. 8.1 below. If these costs were rising at the same rate of inflation, then the lines in this figure would be flat over time; however, we see growth in all

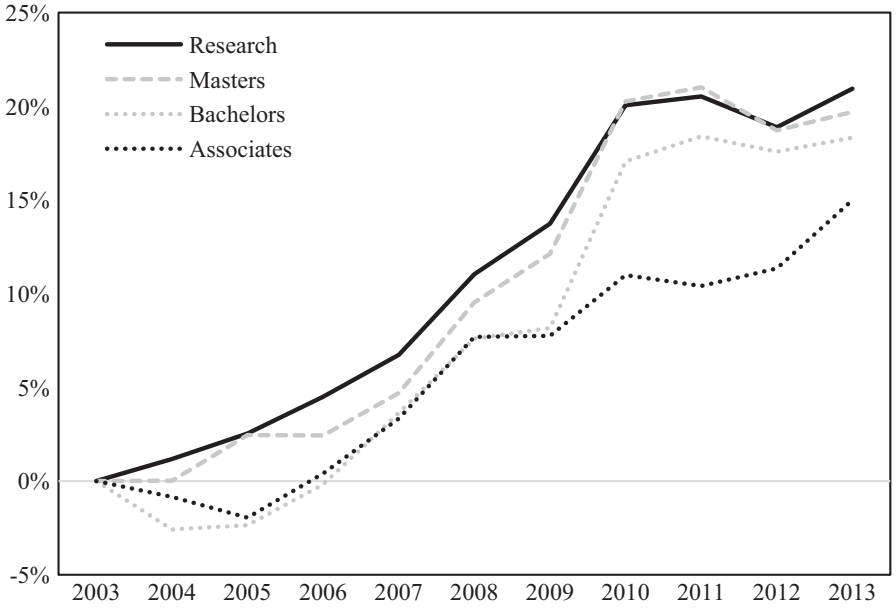

Fig. 8.1 Inflation-adjusted rate of change in total operating expenditures per student (public sector). (Delta Cost Project 2016)

sectors beginning in 2006. We also see total costs per FTE have risen the most within research and masters institutions, while they have risen slower among bachelors and associates institutions. Note this figure displays the cumulative effect, which simply sums the annual change over time. If costs rose one percentage point in 2003 and two percentage points in 2004, then their cumulative growth would be three percentage points over the two years. This display may be useful for institutional researchers trying to communicate the cumulative (long term) effect of annual changes.

Total operating costs can tell us about the overall cost structure of an institution, but campus leaders are often interested in trends occurring within specific categories of spending. These categories are often classified by *functional expenses*: instruction; research; public service; academic support; student services; institutional support; operations and maintenance; scholarships and fellowships; and auxiliary services (Barr and McClellan 2011). Since auxiliaries are self-sustaining units designed to generate enough revenue to cover their own costs, we can exclude auxiliaries from total costs. Doing so results in "education and general" (E&G) expenditures, which is a commonly-used cost measure and will yield lower costs than the previous "total operating cost" example.

Average E&G expenditures per FTE in the public sector ranges from a low of approximately $13,000 in community colleges to a high of nearly $30,000 in research universities. Masters and bachelor's institutions are in the middle with E&G expenditures at approximately $16,000 and $17,000 per FTE. Figure 8.2

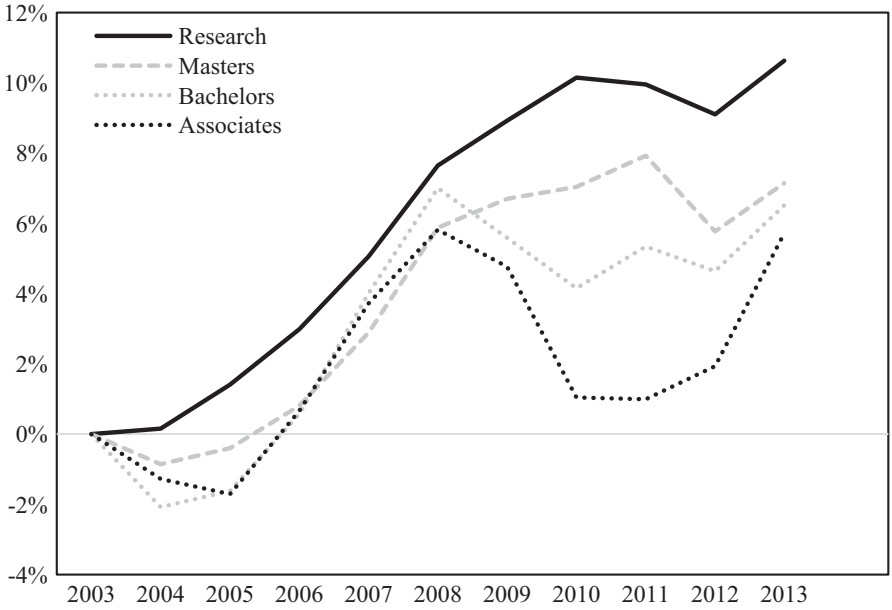

Fig. 8.2 Inflation-adjusted rate of change in education & general expenditures per student (public sector). (Delta Cost Project 2016)

reveals similar growth patterns as Fig. 8.1, but notice the lower growth rate across all Carnegie types. Annual E&G growth is only about 0.5–1.0 percentage points higher than inflation each year, with community colleges' costs growing the slowest and research universities the fastest.

8.2.1 Why Do Costs Rise?

Whether examining Fig. 8.1 or Fig. 8.2, it is clear the underlying costs of delivering higher education is rising faster than inflation. But why? There are three common answers that, only when taken together, can answer this question. There is no single answer that fully explains why costs rise, so institutional researchers should consider each of these when analyzing or communicating costs trends (Cheslock et al. 2016).

First, the "cost disease" is a commonly-cited reason why costs grow faster than inflation. Popularized by William Baumol and William Bowen (1965), it posits that labor-intensive enterprises such as education, performance arts, health care, and other high-skill human services cannot rely on technology alone to increase productivity. In other industries, technological change can reduce costs by substituting human labor with technology. Take the automotive industry for example. Instead of building a car on an assembly line where humans install various part of the vehicle,

technology makes it possible to automate this process – and thus reducing production costs – via robotic-based production (Cheslock et al. 2016).

So long as this innovation does not reduce quality, firms will turn to technology to increase productivity at lower cost. But in education and other labor-intensive services, technological change may not improve quality and productivity; as a result, costs will continue to rise. Baumol and Bowen (1965) use a string quartet to illustrate this phenomenon. It is difficult if not impossible to improve the productivity of a string quartet without reducing its quality. Speeding up the performance, eliminating key instruments, or recording the audio and replaying it for the audience (rather than having a live performance) will all improve productivity and reduce costs. But each of these will also reduce quality. Therefore, the salaries and wages of the performers is likely to rise faster than inflation since technological innovation cannot improve their productivity without sacrificing quality. This parallels higher education, where speeding up a course lecture, removing expensive lab equipment, or recording and replaying course lectures are likely to reduce (or at least not improve) quality.

The second most common explanation is Howard Bowen's (1980) revenue of theory of costs. Whereas cost disease focuses on external factors that affect cost structures, this theory focuses on the internal operations of higher education institutions. Bowen starts with the premise that the central goal of any college is to maximize its reputation and prestige. In this pursuit, colleges will spend as much as they can when delivering the highest quality of education possible. Therefore, they must generate as much revenue as possible to meet these ever-rising costs. This cycle reinforces itself, where colleges raise as much as they can and then spend all that they raise. Under this theory, the only way to reduce costs is to reduce revenues. This helps us see a fundamental difference between profit-maximizing firms and non-profit or public colleges; a profit-maximizing firm will seek to minimize costs, while a reputation-maximizing college will seek to maximize them.

The third theory is Massy and Wilger's (1992) "lattice and ratchet," which also focuses on the internal operations of colleges and universities as a source of rising costs. This theory encompasses a number of managerial and regulatory forces at play in higher education. Citing growth in the number of administrators on college campuses, the "administrative lattice," they suggest the steady professionalization of higher education puts upward pressure on costs. This professionalization gets embedded into administrative practices that may be perceived as inefficient, including administrative entrepreneurialism (e.g., emergence of new positions), consensus management (e.g., shared governance), and expanding governmental regulation (e.g., compliance reporting). At the same time, faculty members have incentives to spend more time conducting research over teaching, resulting in the "academic ratchet" where faculty focus more on their own research agenda over broader campus educational goals. By buying out their time, their teaching load is likely to be filled by adjuncts or teaching assistants, which is an added expense for the institution. Notably, this theory is most relevant to research-intensive universities, a small segment of public higher education, which helps explain cost differences outlined in Figs. 8.1 and 8.2.

These three theories are certainly not comprehensive or mutually exclusive; rather, they help explain in part why costs rise faster than inflation. When trying to diagnose the underlying cost problem for a campus, to the extent one exists, these three theories may offer an explanation. The jury is still out with respect to the utility of these theories, and considering that costs rise less than one percentage point above inflation each year, it is not entirely clear colleges face cost inefficiencies. In fact, colleges have been found to be quite efficient due to economies of scale and scope (Titus et al. 2016; Archibald and Feldman 2010).

Campus leaders and policymakers may ask how much money is necessary to deliver a high quality education. This relatively straightforward question has no easy answer; in fact, some might argue a college can never spend too much on students since more money implies higher quality. Whether expenditures are a proxy for quality is up for debate, but research controlling for a range of student and institutional characteristics finds that spending more on students strongly associated with better educational outcomes (Bound et al. 2012; Griffith and Rask 2016; Deming and Walters 2017; Webber and Ehrenberg 2010). Instead of offering an answer, an institutional researcher might reframe the question in a way that addresses the underlying reasons why costs rise. Two better questions to ask are: 1) How can we deliver the same quality at a lower cost? 2) How can we deliver higher quality at the same cost? Addressing these questions will help campus officials generate economic and technical efficiencies in ways that are quality enhancing.

8.3 Subsidizing the Costs

Now that we have a brief overview of the leading cost drivers, a question becomes "how do we cover these costs?" A common response to this question is to diversify the revenue stream to the fullest extent possible, but without sacrificing the campus' educational mission. This is what Weisbrod et al. (2008) call being "mission centered and market smart," where alternative revenue generation becomes part of the institution's financial management strategy. Public and private non-profit colleges have different sources of subsidies. Both sectors receive private donations, federal grants, sponsored research grants, and tax exemptions to help cover the costs of delivering education. Similarly, but less extensively (and concentrated among research universities) both sectors generate revenue via auxiliary enterprises and are increasingly turning towards entrepreneurial activities like filing patents and securing licenses for research products that are brought to market.

8.3.1 Federal Subsidies

The U.S. federal government subsidizes higher education in three primary ways: student financial aid, tax credits, and grants and contracts. Each funding stream is designed to achieve different policy goals and objectives, though financial aid and tax credits are generally designed to expand access and improve affordability, while university grants/contracts typically fund the research enterprise or help colleges develop their academic offerings. Total federal appropriations for each of these categories is shown in Table 8.1 below.

From this table, we see that federal student loans are the largest federal student financial aid program, disbursing $96 billion in loans in 2014 alone. However, calculating the subsidy for loan programs is difficult for a number of reasons, mainly because loans must be repaid by the borrower. Therefore, the direct subsidy comes only via subsidized loans when the federal government pays the interest rate while the borrower is in school. The federal government does not subsidize interest on unsubsidized loans, and (depending on accounting standards used) the Congressional Budget Office estimates the federal government will generate negative subsidies (i.e., generates positive revenue) from some loan programs over the next decade (Chingos 2015). The emergences of income-driven repayment and public service loan forgiveness programs makes it even more difficult to calculate the true subsidy of federal loan programs, so Table 8.1 provides the total subsidy without loans. The next largest federal aid programs are the Pell Grant and GI Bill, which are administered by the U.S. Department of Education and Department of Veterans Affairs, respectively. The federal Work-Study program is small in comparison to these other programs, and together the majority of federal support for higher education comes via financial aid programs.

Table 8.1 Federal higher education appropriations, in billions (2014 dollars). (College Board Trends in Student Aid, U.S. Department of Education Budget History Tables, and National Science Foundation Higher Education Research and Development Survey)

	1984	1994	2004	2014
Student financial aid				
Loans	$18.3	$36.0	$68.8	$96.0
Pell grant	$7.0	$8.9	$16.5	$30.3
GI bill	$3.0	$2.3	$4.4	$15.2
Work study	$1.3	$1.0	$1.3	$1.0
Tax credits	–	–	$7.7	$18.2
Aid for institutional development	$0.3	$0.3	$0.5	$0.6
Adult education	$0.2	$0.5	$0.7	$0.6
Research and development	$12.4	$20.2	$34.6	$36.8
Total	$42.5	$69.2	$134.6	$198.5
Total (less loans)	$24.2	$33.2	$65.8	$102.6

Sources: College Board Trends in Student Aid, U.S. Department of Education Budget History Tables, National Science Foundation Higher Education Research and Development Survey

Table 8.1 shows that students also receive tuition tax credits (American Opportunity and Lifetime Learning Tax Credits) which are benefits available through the tax code. These tax credits have been in operation since the 1990s and have yet to demonstrate effects in terms of expanding college access and degree completion (Hoxby and Bulman 2016). In addition to these tax benefits, this table includes other federal tax benefits, including tuition and loan interest deductions, savings incentives, and dependent exemptions that primarily benefit middle and upper-income families to the annual sum of approximately $12 billion additional dollars (Dynarski and Scott-Clayton 2016).

The final source of subsidy comes via federal grants and contracts. Through such administrative agencies as the National Science Foundation, Health and Human Services, National Institutes of Health, Department of Agriculture, and Department of Education, the federal government awarded over $36 billion in competitive grants and contracts to universities and faculty members to support research activity. Federal research funds flow directly to institutions, but this money is not discretionary. In fact, most of the research grants funded by the federal agencies are designated for very specific research projects and initiatives. For example, a grant from the National Cancer Institute, would likely be designated for a specific cancer-related research project. Grants can generate additional revenue for campuses, but this revenue is tied up in "overhead," or the direct costs associated with operating and administering the funded project (Barr and McClellan 2011). In addition to research, federal subsidies support adult education and Minority Serving Institutions, though both programs are smaller than the federal work-study program. Notably, Title III and Title V of the Higher Education Act outline a number of ways the federal government invests in Minority Serving Institutions, with programs designed to help equalize opportunity and expand access in colleges serving traditionally underrepresented students.

8.3.2 State Subsidies

Since the word "education" is not mentioned in the U.S. Constitution, Article 10 leaves the delivery of education to the discretion of states. This has resulted in 50 different models for financing public higher education and a wide range of practice with respect to how heavily a state is willing or able to subsidize its colleges and universities. States typically appropriate funds in one of three ways: general fund appropriations, student financial aid, or capital projects. General fund appropriations are used to subsidize instructional operating expenses for state colleges and universities. Every state allocates funds according to their own needs, where some use performance-based budgets and others use formulas or incremental models. Nevertheless, there is a relationship between appropriations and tuition. When appropriations are high, states tend to charge students relatively lower tuition; and when appropriations are low, states tend to charge higher (Mumper and Freeman 2011).

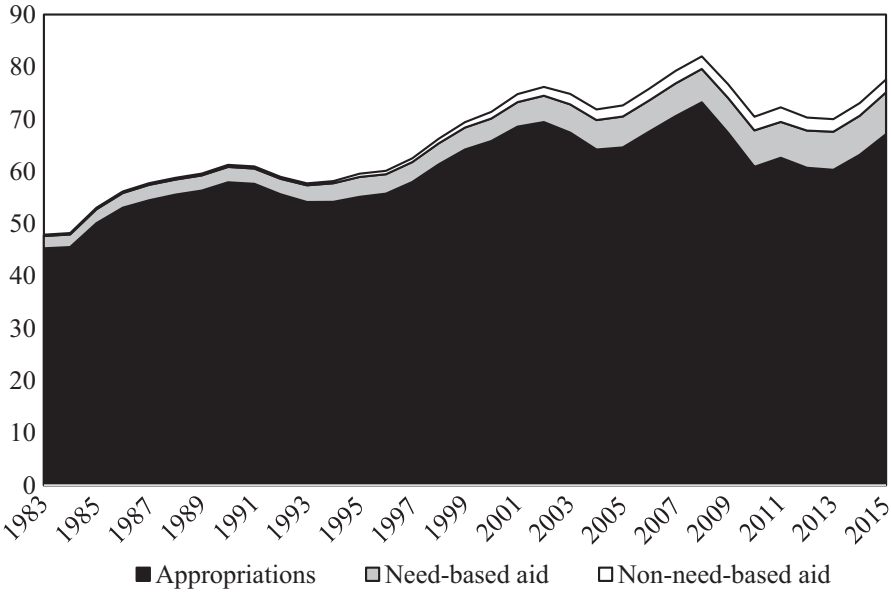

Fig. 8.3 Trends in state appropriations and financial aid (in billions, 2014 dollars)

Aside from these general subsidies to campuses, states also provide subsidies directly to students in the form of financial aid. There are more than 200 different state financial aid programs, and most are grant-based meaning they (like the federal Pell Grant) do not have to be repaid (Brookings Institution 2012; Education Commission of the States 2016). State grant programs tend to use need-based eligibility criteria when allocating aid, where funds are targeted to low and middle-income students; however, non-need-based (sometimes called "merit-based") programs like Georgia's HOPE Scholarship became politically popular in the 1990s (Doyle 2006). Figure 8.3 shows state higher education appropriations on the left axis and state financial aid on the right.

In addition to general fund appropriations and financial aid, states also invest in higher education through capital projects. Such projects include new academic buildings, significant renovations to existing buildings, and other infrastructure costs for public projects. Each state has their own process for prioritizing and financing these projects, and they typically involve a degree of coordination and planning between the campus, university system or board of regents, state capital projects board, and legislature. States invest approximately $118 billion annually on all capital projects (e.g., roads, environmental projects, corrections, etc.) and higher education accounts for about 12 percent of the total, or approximately $14 billion (NASBO 2014).

Table 8.2 Distribution of endowment funds by size and number of institutions (2016). (Reproduced from NACUBO 2016)

	Number of Respondents	% of Total	Total Value ($1000)	% of Total
Over $1 billion	91	11.3%	$382,538,589	74.3%
$501 million to $1 billion	75	9.3	54,064,633	10.5
$101 million to $500 million	264	32.8	60,472,069	11.7
$51 million to $100 million	163	20.3	12,078,690	2.3
$25 million to $50 million	121	15	4,545,969	0.9
Under $25 million	91	11.3	1,409,177	0.3
Total	805	100%	$515,109,128	100%

8.3.3 Philanthropic Subsidies

The role of philanthropic subsidies in higher education continues to expand, but is highly variable from one institution to the next. Table 8.2 shows data from the National Association of College and University Business Officers (NACUBO) illustrating just how unequal universities are with respect to their endowment sizes. Of the 805 participating institutions, 91 hold approximately $382 billion in assets. These institutions represent only 11 percent of colleges, yet their endowments account for about 74 percent of total principal balances. The other 89 percent of colleges hold $132 billion in assets, or 26 percent of all higher education endowment principal balances.

Not only are large endowments concentrated among a minority of institutions, but the performance and payout also varies widely. Colleges with the largest endowments are able to leverage those resources to cover their operating budgets. According to NACUBO (2016), the 91 colleges with billion-dollar endowments use these resources to cover 15.9 percent of their operating budgets. Institutions with smaller endowments cannot leverage their funds to cover operating expenses; colleges with the smallest endowments ($25 million or less) use endowed funds to cover only 4.6 percent of their operating budgets. This inequality is often called the "Matthew Effect" in higher education finance, where the rich institutions get richer and the poor get poorer (Weisbrod et al. 2008). Or at least, the less well-endowed colleges struggle to keep pace with the growth that occurs on the high-end of the endowment distribution.

8.3.4 Endowed Funds

Within a foundation, the endowment is managed as one large investment pool, though there are typically several individual endowed funds with their own designations. Fund managers are responsible for maximizing the return on investment for each fund, meaning they invest the principal balance in vehicles such as stocks, bonds and real estate, among others (Sherlock et al. 2015). The income generated (in excess of fees) from each investment is then allocated back to the fund's principal balance or spent in accordance with the fund's purpose. If the funds are reallocated to principal, then this will maintain the fund's value over time while also providing a safeguard against inflation (Cowan 2008). And if they are spent, it must be done in accordance with the donor's intent. That is, the funds are *restricted* to serve specific purposes determined by the donor. If the donor does not specify how to use the funds, they are *unrestricted* and the institution can use them to meet their own specified goals.

Regardless of whether funds are restricted or unrestricted, foundations raise money in two typical ways: *Annual Giving* and *Major Giving*. Annual giving is when colleges and universities encourage alumni and friends to make one gift, an "annual gift," each year. Annual giving campaigns have multiple objectives, but primarily to generate unrestricted operating support for the institution (Schroeder 2002). There can even be multiple annual funds within a university, giving donors an opportunity to have more control over where their gift is utilized. For example, instead of having one annual fund that is managed by central administration, many institutions establish school/college annual funds and departmental annual funds (Drezner 2011). Major giving, on the other hand, involves donations in the tens of thousands and even millions of dollars. Major giving involves multi-year campaigns and pledges that are later used for mostly restricted purposes (e.g., endowed department chairs, scholarship funds, etc.).

For example, if a donor makes a $100,000 major gift to a university, the foundation would manage the fund and at the end of the fiscal year would pay a certain portion of the revenue it generated. If the board requires funds to pay out 4.5%, then $4500 would become available annually to support the university. If the donor restricted the fund's use to pay for scholarships, then all of this money would go to that purpose. If the funds are unrestricted, then the university can use that for operating expenses or other approved purposes. Earnings above 4.5% would be reinvested back into the principal balance of the fund, which over time, means the fund would continue to get bigger and provide more support for the fund's purpose. But if endowment earnings in a given year fall below 4.5%, the principal balance of the fund will lose value.

8.4 The Price Students Pay

Policymakers and campus leaders often use the term "college affordability" as though there is agreement with respect to what that term means. Unfortunately, there is not agreement in the field with precisely how to define or measure affordability (Baum and Ma 2014). One can measure affordability at the point of enrollment, where a common metric is net tuition relative to the student's family income. By this measure, college is becoming less affordable over time since net tuition is rising while family income is flagging (Radwin and Wei 2015). However, one could also measure affordability after the student finishes college by examining the student's debt-to-earnings ratio. By this measure, college is not becoming less affordable since this ratio has remained relatively flat over time (Akers and Chingos 2014). It is important for institutional researchers to be clear with respect to the definition they use, and to help clarify it for other campus leaders; the following discussion can help in that process.

Often called "sticker price," tuition and fees are the most salient price students face when paying for college. Each institution charges a different sticker price depending on the sector, where two-year institutions charge far lower tuition and fees than four-year institutions. Similarly, due to the subsidies discussed earlier, public institutions tend to charge lower sticker prices than private institutions. For two reasons, sticker price is a poor proxy for the actual price students pay. First, many students receive price discounts via financial aid programs, meaning they pay less than the published sticker price. Second, tuition is only one part of the total cost of attendance, meaning students face a number of additional non-tuition related expenses that can make the price higher than expected. Because of these reasons, "price" should be discussed in two different ways: net tuition and net cost of attendance. Figure 8.4 shows the difference between the sticker price of tuition and net

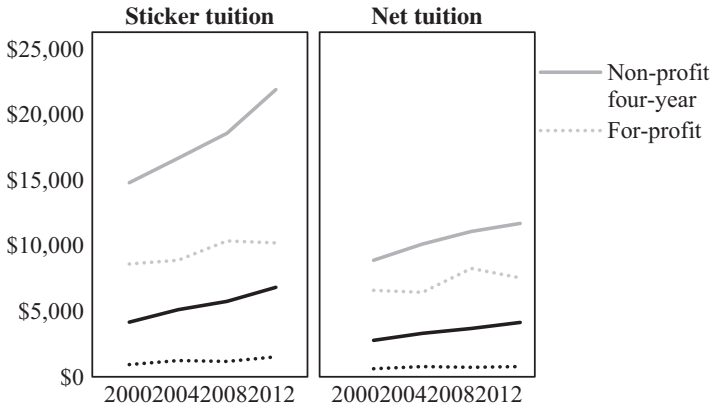

Fig. 8.4 Comparison of sticker versus net tuition for undergraduates (2012 dollars)

Table 8.3 Tuition and non-tuition expenses in undergraduate cost of attendance (2012)

	Non-tuition COA	Net tuition	Net COA	Net tuition's share of COA
Public two-year	$7175	$794	$7071	11%
Public four-year	$11,064	$4155	$14,296	29%
Non-profit four-year	$12,454	$11,699	$23,001	51%
For-profit	$9944	$7551	$17,345	44%
Total	$9453	$4197	$12,820	33%

tuition for each sector, where the average sticker (net) tuition and fees have increased by 55 (44) percent from 2000 to 2012.

Net tuition is approximately 31 percent of student's entire cost of attendance, suggesting the majority of college expenses (depending on the sector) are paying for non-tuition items. Books, room and board, care for dependent, and transportation are among the leading non-tuition educational expenses included in students' cost of attendance. Table 8.3 displays the average non-tuition cost of attendance and net tuition, which can be interpreted as the net cost of attendance students face after receiving grant and scholarship aid. To cover these costs, students likely turn to savings, working while enrolled, or student loans. However, it is notable that tuition is a relatively large portion (43–48 percent) of the entire cost of attendance among private institutions while it is a smaller part of the overall cost of attendance in the public sector (10–27 percent). This table also shows that students face out-of-pocket expenses ranging from a low of nearly $8000 in the community college sector and more than $24,000 in the private four-year sector.

With higher net costs of attendance, students in the private sector are more likely to rely on loans to pay for college. Although the majority of students enroll in public institutions, the majority of student loan debt is disbursed to students attending private institutions. In 2012, student loan debt became the second-largest line of consumer credit (next to home mortgages) and there is currently over $1.3 trillion in outstanding student loan debt (Baum 2016). While approximately one-third of this outstanding debt is held by the wealthiest 20 percent of earners, it is the borrower who leaves college with debt and no degree who is struggling the most to repay their loans (Looney and Yannelis 2015). Since these borrowers tend to enroll for short periods of time, they carry low debts and without a credential do not benefit from the economic returns of higher education. Most of the defaulted loan debt is attributed to these borrowers, and not those who carry high loan debts. To the extent high-debt borrowers are struggling to repay their loans, it is likely due to "consumption smoothing" problems where student loans (which are not dischargeable in bankruptcy) are interfering with their household finances. Income-driven repayment plans are designed to help address this problem by smoothing loan repayment over a longer period of time and making payments contingent upon earnings (Chapman 2016).

8.5 Using Finance Data

To help institutional researchers provide decision support, this chapter concludes with a brief introduction to useful national higher education finance data sources. Most of these data sources are publicly available, though some require restricted-use licenses or other agreements to gain access. For example, the U.S. Department of Education's national student surveys are available online through the National Center for Education Statistics' Data Lab, but if a researcher needed student-level data to conduct alternative analyses that are unavailable here, they could secure a restricted-use license. Similarly, National Student Loan Data System files are available at the campus level and no public database exists from which to access this information. Nevertheless, these are commonly used sources in higher education policy and finance research.

8.5.1 Costs

Aside from the institutional budgets and financial reports, three national data sources can provide institutional researchers with additional data on trends in higher education finance: IPEDS, Delta Cost Project, and the Delaware Cost Study. The finance survey in IPEDS provides a wide range of campus-level finance data including:

- Assets and liabilities including depreciable capital, long-term debt, capital assets, land improvements, buildings, construction in progress, endowment, and equipment.
- Revenue from tuition, government and private grants/contracts, sales/auxiliaries, investment, and independent operations.
- Expenditures by natural class (salaries, wages, benefits, etc.) for instruction, research, public service, academic support, student services, institutional support, operation/maintenance, scholarships, auxiliaries, hospital services and independent operations.

IPEDS reports finance data for all degree-granting institutions participating in the federal Title IV financial aid program. The Delta Cost Project database uses IPEDS finance data to construct its own datasets that organize these financial variables into total operating expenses, education and general (E & G), and education and related (E & R) categories. They also standardize the data to a per-student and per-completion basis, while recategorizing items according to the Financial Accounting Standards Board (FASB) or Governmental Accounting Standards Board (GASB) designations that have changed over time. For a detailed comparison of IPEDS and Delta Cost Project datasets, and the strengths and limitations of each, please see Jaquette and Parra (2014, 2016).

Since IPEDS and Delta Cost Project data are aggregated to the campus level, institutional researchers may find the Delaware Cost Study to be a more helpful

resource when examining departmental finances. This survey is designed to help campuses with benchmarking and monitoring finance data by focusing on costs associated with faculty workload and student credit hour production for various Classification of Instructional Programs (CIP) codes. For example, it would allow researchers to benchmark their university's instructional expenditures for Physics faculty against other universities in their Carnegie Class. Benchmarking data is available to campuses participating in the survey, meaning it is not publicly available. Institutional researchers may find this data source useful for academic program reviews, campus planning efforts, and providing central administration with comparisons among peer institutions. IPEDS and Delta Cost Project can do this at the campus level, but planners may need more granular details at the CIP code/departmental level.

8.5.2 Subsidies

To track trends in state subsidies to higher education, institutional researchers may find the State Higher Education Executive Officers' (SHEEO) State Higher Education Finance report and the National Association of State Student Grant and Aid Programs (NASSGAP) survey to be useful. The SHEEO report provides state-level data on total higher education appropriations, net tuition revenue, and research, agriculture, and medical funds. This data is disaggregated for public and independent higher education; it also disaggregates tuition revenue used for capital or debt service. It does not distinguish how much state support goes to two-year or four-year institutions, nor does it separate financial aid from total appropriations.

Researchers interested in state financial aid trends should use the NASSGAP surveys, which provides the dollar amount, number of recipients, and level of student (graduate or undergraduate) for state need-based and merit-based aid programs. In addition to grant programs, this data provides state aggregates of loan programs, work study, and tuition waivers, which help provide a fuller picture of state investment in financial aid. It also differentiates how much aid is awarded to students enrolling out-of-state and in public, proprietary, and non-profit institutions.

When examining federal research subsidies to higher education, researchers can turn to the National Science Foundation's Higher Education Research and Development (HERD) reports. Data from this report are publicly available via the Web CASPAR program or through the HERD website. This shows trends in national R&D investments, both federally funded and non-federally funded, for each college and university receiving these funds. This data is disaggregated by source of funds (e.g., Department of Defense, Department of Energy, National Science Foundation, etc.) and by basic or applied research categories. This resource provides detailed information on research and development trends that can be useful for guiding campus planning efforts. Similarly, the NACUBO data on endowment assets and performance can provide useful comparisons with respect to trends in philanthropic support at peer institutions. The ability to track and analyze these state, federal, and

philanthropic sources of subsidies will help institutional researchers provide timely support to campus leaders.

8.5.3 Price

Due to the federal need analysis formula and students' selection into differently-priced institutions, the price students pay varies from student to student. Accordingly, when examining price, it is important to use student-level data such as the National Postsecondary Student Aid Study (NPSAS) or the National Student Loan Data System (NSLDS). Researchers interested in aggregating prices up to the campus level should use the College Scorecard, which provides data on a number of price-related variables including tuition, average cost of attendance, and net price for first-time, full-time students receiving Title IV aid. The Scorecard also documents the percentage of undergraduates receiving the Pell Grant, percent receiving federal student loans, and the median debt for a number of different student populations. Between these three datasets – NPSAS, NSLDS, and College Scorecard – institutional researchers can lend valuable decision support services to campus leaders, since these data can help compare campus-level trends to national or regional trends.

The NPSAS survey is administered every four years and researchers can access public data via the U.S. Department of Education's Data Lab or via a restricted-use license. Beginning in 2018, NPSAS will be administered on two-year cycles and (unlike current waves of the survey) will offer state-level representative samples. The survey provides rich details on students' economic, academic, and demographic backgrounds so researchers can examine a wide range of price and financial aid topics. For example, NPSAS allows researchers to see how net price varies over time and by a range of student characteristics including family income, dependency status, and choice of institution (U.S. Department of Education 2014). Aside from being nationally-representative, a strength of this survey is its blending of survey questions and administrative data linked to federal, state, and institutional administrative records allowing researchers to gain rich insights into students' experiences with and perceptions of financial aid. Finally, NPSAS serves as the baseline survey for federal longitudinal studies such as the Beginning Postsecondary Students (BPS) and Baccalaureate and Beyond (B&B) surveys that track students during and after college.

The NSLDS is the best data source to use when examining student loan debt and repayment outcomes. As part of their mandatory default management and reporting requirements, campus financial aid administrators can access NSLDS data via the Loan Record Detail Report or School Portfolio Report (Soldner and Campbell 2016). These reports provide loan-level data for each borrower in a specified repayment cohort and it is possible for institutional researchers to merge this data with other campus records, so long as the data protocol of not disclosing personally identifiable information (see for example Campbell and Hillman 2015). Without NSLDS data, researchers are left with self-reported loan information that is highly susceptible

to measurement error or they rely on institution-level aggregates (e.g., cohort default rates, median debt, etc.) that do not offer granular enough details on individual student outcomes (Brown et al. 2014; Andruska et al. 2014).

8.6 Conclusion

This chapter provides a brief but comprehensive overview of key finance topics, challenges, and data sources to help institutional research professionals become familiar with emerging financial issues in higher education. When providing decision support services to campus leadership teams, it is important that institutional researchers are familiar with key issues and resources outlined here. In so doing, they will build their capacity to provide the needed analysis to help inform and guide the planning process.

Institutional research offices already play an important role in connecting units across campus. But it seems possible that, depending on campus norms and governance structures, issues related to finance can quickly become the sole domain of the budget office or financial aid office. To the extent this occurs, institutional research offices could play a convening role that allows central administration to have a more complete picture of the various issues facing higher education finance. For example, neither the budget office nor the aid office might have a long view of state or national financial aid trends, so the institutional research office could collect and analyze this information to help identify problems, make the case for new programs, or design assessment/evaluation plans. Similarly, if the aid office wants to examine student loan repayment, perhaps institutional researchers could provide the technical support to help analyze and report findings out to other units including budget offices.

Regardless of the organizational context, gaining more insight into finance issues should help build institutional research professionals' capacity to provide leadership support. By framing finance challenges around the topics/concepts covered in this chapter, institutional research professionals may find new ways to analyze, explain, or identify alternative solutions to a wide range of finance problems facing colleges and universities.

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Part II
IR and Decision Support Around the World

Chapter 9
Professional Development for the Institutional Research (IR) Professional: Institutional Research and Decision Support in the United States and Canada

Sandra Bramblett and Michelle Broderick

> "The persons who practice institutional research (IR) are a diverse group from many different academic backgrounds and from many different professional experiences. Add to this diversity among IR practitioners the tremendous variation in the practice of IR as defined at individual colleges and universities, and IR professionals would seem to have little common ground." (Code of Ethics for Institutional Research and Professional Practice 2013).

9.1 Introduction

A central component to building capacity focuses on professional development, and those who devote their work life to IR are no exception. While this chapter focuses on what has been learned about building an institutional research capacity in the United States and Canada, the principles are the same regardless of where one practices institutional research. An educated, informed workforce, in any setting, is the key to successful practice. Degree programs in higher education can include courses or concentrations in institutional research but many times, the institutional research professional brings the skills and knowledge learned in other disciplines to the practice. Professional development for soft skills abound, from effective communications to creating teams to understanding higher education's history and culture. The development of readily-transferrable skills should enhance the experience for both the employer and the IR professional. The Association for Institutional Research and regional or state affiliates are often viewed as the definitive source of continuing

S. Bramblett
Georgia Institute of Technology, Atlanta, GA, USA
e-mail: sandi@gatech.edu

M. Broderick (✉)
University of Toronto, Toronto, ON, Canada
e-mail: michelle.broderick@utoronto.ca

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K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1_9

education for the IR practitioner. In addition, the delivery of educational modules via Massive Open Online Courses (MOOCs) ensure that developing the competencies for an educated workforce, including institutional research, can be cost-effective and can contribute to training that will build the knowledge economy of IR and decision support.

9.2 An Overview on Higher Education in the United States and Canada

Higher education in the United States and Canada continues to respond to the demand for instruction, research, and economic development as summarized by McLaughlin et al. in Chapter Four of *Institutional Research and Planning in Higher Education: Global Contexts and Themes* (2015). Public higher education in both countries is governed at the state or provincial/territorial levels while private institutions are overseen by self-selected lay boards. Day-to-day operations for academic and administrative matters are the responsibility of campus leadership. Institutional accreditation in the United States ensures that a college or university meets a specific set of quality standards and requirements. The U.S. Department of Education and/or the Council for Higher Education Accreditation (CHEA) recognize a number of non-profit, private accrediting organizations in the United States. For example, six regional and six national accrediting agencies are recognized by the U.S. Department of Education and carry out periodic reviews of institutional quality and compliance. In Canada, institutions are required to function within the legislative and policy framework established by their provincial or territorial governing bodies. Unlike the US, no nationally-recognized accrediting body exists in Canadian higher education that evaluates the quality of degree programs. This task is left to agencies and professional bodies for academic programs for undergraduate and graduate students. Membership in Universities Canada (formerly the AAUC or Association of Universities and Colleges of Canada), coupled with a charter issued by the state or provincial government, serves as a quality check to ensure that the university delivers postsecondary education at an acceptable standard (CICIC n.d.).

Data collections about higher education are integral to both countries and aid the institutional researcher in carrying out their responsibilities as producers and consumers of information. The U.S. Department of Education's National Center for Education Statistics (NCES) collects postsecondary institutional data annually through the Integrated Postsecondary Education Data System (IPEDS). Statistics Canada operates the Postsecondary Student Information System (PSIS) and much like IPEDS, collects data on student enrollment, completions, faculty, finance and outcomes. In the United States, over 4700 public and private institutions enrolled 20.4 million students and employed 1.5 million instructional staff in fall 2015 (Ginder et al. 2017). Among Canadian postsecondary institutions, enrollment totaled just over two million students and employed 45,000 faculty (StatsCan n.d.).

Institutional research is recognized in both countries as an important function in higher education. An integral part of any professional development is an organization that seeks to facilitate knowledge, training and networking for individuals in that profession. IR professionals are served by the Association for Institutional Research (AIR), an international organization with over 4000 members. Within Canada, the Canadian Institutional Research and Planning Association (also referred to as CIRPA or Association canadienne de planification et de recherche institutionnelles – ACPRI) provides its members with networking and knowledge-sharing opportunities through annual conferences and newsletters. Several affiliated professional organizations also support institutional research in the United States. These organizations include regional groups like the Northeast Association for Institutional Research (NEAIR); state-located affiliates such as the California Association for Institutional Research (CAIR) or the Texas Association for Institutional Research (TAIR) and non-geographic affiliates such as the National Community College Council for Research and Planning (NCCRP). A comprehensive list can be found at https://www.airweb.org/Resources/AffiliatedOrganizations/Pages/default.aspx.

9.3 Setting the Stage: The Formal Pipeline

Institutional research exists on most college campuses in the United States and Canada. Whether it is handled by a part-time person or a team of full-time professionals or distributed across several offices, institutional research is important to an institution's understanding of itself, both internally and externally. As Volkwein et al. (2012) discussed in Chapter Two of the *Handbook of Institutional Research*, the golden triangle of IR shows the typical duties of: (a) institutional reporting and policy analysis; (b) planning, enrollment and financial management; and (c) outcomes assessment, program review and accreditation. Some colleges combine all of these areas and call it institutional effectiveness. The fulfillment of these duties means that institutional researchers are in the business of transforming data into information to fuel informed decisions on their campuses and across the higher education landscape. Peter Drucker in *Landmarks of Tomorrow* (1959) first used the term "knowledge worker." In 1994, he described this person as one who has advanced formal education and can apply theoretical and analytical techniques. IR practitioners are examples of knowledge workers as evidenced in various studies that have been done on the profession (McLaughlin et al. 2015).

Finding one's way into institutional research is not necessarily intentional. Staffing of the institutional research function varies widely across disciplines. Institutional research concentrations exist within Master's and doctoral programs, but degree programs with majors in IR are elusive. So where do institutional researchers come from? A comprehensive study of over 1100 IR offices was conducted in 2008–2009 by Volkwein et al. (2012). A section of the survey focused on understanding the academic credentials held by the staff. Either a doctorate or master's degree had been earned by 70 percent of IR staff while office leadership held

advanced degrees in 90 percent of those offices surveyed (Volkwein et al. 2012). Academic credentials in the institutional research profession have long been a subject of debate. Is the doctoral degree necessary? Can a practitioner be effective with a master's degree? Can a person be a practitioner if their education stopped at the bachelor's level or below? The answers to these questions depend on the person and the institution, of course, but the research tells us that having an advanced degree is the norm in institutional research and that advanced degree is even more important among the leadership of the institutional research function. Indeed, the trend of advanced degrees among leadership in IR offices is confirmed in the *National Survey of Institutional Research Offices* (Swing et al. 2016). The results of this survey showed that 89 percent of institutional research directors held either a master's degree (46%) or a doctorate (43%) among the 1219 respondents.

Also within Volkwein's survey, the field of the highest degree tended to be in Social Sciences, Education, or Humanities. Nearly 60 percent of all IR staff and 70 percent of office leaders held degrees within these broad disciplines, signaling the start of their development as researchers and eventually IR professionals. A shift may be occurring as the number of doctorates awarded in these areas make up a smaller proportion of doctoral degrees awarded in the United States and Canada. According to the National Science Foundation's *Survey of Earned Doctorates*, degrees in these areas accounted for nearly 47 percent of all doctoral degrees awarded in 2000 in the United States. By 2015, the percentage had dwindled to 36 percent. In Canada, 29 percent of the doctoral degrees awarded were in Education, the Social and Behavioral Sciences, or the Humanities in 2010, down from 38 percent in 2003. About half of the doctoral recipients in these areas still head for academe but with the pipeline slowing, the fundamental foundation of institutional research leadership and staffing could change with a greater emphasis on doctoral degrees awarded in Science, Technology, Engineering and Mathematics (STEM) fields in both countries.

9.4 The Making of an Institutional Research Professional

The competencies required for institutional research professionals go well beyond technical and analytical skills. As mentioned in chapter one of this book, Terenzini (1993) summarized the three tiers of organizational intelligence as related to institutional research in a seminal paper published in *Research in Higher Education* titled "On the nature of institutional research and the knowledge and skills it requires." As the foundation, the IR practitioner brings technical and analytical skills to the table. Often these foundational skills are acquired through graduate training or perhaps thought professional development training as a new entrant in the IR field. Within technical and analytical intelligence, one gathers knowledge on definitions, terms, commonly used acronyms (and their meaning), source data systems and data warehouses. The use of software enables the institutional researcher to gather data from the institution's systems to provide the basis for analysis.

Knowledge of statistical software packages such as SAS, Stata, and SPSS has enabled IR professionals to quickly and easily analyze large data sets. More recently, R, an open source programming language and software environment for statistical computing and graphics, has found its way into the institutional researcher's toolbox. The application of sound quantitative and qualitative methodologies enables the IR professional to make the data come alive and begin to tell the story, whether for student success, financial projections, or a host of other topics of strategic importance to the campus.

Institutional researchers with strong technical and analytical skills are the backbone of any solid decision support foundation (i.e. tier 1 of organizational intelligence). Understanding how decisions are made on a college campus is at the heart of tier 2, issues intelligence. Whether or not someone is in the Office of Institutional Research, it is incumbent upon more experienced IR professionals to act in a leadership role in educating the campus about the use of data and the presentation of information. This experience comes with issues intelligence.

At the top of this structure for the institutional researcher is contextual intelligence. As mentioned in Chapter One, understanding the culture of your institution and its place in the higher education landscape is critical. The phrase "culture eats strategy for breakfast" is most often attributed to Peter Drucker, however, scholars who study such things have a difficult time finding this exact phrase in his writings or transcripts of his speeches. Regardless of who coined it, the idea expresses a fact. Being knowledgeable and respectful of an institution's history is the foundation for developing contextual intelligence. Higher education can be described as intensively personal and oddly political at the same time. When Terenzini revisited the concept in 2013, he advised that "Contextual intelligence must move beyond the campus boundaries, beyond a parochial knowledge of the culture, values, and traditions of our particular institution and how to function successfully in it… Understanding 'how to play the game' locally is still important, but it is more important now than previously to understand both *what the game is* beyond our campus and *what's needed for our institution to play it effectively*." (Terenzini 2013). Helping an institution understand not only how to respond to its environment but also how to create it is the pinnacle of this tier. With the use of a strong, proactive institutional research function, an institution can position itself for greater success.

9.5 Staffing an Office of Institutional Research

Institutional research analyst. Senior research analyst. Business intelligence analyst. Data scientist. Policy associate. Data and analytics associate. These are examples of titles related to institutional research that were listed on higher education job boards in the United States and Canada. Regardless of the position titles, staffing an institutional research office requires a basic skill set. As discussed previously, technical and analytical skills must be present in even the most junior members of the staff. In addition to at least an undergraduate degree, a working knowledge of

spreadsheet, word processing, graphics, presentation, and statistical software would make up minimum qualifications. The junior analyst would also be naturally curious, eager to learn and capable of doing basic, descriptive statistics. As the person grows into the role, more challenging data retrieval and analysis can be accomplished. Interpersonal skills, project management skills and competencies in written and oral communication are also important. Persons with advanced degrees can be poised to do more sophisticated analysis around inferential statistics and predictive analytics. At this career stage, technical and analytical skills are honed and the beginning of issues intelligence is developed. Working effectively within the IR office and outside of it is key to growing one's base of understanding how decisions are made at various levels of the institution. Research and scholarship are important facets that enhance both the technical/analytical and issues intelligence tiers.

Director, institutional research. Associate director of institutional research and analytics. Associate provost for institutional research and assessment. Manager, business intelligence and systems analytics. Vice provost for planning and administration. These job titles reflect leadership roles within institutional research and planning functions at institutions in the United States and Canada. As with staff positions, the leadership has a solid, expanded base of technical and analytical skills, however, daily use of those skills may lessen due to varying demands and responsibilities of the role. Issues intelligence is in full development as leaders interact more with other constituents outside of the IR office and at various levels of the institution. Contextual intelligence would be evolved in terms of understanding the forces at work at the local, state, regional, national and international levels and the effects of those on an institution's environment. In revisiting contextual intelligence in 2013, Terenzini noted that "IR professionals, the people with the analytical, issues, and context intelligence, knowledge, and skills have a vitally important role to play in campus and national discussions of what constitutes 'educational effectiveness' and how it can be achieved and documented meaningfully."

9.6 Models of Organizational Placement for IR

Decision support is a term that often is used in the context of institutional research, distributed across an institution. Bringing together subject matter experts on a variety of strategic issues positions the institution to respond to these external environmental challenges in a proactive, mindful manner. Shared networks of institutional decision support can be created to effectively distribute the responsibility of using analytics to inform decision making, planning and policy formation. This is the basis for the "Statement of Aspirational Practice for Institutional Research" (Swing & Ross 2016). The authors make a case for "leveraging talent across the institution" with the institutional research professionals acting as coaches and mentors. In this case, institutional research refers to a campus-wide competency in which the use and dissemination of data and information are governed and shared across offices and departments. This "hub and spoke" model (Fig. 9.1) places the IR office in the

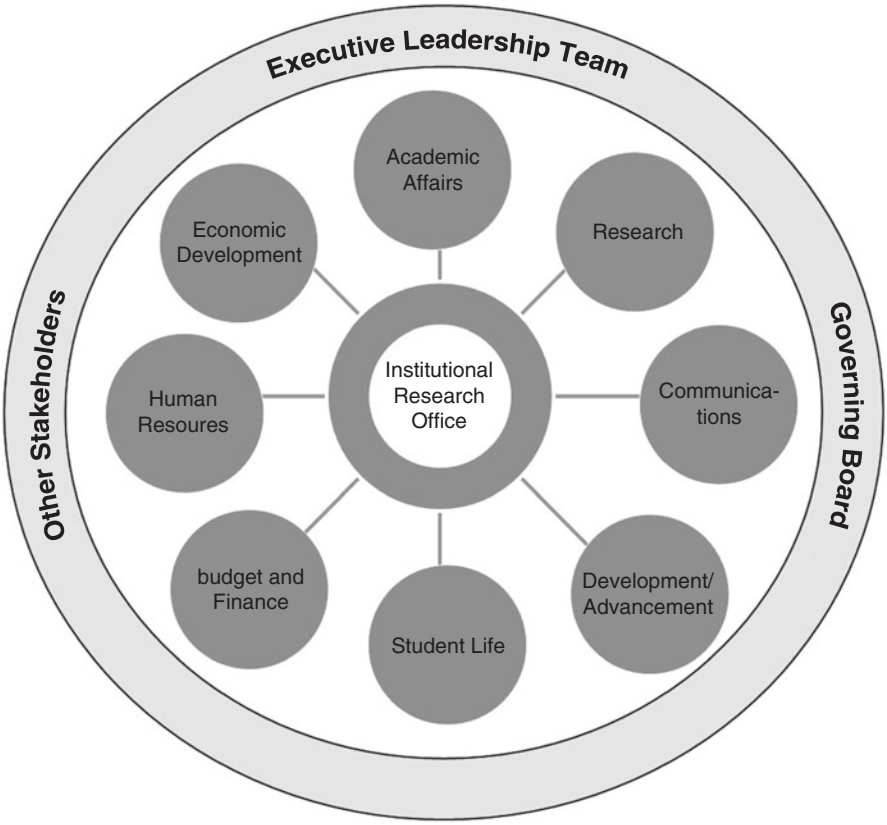

Fig. 9.1 Aspirational Model for Institutional Research (Source: Association for Institutional Research)

center with campus partners occupying the spokes to support an institution's constituents such as the executive leadership team, governing board, and other stakeholders. The success of this structure lies in the capacity of the IR staff to work effectively with their colleagues and be available to educate and empower them to share the responsibility for building an institution-wide culture of data-informed decision making. In this model, the IR leadership works alongside the executive leadership team and has a seat at the table to define issues, explain options, and make recommendations based on the information at hand. It should be noted that AIR's "Statement of Aspirational Practice for Institutional Research" suggested a student-focused paradigm that keyed on success. This aligns well with institutional research's perceived traditional strength in topics related to students such as admissions, enrollment, co-curricular participation, retention and graduation. However, the model can also apply across the institution. Data related to finance and budget, human resources, research, economic development, and advancement can be leveraged to create a robust decision support infrastructure. Although IR should (and

does) collaborate with many other key leaders on campus, IR leaders must be leaders for tasks related to data analysis, interpretation of information and recommendations of actions. While actual decisions are made by the executive leadership team, their confidence in those decisions must be rooted in good data and value-added information that comes from IR. The fine balance of collaboration and distribution of data requires IR to be positioned at the center, and in doing so, can retain value and confidence from senior officials.

9.7 Continuing Education for the Institutional Research Professional

Section 1 (c)(d) of the Association for Institutional Research's Code of Ethics and Professional Practice states the responsibilities for professional development lie with the supervisor and with the institutional researcher (AIR 2013). Opportunities for professional development are key to growing a staff that is skilled, knowledgeable, and competent. Along with many activities at the annual AIR Forum, good examples include the North East Association for Institutional Research's (NEAIR) summer drive-in workshops (http://www.neair.org/2017_drive-in_workshop_session.php) and a workshare session to discuss professional development needs at the 2016 Southern Association for Institutional Research (SAIR). At the SAIR session, an informal poll was conducted with the audience. Ranging from brand new IR professionals to seasoned veterans who had been in the business for more than 40 years, audience members commented on skills that are needed for new, mid-career, and long-term IR professionals as well as IR leaders, and results aligned with Terenzini's institutional intelligence tiers (Terenzini 1993, 2013). Newer IR professionals cited the need to hone their skills in Excel and statistical software packages as well as database queries and analysis of results. Mid-career and long-term professionals wanted to sharpen their written and oral communication skills, learn more about data visualization and programming languages such as R and SQL, and further develop their networks across campus and within the IR community. Leaders in institutional research wanted to better understand how to successfully navigate the cultural and political waters on their campuses. How to communicate with other campus leaders was also cited as a necessary skill (Bramblett 2016).

As a main raison d'etre, the Association for Institutional Research provides opportunities for educating the institutional research professional. With great thought and discussion among AIR Board members, the Association offers professional development training through various modalities. In-person events include the annual conference, pre-conference workshops, Integrated Postsecondary Education Data System (IPEDS) workshops and the National Data Institute. Online opportunities include the Data and Decisions Academy, IPEDS Keyholder Courses and video tutorials, and an electronic library that gives members access to IR-related books, monographs, and *The AIR Professional File*. The latter enables authors to

submit journal-length publications that present research on current issues, new processes, or applications for institutional research.

9.7.1 Specific Training for New IR Practitioners

AIR's newest offering, "A Holistic Approach to Institutional Research" is conducted online or as a hybrid online/in-person six-week course with mentor support. Several veteran institutional research professionals developed the curriculum for newcomers to the profession. Since it is a cohort model, students are enrolled with the same group of colleagues throughout the experience. Topics covered include what it means to work in institutional research, data governance, applied research design, transforming data into information for decision support, and developing a data-informed culture. The Data and Decisions Academy is also offered online and focuses on skills needed by community college institutional research professionals, although any newer IR professional can benefit. Courses include statistics for decision support, data management, research design, survey design, learning outcomes, longitudinal data, and tracking student success. The typical community college will staff one or two professionals in an IR office so being able to receive training in high-impact areas is critical. The online structure of the Academy is cost-effective as no travel expenses are incurred and students can complete the modules at their own pace. In addition to the international reach of AIR, a host of regional, state and special interest groups provide professional development for institutional researchers, mostly in the form of annual meetings.

In Canada, CIRPA provides its members with networking and knowledge-sharing opportunities through annual conferences and newsletters. An example of regional offerings is found with the Council of Ontario Universities. The Council sponsors an affiliated organization called the "Council on University Planning and Analysis," which advises members on matters of sector-wide issues, challenges and solutions as well as best practices.

The United States is home to regional organizations such as the Northeast Association for Institutional Research (NEAIR), the New England Educational Assessment Network, and the Rocky Mountain Association for Institutional Research (RMAIR). These professional groups host conferences, pre-conference and drive-in workshops, and institutes that allow participants to immerse themselves in a topic related to institutional research over the course of several days. Regional institutes are reminiscent of those previously sponsored by the Association for Institutional Research which were generally held during the summer months and covered such topics as Foundations for Institutional Research (I and II), Statistics, Technology, and Assessment. Many of the state and regional organizations operate listserves that provide an easy way to poll and network with colleagues on a variety of topics.

9.7.2 Professional Development for Mid and Senior Level IR Practitioners

Leadership in an institutional research office requires training that is more general in nature and can be obtained through many different resources. Technical and analytical skills have been developed at this stage and while those applied skills may not be used quite as much, it is important for leaders to maintain some level of proficiency in these areas. Learning to use new tools and technologies will ensure that the IR leader can stay relevant and contribute to meeting the demands placed on their teams in times of high staff turnover.

Project management is also a necessity when balancing multiple priorities. An understanding of how to charter, resource, and sunset a project can ensure the IR staff stays focused on a successful end result. Further, any IR professional in a leadership role needs to have superior written and oral communication skills to enable positive interactions with all levels of faculty and staff on campus as well as with the institution's external constituents. Communication and leadership skills are covered in many arenas from books and journals to webinars and conferences. Intensive learning experiences at this level can also be had in programs such as the Higher Education Resource Services (HERS) and the Harvard Institutes for Higher Education. Additional information can be found at these websites: https://hersnet.org/ and http://www.gse.harvard.edu/hihe.

9.7.3 IR Certificate Programs

Even without a formal graduate degree program in institutional research, an IR professional can enroll in one of several graduate certificate programs at institutions in the United States. Graduate certificate programs in institutional research are housed at institutions such as Pennsylvania State University, Florida State University, and Ball State University, among others. Since many of these programs are offered online, the physical location of the institutional researcher is not an issue. The certificate programs enable a foundation in institutional research functions such as analytics and planning and some cover leadership and resource management. Finally, the proliferation of Massive Open Online Courses (MOOCs) enable the institutional research professional to receive training in specialized areas for little or no charge. Courses such as data science and analytics, statistics, data visualization, programming languages (R, SQL, etc.), and design thinking, among others, provide the IR professional with ample opportunities to learn new skills that are completely and immediately transferable to their role. Coursera, edX, and Udacity are among the most well-known MOOC providers. In addition to their free online courses, MOOC providers are also bundling courses into specializations, such as "Nanodegrees" and "MicroMasters", for fees that are significantly less than full-fledged degree programs.

9.8 A Case Study in Decision Support

In 2011, the Georgia Institute of Technology created the Decision Support Group (DSG) to provide the executive leadership team with accurate and timely data and information to frame issues, set direction, identify and evaluate options, and develop and implement strategies. The DSG is a cross-functional team embodying a wide range of expertise and institutional capability. Led by Institutional Research and Planning, the subject matter experts (SMEs) who routinely partnered on projects included Capital Planning and Space Management, Financial Services, Institute Budget Planning and Administration, Enterprise Project Management, and Organizational Development along with the Office of Information Technology; Academic Affairs units; Research Centers and Administration; Institute Communications; and Campus Services.

The catalog of services offered by the DSG included: environmental and organizational assessments, stakeholder analysis, scenario planning and development, business case analysis, benchmarking and best practice research, orchestration of process management approaches for taskforces/committees on behalf of the executive leadership team (ELT) and responses to external stakeholders. A sample of projects undertaken by the DSG and their outcomes include:

Impact of a Larger Freshman Class – Participants in the project included Institutional Research and Planning (lead), Capital Planning and Space Management, Enterprise Project Management, Financial Services, Institute Budget Planning and Administration, Organizational Development, and subject matter experts from 15 different areas impacting students across campus such as Academic Affairs, Financial Aid, the Counseling Center, and Housing. Outcome: The impact of the additional freshmen could have had a negative effect on freshman course availability and the overall student experience resulting in attrition due to lack of classes and services. These circumstances were mitigated by additional funding allocated by The Provost's Office to the colleges responsible for service courses as well as the Center for Academic Success. This enabled the colleges to secure the necessary resources to offer additional introductory sections in English, U.S. History/Government, Math, Chemistry, Biology, Physics and Health. The additional funding also enabled greater access to academic support services (i.e. tutoring, communications, etc.). As a result, our largest freshman class ever had the highest first year retention rate at that point (96 percent).

Tuition Proposal/Supplemental Tuition Analysis Participants included Institutional Research and Planning (lead), Institute Budget Planning and Administration, and Government and Community Relations. Outcome: The DSG analysis enabled Georgia Tech to make its case to the Board of Regents to approve tuition rates that were more in line with Georgia Tech's peer institutions. As a result, tuition revenue to the institution increased from $152 million in FY2009 to $354 million in FY2016. During that time frame, tuition revenue accounted for 23 percent of Georgia Tech's budget versus 13 percent in FY2009. It should also be noted that the state appropriation decreased from 23 percent of the FY2009 budget to 15 percent in FY2016. In

addition to tuition recommendations, the DSG also provided analysis on the effect of the proposed tuition increases on the state's HOPE scholarship program, an important consideration when interacting with the state General Assembly.

Online Master of Science in Computer Science (OMS-CS) Pricing Strategy and Cost Analysis Participants included Financial Services, Institute Budget Planning and Administration, and Institutional Research and Planning (co-leads) and subject matter experts within the leadership teams from the College of Computing, Georgia Tech Professional Education, Provost's Office, and Udacity, Inc. Outcome: Georgia Tech received approval to offer the OMS-CS program in May 2013 with the first cohort enrolling in January 2014. By fall 2016, nearly 4000 students were enrolled in this wildly popular master's program that has driven enrollment increases not just for Georgia Tech but for the University System of Georgia as well (USG 2017). According to the fall 2016 Semester Enrollment Report, the USG experienced an enrollment increase of approximately 3500 students going from 318,100 in fall 2015 to 321,600 in fall 2016. Without Georgia Tech's OMS-CS program, the USG enrollment would have been 315,300 in fall 2015 and 317,600 in fall 2016. In a state where higher education dollars are tied to enrollment and formula funding, the OMS-CS program has proven to be a game-changer.

As the Decision Support Group matured, Georgia Tech's data infrastructure became the focus of improvement efforts. The DSG's recommendations to build a Center of Excellence for both functional and technical data management resulted in the establishment of the Enterprise Data Management (EDM) function. Housed in the Office of Institutional Research and Planning, the goal of EDM is to give Georgia Tech a cohesive, concise and coherent strategy for delivering integrated solutions for data governance, data warehousing, and enterprise intelligence.

9.9 Staff Development and Retention: An Ongoing Challenge

The challenge in any workforce today is retention. Practically, employees are looking for fair salaries, benefits, flexible working arrangements and meaningful work. Employers are looking for competency, loyalty and contributors to a greater good. The cost to educate and train an employee is often not recovered as a more mobile generation enters the workforce. Gone are the days when a person could work their way up the proverbial ladder to a position of leadership at one institution as more and more institutions look to hire external people who can bring new ideas and ways of doing business. Developing institutional knowledge (issues and contextual intelligence) must happen quickly if an IR professional is to remain engaged and be retained by an institution. This development should be facilitated by the IR leadership. Inviting staff to present their work or to sit in at high-level meetings will demonstrate the manager's confidence in their work. Furthermore, it will also serve to expose the staff to colleagues outside of IR who can be potential partners in later

projects. For every meeting the leader is invited to attend, he or she should ask themselves who from their staff would appropriately benefit from participating. Such opportunities are beneficial, even if the IR staff member just listens to the discussion. Finally, developing a training and professional development plan for each employee serves two purposes: (1) it sends a message to them that their continuing education is important enough to invest in and (2) it enables them to sharpen their skills in a variety of areas that will make the IR function stronger and more valuable to the institution. By developing a plan with their staff, IR leaders can better position relevant training and projects. Understanding where individual IR staff members want to be professionally over the next three to five years will enable the manager to align opportunities for growth and development, leading to a richer experience for both the staff and the leadership.

Mentors in the institutional research profession and in the campus community can be an invaluable resource to practitioners at all levels. Within the IR network, the Association for Institutional Research maintains a comprehensive directory that not only provides a member's name, position and institution, but also a live link to their email address. Attendance at AIR's annual conference or at any of the regional or state gatherings would also give a practitioner access to potential mentors. Staying in touch is easier through the use of technology and social media. Mentors in the campus community can be found through informal colleague networks or via institutional programs that match mentors and mentees. These programs will pair mentees with mentors who have been on campus longer and work in different units. A commitment is outlined for the mentor to meet with the mentee routinely (at least once per month, for example) and to be available via phone or email for the occasional question. Mentors from within the campus community can be crucial to building the capacity for issues and contextual intelligence for the new IR professional.

9.9.1 A Case Study in Professional Development

The University of Toronto (UofT) has a decentralized IR model. In regards to the majority of external reporting, IR professionals at the St George Campus are associated with either the Provost's Office or the Office of the Vice-President Research and Innovation. IR professionals are also located in each of the University's Faculties, as well as the two suburban campuses.[1] Due to the diffuse nature of the IR function at UofT, there was little or no sense of an IR "community". In 2010, several IR professionals at the St George campus met to discuss possible ways of changing this, as well as providing targeted professional development opportunities. From

[1] The University of Toronto is comprised of three integrated campuses – St George (the downtown campus), UofT at Mississauga (UTM), and UofT at Scarborough (UTSC). The campuses are integrated in the sense that faculty at all three campuses have status in the School of Graduate Studies which is located on the St George campus.

these discussions was born the Community of Institutional Researchers (CIR), which held its inaugural forum in December 2012. The goals of this forum, besides fostering a sense of community, are to provide networking opportunities across all three campuses, to engage IR professionals at different levels in their careers, to share best practices, and to disseminate knowledge vital to the IR function.

CIR meets, on average, three times each year, and attracts a diverse group of individuals, many of whom are not associated with "traditional" IR offices, such as Information Technology, International Relations, Environmental Health and Safety, Innovations in Undergraduate Research, Teaching Support and Innovation, to name but a few. The common thread among them is the need for data and analytical support/expertise. A typical CIR forum is 1.5 hours in length, and is organized by IR professionals in Planning & Budget. Topics are suggested and presented by our members.

The types of topics covered in the CIR sessions to date include:

(a) an overview of the IR function in different units, e.g. UofT's Business Intelligence (UTBI) Team
(b) university-wide project updates, e.g. Next Generation Student Information System (NGSIS); Student Accounts BI; strategies for disseminating results from the Faculty & Staff Satisfaction surveys.
(c) updates on government initiatives which affect UofT in particular and the university sector in general, e.g. changes in the provincial government funding formula, tuition fee policy changes, new funding (such as the Productivity and Innovation Fund), changes in the Strategic Mandate Agreements (SMAs) between Ontario and its colleges and universities.
(d) internal processes, e.g. how enrolment planning feeds into the UofT budget model (from the perspective of both central administration and individual Faculties); development of a Graduate Data Workbook in the Faculty of Arts & Sciences.
(e) an overview of data sources and subject matter experts available at UofT, e.g. data exchanges and other sources of data; data cubes.
(f) best practices for data visualizations.
(g) web demonstrations of data visualization and data governance tools (e.g. Tableau, Data Cookbook).

The list of CIR members and meeting materials (agendas, slide decks, etc.) are maintained on UofT's portal using Blackboard. This provides a central repository which is readily available to all (note – access is limited to those who are registered as members of the CIR – there is no fee for registering).

Each forum also offers informal networking opportunities, with some time set aside after each presentation for members to speak one-on-one with each other. At UofT we've found that holding such sessions on a regular basis has fostered a more integrated sense of community among IR professionals, has facilitated the dissemination of information, and has increased opportunities for collaboration among diverse offices. Over the next few years the University will be developing a more

formal data governance framework. Development of the new framework will rely heavily on the existing CIR.

9.10 Addressing the Integrity of the Profession

An integral part of professional development for the IR practitioner is acquiring an understanding of and an appreciation for ethics and integrity in the profession. As stated in AIR's Code of Ethics for Institutional Research and Professional Practice (2013),

The institutional researcher should work toward the maintenance and promotion of high standards of practice.

(i) The institutional researcher should uphold and advance the values, ethics, knowledge, and mission of the profession. He/she should protect, enhance, and improve the integrity of the profession through appropriate study and research, active discussion, and responsible criticism of the profession.
(ii) The institutional researcher should contribute to the knowledge base and share with colleagues knowledge related to practice, research, and ethics. He/she should seek to contribute to the profession's literature and to share knowledge at professional meetings and conferences.

These statements outline the obligation of institutional researchers to contribute their knowledge and scholarly work to the profession. While the other sections of the Code are important, the preservation of institutional research as a profession is the key to its acceptance on college campuses as a credible contributor to academe. In today's higher education setting, and especially in the collaborative work that happens with academic faculty, it is critical that IR leaders have and maintain a solid understanding of relevant theory and research that can inform their practice. For academic faculty, rigor in designing a solid empirical study guided by one or more theories is expected, and such an approach can strengthen IR practitioners and their perceived value by others on campus.

When we reflect on the principles of Terenzini's (2013) third tier, it reminds us of the need to possess relevant information and knowledge often obtained by reading scholarly journal articles and white papers that are developed for specific stakeholders that are aligned with IR. Following the fundamentals of good research requires the IR researcher to understand relevant theories that guide the research questions and methods. Good research also includes knowledge and intentional selection of analytic methods, and good IR work includes the ability to explain results that can make sense (or not) in light of the theory that guided the study. IR practitioners will find John Creswell's (2013) book on *Research Design* an easy-to-read but comprehensive book that articulates many important points about research design.

Often, staff members with advanced degrees bring these research and writing skills with them to the practice. Opportunities to develop staff to participate in research can enable greater job satisfaction by providing a means to collaborate and

publish their work. This interaction can happen on campus with colleagues from other campus departments, both academic and administrative, or outside of the campus with institutional researchers from other institutions or agencies. By setting up this capability within an IR office, the satisfaction of doing research and publishing the results fulfills a need within the IR practitioner and ensures that the scholarship of institutional research continues through the next generations.

9.11 Conclusion

Institutional research in the United States and Canada continues to play a meaningful role in decision support across higher education. A well-educated, well-trained workforce is vital to IR's success as a profession. Advanced degrees are still the norm for IR practitioners, particularly those in leadership roles. Professional development in the form of post-graduate education, conferences, workshops, and institutes is available to institutional researchers at all levels. Training in soft skills, such as team-building, written and oral communication, problem-solving and conflict resolution, can be found more readily as these are transferrable competencies that are required, regardless of one's industry. By its very definition, institutional research lends itself to the pursuit of knowledge and scholarship on which the profession relies to remain relevant and credible within academe.

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Chapter 10
A Focus on IR and Decision Support in the UK, Ireland, Germany, and The Netherlands

James Williams and David Kane

10.1 Introduction

Although many tasks traditionally associated with institutional research (IR) are done, the lack of a common notion or understanding of institutional research in Western Europe has implications for how it is actually conducted within the higher education sector, particularly for the way in which institutional data is collected and how it this process is coordinated (Huisman et al. 2015). It also has consequences for the ways in which staff are recruited, how they are trained, what professional development they receive and how they are retained. Furthermore, it can have implications for institutional memory, which in higher education, seems to be notably poor. Often, initiatives that provide useful data are abandoned or forgotten as new staff members begin. Staff turnover is relatively rapid as individuals migrate from institution to institution in order to progress. This is important in any discussion of institutional research as new leaders introduce new approaches. Often, new managers are unaware of what went before and what expertise is available within the institution; existing processes are often changed or abandoned as part of a general attempt by new University leaders to 'make their mark' or to ensure visibility within national initiatives. In addition, other activity that could provide valuable insights into the workings of the institution can be taking place, but not recognized as a source of data.

Institutional research in Western EU tends to focus on the present rather than the past, but archives of data could be extremely enlightening. Data collected over time can, when methodically analyzed, provide invaluable benchmarking for how an institution has developed over time (Kane et al. 2008). It is possible that greater

J. Williams (✉) · D. Kane
Birmingham City University, Birmingham, UK
e-mail: james.williams@bcu.ac.uk; David.Kane@bcu.ac.uk

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K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1_10

awareness of the decisions and developments of the institution's past can help managers avoid making the mistakes of the past. A central repository of knowledge, represented, perhaps, by a centralized institutional research function would be valuable because it has the potential to raise awareness amongst colleagues of how the institution has developed and understand what decisions were made and why.

Ironically, most, if not all higher education institutions in Ireland, the United Kingdom, the Netherlands, and Germany (and to a similar degree, Austria), now collect a vast amount of data about different aspects of the student and staff experience within them as well as contributing to national datasets.[1] However, this activity is not generally referred to in the sector as "institutional research" and is much less clearly defined than in the United States. Compared with IR in the United States, IR in Western EU has not developed as a profession, with all that implies for professional and career development. This may be because national systems in Europe are smaller and more diverse, making commonality more difficult to achieve, and because those whose work encompasses institutional research can be found in a variety of positions, with only a minority perceiving themselves as "IR professionals (Huisman et al. 2015). An additional challenge is that for some colleagues, institutional research clearly overlaps, or is confused with higher education research (See Borden & Webber 2015 for a discussion on these concepts). This confusion is perhaps easily understood given that now, more than ever, institutions seem to be engaged in a huge intelligence gathering operation and much work is undertaken as part of academics' professional development, either as part of their research interest or their doctoral studies.

Experience suggests that only a relatively few colleagues in Western EU higher education either know what "institutional research" is or would actually refer to themselves as "institutional researchers." A few clearly do understand the concept, such as those colleagues involved in associations such as the European Association of Institutional Research (EAIR), the UK and Ireland Higher Education Institutional Research Network (HEIR), and the Dutch Association of Institutional Research (DAIR). However, even within these associations, the understanding is often limited to enthusiasts. A survey of its members conducted by the DAIR in 2016, for example, indicated that only in 10% of job titles was the term "Institutional Research" mentioned.[2] In the case of the Netherlands, the term "Institutional Research" is not very well-known outside the DAIR-network. A few higher education institutions have (sub-) departments with "Institutional Research" in the name.

[1] Klemenčič, (2016) highlights that Austria, alone of Central and Eastern European countries, is closer to Germany in its development of institutional research practice.

[2] We are indebted to colleagues on the Executive Board of the Dutch Association of Institutional Research for this information.

10.2 Tasks Associated With and Institutional Locations for Institutional Research

While semantics may play a part in any discussion of its practice, IR is currently taking place under a variety of different names in many institutions across Europe, but not formally recognized as such. The key difference being, however, that institutions with named institutional research offices achieve coherency by bringing staff engaged in such activities together. Furthermore, institutional leaders are aware of the existence of this discrete department and its contribution and importance.

10.2.1 Collecting Existing Data

First, it is fairly common for statistical data about the institution to be collected by a single department. This can include information on the demographics of the institution, student pass rates, and other information. This information may be used to support different departments within the institution or be provided to national statistical agencies. Such data is usually routinely collected according to local and national requirements. It is common for such data to be collected by a department within the Rector's or Vice Chancellor's Office. A brief review of institutional websites in the UK shows clearly that most universities appear to have an office with a name such as the "Directorate of Planning" (University of Manchester 2017), "Planning and Performance Department" (Birmingham City University 2017a) or the "Planning and Business Information Office" (University of Kent 2017). At the University of Amsterdam, the Office of Strategy & Information is responsible for "the provision of executive information" (University of Amsterdam 2017). All these, at heart, undertake what is referred to at Birmingham City University's Planning and Performance Department as:

> taking data and information from a wide range of sources (both internal and external) and producing high quality and useful analysis that can be used to inform decision making at all levels of the University (Birmingham City University 2017a).

The sort of data that is collected is exemplified in this description of the work of the Analytics Department of Kings College London:

> The Analytics department provides a range of management information data relating to student composition, student performance, student satisfaction and external metrics. We currently facilitate the planning process (focused on student number planning), provide a wide range of reports to inform planning and performance management, and deliver Student Statutory Returns (including HESA and HESES). In addition, we provide the analysis of student survey data, including the NSS, KSS, PTES and PRES (Kings College London 2017).

This indicates that there are departments within institutions that undertake similar functions to those of institutional research departments in the US, but this is normally done under the rubric of planning and performance. In particular, as

Klemenčič and Brennan (2013) have argued, "data management, internal and external reporting and advising for institutional governance have been blended into the management of quality assurance."

10.2.2 IR and Learning and Teaching Development

Along with the task of collecting data, some institutional research is conducted within institutional learning and teaching development departments. These departments have gained greater prominence in recent years owing to the growing need to develop teaching capacity. As learning and teaching are possibly the most important functions of higher education institutions, it is hardly surprising that much work is done to understand aspects of these activities. The scale of the research undertaken in such departments varies, as in most cases, their focus on professional development. However, there is evidence of pedagogical research being undertaken to help understand and develop learning and teaching.

At Birmingham City University, for example, the Centre for Excellence in Learning and Teaching (CELT), an autonomous central department, "provides guidance and funding that brings together innovators from across the University" to improve lecturers' teaching skills (Birmingham City University 2017b). The role of the Centre is to inform colleagues of the most up-to-date teaching methods and, importantly, bring together existing expertise within the institution. Staff members within the Centre are from a range of backgrounds, both academic and technical and staff members are seconded from different parts of the University.

CELT is therefore part of an institutional "web" in which information is shared across the institution. The model is similar in other institutions but with notable nuances. For example, at the University of Warwick, the Learning and Development Centre performs a similar function, that is, "to provide accessible, relevant learning and development opportunities for staff," but it is based within the University's Human Resources Department (University of Warwick 2017).

This illustrates, again, the existence of institutional research but within departments that are constituted differently and with a range of remits and responsibilities. In this case, institutional research is tied into the central function of learning and teaching development.

10.2.3 Surveys

A key element in the activities of institutional researchers is the development and implementation of stakeholder surveys, a point highlighted in the US system and one that has also been recognized in the UK (University of Warwick 2017; Hathaway 1995). However, a common experience in Western European countries is that most

institutional surveys tend to be conducted in a haphazard, inconsistent manner and not by staff who might be categorized as institutional researchers. In addition, surveys are too often seen as a quick way of gathering information and they are not always (or often) conducted well. It is common for different departments within the institution to conduct surveys with no reference to each other, whilst institutions will occasionally employ external consultants to conduct surveys on specific areas of concern, such as staff satisfaction, adding to the confusion. Arguably, such surveys should be more coordinated and perhaps the responsibility of an individual department.

It is common for surveys to address a range of issues, but many focus on aspects of the student experience, with fewer exploring the experiences of staff. Institutional surveys canvassing students about their experience of higher education are conducted much more randomly and often for much more specific reasons. They tend not to be part of the accepted annual timetable of the institution. Surveys are initiated usually to explore a specific issue as a "snap-shot." They are seldom conducted as part of an on-going consultative process (Williams 2011; Harvey 2003).

An example of an institutional student survey process that was part of a university's annual quality improvement process was the *Student Satisfaction Approach*, devised by Professor Lee Harvey in the 1990s and which ran until the late 2000s. The advent of the National Student Survey arguably made the approach redundant as it focused on the institution and could not be used to make inter-institutional comparisons. The approach, which used a questionnaire that developed and changed over time depending on what students felt to be important, allowed the institution to address issues that students felt were important. A key part of the process was that staff, students and management were engaged in the process: the vice chancellor was committed to it and change was seen to occur.

National student surveys have replaced examples such as that given above and currently, both the United Kingdom and the Netherlands conduct national surveys about students' experience of higher education. As such, these surveys are perhaps not strictly part of the institutional research discussion except that, at least in the United Kingdom, the controversial National Student Survey (NSS) has stimulated innumerable and so far un-adumbrated follow-up research activities within institutions. However, experience indicates that these tend to be one-off studies to explore why particular items on the survey are performing poorly or, more controversially, to identify issues facing first and second year students before they are asked to complete the NSS in their final year. Such approaches are not part of a consistent, routine approach to improvement. Surveys such as the National Student Survey, the Postgraduate Research Experience Survey, or the Destinations of Leavers of Higher Education are problematic because, whilst they may provide some useful information for stakeholders, such as potential students and their sponsors, they are most popularly presented as league tables.

10.3 Examples of Institutions that Have Good IR Capacity

As noted above, few institutions in the United Kingdom, the Netherlands, and Germany have a dedicated institutional research office as in universities in the United States. Only Ireland, as Woodfield (2015) points out, is unusual in that it has a number of small IR offices, although these are mainly located in a wider structure. For example at University College Dublin, the Director of Institutional Research is based within the University's Quality Office (University College Dublin 2017). The role of the Director of Institutional Research, we are informed by the University's website, is "to inform decision making and planning at senior management level." The Director of Institutional Research:

> …will supply statistical data and information for use in the quality review process which will include information on applications, student registrations, graduations, and retention rates. This suite of statistics will give each unit under review a consistent and reliable source of information to begin their self-assessment process (University College Dublin 2017).

This, however, is very similar to the role of departments such as those mentioned above (in the description of planning/performance). At the University of Manchester, the Directorate of Planning appears to undertake similar activity. It:

> works closely with planning and finance colleagues in the Faculties who deal with local Faculty and School planning matters. We meet regularly and work together within the University's planning and accountability cycle to facilitate two-way communications, ensure consistency of practice, and share data and information. (University of Manchester 2017).

Staff members in the Directorate of Planning also undertake data analysis to inform institutional strategy:

> Data analysis is conducted on a range of student-based data to produce research that is used in formulating strategic and operational plans and policy. Key areas of the student experience are studied to ensure that delivery meets the needs of the diverse student population. (University of Manchester 2017)

It seems clear, therefore, that an institutional research function is developing within the various "academic planning" type offices referred to above.

10.4 The Future of IR and Decision Support in UK, Ireland Germany, and the Netherlands

What the above indicates is that while there is no discrete "profession" of institutional researchers in the countries under consideration, it is evident that the "practice" of institutional research, as understood in the American definition, is taking place (Volkwein 2008). Currently, as illustrated, the various institutional research activities are taking place in a number of departments with different institutional remits and functions. It can be argued, therefore, that for institutional research to be

recognized as a specific activity, these currently disparate activities need to be brought together and formalized. This might help to address training and skill development required by individuals currently engaged within such departments and lead to the development of a more formal and recognized program of institutional research within institutions. Mitigating against this idea is the presumed confidence that institutions have in their existing arrangements. If the departments are currently delivering, what is the motivation to change? An answer might lie in encouraging development of a program of staff development that would engender a notion of working within a specific profession rather than undertaking a number of "functions" that characterize current arrangements. The following section examines what such a program might need to include.

10.4.1 What Kind of Training Is Needed?

Institutional researchers require a wide range of research skills to engage with the different research requirements. There is a need for quantitative and qualitative research methodologies. Innovative approaches also required to engage different stakeholder groups. Documentary analysis also vital. There are a wide range of training courses open to the researcher and to "professional services" but this is not specific for the institutional researcher. HE researchers come from such wide ranging disciplines with quite different assumptions, from the positivistic end of the spectrum to qualitative end. The issue here is that a robust methodological approach is clearly required.

Training in the use of surveys is an important element in the training of institutional researchers. There is evidence of many bad surveys being undertaken by departments without understanding even the basic principles of survey design. In particular, experience suggests that many surveys are produced that "try to capture everything." Surveys are a popular approach to collecting information from stakeholders but often there is little real understanding of how to do an effective survey.

At the same time, there seems to be little enthusiasm amongst institutions on this region for collecting qualitative data. Surveys can appear to be quite easy to design and implement; there are several survey tools available on-line and data can be generated quickly. Qualitative data is usually generated from high-cost approaches such as interviews and focus groups and require significant effort to transcribe and analyze. However, there is much rich data that can be drawn from such approaches.

In recent years, there has been an effort to bring together the various elements of higher education research under the umbrella of a "field" or even "discipline." Malcolm Tight's work on HE research methodologies is one element in this attempt (for example, see Tight 2012). However, it is clear from reviewing submissions to higher education journals that contributors still work within their own academic disciplines and seem to be unaware of relevant work in other fields. Hence, potential cross-fertilization opportunities are often missed. At the same time, there is a danger that this might make the work of higher education researchers more "academic" and

less practical application. In the case of the EAIR), as Huisman et al. (2015) have suggested, "academization" may have excluded practitioners.

10.4.2 What Sort of Skill Development Is Needed?

It could be argued that these activities correspond to the model of institutional research espoused by Terenzini (2013), who argues that institutional research is "organizational intelligence" and stresses that three competencies are necessary:

1. Technical/analytical intelligence, which boils down to the crafts of data mining and analysis, the "toolbox" (Terenzini 2013).
2. Issues intelligence, which relates to understanding how higher education institutions function internally. Here he argues that institutional researchers need substantive knowledge (from the research literature) on the core issues that institutional research should focus on. As important, institutional researchers must be able to learn to play the institutional research game in collegial, bureaucratic, and political settings within their higher education institutions (Terenzini 2013).
3. Contextual intelligence, which denotes a sound grasp of context and culture. This engages with the nature and history of the higher education institution. Regarding this, he argues for much greater sensitivity of "the world out there" (Huisman et al. 2015).

There is clearly room for continued skill development in various effective research methodologies. Not only is there a need for an understanding of qualitative and quantitative approaches to research but also an understanding of how to engage with different types of data.

Recognizing the applicability of different methodologies is essential: institutional researchers need to recognize when and where to apply different approaches. In particular, it is useful to be able to recognize when surveys are less valuable and qualitative approaches are more useful. For example, the surveys may be useful for gathering data from a large sample of students across an institution but they are not much use for engaging with students about their module, yet end-of-module questionnaires seem to be used by default. In addition, institutional researchers need to develop their skills in a range of software. In particular, they need to be able to engage with software for the collection and analysis of statistics and qualitative data.

Institutional researchers also need to be able to write for different audiences. For those coming from an academic context, the transition to writing for a non-technical audience can be challenging. Identifying who the audiences are is also important. The audiences will be a range of different stakeholders with specific requirements. Similarly, it is vital that institutional researchers can write persuasively in order to convince senior executives to listen to them. For many colleagues who conduct academic research, it can be difficult to get senior management to listen.

Interpersonal skills are vital for institutional researchers. A great deal of the work of institutional researchers is collaborative. They work with colleagues across institutional and disciplinary boundaries and as such, will be required to engage with different disciplinary perspectives and forcefully present new approaches (for example, using qualitative approaches in departments which may have a preference for quantitative research methods). At the same time, institutional researchers may also provide an external perspective, or even a valuable "critical friend" for those colleagues with who they work.

The use by academic researchers of institutional data builds a bridge with the administration that often "owns" these data, and with data analysts that do the collecting, the cleansing ad analyzing. The varied participation at EAIR) Forums implicitly encourages such bridge-building, and invites administrators and academics to collaborate in order to strengthen practices and to make them more theoretically informed (Huisman et al. 2015).

10.4.3 What Professional Development Is Needed for Advanced Professionals?

Professional development can only occur when there is a recognition of a profession in the first place. As Guy Neave wrote (2003), over a decade ago, it is important that institutional researchers should "know thyself." Sadly, that still seems to be a challenge. It is therefore unlikely that institutional researchers will receive professional development training if they are not recognized as a profession.

Do institutional researchers see themselves as a profession? Some may, but others may seem themselves as representatives of their own disciplines. What happens when people who define themselves as institutional research experts move within the institution, from the institution or retire? Who are they replaced with, given that institutional research is not recognized as a profession? Is it generic skills that are in demand?

Anecdotally, it is possible to argue that EAIR) has moved away from its institutional research origins. Even in its "strapline" it is referred to as "The European Society for Higher Education;" Huisman et al. (2015) also highlight that there was a need in 2005 to introduce a track specifically for discussion of institutional research.

Winter and Krempkow (2013) highlight the lack of a sound network for higher education researchers in the German context and refer to a poor career progression for higher education researchers:

> The problem of HE research in Germany is moreover the lack of an effective institutionalizing process of research networks. This is particularly noticeable in the difficult career perspectives of HE researchers. (Winter and Krempkow 2013, p.45)[3]

[3] We are indebted to Dr. Suzan Bozkurt for her translation of this source.

Institutional research networks have attempted to professionalize it. The Dutch Association of Institutional Research notes on it website that "DAIR is an organization of people who want to develop their profession and who want to increase the effectiveness of their work."

The Higher Education Institutional Research Network of the UK and Ireland (HEIR) is perhaps less ambitious. One of its key aims "to build an IR community in the UK and Ireland that can help individuals develop their knowledge and expertise and contribute to the building of capacity for IR across the sector."

Currently, there are a few programs in existence that are designed to help professionalize the institutional researcher. Examples include postgraduate programs at the University of Speyer (University of Speyer 2017), the University of Osnabruck (2017), and the University of Hamburg (University of Hamburg 2017), all of which train individuals in aspects of higher education management. The Erasmus Mundus funded "Masters in Research in Higher Education," managed by the Danube University Krems (Austria), is a collaborative venture including the University of Applied Science, Osnabruck, Germany, the University of Tampere in Finland and Beijing Normal University. This program, running since 2012, teaches a small group (usually around 25 each year) about a wide range of higher education issues with a view to building institutional research capacity (MARiHE 2017).

10.4.4 Doctoral Studies

Research in higher education has been recognized in Western European countries as a serious subject for doctoral study (Teichler 2005). For many academic staff already in post, case studies of academic practice are sensible routes to gaining doctoral qualifications as the research material is more easily available. Popular areas are quality assurance and learning and teaching. It seems that this is an increasing phenomenon. This, whilst certainly doctoral in nature, is, in many ways "institutional research" because it is institutional focused. However, it is questionable whether institutions take the findings of such studies seriously.

Of particular interest here is the development of the professional doctorate in education in many UK institutions (Wellington & Sikes 2006; Scott et al. 2004). This is a doctoral program that is increasingly popular amongst academic staff who are in an applied practitioner position. The focus is on reflective practice, which is perhaps different from standard PhD studies and therefore has a potentially powerful role in encouraging staff who undertake such programs to reflect on their practice. There are a number of examples of such programs in the UK and staff who take part are drawn from a wide range of different backgrounds. Some are in academic roles, while others are in professional services or learning and teaching support. Disciplinary differences are also varied.

10.4.5 How Are New Professionals Recruited?

To paraphrase Simone de Beauvoir, "one is not born [an institutional research professional], one becomes one." Few, if any institutional research professionals in the countries under discussion become so as part of a career choice: a common experience is that a career in institutional research simply developed. This means that they are recruited from a huge range of backgrounds. Colleagues who consider themselves to be institutional research professionals are academics, administrators, and technical staff. They come from a huge range of disciplines and this. As Yorke (2016) argues in his 2016 HEIR) address, "Peregrinations," institutional research is a little bit of everything. Although there is seldom an idea of "institutional research," there is a common core of activities accomplished by higher education professionals that collectively represent the Western EU's current vision of IR.

Staff from "academic planning" offices are drawn from a range of backgrounds and not always (or often) with a research history. Experience indicates that they tend to come from technical backgrounds. Departments such as strategic planning need qualified statisticians and these can be recruited from a range of areas and are not generally academic staff. Staff in learning and teaching support departments are perhaps more likely to be from an academic background. In the case of units such as CELT), they are often lecturers with experience and interest in innovative teaching practice. Consequently, they will also be from a huge range of disciplinary backgrounds.

In the Netherlands, staff members move from or to institutional research positions from or to other policy and (or) management positions in the organization. People who apply for an institutional research position need to have certain generic skills (such as the sense of numbers or communication skills) and preferably have knowledge of the higher education system in the Netherlands. Although institutional research might demand specific skills and experience, in staff recruitment these skills and experience seem to have limited value.[4] In Germany, similarly, staff who are involved in institutional research will be more likely to be drawn from social science backgrounds.[5]

The picture is confused further by the fact that higher education research is a popular topic for academic staff who are doing their doctoral work whilst in post, particularly in fields such as Business Studies, Education, and Nursing. There is a preponderance of work on issues, such as learning and teaching, quality assurance, and transnational education provision where staff have a particular interest in these areas.

[4] We are indebted to colleagues on the Executive Board of the Dutch Association of Institutional Research for this perspective.

[5] We are indebted to Professor Uwe Schmidt of the University of Mainz for this perspective.

10.4.6 What Is Needed for Staff Retention?

There is no great evidence that staff retention is poor. Presumably, retention depends on the particular role of individual staff members. Anecdotally, there are many cases of staff members who are employed to collect institutional data as part of their institutional planning departments who remain in post for many years.

In general, if staff members are treated with respect, their work influences institutional policy making. Being ignored is a common irritation for all staff. Whilst there is much higher education research being conducted that could affect institutional improvement plans, arguably, much is, at best, simply unknown to management or at worst, simply ignored. What are the reasons that lie beneath this? Why do institutional leaders/managers choose to ignore expertise possessed by their own staff? Is there a dichotomy in the promotion of expertise in the marketing of the institution and the apparent disregard of this expertise when undertaking institutional research or other related strategic activities? Is this a question of trust or other reasons?

In the case of Germany, the state dominance of higher education makes it difficult to retain higher education researchers, if not specifically institutional researchers. As Winter and Krempkow note:

> The state plays a pivotal role in funding HE research, without it such research would not be possible […] if departments fail to succeed in bids colleagues with valuable expertise are dismissed, which usually means the institute's reputation is lost. (Winter & Krempkow 2013, p.46)[6]

The use of external consultants is common but there is evidence that it causes bad feeling amongst institutional staff. In particular, it is often felt that local expertise and knowledge is ignored. This can be both insulting and demotivating for staff within the institution who have the expertise required.

Clarity of role and the importance given to it is clearly vital. The existence of an institutional research office and associated understanding and recognition of the role potentially could strengthen the position of institutional researchers.

10.5 Finding a Model for IR that Fits for Western Europe

We have noted that there is a disparity between institutional research as it is understood and practiced in Europe and corresponding activity in the United States. In the UK there are few examples of the US IR model of a central institutional research function that combines reporting, change management, quality assurance (for accreditation purposes) and decision support. It is not clear cut whether following the US model would be appropriate for UK HEIs since many institutions also undertake IR activity across different units, which often works well when work is

[6] We are indebted to Dr. Suzan Bozkurt for her translation of this source.

aligned, and avoids bureaucratization. However, in a climate of scarce resources a more coordinated approach may be preferable to avoid overlap and ensure strategic focus and effective dissemination across relevant institutional stakeholders (Woodfield 2015, p.155).

Within higher education, the role of institutional research is to provide decision makers with essential information about their institutions and the environment in which they operate. In that way institutional research supports decision makers to make informed decisions and to realize their ambitions more effectively. (Huisman et al. 2015, pp.5–6). While Huisman et al. (2015) argue that the diverse nature of HE in Europe can result in the particular role of institutional research differing widely from country to country, it is evident that elements of Terenzini's model of Organizational Intelligence (2013) lie at the heart of many functions undertaken in European institutions whether under the guise of institutional research or not.

Is it likely, or indeed desirable, that the American notion of institutional research be adopted for use within European institutions? It could be argued that there is a fundamental need for greater sector-wide awareness and recognition of institutional research to underpin building of institutional research structures and provide the institution with the organizational intelligence necessary to enable it to quickly adapt to the rapidly changing higher education environment. It could also be argued that the increasing marketization of higher education in Europe would encourage institutions to equip themselves with anything that will give them an advantage over their competitors. Ultimately, when we talk about "institutional research," it is arguable that we have a US model in mind and it is not necessarily one that needs to be applied elsewhere. If existing models work for institutions in countries like Ireland, the United Kingdom, the Netherlands, and Germany, there is no reason why it should necessarily change: the issue is primarily about how to make what is done more efficient, consistent, and coordinated.

10.6 Conclusions

These thoughts highlight the fundamental problem facing the development of institutional research in the context of Ireland, the United Kingdom, the Netherlands, and Germany. The lack of awareness of the concept of institutional research is an important barrier to the development of an institutional research profession. Hence, what we have tried to argue is that this leads to inconsistency, lack of coordinated working and, worse, waste of colleagues' time.

There is no clear career progression for institutional research staff. They are neither teachers nor administrators and as "researchers" they do not fit into standard models. Institutional researchers develop rather than being employed with a clear longer term aim in mind. If institutional research is not recognized as such, how can a career progression be developed? In part, perhaps, it is a possible role for organizations such as EAIR) to encourage this. As Klemencic (2016) recently argued, "Work remains to be done by associations such as EAIR) to affirm the practice of

institutional research and sustain the professional identity and professional community of institutional researchers."

There is, of course, a need for institutional research to be listened to and acted upon. It is vital to develop effective feedback loops. Does this mean the development of coherent institutional research policy within the institution (or something similar but not called institutional research?). Could the US model of "organizational intelligence" be adopted by European institutions? i.e., would calling it something else galvanize activities? Is it all in the name? Readers may wish to review Chapter Three of this book which details conceptual models and organizational structures related to IR. Of particular note is reference to Taylor's (2015) maturity models as a way to further organize or structure tasks and personnel for growth of the IR profession.

There is a need for solid research methodologies. Institutional researchers come from a wide range of different backgrounds and have widely differing assumptions about conducting research. Ontological and epistemological positions are not always understood and the value of qualitative and quantitative approaches need to be recognized and used where appropriate. Above all, there is a need for consistent and coordinated research efforts to be made rather than responses to national surveys. However, these are dependent on an acceptance of institutional research as a profession in its own right, the nub of the current problem.

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Chapter 11
Professional Development for IR Professionals: Focus on Latin America

María Pita Carranza

11.1 Introduction

As is discussed throughout this book, institutional research (IR) has a long history within higher education and is gaining support around the world. Although the practice varies from one country to another, as it is linked to the context, higher education systems and institutions particular characteristics, the definition of its functions, the structure that it adopts, and the complexity with which it is carried out, in all regions can be found evidence of the significant benefits that it offers.

Interestingly enough and for some reasons, South America is an exception to the preceding, as there is a lack of a culture of using data for management since information production and analysis is often subordinated to short-term needs and decisions are more influenced by political issues than by evidence. Although there is a rising increase of subjects related to higher education in Latin America, and universities have been identified as objects for research, there is little evidence of IR as an organized activity in most countries.

Nevertheless, despite the absence of references about 'institutional research', some IR functions are performed albeit in their infancy. Many Latin American countries have implemented national systems for evaluation and quality assurance, which have resulted in the continuous production of valuable reporting from the different universities. While there are differences among these systems, many of them share similarities, and all of them share the same goal of ensuring quality. Taking the latter into account, it can be asserted that many Latin American universities carry out activities on a daily basis that can be attributed to the function and practice of IR despite the absence of organized activities in this field.

M. Pita Carranza (✉)
Universidad Austral, Buenos Aires, Argentina
e-mail: pita.mb@gmail.com

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K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1_11

This chapter will address an overview of the state of institutional research in two Latin American countries, Argentina and Chile: the activities related to IR, the processes that led to its implementation, the problems involved, and the future challenges that this activity will have to face.

11.2 Evidence of Institutional Research Activities in Latin American Universities

Although the practice of institutional research has not spread widely in Latin American universities, it has experienced some practice based primarily on the evaluation and accreditation activities that emerged as a need to regulate the functioning of higher education systems and to ensure its quality.

Higher education evaluation and accreditation processes were implemented in Latin America in the mid-1990s and have had significant development in almost all countries that faced changes in legislation. Due to the legislative needs, higher education institutions (HEIs) created specific areas and developed quality assurance systems, most of them based on a self-evaluation, peer evaluation, and an external evaluation process. (Fernández Lamarra 2005; Rama 2005). Although quality assurance processes in these countries were usually initiated by the governments, a significant diversity can be seen, as they were developed according to the information needs of the different higher education systems and culture of each country (Romero 2009; Lemaitre and Mena 2012). However, they all share a common goal that is to assure the quality of the procedures and results of the programs offered by universities.

For this particular discussion, I describe the current practices related to institutional research in two countries that are placed on each end of the spectrum: Argentina, where there is no evidence that it has been implemented as a formal activity, and Chile that can be considered as an exception, as a remarkable degree of institutional research development is evidenced. Regarding the practice of IR-related tasks, other Latin America countries are positioned somewhere in between Argentina and Chile.

11.3 Processes that Led to the Implementation of Institutional Research Activities in Argentina and Chile

Originating from the implementation of evaluation and quality assurance mechanisms, institutions in Latin America sought different ways to respond to requirements of national systems. For this they had to develop various processes between which there are two issues that can be highlighted, strongly linked to the

development of institutional research: the implementation of information systems and the establishment of units capable of generating and managing valuable information about the institutional real situation. Although there is not a direct relationship between funding and quality assurance, its influence can be seen in the development of organizational processes and structures within universities in Argentina and Chile.

In Argentina, as a result of the changes introduced by the new Higher Education Law in 1995, the production of institutional information was promoted, as universities needed accurate data about their real situation. The new law covers the whole higher education system, and the most relevant issue was the creation of the National Commission of University Evaluation and Accreditation (CONEAU) agency in charge of the external evaluation of institutions, accreditation of postgraduate degrees programs, public interest graduate degree programs (article 43), and the evaluation of new universities projects. (Fernández Lamarra 2003). In this context, emphasis was placed on providing tools to improve the reliability of information for institutional analysis. This led to the establishment of information systems within universities, based on the creation of a national system called "University Information System" (SIU) and the granting of funds for its implementation. In this period, the Secretariat of University Policies, depending from the Ministry of Education, called for the "Fund for the Improvement of University Quality" (FOMEC), giving financial support to state universities in order to carry out educational reforms projects and to improve management. (Gurmendi and Williams 2006). FOMEC had a special component oriented to the implementation of information systems within universities, and many of them took advantage of these funds developing their own systems or implementing the different modules of the SIU.

In Chile, a Law on Quality Assurance of Higher Education[1] that established a National System of Quality Assurance was sanctioned in 2006. The National Accreditation Commission (CNA) was responsible of institutional accreditation, which is based in the analysis of the mechanisms that ensure quality and the accreditation of undergraduate and postgraduate degrees within institutions, according to institutional purposes and the criteria established by academic and professional communities, the authorization and supervision of parallel accreditation agencies, as well as the construction of an information system for Higher Education. In this context, institutions had the possibility to compete for funds through the MECESUP agreements, based on a contract between the government of Chile and the World Bank with the aim of implementing quality assurance processes, related to the development of 'institutional analysis' capacity and systematic self-evaluation (Middaugh et al. 2008; Fernández 2010).

These agreements were focused on: (a) allocation of resources for academic improvement. Institutions competed for funds, and the allocation was based on the development of specific measures of institutional performance and determinate analytical strategies oriented to assess performance. This evaluation could only be achieved through a rigorous program of 'institutional research'; (b) strategic

[1] Law N° 20.129.

planning and capacity building at institutional level, with the aim of ensuring the engagement of institutions in comprehensive strategic plans; and (c) quality assurance. In order to compete for funds, institutions had to be accredited, and many public and private institutions took advantage of accreditation as a way of distinguishing themselves from other institutions (Middaugh et al. 2008). In this context, MECESUP became the main trigger for the expansion of institutional research activities in Chile (OCDE-BIRD/World Bank 2009).

The granting of government funds determined the shape that information management took within universities and the functions and structures that institutional research activities adopted in institutions of these two countries. Below I briefly describe how it developed in each case.

As mentioned before, in Argentina some universities developed their own information systems, while others implemented the different modules of the SIU, as a result of FOMEC funds (Gurmendi and Williams 2006). Currently, most universities have computerized systems capable of producing a large amount of information for diagnosis, monitoring, control and decision making. However, it has not been so easy to establish in institutions the need for structures to carry out these tasks. Although the higher education law foresees the creation of internal instances of institutional evaluation, few institutions created administrative units for that purpose in a permanent way. Instead of a specific unit to carry out IR, the most usual is that it takes place in certain dependencies where it is one more task among others. And where these units exist, they basically have the assignment of managing information in order to raise different requirements, for external agencies – information required by the CIIE and CONEAU accrediting agency - and for internal use - relevant information for self-evaluation processes or any other specific requirement – (Pita Carranza 2012).

In Chile, the funds of MECESUP encouraged the creation of institutional analysis units within institutions and the development of data exchange networks for the promotion of comparative analysis and the sharing of strategies for better access to information. The creation of “Institutional Analysis Offices” gave a response to the need of valid and timely information for management and its main function was to support decision making and the permanent diagnose of institutions performance. They are also responsible for providing information according to external requirements (Rivera et al. 2009). With the promotion from the highest levels of the system, institutional research was installed as an organized activity in many Chilean institutions, and in recent years these offices have proliferated and consolidated in most universities.

11.4 Information Management Units in Argentina and Chile

Although in the last decades the literature on evaluation and quality of higher education has grown in Argentina and Chile, there is not much written evidence or information about “institutional research” or “analysis” units in these countries, nor

about their structure or operation. Most of what is known is cobbled together by individual scholars who have an interest in studying higher education in the region.

In 2007, the actual University Information Department (e.g., "Information and Statistical Research Coordination" - CIIE), which depends on the Secretariat for University Policies of the Argentine Ministry of Education, did the only survey of information management units in universities[2] (CIIE 2007), so in 2012 a study was carried out by Pita Carranza (2012) with the aim of inquiring more deeply in this subject. For this, it was necessary to search for evidence of their existence in different sources, such as external evaluation reports carried out by CONEAU, which, as they exist, make some reference to them, universities' websites, and interviews with key informants (Pita Carranza 2012). At the same time, a study was carried out in Chile about the units responsible of processing information and giving support for decision making. These units are generally called "institutional analysis offices" (Rivera et al. 2009; Fernández 2010). This research was based on the study of web pages, interviews and questionnaires applied to managers and professionals of these units. Finally, in 2011, an evaluation report was prepared by Silva Triviño (2011) on the functioning of institutional analysis units of 12 universities, installed and developed from the funds granted by MECESUP2. This report compiled information in five areas: characterization of the units; staff; resources; performance; and tasks and achievements. From these researches, the way in which institutional research has been carried out in these two countries can be inferred.

Regarding the names that these units receive, in Argentina, although they may vary, they are grouped into three main categories: "Institutional Evaluation," "Planning," and "University Statistics." Some external evaluation reports of CONEAU mention the creation of units called "Institutional Analysis," that carry out activities related to the coordination of strategic planning and the implementation of information management systems, but there is not much information available about them. In Chile, these structures are called, in addition to the previously mentioned "Institutional Analysis," as "Planning and Development," "Quality Assurance," and "Projects and Studies."

In terms of their hierarchical dependence, the experience is heterogeneous between the two systems. In Chile, the units that support institutional research processes are mainly located at a senior management level, or even constitute an autonomous structure, which reflects their relevance in strategic decision making processes; however, in Argentina the units that support IR are placed at a more operational level, mostly depending on Academic Affairs (56,7%) and secondly, on Information and Technology Services (10.3%).

Regarding institutional research teams, the structure is similar in both countries and its size depends on several factors such as the size of the organization or the legitimacy that institutional research has (Fernández 2010). Taking this into account, larger and more traditional universities can count with solid teams, while smaller

[2]The University Information Department is conducting a new survey of these units in 2016–2017.

institutions may only have one person performing such tasks. In general, they are small structures, composed of two or three people.

In Chile, 64% of IR units' directors own a master's or doctorate degree, and 82% have at least five years of experience in gathering and analyzing information, planning, budgeting, and evaluation. The other members of the staff, with a few exceptions, are professionals in the areas of engineering and administration, with variable experience (Silva Triviño 2011). The study carried out in Argentina shows that 64% of the staff have a graduate (48.5%) or a postgraduate (15.5%) degree, while 17.5% only have a high school qualification. It also emerges that most of the people who perform these tasks come from statistics, computer science, and sociology areas. They generally have a deep knowledge of data and seniority in institutions but, due to their technical profile, they lack of training for a deeper or conceptual information analysis. However, from the interviews, it emerges that in recent years a change to a more academic profile in the people who are in charge of tasks related to information management can be observed, in response to the need for a more conceptual and broad view of the university.

Finally, in both countries the activities carried out are mainly oriented to the collection, analysis, and dissemination of statistical information of the institution. Other activities mentioned are related to the analysis of the context, to the management of ideas, proposals, action plans, problem solving, and research that could produce knowledge in order to promote the development of teaching, research, and extension functions of universities. On the other hand, some differences are observed in both countries, with an orientation toward the consolidation of practices on evaluation processes, the construction and maintenance of databases, and the generation of indicators in Argentine universities, and an emphasis on the safeguarding of the institutional mission and in the development of the capacity to observe competition in the case of Chile.

11.5 Challenges for Implementation

As mentioned above, changes introduced by the new Higher Education Law in Argentina prompted efforts to improve the quality of information, mainly from the implementation of information systems within universities and the granting of funds for its implementation. Although the information coverage of these systems is extensive and there is a large amount of data available, a systematic set of coordinated and integrated components has not been built, making it difficult for individuals to generate timely and relevant information, and thus increase efficiency and effectiveness for decision making. The information that is produced is scarce, and mostly responds to external requirements. The need for reliable and up-to-date information has not yet been established in the institutions, for several reasons. Firstly, there is not an institutional culture of using data for management, so information has little influence on the decision making process. There have not traditionally existed in Argentine institutional policies that include in an articulated and

sustained way the production of analysis and effective reports about the institution itself. It can be inferred that, in this context, it is not easy to generate consolidated areas for the production of information and knowledge.

The self-evaluation process prompted Argentine universities to conduct deeper analyses of qualitative and quantitative information, installing quality assurance mechanisms that contributed to the development of some academic-administrative units responsible for executing or promoting actions related to institutional evaluation and programs' accreditation. These units are the closest to what can be considered an "institutional research" unit, but information management within these areas is mostly circumscribed to data collection and systematization. Finally, although universities, like any other public institution, have an obligation to disseminate and socialize their information, this hardly happens. In this context, it can be affirmed that although there exists discussion that the university system needs to have reliable and up-to-date information in all areas of its management, a deeper reflection still needs to be done, since evidence of practices tending to favor information management is still scarce.

With regard to the situation in Chile, the value of information and the role of "institutional analysis" units is emphasized, assigning them an importance that goes beyond management requirements, and giving it a public value. However, while it is highlighted that information plays an increasing role in government and management (Rivera et al. 2009), the lack of information systems that support institutional decision making is identified as a deficit. In addition, institutions in this country show little willingness to share information, although there are some exceptions. The report "Reviews of National Policies for Education. Tertiary Education in Chile," carried out by OCDE-BIRD/World Bank in 2009, showed that information management is still not robust nor clear, with significant gaps and a lack of consistent data, despite individual efforts to generate information. Responding to this, a series of strategies were designed, implying the challenge of increasing and diversifying available data through the development of the National Information System (SIES) (Salamanca 2011). The SIES seeks to keep an adequate level of information of the national higher education system and generate higher education indicators, maintaining a certain control over data collected, since this system operates on the basis of the compilation of individual records about academic programs, national and international students, graduates, faculty, infrastructure, resources, and financial information.

In Argentina universities, where information management units exist, their declared functions cover a great variety of subjects. However, from the information collected in the interviews (Pita Carranza 2012), the work of these units is quite routine and, as small structures, they end up being limited to provide only the information requested. Another problem that evidence shows is that these areas work in isolation, and disjointed from both the central level and other dependences of the university. On one hand, universities give little importance to the existence of a centralized area of information management, and on the other, it is uncommon that information is valued beyond the need of having data for a specific requirement. In general, data are requested in certain situations and these units just refer to the

required information. Thus, many times staff members are dedicated to comply with certain operative instructions, without knowing how data was constructed.

On the other end of the spectrum, the proliferation and consolidation of institutional analysis units within Chilean universities is a sign of the professionalization of institutional research and the goal to make increasingly data-informed decisions. The most important achievements that can be mentioned are the positioning of these units as a source of useful information, the consolidation of institutional planning, the progress towards the implementation of management information systems, and the creation of data exchange and institutional analysis networks (Silva Triviño 2011), which provide an opportunity to promote, generate, and share good practices between institutions. However, although the value of IR may appear obvious to those familiar with the practice, its installation has not been trouble-free. Often in this culture, institutional units that do not easily link with university traditional functions may be challenged with the problem of perceived legitimacy. Some scholars posit that the organized practice of IR and decision can progress in Chilean and Latin American higher education when built from formal response to internal and external requirements, but even this first area has occurred only minimally, with still greater need for resources and necessary authority to be effective (Rivera et al. 2009).

11.6 Further Discussion

In spite of the gradual incorporation of the quality assurance culture in institutions and the efforts to have timely and relevant information, information management in Latin American universities is still lacking the fundamental contribution of "institutional research" as a key part of this process in general.

Although some activities traditionally associated with IR are carried out in most universities, "institutional research" as such remains almost unknown in Latin American institutions, with the exception of Chilean universities, where these activities are known as "institutional analysis." The creation of institutional research units or areas is not common, nor is the training of professional staff who can carry out the tasks involved. Therefore, it is relevant to address the information management issue from the perspective of "institutional research." The fact of being a late developer of this activity supposes as an advantage the possibility of learning of others' experiences, and this allows to define some guidelines that can be useful for the universities of the region:

1. The implementation of an institutional research unit needs to have a definite purpose in the context of each institution. Although the decision is usually determined by specific requirements at a certain moment, which can respond to both an institution's own initiative and a government's request, if institutional research does not have a clear and concrete purpose, it will not be become a sustained contribution to management.

2. It is not possible to implement institutional research activities effectively without the support of leadership. This implies the commitment of managers to make decisions based on evidence, and that requires a change of attitude that gives value to information as an important input for this purpose and as a support for strategic planning, evaluation and accreditation, and quality assurance processes. As a first step, the organization's leaders must define their own information needs and integrate the information that can be supplied by skilled IR professionals. Since substantial funding for higher education in Latin America comes from the government, institutional leaders need to develop an intentional plan and vision for the institution, and once this is done, IR practitioners can be in a better position to provide helpful decision support.
3. Fundamental to decision support is the need for data and data management. Both are in their infancy in Latin American higher education. A clear definition of data points and the ways in which they are going to be collected, stored and analyzed is needed, so that the information produced is adequate, valid and timely, and covers all aspects of the institution. As mentioned in other chapters of this book, IR practitioners are positioned to lead these efforts. In Latin America, even in Chile where IR has made some inroads, many more efforts are needed. IR officials can be most helpful when information is incomplete, inconsistent, and contextualized. However, a first step is building data systems within and then across institutions in Latin America.
4. Finally then, a most important issue is the need to have an adequate structure and staff. As the economy grows and institutional leaders see the value of IR, staff can be added. Professional development training for staff members is needed at all stages – as new staff members are employed as well as on-going training to ensure that staff members stay informed of local, regional, and global policies in higher education that may affect their institution, build networks of colleagues, and to become aware of innovative practices that may be incorporated in one's specific setting.

In conclusion, "institutional research" can be effectively developed and turn into a real contribution leading to improve information management in Latin American universities if there are not only public but also institutional policies that drive the processes and if they are assumed as part of their management. And finally, the need of having qualified professionals to carry out this activity and leaders committed to make decisions based on evidence can be fulfilled.

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Chapter 12
Building Capacity for Planning and Institutional Research – A View from Down Under

Angel J. Calderon

12.1 The Australian HE Context

Australia's higher education (HE) system comprises 172 registered providers, of which 37 are public and six are private universities. The reminding 129 are non-university private providers. In 2015, there were 1.4 million students enrolled across all institutions, of which 91% were enrolled in public universities (Department of Education and Training [DET] 2017), compared to 420,850 enrollments in 1988 and about 90 institutions – of which 19 were (all public) universities (Department of Education and Training [DET] 2016). Australian HE system is a success story. Consider, two facts:

- 24 of its public universities are included in the top 500 of the major world universities rankings schemas and
- Education is Australia's third biggest export industry after iron ore and coal, earning approximately $20.3 billion in 2015/16 (DET 2016).

There were several successive tough economic reforms that commenced in the late 1980s, which went through the 1990s and 2000s, that delivered unprecedented economic stability and growth. The main argument for the undertaking of reforms was that Australia needed to be more competitive internationally. Australia is the only major developed economy that has not experienced an annual recession since 1992 (Austrade 2017). Australia's HE system has played an important role in contributing to such economic boost and growth. Specifically, Australia's substantive transformation of the HE sector began in 1987, with the release of the Green Paper (Higher Education: a policy discussion paper), which proposed fundamental changes (DET 2016). Among these, the demise of a binary system of HE (i.e.,

A. J. Calderon (✉)
RMIT University, Melbourne, Australia
e-mail: angel.calderon@rmit.edu.au

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K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1_12

distinction between universities and colleges of advanced education) and replaced by a Unitarian system, which prevails now. In addition, the reforms resulted in:

- Amalgamation of institutions – from 73 higher education institutions (HEIs) including 19 universities in 1987–38 institutions in 1991;
- An increase in the number of publicly funded places available for study, which in the past varied by institution, were made consistent thanks to a relative funding model based on discipline and level of study;
- Changes in the way institutions were funded, including institutions' ability to charge students a contribution and seek funding from the private sector;
- Changes to research funding, with greater emphasis on research on topics of national priority;
- Changes to the composition of governing bodies (e.g., council and academic board) and strengthening management roles in institutions;
- Major changes in staff, aimed at increasing flexibility for staff recruitment in priority areas as well as improve staff performance; and
- Changes to achieve greater efficiency and effectiveness of institutions, including reduced unit costs in teaching.

These reforms were influenced by neoliberal forces that prevailed at that time. Many governments around the world turned to economic rationalist approaches to solving problems they confronted (such as trade deficits and reduced ability to fund programs) and resulted in governments adopting market-driven approaches to solving these problems (Meek 1991; Broucker and De Wit 2015; Cantwell 2016). With each subsequent wave of reform, the Australian government has further advanced liberalization, heightened institutional competition, and increased deregulation and marketization of the HE sector (Davis and Farrell 2016). The basis for the current financing system of government support to institutions are a result of reforms introduced as part of the Nelson Review (DET 2016). As a way of illustration, Table 12.1 lists the various reforms undertaken between 1988 and 2016. Additional policy programs have shaped the current modus operandi in Australia's HE. For instance, the Learning and Performance Teaching Fund (LTPF) was a program administered between 2003 and 2008. The LTPF was designed to reward excellence and then expanded to recognize quality improvements made by institutions. In 2012, the Australian Government launched the MyUniversity website, which was designed to provide to prospective students a basis of comparison of performance between Australian universities. The website provided information at the field of education level on several metrics, including student satisfaction, graduate employment and attrition rates. MyUniverstiy was however replaced by the Quality Indicators of Learning and Teaching (QILT) website, which was launched in 2015. These examples illustrate that policy instruments have been supported by considerable volumes of statistical analyses, and institutional processes driven and operationalised by planning and IR offices.

Table 12.1 Australia's Major Higher Education Reforms Since 1988

Title	Year	Review	Purpose	Key outcomes
Higher education: a policy statement	1988	Dawkins white paper	Determine reforms to expand capacity and effectiveness of the sector	Amalgamations, end of binary system, increase in public funding, increased capacity to offer places to international students
Learning for life: Review of higher education financing and policy	1998	West review	Identify options for the financing of higher education teaching and research over the next 20 years	Move towards a "student-centred" approach; quality agency established; set groundwork for subsequent reviews to address issues of access, competition, levels of funding
Review of Higher Education in Australia	2002	Nelson review	Determine appropriate mechanisms and levels for funding HE	Block grant replaced by per-student student finding, increase in maximum student contribution, universities permitted to set their own student contribution, regional loading for universities, additional funding for equity and quality programs, access to income contingent loans for full fee-paying courses
Review of Australian Higher Education	2008	Bradley review	Examine state of the Australian system against international best practice, explore future directions and consider options available	Student demand-driven funding system introduced, continued ability to offer full-fee courses for domestic undergraduate students, a revised qualifications framework
Higher Education Base Funding Review	2011	Lomax-Smith review	Identify principles to support public investment in HE	Government accepted recommendations but no significant changes to existing arrangements were required
				It recommended average level of base funding per place be increased, areas of underfunding were identified, maximum student contribution should remain capped
Report of the National Commission of Audit	2014	Audit	Review the performance, functions and roles of the government and make recommendations to achieve efficiencies, saving and productivity improvements	Review found government investment in HE contributes to a more agile and productive workforcenational priorities for research were updated and commissioned reviews of research funding policy and research training

(continued)

Table 12.1 (continued)

Title	Year	Review	Purpose	Key outcomes
Review of the Demand Driven Funding System	2014	Kemp-Norton review	Examine impact of the demand driven funding system	All HE providers should be eligible for government supported places, further open system for competition between public and private providers

12.1.1 Institutional Research Enters the Arena

The market-driven HE reforms in the late 1980s gave rise to the vital role that planning and IR has played in contributing to the fulfilment of the mission of the university. Low (2002) argues that no university can address the issues of continuous change and strategic planning without IR, which considers the institutions array of information it collects, its educational missions, and the challenges it confronts in the external environment, both domestically and globally. However, the systematic provision of statistical information by institutions goes back to the 1970s when the federal government mandated that all HEIs should provide data on their students, staff, and financial arrangements (Borden et al. 2013). Institutions provided such information to the Commonwealth Tertiary Education Commission, which was charged with the responsibility of advising the minister of education on matters relating to Commonwealth financial assistance to tertiary education institutions (Department of Education, Employment and Training [DEET] 1993).

Maasen and Sharma (2002) note that interest in IR as a field of profession and practice began late in the 1970s in Australasia, and by 1988 the Australasian Association for Institutional Research (AAIR) was established. AAIR is the professional association for those who see their field of practice as IR. Members contribute to planning, decision making, policy formulation and analysis concerned with the management of tertiary education (AAIR 2017). AAIR continues as a body umbrella and its annual conference is its main event.

In Australia, typical functions associated with the practice of IR or planning can be summarised as follows:

- Preparation of statistical returns to the Australian Department of Education and Training as required by the Higher Education Support Act);
- Compilation of the institution's annual compendium of statistics;
- Custodians of the historical returns and official statistics, which form part of the Higher Education Information Management System (HEIMS);
- Development and management of student load projection (three to five years out);
- Development of student load target setting, including monitoring against agreed target;
- Resource planning and analysis, including the preparation of such derived statistics as student: (faculty) staff ratio;

- Preparation of management reports, including dashboards;
- Environmental scanning activities, including report analysis and insights;
- Management and reporting of student surveys;
- Development and monitoring of key performance indicators, including institutional benchmarks;
- Monitoring and reporting of World University Rankings; and
- Contributing to quality assurance and quality improvement plans.

Planning and IR functions vary from university to university. While there may be common features in the composition, staffing arrangements, and organizational structure, there is not a single typology to describe Australia's planning and IR functions. There is a degree of uniformity in that these are central functions and are often the group which contributes to shaping policy, planning and strategic advice that informs and supports decision-making in the university. Planning functions are usually in functional proximity to the vice-chancellor (president) and their executive. Progressively there are more planning, project management, and related functions being undertaken centrally but also across faculties and schools. In part this is driven by the emergence of "big data" but also because of the influence of new management approaches.

In the organizational structure of universities in the past, administrative and service units were small units and worked in conjunction with other units. There is now a greater level of complexity in the organizational structure. There are no longer small units but divisions, and there are more boundaries separating each division. There is a greater emphasis about strategic planning, strategy, governance, analytics, project management and business intelligence. Invariably, use of such terms have evolved over time. In looking to the future, where planning and IR may fit in the organizational structure in the next ten or twenty years' time is likely to look very differently as it looks now. The traditional interpretation of IR is rapidly being uncoupled by contemporary language that prevails in HE. In fact, the practice and approaches of IR as it was seen during the 1970s to the 1990s has faded away. What we see in contemporary Australia is that IR is an applied discipline or a set of tools to inform sound decision making (Dressel 1981; Terkla 2008; Taylor 2015; Calderon and Webber 2015) that draws ideological practice from neoliberalism – as evidenced by the evolution of the Australian HE funding and policy reviews since the late 1980s. The current planning and IR practice is influenced by "big data" or the science of business intelligence. To illustrate the variety of planning and IR practice in Australia, Table 12.2 shows where such offices fit in the organizational structure in 15 out of the 37 public universities. It stands clear that 'institutional research' as a term of discourse and as a distinct set of roles and functions are not visible at the top of the hierarchy in Australia's HE landscape.

Planners and IR practitioners fit into what Whitchurch (2009) call the third space and blended professionals. The roles of planning and IR professionals are shaped by the four dimensions of professional activity of blended professionals described by Whitchurch: spaces, knowledge, relationships, and legitimacies. They have different identities that are shaped by the variety of roles and functions they perform in

HEIs. However, the roles and responsibilities for planning and IR professionals are changing as much as we see it in other knowledge-based occupations. We are amidst a greater transformation that is likely to have profound impact in the labor market, in part driven by technological transformation, automation, geopolitical shifts, and globalization – despite anti-globalization forces forcing a rethink. This means that the skills and abilities that are necessary for the practice of planning and IR will continue to be as diverse as these have been, except with increased emphasis on judgement-related skills, increased ability to anticipate, foresight and forecast. Before considering the challenges and the possibilities that lie ahead for planning and IR professionals, let us briefly consider the depth and breadth of Australia's HE data collections.

12.2 Higher Education Data Collections

The statistical information that institutions submit to the Australian department of education and other government agencies has been one of the critical activities performed by the offices of planning within each institution, and these collections have evolved considerably and increased in volume and complexity since it was systematised in the 1970s. Unlike the United States where such are called offices of IR, these are typically called planning or statistical offices. Regardless how such offices are called, the practice of IR has risen out of the mandate for institutions to report statistical information to governments, and it has further developed as the reporting and accountability requirements have evolved (Calderon 2011). All institutions are mandated under the Higher Education Support Act (HESA) 2003 (Section 19–70) to provide such statistical returns. The coverage of the statistical collection relates to:

- Courses offered by HEIs;
- Numbers and characteristics of commencing and returning students undertaking courses;
- Student load distribution (full-time equivalence) by study term, course, program and discipline;
- Completion of units of study and degrees;
- Students' liabilities under the Higher Education Contribution Scheme (HECS);
- Numbers and characteristics of staff in HEIs;
- Income and expenditure for HEIs;
- Research activity; and
- The educational profiles of HEIs.

These statistical data collections occur annually and submissions are monthly, depending on the component being reported. In addition, Australian HEIs are required to participate in surveys of commencing and returning students as well as graduates every year. Results of these surveys are made available for public consumption in the QILT) website (https://www.qilt.edu.au/). University leaders use results from these surveys to monitor institutional performances (KPIs against

agreed objectives); measures such as good teaching, overall satisfaction, and graduates in full-time employment are derived from these surveys.

There are also data collections for a variety of purposes to comply with regulations and other requirements from other agencies, such as:

- Institutional facilities and space management, which would fall under the domain of those groups managing campus facilities;
- Activities of international enrolled students, which would fall under the domain of international student recruitment;
- Equity and diversity, which would fall under the domain of student services; and
- Health and safety, which would fall under the domain of human resources.

In addition, the Australian Bureau of Statistics undertakes the biennial research and experimental development survey, which is managed in each university by the research offices. Further, the Australian government introduced the Excellence in Research for Australia (ERA), with three rounds now completed in 2010, 2012 and 2015. ERA is a comprehensive audit of all Australian university research outputs, staffing, and activity, as well as research income and research application data. The ERA audits are major institutional endeavors that require detailed project management, data collection, and validation.

Lastly, for transparency the Australian government requires that universities provide detailed plans. Over the years these plans have received various names – institutional profiles, institutional assessment framework portfolio, mission statements or institutional compacts. Invariably the Australian government has adjusted the form, shape, and depth of such requirements. Planning offices have been typically the point of contact and coordinating unit between government and institutions for these collections.

To address issues of growing and competing reporting requirements from government and agencies, the Australian government commissioned a review of the reporting requirements in 2012. The review undertaken by PhilipsKPA (DET 2016) consultants found that there was:

- Duplication and a lack of coordination of reporting requirements;
- Tendency of reporting requirements to accumulate over time;
- Issues relating to definition and documentation;
- Issues relating to scale and proportionality;
- Frequent changes of reporting requirements and inadequate planning for change; and
- Concerns with universities' access to useful and timely information.

At the end of 2013, the Australian government provided a response to the reporting requirement review, in which it accepted all recommendations put forward by the review panel. This led to a reduction in the administrative and regulatory burden on institutional reporting; in part it was achieved by improvements due to technological progress, automation, and simplification to institutional processes. It also implied a shift from a top down approach (i.e., from the state to institutions) to considerable mandated reporting to one where reporting continues, albeit with

fewer external demands, and where various state and regulatory stakeholders can access the information from a secure data portal to undertake their own reporting analysis. This has meant not only a decentralization in the reporting and regulatory processes, but it enabled other stakeholders to undertake their own analyses. Greater decentralization means there is an increased use of evidence-informed decision making, and in turn it encourages planners to engage with internal and external stakeholders in the use of data to foster accountability, address concerns about integrity, privacy, and security. However, the shift to more decentralized data access by the state (and institutions themselves), increases the probability that inaccurate inferences will be drawn out.

The Australian government makes available statistical reports via its website (www.education.gov.au) and has a data portal. These developments have meant a democratization in the access of high level summary data, in that a variety of stakeholders can access information directly, without having to go through an institutional intermediary, therefore increasing flows of information and sophistication in institutional analyses. These developments represent a shift in the central role of institutional planners in Australia, in that they are no longer the custodians of benchmark data and a possible barrier for accessing externally produced data. Therefore, analytics capabilities are dispersed and distributed across several strategic and functional units.

From a macro policy perspective, this process of democratization in accessing information reflects the belief that many of the problems confronted by HEIs (e.g. student attrition, institutional funding and staff retention) can be solved by market-driven approaches. As has been mentioned in other chapters of this book, a danger in the building capability process is incoherent or weak data governance principles to underpin this democratization, and increase use of big data, institutional leadership, and commitment is fundamental in driving an agenda of innovation in planning and IR (Calderon and Mathies 2013; Calderon and Webber 2015; Coates 2016).

Outside the scope of government, reporting is the data required by the various rankings schemas, which vary from schema to schema. Fulfilling these requirements are time consuming and need institutional vetting, because rankings are influential in shaping an institution's reputation. Rankings have become not only an input in the institutional decision making process but they are an enabler for institutions to attract international students (and therefore much needed revenue). Rankings have also become influential in shaping policy both at the institutional and government levels (Hazelkorn 2016). Also, outside the scope of government reporting is the data that is required by universities in complying with requirements for accreditation purposes for specific degrees (and these can vary considerably from agency to agency) and across national jurisdictions (as many Australian universities have campuses or presences offshore). In both cases, data for rankings and accreditation purposes are furnished by planning offices.

To sum up, Australia has a comprehensive system of national data collections that are overwhelmingly undertaken by planning and IR officers, these also involve other functional areas across the university, thus requiring considerable coordination, effective communication, and ongoing engagement with several internal and exter-

nal stakeholders. These data collections aside from being instruments of compliance, accountability, and transparency are source data to university KPIs. The next section contextualises the development of planning and IR considering the main policy stages in Australia's HE.

12.3 Stages of Development in Planning and IR

As noted earlier, the various reviews in Australia's HE have continued to advance the liberalization and marketization of the sector (Davis and Farrell 2016). This transformation has been in the making for more than 30 years, Table 12.2. One way to bring context to the role of institutional research in such evolution is to view it through the lens of the various waves in Australia's HE reviews and the main issues it sought to address since 1987.

- **Expansion** Between 1987 and 1992, enrollments increased by 42% from 393,734 to 559,381 (Department of Education, Training and Youth Affairs [DETYA] 2001). During this period, there were several institution amalgamations and the planning offices played a pivotal role on institutional analysis on addressing institutional expansion and satisfying growing demand. From 79 tertiary education institutions (of which 19 were public universities) in 1988 to 85 institutions (of which 36 were public universities) in the mid-1990s (DET 2016).
- **Quality** In 1992, the Australian government established the Committee for Quality Assurance in Higher Education (CQAHE) to conduct audits of institutional quality assurance policies and procedures. The audits were conducted during 1993 to 1995 and institutions were required to prepare self-evaluation reports and submit to audits. Preparation for these audits were resource intensive and required co-ordinated holistic efforts across all parts of the institutions. While these efforts were in the main focused on providing evidence about institutional quality assurance and quality improvement progress, these required considerable amounts of information sourced from planning offices. Alas, quality offices were in many cases part of planning offices.
- **Institutional performance indicators** Its ongoing practice in Australia goes back to the late 1980s and early 1990s, when the Australian government commissioned a report to pilot a range of quantitative indicators. The report group, led by Professor Russell Linke (Borden et al. 2013). developed measures of institutional context, teaching and learning, research and professional services, and participation and social equity. This review set the tone for institutional comparison and benchmarking.
- **Equity** In addressing issues because of HE expansion and broadening access for people from disadvantaged backgrounds to participate and succeed in HE, the Australian government commissioned a project, led by Lin Martin, to define and evaluate a set of equity indicators to augment a set of general performance indicators (Martin 1994). This work occurred between 1992 and 1994, and it

Table 12.2 Planning and Institutional Research Functions within Organizational Structure in Selected Australian Universities

University	Year established	Network	Office / Portfolio	Revenues - 2015(A$ '000)
Monash University	1958	Group 8	Planning and quality	1,911,482
University of Melbourne	1853	Group 8	Policy and projects	2,106,986
University of Sydney	1850	Group 8	Institutional analytics and planning	2,030,293
University of New South Wales	1949	Group 8	Planning and performance	1,671,811
University of Queensland	1909	Group 8	Planning and business intelligence	1,712,812
Australian National University	1946	Group 8	Planning and performance measurement	1,112,310
Adelaide	1874	Group 8	Planning and analytics	872,694
University of Western Australia	1911	Group 8	Strategy, planning and performance	937,391
Curtin university	1987	ATN	Strategy and planning	909,998
RMIT University	1992	ATN	Strategy and governance	1,036,540
Queensland university of technology	1988	ATN	Strategic intelligence	955,854
University of South Australia	1991	ATN	Business Intelligence and planning	607,720
University of Technology Sydney	1988	ATN	Planning and quality	751,841
Griffith university	1971		Strategic and operational planning	881,151
Macquarie University	1964		Strategic planning and information	794,468
Newcastle university	1965		Planning and performance	705,056
Deakin University	1974		Strategic intelligence and planning (chief financial officer)	916,065

Group of 8 refers to the most research-intensive universities. The ATN refers to the Australian technological network, a group of universities that have a technological orientation

resulted in a set of equity indicators that remain in use in 2017. While equity offices in every institution undertake evaluation of institutional efforts in improving access, retention, participation, and success of the identified equity groups, planning offices provide the statistical analysis that underpin the institutional assessment.

- **Benchmarking** The increased availability of data has meant that institutions are able to undertake in-house exercises of comparing and monitoring institutional performance, and assessing strengths and weakness of institutions on a variety of critical dimensions. The first Australian benchmarking manual was developed by

Professor Ken McKinnon, with support from the department of education in 1999. The manual contains benchmarks to measure 67 performance activities. However, it drew criticism in that it did neither encourage better practice nor systematic improvement, or institutional change (Garlick 2004). In practice, the education department through various instruments has promoted the operationalization and systematization of benchmarking among Australian HEIs. Examples are the Equity and Diversity Indicators published at various times, and the Learning and Teaching Performance Fund (which operated between 2006 and 2009). More recently, the Australian government replaced MyUniversity with the QILT) website in 2015, which provides information on student satisfaction and graduate outcomes.

- **Quality audits** These were conducted by the Australian Universities Quality Agency (AUQA) between 2002 and 2011 and institutions completed two rounds of audits. These audits were a systematic and independent examination of institutions to determine whether activities and related results comply with intended objectives and whether these were implemented effectively and in accordance with clearly defined quality industry standards. While these audits were primarily coordinated by quality offices, planning offices provided the statistical data that was necessary to evidence institutional performance against the metrics for which they were assessed.
- **Unmet demand and demand driven funding** Since the late 1980s, Australian universities have sought to address issues about providing students access to HE and satisfying unmet demand. Following the years of considerable expansion (1987–1992), Australia confronted its last economic recession which ended in 1991 and many young people sought to enter HE to forge their way to improve chances for entering (or staying) in the labor market. The Australian government has also sought to address issues of funding for undergraduate education. For example, one of the issues considered by the 2002 review of HE was that institutions were enrolling students beyond agreed targets with the Australian government, and the government believed that quality of education was affected. The 2008 review of HE examined the capacity of the sector to meet the needs of Australia, and it recommended the introduction of student demand driven funding. Thus, removing caps on number of government supported students universities could enroll. While the Australian government accepted most of the recommendations of the review panel, there has not been considerable progress, because of governments' weakening ability to undertake further policy reforms as well as public opposition in limiting funding for undergraduate education for government supported places. The 2014 review of the demand driven funding system concluded that the system was performing well and it was meeting the demand for skills in the economy (DET 2016).
- **Rankings** The first domestic ranking of universities was published in 1992 and it continues to be published as *The Good Universities Guide to Australian Universities* (Ashenden and Milligan 1992). From a global perspective, Australian universities have been active participants in international rankings since they emerged, commencing with the ranking of Asia's best universities in

1999, published by *Asiaweek* (Borden et al. 2013). When the Shanghai Jiao Tong University published its first Academic Ranking of World Universities (ARWU) in 2003 it included seven Australian universities in the top 200. The first commercial ranking of world universities was published in 2004 by The Times Higher Education (THE) in association with Quacquerelli Symonds (QS) and it included 14 Australian universities among the top 200. Fast track to 2016, 30 out of the 37 public Australian universities are included in the top 500 in any of the main world university rankings (ARWU), QS, or THE).

In these developments, professional staff involved in strategic planning, academic planning, institutional research, or institutional effectiveness have played a pivotal role in shaping Australia's HE system. Their input has been varied and extensive – from providing statistical information; devising planning tools and frameworks, and driving all stages of the strategic planning process. Monitoring and managing institutional performance is a function that has been intrinsically associated with planning in Australian HEIs. In Australia, planning is what is broadly interpreted as IR in the United States. Planning functions in Australia HEIs have evolved in conjunction with the HE policy landscape in that the level of sophistication in approach and method evidenced in current practice is in direct association with the rise of new management approaches and external forces of change (Calderon 2011; Mahat and Coates 2015; Coates 2016). Planning functions in Australian universities draw more from strategic planning and broad management approaches.

12.4 Responding to the Forces of Change

The various reviews of the Australian HE system point to a devolution of the role of the state in funding the sector, although it will maintain its regulatory and oversight role in the pursuit of national policy priorities. Government policy and the regulatory framework remain the fundamental force of change in HE, but it is also equally important to ponder on the influence of the major forces of change in the practice of planning and IR:

- Technological transformation has meant automation and progressive democratization in accessing and using large volumes of data. In practice, it has reduced the number of data silos and in turn it has broadened opportunity for collaboration, a vital ingredient for an institution's ability to innovate. It has also meant that communities of practice can integrate large and complex sets of data, have the capacity for greater and deeper levels of analysis, consider possibilities, and find relationships and patterns not previously considered or afforded.
- Globalization has meant that practitioners can tap into global networks, have greater opportunities for knowledge transfer and diffusion, knowledge transformation for the insights gained from their work, and have opportunities to translate their knowledge to solve many of the challenges facing HE.

- Demographic change has meant that we can attract talent, draw insights from the wider population and have strengthened the ability to broaden and deepen our views and understanding of society and the economy.

These expanded possibilities envisaged as a response to the challenges posed by the major forces of changes are driving HEIs to adopt efficiency principles and market oriented mechanisms in the conduct of their inherited mission and modes of operation against their stated objectives. What these mean to the practice of planning and IR is that:

- Professional staff is recruited from a wider, varied educational backgrounds, life experiences, and so forth. Bear in mind that over 28% of Australia's resident population was born overseas (Australian Bureau of Statistics [ABS] 2017), and the proportion of foreign born professional staff working universities is greater than 40% (DET 2017).
- There is an increased use of consultants to drive development of strategy, analytics, insights and other activities that previously would have been undertaken by planning and IR professionals. This is not surprising as in the past expertise from the professoriate would have been sought to drive new institutional initiatives or programs, and aligns with new management approaches.
- Increasingly the professional workforce in HEIs have a blend of roles and functions to perform, and there is a contest between the ability to deepen knowledge (and therefore expertise) or have broad generic knowledge.
- The practice of planning and IR is distributed and dispersed throughout service and academic units. In this sense, planning is everywhere and there is no longer a monopoly on the vastness of institutional data that is generated for external reporting. In turn, it has meant outsourcing analysis, drawing inferences about the data and democratizing decision making. It has also meant need to develop skills in project management and need for ongoing learning engagement with all stakeholders.

12.5 Greatest Threats for IR

In going forward decision makers need to consider the possibilities that lie ahead for the practice of planning and IR in Australia, and elsewhere. From a macro policy perspective below are considerations that are the foreseeable threats:

- Institutions' data submissions for the purposes of government reporting are progressively being automated and data input being checked on an on-going basis. Job losses are likely to occur, particularly from those performing manual, repetitive technical functions, considering improved efficiencies gained through 'machine learning';
- Generation of many standard reports, which are cyclical in nature and time consuming in preparation, are likely to be automated in years to come, in part influ-

enced by improved coding languages that can recognize patterns and text, and therefore would be able to generate possible outcomes, including predicting possibilities about the future on a given topic;

- Structural changes to labor market and employment conditions in HEIs are likely to impact in service provision, together with the effects of technological transformation. There is an increased casualization of the labor force, in that these workers enjoy fewer benefits compared to those on contract or on an ongoing bases. For a considerable number of Australian universities, terms and conditions of employment are set out in an enterprise agreement and these are due to expire during sometime in 2017/18 (National Tertiary Education Union [NTEU] 2017);
- Outsourcing remains one viable consideration in universities to maintain costs down, reduce number overheads, and consolidate staff management. Outsourcing is also used by universities to draw expertise from elsewhere (particularly from industry). One argument made in favor of outsourcing is that it has the benefit that those engaged in the process are neither time nor spatially bound or constrained, therefore institutions can benefit from quick turnaround in delivery (see for example, Gupta et al. 2005);
- Increasing use of shared services to gain efficiencies and to keep costs down. For example, consolidation of academic-support services (such as marketing, student recruitment, student and academic services) across institutional sub units (schools and colleges) enable economies of scale;
- External consultancy companies – such as those involved with world university rankings, hold huge amounts of data from institutions worldwide. Many of these companies have been investing considerably in data analytics, and developing tools to assist institutions, for a price, in decision-making. There are also leading consultancy and some are multi-national) firms which can undertake projects at a loss with the expectation that they are likely to gain repeat contracts from institutions; and
- Uses and misuses of data- Increased democratization of information has exponentially increased probabilities of misuses of data, and inaccurate inferences drawn out. Custodians of data have a duty of care to ensure data is utilized for the purposes for which they were collected. There is an element of power, legitimacy, and ideological intent in what information is collected, why it is collected and how it is utilised. Therefore, custodians of data also need to be aware of its legitimacy and the accountability such custodianship entails (Calderon 2015; Borden et al. 2013).

12.6 Possibilities About the Future

As we come close to pass the first 20 years of the new century, and realizing the significant gains from the growth in HE enrollments in Australia since the reforms from 1988, planners and IR practitioners can reflect with pride about their contribution in this transformation process. The Australian HE system moved away from

having an elite tag to universal access, from a binary to unified system of institutions, and from an entire financial dependency on public funding to increased reliance on international students and private funding.

What lies ahead for the profession? There are many insuperable challenges, in part because many of these are beyond one's control, but also because we need to question what planning and IR stand for right now, and what the possibilities are for the profession over the next 20 or 30 years. IR as such has no much salience at present in Australia's HE professional workforce; we see greater level of discourse about analytics, insights, market intelligence, and learning analytics. There is no longer salience to the title of "statistical officer," "planning officer," or "analyst," but it is rather more topical to say "data wrangler" or "data scientist." Furthermore, IR is often contrasted to educational research, which in the Australian context is epitomized by the academic endeavors out of the LH Martin Institute and the Australian Council for Education Research. IR is more likely to continue an experimental path in contrast to the evolving practice of educational research, which it primarily seeks to address specific aims in a system-wide context, hence a more applied-driven approach (Borden and Webber 2015).

We are more likely to see that future job roles and functions would be less about data and collection complexities, but more about decoding, inferring, and predicting what the vastness of data and set of inter-related vectors mean and how they inform, support, and help to make decisions. In going forward, we argue that the planning and IR community needs to raise the expectations and currency of practice and focus more on untangling the possibilities about the future and how these can be put to the advantage of institutions, but also university leaders need to consider what kind of labor force it needs to confront the challenges of the future. In this sense, planners and IR practitioners (in conjunction with university leaders) can take advantage of their deep knowledge about their institution and the system in which they operate to guard off the threat of their demise. Ongoing re-skilling and up-skilling is a must for survival, but it is also worth remembering that as practitioners, we all wear multiple hats, and many of them happen to be imposed or permeated one over another. In brief, some of the skill sets that would help IR practitioners remain relevant include:

- Increasing ability to adapt and to change considering emerging trends in the labor market (as a result of substantial shift in job roles and skills required from automation, decline in job opportunities, etc.);
- Strengthening ability to infer about possibilities of the future (whether it is called foresight, forecasting, predicting, or something else) and judging about the best possible course forward;
- Bolstering judgement-related skills, with emphasis on ethical considerations, are likely to become more salient as further technological advances occur which may further transform society;
- Capacity to consider implications for institutions and the wider society about tensions arising out of local as well as global imperatives;

- High level of communication skills and ability to engage with a variety of stakeholders (some with differing and conflicting agendas).

The capacity of planners and institutional researchers to continue playing a pivotal role in the development of HE depends on their ongoing ability to adapt and adjust their skill sets to the changing requirements of the labor force now and into the future.

12.7 Strategies for Capacity Building

The purpose of this section is to outline some possibilities for building a sustainable planning and IR capacity to advance practitioners, institutions, and national systems of education. The basic tenet is that there are many pathways by which a desirable level of capacity can be reached, and for which long lasting gains can be realized. The conventional approach for which staff has gained new skills, re-skilled, and up-skilled is via uptake of opportunities offered through programs offered by human resources departments, guilds or professional associations and networks. An emerging trend is that conferences, professional development courses, and other networking events are increasingly being offered by for-profit enterprises. In part this is driven by market forces, the increasing cost and resource intensity in organizing such events, as well as the salience of professional associations weakening. Table 12.3 provides a selected list of capacity building opportunities that currently exist in Australia offered by professional associations or education-related entities.

12.7.1 Human Resource Development

Firstly, in recognizing the need for ongoing learning, practitioners need to embed in their annual workplan activities that contribute to deepening and broadening their knowledge and expand their skill set. These activities can encompass online learning; having a set number of hours (per year) committed to skilling, re-skilling, and up-skilling; participating in coaching and mentoring activities (either as a mentor or mentee), and scheduling presentations, conducting workshops to other functional groups within the institution on projects one is a contributor or in areas of expertise.

Secondly, establishing communities of practice, organizing town hall meetings, contributing to special interest users' groups and nodes of networks to bolster collaboration and dissolving boundaries across functional units and teams of professionals. These activities can be effective mechanisms as these tend to induce discussion by sharing ideas, knowledge and provide opportunity to have instantaneous feedback. These activities can occur within the institution, peer institutions, the region and across national systems of education on a regular basis.

Table 12.3 Opportunities for Capacity Building from Selected Australian for Non-Profit Associations/Entities

Entity	Overview	Web link
Australasian Association for Institutional Research	AAIR is the professional association for institutional research practitioners in higher education and other institutions in Australasia. Organises an annual forum and special interest users' meetings	http://www.aair.org.au/
Association for Tertiary Education Management	Provides a wide range of professional development and leadership programs for the tertiary education sector in Australia and New Zealand.	https://www.atem.org.au/
Australian Association for Research in Education	Facilitates contact between educational researchers and supports the development of high quality educational research	http://www.aare.edu.au/
International Education Association of Australia	Strives to empower professionals, engage institutions and enhance Australia's reputation as a provider of world-class education. Offers a range of professional development programs throughout the year	https://www.ieaa.org.au/
Australasian Research Management Society	Provides high quality professional development through events and programs it delivers to its members across all chapters. The society also offers a comprehensive foundation level and professional level Accreditation program.	https://researchmanagement.org.au/
Tertiary Education Facilities Management Association	Provides strategic and operational infrastructure and services in support of tertiary education in the Australasian region. Organises an annual forum and various events throughout the year	http://www.tefma.com/
LH Martin Institute	Provides the tertiary education sector with career and capability development through an integrated set of programs, events and projects.	http://www.lhmartininstitute.edu.au
Australian Council for Educational Research	Established to create and promote research-based knowledge, products and services that can be used to improve learning across the lifespan. Conducts several events during the year for all educational sectors	https://www.acer.org/
National Centre for Student Equity in Higher Education	Aims to inform public policy design and implementation, and institutional practice, to improve higher education participation and success for marginalised and disadvantaged people. Has an annual forum and other events during the year	https://www.ncsehe.edu.au/
Universities Australia	Umbrella body for all universities in Australia. Organises an annual forum and other activities throughout the year	https://www.universitiesaustralia.edu.au/

(continued)

Table 12.3 (continued)

Entity	Overview	Web link
Australian Data Archive	Provides a national service for the collection and preservation of computer readable data relating to social, political and economic affairs and to make these data available for further analysis.	http://www.ada.anu.edu.au/
Melbourne Institute	It is a leading economic and social policy institute. It has developed various longitudinal research tools to inform decision making. It conducts seminars, workshops and other events throughout the year	http://melbourneinstitute.unimelb.edu.au/

12.7.2 Organizational Development

Thirdly, functional units and institutions can provide incentives to enable realization of the above (human resource development activities). Most institutions would have an allocated percentage of its budget for workforce development and incentives may need to reflect such reality and the benefits gained in terms of productivity from such activities. There are often significant gains made from initiatives that are both supported from top-down and bottom-up approaches.

Fourthly, most if not all universities would have policies and procedures for sustainable capacity building that are aligned to the agreed strategic direction of institutions. Therefore, the context, management support and information systems would be vital for practitioners to maximise opportunities that exist for ongoing professional development. Technological transformation has meant that there are many more opportunities to share information, knowledge, and in the process, gain input from others compared to the past. In this sense, there is a world of knowledge within reach, regardless of geography and industry. Institutional frameworks need to support professional development frameworks that provide greater opportunities for on-the-job learning. For planning and IR practitioners, bringing in the external context combined with the internal academic discourse (as manifested at the discipline level) are strong catalysts for improving practice because these become another tool to inform sound decision making.

12.7.3 Leadership

None of the above can be achieved if there is not leadership and institutional commitment that supports a capacity building framework for strengthening planning and IR capabilities. Fostering a culture of ongoing learning, reflection, and shared practice would inevitably be uplifting. University leaders need to become stewards and proactive builders in optimising capacity building. One way to do so is for the university leadership team to engage in dialogue (say quarterly) with the planning

in outlining their ongoing expectations of deliverables and discuss milestones against projects of strategic significance.

12.7.4 Partnerships

One long held value in Australian society is that of mateship, i.e., we embrace one another and we seek to solve common issues in cooperation. For planning and IR practitioners this mean that we can collaborate; establish alliances with those we share common practice; and help each other to perform tasks, advance professional interests, and in the process, fulfil expectations of what is that we are expected to deliver. Higher education has relied considerably on the spirit of good willing and international collaboration for many decades. For institutions and national systems in developing their data collections and systems of decision support, the Australian experience provides a useful framework to advance and strengthen the quality of their educational national systems and it also helps to map out a comprehensive strategy for evidence-informed decision making.

12.7.5 Parting Thoughts

Further HE reforms are inevitable – there remains many unresolved issues and tensions, particularly about the state's capacity to continue to provide adequate funding on an ongoing basis or whether the financing burden is shifted on to students. In Australia, there has not been further amalgamation of HEIs and consolidation of course offerings as experienced in the early days of the reforms that started in 1988. In some institutions that have neither the financial resources nor the student demand to compete should further deregulation occur. Therefore, we need to remain abreast about the challenges and possibilities of the future for both the institution and the national system as well as the global forces influencing HE. Practitioners need to balance breadth and depth of their knowledge about the state, civil society and the economy, and how each part intersects with one another. At the same time, we need to remain conscious that we are agents of change, and through our active role in shaping policy and guiding decision making, we are contributing to advancing the communities and societies in which we work and live. We must also ensure that we adequately address concerns about data integrity, privacy, and security in light of the democratization in accessing and using information.

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Chapter 13
Building Capacity in Institutional Research in South Africa

Yuraisha Chetty and Nicole Muller

13.1 Introduction

Higher education in South Africa has undergone complex and often turbulent change since the democratic dispensation in 1994. It continues to experience ever-increasing pressures in the face of a continuously changing national context. Institutional effectiveness, responsiveness, and accountability are but some of the pressure points amidst an environment faced by decreasing fiscal support from government and increased student activism against perceived slow transformation from an apartheid and colonial past. Transformation in a South African context involves redressing inequalities created by an Apartheid past, and is therefore informed by a particular socio-political landscape. Student activism within this context has been given expression in recent hashtag (or 'fallism') campaigns such as #FeesMustFall and #RhodesMustFall. Moreover, unsatisfactory graduation and success rates have exacerbated the growing discontent. In a briefing paper prepared for the Second National Higher Education Transformation Summit, Universities South Africa (USAf) which comprises the vice-chancellors of public universities in South Africa, pointed out the "lack of growth, low participation, high attrition, low completion and variable quality relating to equity of access and success (USAf 2015, p. 10). An important disclaimer is that South Africa does not face these and other challenges alone, nor is what we face dissimilar to other contexts. The declining government subsidy per capita, low completion rates, and pressures to demonstrate institutional

Y. Chetty
Higher Education Research Consultant, Independent, Johannesburg, South Africa
e-mail: chettyyuraisha@gmail.com

N. Muller (✉)
Durban University of Technology, Durban, South Africa
e-mail: nicky.muller@gmail.com

© Springer International Publishing AG 2018

K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1_13

effectiveness, responsiveness, and accountability are indeed global higher education challenges in an increasingly "disruptive" geopolitical landscape.

Against this backdrop, institutional researchers find themselves having to draw from their intellectual and emotional resources to face these challenges skillfully and artfully. In South Africa, the increasingly rapid pace of change facing institutions requires institutional researchers to reengineer their mindsets to more readily see challenges as opportunities to undertake interesting work, to not only adapt to change but to be comfortable with it and embrace it, and to gear themselves to be responsive to the institutional needs emanating from these changes through enhancing their skills and competencies, where these are lacking. From a capacity building point of view, institutional researchers will need to acquire the multiple intelligences espoused in Terenzini's "three tiers of intelligence" framework (1993, 2013), as detailed in Chap. 1 of this book. Importantly, while all three kinds of intelligence are mutually dependent and supportive, not all competencies reside in one individual (Terenzini 1993, 2013). IR offices will therefore need to be equipped with staff who have a range of skills and competencies. Research undertaken by Geyser and Murdoch (2016, pp. 151–152) among quality assurance units in South African institutions that were involved in conventional IR activities among other activities, pointed to a "less developed maturity of contextual intelligence," suggesting a need to strengthen this skill. Contextually-intelligent institutional researchers will be better-equipped to engage with the dynamic nature of the South African higher education landscape. Muller et al. (2016) also found that there was minimal evidence in the South African IR offices they surveyed, of operations in the contextual level. Moreover, in responding to the decision support needs of institutions within this context, institutional researchers will no doubt be increasingly faced with a variety of competing interests, activities, policies, and tensions. This will require them to put on different "faces," assuming the four roles identified by Volkwein (1999) which he calls the Four Faces of IR: IR as information authority, IR as policy analyst, IR as spin doctor, IR as scholar/researcher, and assuming the 5th face added by Serban (2002), namely IR as knowledge manager. Within the South African context, a variety of roles are performed, with some roles featuring more prominently than others, the latter mostly due to the nature of the focus of South African IR offices. This is evidenced by the research undertaken by Muller et al. (2016) discussed later in the chapter, which revealed that South African IR offices are mainly internally focused on the creation of intelligence for formative purposes to be used in support of institutional improvement, with a smaller focus on the external audience for accountability purposes. This points to possible areas for further development and strengthening of skills and competencies to meet growing demands in a more "balanced" manner.

13.2 A Historical Lens on IR Capacity Building in South Africa

IR in South Africa was formally recognized in 1994 through the establishment of the Southern African Association for Institutional Research (SAAIR). Within the context of the historical foundations of IR in South Africa, the concept of capacity development resonated most strongly with the notion of "training" for the development and enhancement of knowledge and skills in IR. Higher education institutions at the time increasingly needed IR for evidence-based decision support, and this resulted in a strong focus on developing a cohort of institutional researchers with research, analytical, and writing capabilities.

According to Chetty et al. (2016) in their description of the history of the SAAIR, capacity development in IR within the South African context was influenced by the higher education policy environment at the time. Addressing the 2003 SAAIR Forum in Bloemfontein, David Bleazard, the SAAIR president at the time referred to the growing demands, the impending mergers of universities, and other factors, such as the new funding formula, higher education quality assurance processes, and the program and qualification mix (PQM[1]) exercise, placed on institutional researchers in the country. Furthermore, these demands were increasing alongside frequently expressed dissatisfaction on the part of the Department of Education about the overall quality of data provided by staff members in higher education institutions.

Against this backdrop, the SAAIR's executive committee launched two different types of training initiatives for South African institutional researchers in 2004. The first provided training on the use of the Higher Education Management Information System (HEMIS) for statutory reporting purposes and the second provided training focusing on acquiring generic IR skills such as surveying, data management, reporting, and statistics (Chetty et al. 2016). In line with the two key purposes of the SAAIR, as expressed in its constitution, these initiatives had the following aims: (a) "to benefit, assist and advance institutional research leading to improved understanding, planning and operation of institutions of higher education" (SAAIR 1994) and (b) "to provide capacity development and national, regional and international networking opportunities" (SAAIR 1994). It is evident that the terms "training" and "capacity development" are used interchangeably in the SAAIR Constitution, and this has shaped the overall understanding of capacity development within the IR context in South Africa.

[1] Program Qualification Mix – a list of programs and qualifications approved by the Minister of Higher Education and Training for a public higher education institution to offer.

13.3 Capacity Development Activities for Institutional Researchers in South Africa

In this section, the term capacity development is used to discuss the various professional development activities undertaken by the SAAIR for its members to build capacity in IR. Such activities have made it possible to develop and strengthen the talent of institutional researchers. Borrowing from human resource strategy, these activities can be seen to be included under the umbrella term of "talent management." This section also begins to describe the "how" of capacity development in the South African context.

To give effect to its capacity development plans, the SAAIR introduced a number of training institutes, which followed the model of the Association for Institutional Research (AIR) in the US. The offering of HEMIS Institutes first commenced from 2004. As discussed by Visser and Barnes (2016) in their recent research on professional development for IR, the HEMIS Institute focused on the Higher Education Management Information System (HEMIS), which is a unit-record reporting system introduced by the South African Department of Education (DoE). Technical training in HEMIS became necessary following the challenges posed by the introduction of this system in 2004, and the SAAIR subsequently responded to this growing need to capacitate institutions accordingly. The HEMIS Institutes were responsive to the training needs of delegates and the program was refined regularly to cater for new training requirements. Since 2006, the program provided tailor-made learning opportunities for both experienced and less experienced colleagues. This balance shifted over time with a more advanced program being offered since 2010 (Visser and Barnes 2016). However, following this change in focus of the HEMIS Institute to cater for a more experienced audience, new and inexperienced members of the SAAIR expressed a need for a more introductory training opportunity. This prompted the SAAIR to offer a National HEMIS Foundation Workshop since 2011 aimed at beginners in IR practice. Over time, the HEMIS Institute has attracted the participation of IR staff from universities in other countries of the Southern African Development Community (SADC), and delegates from private institutions and Technical and Vocational Education and Training (TVET) colleges, reflecting its broadened reach. While private institutions and TVET colleges do not report on HEMIS, the Department of Higher Education and Training (DHET) is planning towards having the external reporting of these two institution types included on the Higher Education and Training Management Information System (HETMIS) (Visser and Barnes 2016).

The offering of IR Institutes with their specific focus on developing research and analytic skills also commenced from 2004. As part of a joint venture between the SAAIR and the AIR, the first two IR Institutes were offered in June 2004 by experienced trainers from the AIR. As discussed by Chetty et al. (2016, p. 32), these institutes that were held at Peninsula Technikon in Cape Town in June 2004, were indebted to the international example of the AIR. The themes were: "Developing and Applying Institutional Research Skills within the Context of the Institutional

and National Data Needs" and "Developing and Applying Institutional Research Skills focusing on Academic and Financial Issues." Since 2004, the SAAIR has continued to present Institutes on IR. The IR Foundations Workshop was introduced in 2015 to target novices in IR.

The Quality Assurance Institute was another learning opportunity introduced by the SAAIR. This has been offered since 2006 and was prompted by the South African government's introduction of quality assurance as a third steering mechanism, along with planning and funding. Institutional researchers were consequently required to support quality processes and initiatives within their institutions (Chetty et al. 2016). National bodies such as the Higher Education Quality Committee (HEQC) are consulted in relation to the program design, and the needs of quality assurance practitioners are an equally important consideration (Visser and Barnes 2016).

Taking cognizance of the growing discourse on learning analytics in higher education (Long and Siemens 2011; Arnold and Pistilli 2012), which predominantly focused on improving academic student success, the SAAIR partnered with the South African Higher Education Learning Analytics (SAHELA) to embark on a joint pre-SAAIR conference workshop in 2014 and 2015. The SAAIR subsequently introduced its first Learning Analytics Institute in 2015 within the broader context of data-driven decision making. This Institute, held at the University of Pretoria, was positioned to fulfill an important need for the basic foundations of learner analytics and was presented by Victor Borden, a past president of the AIR (Chetty et al. 2016; Visser and Barnes 2016).

For the past 22 years, capacity building was also realized through the annual conferences of the SAAIR which provided practitioners with an opportunity to present their work as researchers and scholars within an environment of constructive peer engagement. Institutional researchers have also published their research, further contributing to the body of knowledge in higher education management research more broadly. Institutional researchers as "impartial scholars and researchers" resonates with Volkwein's categorization of the four faces of IR (1999, p. 18) and can be mapped to the fourth face in his categorization. The SAAIR conferences also created a conducive environment for the development and strengthening of networking skills and competencies, made possible through the representation and participation of a range of South African higher education universities at these conferences.

Formal certification in IR was introduced in South Africa through a contractual partnership between the SAAIR and the AIR in 2010, aimed at making the AIR Data & Decisions courses available to the SAAIR's members. Institutional researchers from various universities were nominated to undertake the certificate course. The first cohort of 17 SAAIR members completed these courses in 2011, while the second cohort has graduated two members with another 15 still busy with the course. The advantage was that these courses had an international flavor and were offered in a flexible manner (Visser and Barnes 2016, 84). The professionalization of IR within the South African context has been a topic of debate and discussion by the SAAIR, with keen interest over the years in introducing a Postgraduate Diploma in

Institutional Research. However, efforts have thus far not materialized. Visser & Barnes (2016) reported that one South African institution was prepared to expand their Postgraduate Diploma in Education Management to include an IR option through distance education. However, this required the SAAIR to provide significant input into the design and delivery of the modules, which was not possible at the time. The criticality of the professionalization of institutional research practice was echoed by respondents in the study conducted by Chetty et al. (2016, p. 39) who saw this an opportunity for ensuring the "longer term stability and viability of the SAAIR" and for ensuring a "higher level of service to members." Furthermore, it was felt that universities should be proactive in developing postgraduate qualifications for people interested in pursuing IR as a career. The authors concluded that the SAAIR needed to "champion change" and lead efforts to expand the profession of institutional research within institutions as this would "contribute to the sustainability of IR as a profession dedicated to providing decision support in higher education" (Chetty et al. 2016, p. 40). This notion of IR professionals as change champions is further supported by Muller et al. (2016), Leimer (2012), Swing (2009), amongst others.

13.4 Staff Development Practices and Needs of South African IR Offices

Having described the capacity development activities available to institutional researchers in South Africa, we now proceed to briefly contextualize the development of institutional researchers within the broader professional development space of higher education management, with a lens on their roles. We thereafter turn our focus to some of the staff development practices within South African institutions as well as the needs expressed by IR offices for staff development opportunities.

13.4.1 Broader Professional Development Context and Roles

In 1998, the Commonwealth Secretariat through the Commonwealth Higher Education Management Services (CHEMS), debated the matter of higher education staff development. The paper entitled "Higher Education Staff Development: A Continuing Mission" (Fielden 1998) argued that staff development was key to the quality of higher education, and pointed out that higher education institutions such as universities, colleges, and polytechnics are labor intensive and depend on people for the delivery of their services. The paper further argued that any strategy for developing human resources in an institution must consider all staff, both administrative and support personnel, as both categories can play important roles in "helping students to learn, and in enabling and facilitating an environment that favours

learning." Institutional researchers, who are primarily categorized as support personnel, require development as much as their academic counterparts to be able to effectively contribute to their key role in providing evidence-based decision support, which can ultimately influence and impact the student learning experience, student success, and other strategic and operational objectives. At the same time, institutional researchers also function as "impartial scholars and researchers" (Volkwein 1999, p. 18), and therefore by implication, as "quasi-academics" whose roles and qualifications may cross the boundaries between academic and administrative roles. This intersection of functions is increasingly blurring the professional boundaries within which institutional researchers work, and relates to the notion of the "blended professional" and the "third space professional" (Whitchurch 2013). The implication of these trends for institutional researchers is that a one size-fits-all approach to staff development is not ideal. Professional development activities, both within institutions and under the auspices of the SAAIR, need to take these dual roles into consideration. In the last section of the chapter, we revisit this trend and share our thoughts and possible suggestions.

13.4.2 Practices and Needs

We now consider some of the staff development practices within South African institutions, and the development needs expressed by institutional researchers. Volkwein et al. (2012) have written extensively on the three factors that can influence the type of work conducted in the IR office and the skills needed for such work – the organizational structure of the IR office, the size of the office, and its location within the organization. In 1990, Saupe described the broad range of possible contributions of institutional research to planning, decision making, and policy formulation (Saupe 1990) requiring a range of skills and expertise across the IR spectrum. But how can we know what these are?

Surveys are a commonly utilized instrument to gather data for a specific research question and are appropriate when research questions are narrowly focused (Simone et al. 2012). The questions of what constitutes IR, how is it organized and what are the characteristics of the IR professionals and the skills and competencies required for effective practice, lend themselves to this type of data gathering exercise. This is evident in the range of national surveys conducted over extensive periods of time. Volkwein et al. (2012) list a number of multistate and national surveys of the AIR dating from 1985 to 1999. More recently, surveys on the profession of IR in the United States have included a survey by the University Leadership Council (2009), the Survey of IR offices in the California Community College system (2009) conducted by the RP Group for the California Community College System, the 2012 AIR survey of work tasks in USA and Canada, Gagliardi and Welman's (2015) survey on behalf of the National Association of System Heads in association with the AIR, and most recently, Swing et al.'s national survey (2016) of IR offices in the USA, on behalf of the AIR.

Earlier in this chapter we gave an historical overview of IR capacity development in South Africa that provided the background to what is currently in place today. The most recent survey of South African IR offices was conducted in 2015 by Muller, Langa and Dlamini (2016). The findings of this survey span the considerations of the structure and functions of the IR offices, the institutional location and organizational structures, as well as the staffing competencies and skills evident in the offices and those required for effective functioning. Briefly, we give an overview of the general findings of this research, applicable to understanding the South African IR context, structures and staffing needs.

13.4.3 Qualification Levels and Length of Experience

The results suggest that the management (director) level of the IR offices have a fairly mature group of professionals (length of experience of more than six years); in terms of qualifications, 58% have a Masters' qualification, 25% hold a doctorate and the remainder a national diploma with one having a matric (school leavers) certificate. The converse seems to the case for the cohort of institutional researchers; out of the reported 21 professionals falling in this category, 11 (52%) have less than three years' experience. This group also contrasts with the managers/directors, in that they are more qualified with 60% holding a Masters' qualification and 30% with a doctorate. This points to the need to retain and develop this group of individuals, but to consider also how this group can assist in the development of their seniors. Visser and Barnes (2016) in their discussion of professional development for IR, posit the thought that mentoring should be a two-directional process with experienced professionals also being mentored by younger, tech-savvy institutional researchers in the new technologies available for the profession.

13.4.4 Organizational Intelligence Levels

Terenzini's three tiers of organizational intelligence (1993, 2013) are well-known and form the point of departure for many studies in respect of the capabilities, skills, and knowledge required for institutional researchers. From their South African survey responses, Muller et al. (2016) mapped the reported functions against Terenzini's three tiers. Respondents had been requested to prioritize the most important functions undertaken in their offices, and to indicate if these were primary functions of the office, or whether they were functions shared between the IR office and another entity, or whether these were functions undertaken as a support function in service of other departments or units in their institutions (Muller et al. 2016). Similar to what Webber et al. (2015) found in the US, the South African data show in Table 13.1 that most of the primary functions identified fell into tier 1 (technical/analytical intelligence) and that the prevalence of primary functions in tiers 2 and 3 decreased

Table 13.1 Primary Functions in South African IR Offices Mapped Against Terenzini's Tiers of Organizational Intelligence (Adapted from Muller et al. 2016)

Terenzini's tiers of organizational intelligence	Primary functions in South African IR offices
Tier 1 technical/analytical intelligence	Administration of student surveys
	Enrolment statistics
	Retention and graduation rates
	Data administration
	Degree award statistics
	National data contribution
	Survey analysis
Tier 2 issues intelligence	Benchmarking
	Comparative staffing patterns
	Salary studies
	Workload analysis
Tier 3 contextual intelligence	Policy formulation

considerably, with only one primary function identified in tier 3 (contextual intelligence). These findings may be a map for potential capacity development to move operations into tiers 2 and 3, particularly if institutional researchers are to cope with future trends and directions for IR to be effective in their institutions.

13.4.5 Volkwein's Four Faces of Institutional Research

Earlier in this chapter we referred to the three dualities faced by higher education professionals as expostulated by Volkwein (2008). Volkwein designed a framework for the variety of roles IR professionals play. Termed the four faces of IR, adapted from Volkwein's original paper in Fig. 13.1, these depict the internal (formative purpose for improvement) and external (summative for accountability) on the horizontal axis, and the organizational roles and culture on the vertical axis (administrative/institutional and academic/professional). In Volkwein's words, "Combining these categories produces a typology of four overlapping yet distinguishable types of IR purposes and roles. These are not pure types, but they reflect dominant tendencies and can be applied either to the IR office as a whole or to the separate individuals and functions within it" (2008, p. 17).

Muller et al. (2016) also mapped the responses to their survey against these "faces." This mapping exercise showed that the focus in South African IR offices is largely focused on the internal face for both the administrative and academic quadrants (1 and 2) where the creation of intelligence is used in support of institutional improvement. This is an important consideration for building capacity for effective IR in South Africa: if the sector is to take up the challenges of a complex, ever changing environment, IR professionals need to engage more actively and proactively in the external face (quadrants 3 and 4).

Organizational Role and Culture	Purposes and Audience	
	Internal Formative – for improvement	External Summative – for accountability
Administrative and Institutional	1. IR as information authority – to describe the institution *Description of shape and size of the institution*	3. IR as spin doctor – to present the best case *The glass as half full rather than half empty*
Academic and Professional	2. IR as policy analyst – to analyze alternatives *Study the institution and policy and suggest alternatives*	4. IR as scholar and researcher – to supply impartial evidence of effectiveness *Impartial researcher and scholar*

Fig. 13.1 Volkwein's four faces of institutional research

The concept of "knowledge worker" was first used by Peter Drucker in 1994, to characterize someone who has an advanced level of formal education and who is able to apply theoretical and analytical techniques (McLaughlin et al. 2015). Serban (2002) added a fifth face to Volkwein's framework, namely knowledge management, where managing knowledge is a form of organizational intelligence that, according to Volkwein "fertilizes" the other three levels (Volkwein 2008, p. 37). In the South African survey, this fifth face was not evidenced.

13.4.6 Staff Competencies and Skills

While not a direct focus of the 2015 survey, Muller et al. included two questions on staff development, firstly focusing on current staff development practices within the respondents' institutions, and secondly, probing what further development opportunities respondents required. We draw on the results of their investigation of the staffing competencies and skills for a more succinct discussion for the purposes of this chapter, and to further build the picture of the "how" question in the triage of whose capacity, for what, and how?

What capacity development is currently happening? The majority of the respondents (75%) indicated that conferences and workshops are the main vehicles for

capacity development of their IR staff, with specific references to the opportunities offered through the SAAIR (described earlier in this chapter) and the Data and Decisions Academy. Some institutions provide opportunities through short learning courses (for example, business intelligence and analysis tools, research ethics, use of specific databases) and formal qualifications (such as postgraduate diplomas).

There are needs beyond what is currently being proffered. Respondents put forward needs for capacity development in the areas of:

- Understanding different operational systems and their integration;
- Business intelligence;
- Data analytics;
- Scenario planning;
- Research methodology; and
- Statistical software packages.

Respondents also expressed needs for more mobility opportunities for national and international travel for benchmarking and best practice identification, as well as for online courses allowing for flexibility in participation.

These needs are similar to those expressed by respondents to a membership survey conducted by the SAAIR executive committee in 2016. Amongst questions posed to the members were those focusing on capacity development needs, shown in Table 13.2.

In terms of the kinds of format in which current capacity development opportunities are offered through the SAAIR, most respondents were happy with what was provided. Others suggested expanding the formats to include more workshops with actual facilitation rather than a series of presentations and offering more practical and technical demonstrations of new technologies and systems.

Some good suggestions were made in terms of building relationships with other associations within the higher education sector; one respondent indicated that the SAAIR seemed grounded in quantitative data analysis and suggested that a relationship with the Higher Education Learning and Teaching Association of Southern Africa (HELTASA) would be a synergistic relationship to the benefit of both, as both associations form sides of the same coin. Another suggestion was that the SAAIR should ensure that the umbrella organization representing South African university vice-chancellors, Universities South Africa (USAf), was aware of the SAAIR and the work it does; this respondent was concerned that there seemed to be duplicated efforts in research projects between the SAAIR, the Council on Higher Education, USAf, and the Department of Higher Education and Training. These comments are pertinent in the light of the trends that have surfaced of institutional researchers being collaborators and connectors and the findings of Chetty et al. (2016, p. 39). This is applicable both within institutions and at regional/national levels.

This section, Staff development practices and needs of South African IR offices, has given an overview of what IR offices have indicated they do to build capacity and what they need, as well as reflecting briefly on what members of the SAAIR have indicated they would like to see the association offering. We discussed these

Table 13.2 Themes of Institutional Research

Theme	Item
Academic planning	
Data and analytics	Learning analytics
	Predictive analytics, real-time analytics
	Reporting on unstructured data sources
	Big data Data-driven decision making
Funding Student financial costs University costs	Cost of studies
	Cost effectiveness
	Impact of free, open online courses on traditional offerings
	Changing government funding formulae
	Integration of support services in higher education institutions
Legislated reporting requirements	Sequencing planning and reporting and drawing appropriate data
	Understanding regulatory requirements
Ethical considerations in use of data	Protection of personal information act
Management support/higher education leadership	Providing data based evidence for decision making
	IR and leadership support
	Role of higher education leadership and management in IR
	Ethical management
Faculty	Extended focus on academic staff and their role in the institution
Higher education environment	Responding to challenges
Curriculum issues	Aligning curricula to the South African higher education quality sub-framework
	Program qualification mix (PQM)
Articulation	Student access paths from technical and vocational education and training (TVET) colleges
Institutional effectiveness	Monitoring & evaluation
	Performance management
	Risk management
Surveys	Tracer studies
	Making meaning of survey data
Transformation	Post-apartheid transformation of higher education and in universities
IR and planning	International perspectives
Institutional research	Uptake of IR findings
Quality assurance/enhancement	'Quality balancing act in HE'
	Going from assurance to enhancement
Space management and utilization	IR focus on effective use, including impact of multi-campuses
Student success	Academic success, graduate destinations and graduate employability

offerings and needs against the frameworks of Terenzini's tiers of organizational intelligence and Volkwein's four faces of IR. We now turn to discussing capacity development to support the future of IR.

13.5 Capacity Development for the Future of Institutional Research in South Africa

Within the South African context, the future of IR is littered with a plethora of opportunities for capacity building. This section will highlight some considerations for the future and also attempt to re-imagine the space.

13.5.1 Some Considerations for the Future

The perceived value of IR is critical for its longevity within higher education institutions. Sustaining and building on the value and credibility of IR among institutional management structures, is no mean feat, and requires considered approaches and strategies. Recent research on the SAAIR (Chetty et al. 2016) identified networking as one key opportunity through which the value of IR could be realized. According to one respondent, this would involve making "solid connections with groups and associations that support administrative leaders, so that the good word about the value of IR as a professional network can spread to those to whom IR practitioners report." Reflecting on this, it is evident that such bodies could include the Council on Higher Education (CHE), USAf, the National Research Foundation (NRF), HELTASA, and the DHET, to name a few. What the aforementioned study did not investigate was *how* these connections could be forged. We suggest that the SAAIR and its members could, for example, present research at conferences or workshops associated with these bodies, invite key stakeholders from these bodies to IR events, seminars or workshops within institutions, and also invite them to institutes and annual conferences of the SAAIR. While keynote speakers for the annual conference of the SAAIR have included such stakeholders, perhaps more could be done to strengthen ties.

Chetty et al. (2016, 38) reported that some respondents in their study saw an opportunity for broadening the scope and contribution of IR at a sectoral level, which included proactively providing key responses to government or other agencies, and this was also highlighted in the 2016 SAAIR Executive Committee Survey results. Upon reflection, this could also play an important role in elevating the status and value of IR among key role players in the higher education space. Another finding, pertaining to the professionalization of IR, was discussed earlier in the chapter, and is briefly reiterated here. As indicated, while there were efforts by the SAAIR to advocate for a qualification in IR, such efforts did not come to fruition due to the

extent of the involvement and contribution required. The professionalization of IR practice should not be underestimated, as it could solidify IR's position in higher education institutions and enhance its legitimacy among senior managers in institutions. Elevating the contribution of IR by ensuring the relevancy of evidence-based information provided to leadership, was also considered a way of making the IR professional a "critical component of the institution's leadership" (Chetty et al. 2016, p. 39).

The areas of curriculum, transformation (in relation to redressing past inequalities), and institutional effectiveness, were seen as both opportunities and challenges for institutional researchers (Muller et al. 2016). The issue of the curriculum is most likely related to debates about decolonizing the curriculum as evident from recent student protests. Botha (2015) refers to the impact that the transition to democracy has had on South African researchers, and postulates that future challenges include student access and success, increased demands for rich data to support enhanced teaching and learning, the provision of actionable information on the formal and informal (out of the classroom learning) curricula, and the greater use of tools to generate and report on organizational intelligence (Botha 2015).

Turning our lens to skills for the future linked to professional development, Visser and Barnes (2016) refer to Muller et al.'s 2015 study that found there were needs beyond what is currently being offered by South African institutions. This was discussed earlier, and is briefly highlighted here with some suggestions for how this could be addressed. Suggested areas for further capacity building included the following: understanding different operational systems and their integration, business intelligence, data analytics, scenario planning, research methodology, and statistical software packages. Attempting to map these needs to Terenzini's three tiers of intelligence (1993, 2013), we find that all easily relate to Tier 1, and "scenario planning" would also most probably require Tier 2 and Tier 3 intelligence. Similar needs were also expressed in a 2016 survey undertaken by the SAAIR Executive Committee, tabulated earlier in the chapter and categorized into themes. To take the expressed needs forward, the managers of IR offices, in consultation with their line mangers and Human Resource Development Departments (HRDs), will need to discuss how to give effect to these needs within a sectoral context of budgetary constraints. Creative solutions are therefore important. IR offices could, for example, partner with internal departments in disciplines such as Statistics for practical and theoretical training in statistics, and Psychology for training in research methodology. However, finding affordable external providers is also a viable option. Such providers could, for example, provide training in statistical software packages and data analytics. Institutional researchers in Muller et al.'s study (Visser and Barnes 2016) also indicated a need for exposure to best practice and benchmarking opportunities through national and international travel, and it is clear that such opportunities will be dependent on finances available. Lastly, Muller et al.'s study, as cited in Visser and Barnes (2016, p. 81) revealed a need for online courses allowing for flexibility in participation. In this regard, IR offices and HRDs in line with global trends could consider massive open online courses (MOOCs) for some of the areas requiring development, as well as open educational

resources (OER), both providing an affordable and viable solution to developing capacity in the areas identified. The skills deficit identified by respondents in the Muller et al. survey (2016) speaks to some of the needs mentioned above and also revealed additional areas. The "deficit skills" include modelling, strategic planning, leadership skills, curriculum development and academic planning, high-level statistical analysis, and predictive analytics. The dynamic nature of the South African higher education landscape will require such a varied range of skills. Furthermore, recognizing a need to become skilled in academic planning and curriculum development, which are typically in the "academic" domain, suggests that institutional researchers see a need to function as "quasi-academics" in undertaking their roles, and this resonates strongly with the third space professional described by Whitchurch (2008).

We now briefly turn our attention to predictive analytics, learning analytics, and big data, which are becoming prominent considerations in a data-driven approach to higher education. The survey undertaken by the SAAIR Executive Committee revealed that institutional researchers need to build capacity in all these areas. The Muller et al. survey (2016) also shows that predictive analytics as a skill was in "deficit" among South African institutional researchers. However, trends in higher education point to the importance of these skills in the sector. Learning analytics, as described by various authors (see for example Long and Siemens 2011; Greller and Drachsler 2012; Norris and Baer 2013) is a new field in South African Higher Education. It officially emerged in 2013, when the University of Pretoria launched the first South African Higher Education Learning Analytics event in collaboration with the Learning Analytics Summer Institute (LASI13) at Stanford (Jordaan and Van der Merwe 2015). This was followed with an event linked to the SAAIR conference in Pretoria and the Learning Analytics Summer Institute (LASI14) at Harvard. Numerous workshops were subsequently held across the country to introduce the concept to the leadership at other universities (Jordaan and Van der Merwe 2015). Learning analytics continues to be a prominent feature of SAAIR conferences as part of building institutional research capacity in this area. A South African study (Lemmens and Henn 2016) explored the maturity of learning analytics at South African higher education institutions that were involved in activities that used data about students at a miso level to enhance student support and success. The study found that higher education institutions used data sources such as survey data or LMS data to improve their understanding of the individual student. The study further revealed that while some universities had made good progress towards the micro level of analysis, there was still room for improvement. Lemmens and Henn (2016, p. 251) point out that the "complexities pertaining to the South African higher education sector create barriers that make the development of learning analytics a difficult and daunting task." From a capacity perspective, these authors pointed out that institutional researchers in South Africa must develop skills to support learning analytics processes and to report on non-typical data (Lemmens and Henn 2016).

Institutional researchers in South Africa who equip themselves with advanced analytic skills for different types of data are more likely to effectively harness the

potential that learning analytics, and linked to this, big data, offer to higher education. A sophisticated set of skills will be required to extract, analyze, and synthesize the digital footprints of students for decision making, in keeping with technological advancements in this space. Developing these skills augurs well for improving the relevance and sustainability of institutional research. Linked to this is the notion of the "data scientist," which is one of the key emerging titles in the big data space. According to Prinsloo (2016), this title is often found amidst titles such as data developers, data researchers, data creatives, and data business persons (Prinsloo 2016). He argues that institutional researchers are expected to function as data scientists and proceeded to scope the identity, skills, and roles of the data scientist. Skills include statistics, machine learning, programing, and analytics. In South Africa, such skills will be an important part of the sophisticated skills required of institutional researchers alluded to above. On a more cautionary note, given the growing climate of big data and algorithms, Prinsloo reminds IR practitioners to be critical, ethical and transparent in using data. Furthermore, while we assume that bigger or more data are necessarily better and that combining data from disparate sources will lead to a more holistic picture (Prinsloo et al. 2015), Prinsloo (2016, p. 346) cites Boyd and Crawford, who claim that "big data and whole data is not the same. Without taking into account the sample of a dataset, the size of the data is meaningless."

Regarding external reporting in South Africa, Visser & Skeene (2016, p. 206) challenge IR Offices to proactively develop integrated data sets, information systems, and reporting processes to "report accurately, consistently and comprehensively to a range of internal and external stakeholders." IR offices need to adopt a more holistic approach by broadening their research base to include the results of academic studies and research on teaching and learning done by academics and postgraduate students.

13.5.2 Re-Envisioning the Institutional Research Space

Earlier in the chapter, we highlighted the blurring of the boundaries within which institutional researchers work, often with intersecting professional and administrative roles. We pointed out that these dual roles will need to be considered by the SAAIR and institutions alike in strategizing about possible capacity development initiatives for this "new type" of professional. What can be done? The suggestions below are really thoughts and ideas rather than concrete strategies, and are put forward more generally and not only in relation to South African institutions.

One possible suggestion could be to provide academic training for institutional researchers, focusing on the academic terrains they function in. For example, institutional researchers could attend academic writing workshops to enhance their contribution to scholarly research publications. Furthermore, given the generally high qualification level of institutional researchers, those who have achieved a Master's degree could be trained as mentors of students with lower level qualifications,

while those with doctoral qualifications could train as supervisors for doctoral candidates. Institutional researchers with Masters and Doctoral qualifications could also perform lecturing and tutoring functions. While some of these "academic" roles and functions do occur, they may not be "formally" written into the job descriptions of institutional researchers or taken into account during performance reviews, possibly due to a limited understanding of the intersection of academic and administrative roles by university management and the resultant third space functioning described by Whitchurch (2008). For institutional researchers to effectively navigate these roles, such roles firstly need to be recognized by higher education managers, and thereafter supported through the relevant systems and processes. Once achieved, this could potentially influence how institutional researchers are perceived by institutional managers. Their "academic" functions could elevate their credibility and reputation among senior institutional managers in both the academic and professional spaces, and influence the level of engagement with the work they produce.

Another suggestion, this time pertaining to academics, is to provide IR training for academics. This does not merely involve the typical training sessions on how to extract the relevant data from dashboards and portals or roadshows to explain what institutional researchers do and how they could be of service – this is indeed still important and must continue. However, we want to provoke thinking along the lines of academics being trained, for example, in Terenzini's three tiers of intelligence (1993, 2013), which would involve a deeper and more nuanced training in IR. As evident in global trends, higher education institutions cannot escape a growing climate of data-driven decision making. Within the South African context with its highly regulated higher education sector through the key steering mechanisms of planning, funding, and quality assurance, as well as various performance/accountability-driven initiatives (e.g. Academic Performance Plans for institutions which are contracts with the Minister of Higher Education and Training), academics will be required to become data-driven in their planning, decision making and reporting. The notion of academics functioning as institutional researchers could therefore be a plausible one. This can furthermore be linked to a notion of building a critical mass of institutional researchers across the institution and beyond a central office, in a more decentralized model, to cater for the increased demand in IR services. Institutional researchers and academics can be positioned to function across academic and administrative functions (blended professional), which links to the third space professional described by Whitchurch (2008). This will indeed have implications for the organizational structure and function of future IR offices as well as the roles and functions of academics, and could invariably lead to various challenges about professional identity and "turf." Whitchurch (2008, pp. 11–12) points out that "organizational restructuring is likely to remain a feature of institutional life," and acknowledges that working within clear structural boundaries (bounded professional) is likely to continue in institutions to "maintain systems and processes," "safeguard academic and regulatory standards," and "ensure organizational continuity," (p. 11) but suggests that the "nature of boundaries and the way individuals operate around them" could be considered by senior institutional managers during restructuring

processes. Benefits could also flow from this blended model in that it could possibly also lessen the academic/professional divide and the tensions that emanate from this. Whitchurch (2008, 12) asserts that third space working may assist in overcoming the "systemic problem of reconciling professional and academic agendas." Within an IR context specifically, this could also lessen the need to crisply differentiate between "academic researchers" and "institutional researchers" and limit potential criticisms or confusion about the value associated with each function (p. 12).

The role of institutional researchers as proactive change agents with a more strategic focus, has an important place in a re-imagined IR space. Calderon and Webber (2015, p. 24) state, "IR practitioners are now playing an active and visionary role in assessing the long-term positioning for institutions and national systems." Voorhees and Hinds (2012) speak about institutional researchers moving beyond passive roles towards functioning as intelligent actors: "…we point to the profound need for institutional researchers to engage directly in the challenges ahead and to position their institutions to move ahead with creating actionable data that can spell the difference between being passive recipients of change or intelligent actors trying to create a more manageable future" (2012, p. 74). Voorhees and Hinds (2012) and Nel (2016) view IR as playing a pivotal role in institutional strategy. As discussed earlier, strategic planning as a skill is lacking among South African institutional researchers, who called for more capacity building in this regard (Muller et al. 2016). South African institutions are in need of a clearer direction given the rapid pace of change, and institutional researchers could play an integral role in illuminating the strategic direction through relevant evidence-based insights.

Furthermore, to support the sector's transformation imperative in its broadest sense, South African institutional researchers will need to move away from mere reporting on the institution to actively recommending changes in policies and practice, with the latter being given a voice (or more of a voice) in analytic and research reports. This will require institutional researchers to display high levels of contextual intelligence, which as discussed earlier in the chapter, was found to be lacking among South African researchers. Borden and Webber (2015) maintain that changes in technology and increased globalization required enhanced knowledge production; this has implications for the issues intelligence tier. They also suggest that there should be a greater focus on the contextual intelligence tier, on external environments at the local, national and international interfaces, and how these impact on the institution. Leimer (2012) suggests that IR practitioners must shift to becoming knowledge creators, problem solvers, and connectors, as well as tacticians and change agents. We would call these "higher order" skills requiring a high level of professional maturity, and see these skills, as well as those identified by Voorhees and Hinds (2012), namely organizational skills, cultural skills, interpersonal skills, and leadership, as critical given the various challenges facing South African higher education institutions.

The notion of institutional researchers as "detectives" was put forward by Volkwein (2008). As discussed earlier in the chapter, and reiterated here, Volkwein (2008) describes the IR Office as a practice-oriented detective agency with dual purposes:

> The IR office serves at times as a home for theory-driven social science research but more often as a practice-oriented detective agency. We are trained as researchers, and some of us hire graduate assistants or draw upon faculty expertise to help us with our research, in the same way that an academic department does. But unlike the academic department's work, our research sometimes is for the president's inner circle only. (p. 10).

Given the complexities facing South African higher education, institutional researchers may be required to play this "detective role" more often than not. The sensitivity and emotionally charged nature of issues such as the decolonisation of the curriculum and free higher education, for example, could require institutional researchers to undertake confidential analyses and insights for senior management to assist them in formulating more public statements or responses. Volkwein (2008) further states that IR may be considered as a 'halfway house' (2008, p. 10); while some of the IR work is administratively directed, there are also responsibilities and activities that take IR professionals into the academic domain. The latter resonates with the third space professional (Whitchurch 2008), a role that South African institutional researchers do play (based on anecdotal evidence), but which will perhaps become more prominent in the near future.

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Chapter 14
Professional Development for IR Professionals: Middle East and North Africa

Gina Cinali

14.1 Introduction

In the past three decades, the number, diversity, and availability of higher education institutions have grown exponentially in the Middle East and Northern Africa (MENA) region, particularly in the oil-rich states of the Gulf Cooperation Council (GCC). Demand for expanded capacity higher education – in terms of seats for students and availability of quality faculty and staff, as well as a push for a more diverse offerings, have created a highly diverse landscape, with a great variance in terms of quality oversight, and capacity for tracing, measuring, and planning based on human resources and talent. The need for an expanded depth and breadth of professionals in institutional research (IR) has arrived in the MENA region.

Although higher education in this region is becoming more diverse in its size and focus, the model that has predominated in the region in the past 30 years is the US-style, liberal arts institution model. While there is great variance in terms of adherence to and understanding of the liberal arts approach, there is a quest for the coveted US accreditation. Whether it is regional institution-level or programmatic accreditation, there is need for a much more rigorous and regularized approach to academic planning, tracking, and presentation of accurate and timely data, and above all, transformation of data into useful information that allows for planning and assessment. As anywhere in the world, the level of sophistication and sense of urgency or necessity to engage in solid integrated planning varies from country to country and from one institution to another within a given country.

Some countries in the MENA region have been much more vigilant, "hands-on" and demanding in terms of setting up compliance reporting requirements and sub-

G. Cinali (✉)
Institutional Research and Effectiveness, Al Akhawayn University in Ifrane, Ifrane, Morocco
e-mail: Gina.Cinali@aui.ma

© Springer International Publishing AG 2018

K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1_14

sequent analyses of the educational landscape, its quality, projection for future (long and short-term) needs for programs, instructors, and staff at the national levels. Oversight bodies also try to gauge, based on their knowledge of the educational pipeline, the future needs and wishes of the young populations aspiring to enter colleges, universities, or vocational and technical institutions – while being mindful of national needs and aspirations. Some countries have very sophisticated and stringent oversight bodies and reporting requirements – and even conduct audits (examples include the UAE, Kuwait, and Egypt), while others lack coherent oversight at the state level, or find themselves at an embryonic stage of such activities (examples include Qatar, Lebanon, and Morocco).

14.2 Where Is the "Middle East" and What Is the MENA-Region?

A precise, geographic delimitation of the "Middle East" has eluded people ever since American naval officer Captain A. Mahan coined the term in 1901 (Davison 1960). Often used, are the labels "the Near East," "the Arab World and its neighbors," and other designations. International institutions such as The United Nations and the World Bank enumerate different countries when defining this region – which is not monolithic, but rather vast and wonderfully diverse - escaping facile and misleading labels. In the middle of what East is Morocco located? "The Middle East" is an artificial construct imposed by outside observers - an "elastic" region with amorphous boundaries that has been employed by scholars to encompass ever-expanding or contracting landmasses and countries depending on convenience and the subject matter under discussion. Policy makers and politicians have been hard-pressed to define the region and its exact boundaries, whether today or in historical perspective.

For the purposes of this chapter, the MENA-region refers to the Middle East and North Africa, an area spanning from Morocco in the West to Iran in the East, from Turkey in the North to the Arabian Peninsula in the South. Some organizations exclude Turkey and Iran, while others include the Sudan, Djibouti, and Afghanistan. Some exclude Israel as has been done by several ranking bodies. Some focus on sub-regions – such as the Levant, The Arabian/Persian Gulf/the Gulf countries and "North Africa. Yet others include several countries in Asia. For the sake of brevity and focus, this chapter will include and refer to the three sub-areas of the larger MENA-region: North Africa, the countries of Gulf Cooperation Council (GCC or the Gulf States) and the Levant. Fig. 14.1 shows the MENA Region.

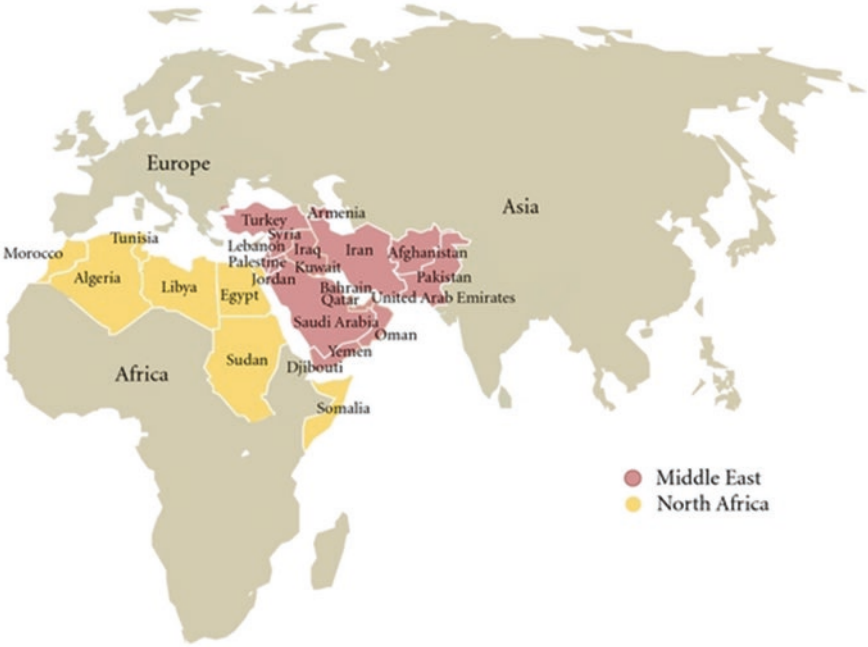

Fig. 14.1 MENA Region (Reproduced from El-Hage-Sleiman et al. 2012)

14.3 Institutional Research in the MENA-Region

In the MENA region, the profession and practice of IR is fairly young and there is a relative paucity of literature. Great literature reviews do exist from regional authors (El Hassan 2010, 2013; Nauffal 2015) as well as from international authors (Borden and Webber 2015; Howard et al. 2012; Middaugh et al. 2008; Peterson 1985) and we are reminded of Volkwein's comprehensive illustration of the myriad contributions of a good IR operation (Volkwein 1999, 2008, 2010), shown in Fig. 14.2. As shared with an audience at a conference held in Beirut, 2010, by the Middle East and North Africa Association for Institutional Research (MENA-AIR), see below), Professor Volkwein reminded the audience of the multifaceted work of any IR officer, stressing the need for being versatile and nimble enough to "Navigate the Winds of Change." The caution was particularly appropriate and timely, as the region was well into the so-called "Arab Spring," and an IR professional would have his or her professional prowess of observation and cool head tested when trying to provide good decision support information.

Despite the literature that is available, primarily from US and EU authors, the dispersion, level of awareness, development and sophistication about higher education is uneven. This has its roots in the disparate nature, distribution, and supply of systems of education throughout the MENA region. In many instances, the language,

Fig. 14.2 IR as the Guiding Light for Ships at Sea (Reproduced from Volkwein 2010)

terminology, and nomenclature are different and the reporting requirements within each state vary in nature, frequency, and detail. This has made it difficult to build a level playing field in terms of what schools, colleges, and universities are required to submit in terms of institutional figures, how frequently, and how detailed. This has to some extent hampered the growth of a region-wide collegial network. While some officials do not understand the need and/or see the usefulness of such learning and exchange, others with more mature systems and offices in their home institutions are quite keen to enhance regional understanding and collaboration.

For those who see the tremendous value that comes with mature exchanges, it seems self-evident that collaboration and shared databases would have great merit. However, because of the great diversity it is not a foregone conclusion to all. Similar to the great efforts expended by individuals in European countries to unify terminology, standardize credits, explain, and elaborate on articulation agreements with a view to higher mobility in the educational sector, one can understand the challenges faced by MENA region countries to arrive at commonalities and a "level playing field" – even with all the best intentions. Even the relatively small and somewhat similar sub-region of the Gulf-Cooperation Countries (GCC) have only managed to craft some agreements regarding the primary and secondary school topics, whereas collaboration and articulation at the tertiary level is absent – or has to be crafted on a case-by-case and at an institution-to-institution level.

Although IR in the MENA region has faced some challenges, the need for compliance reporting to outside accreditors, whether institutional or programmatic, combined with the increase in reporting activities to many national quality assurance bodies (which often emulate US methods), has acted as a very beneficial cata-

lyst for bringing attention to the crucial need for professional IR activities and has helped galvanize a certain movement to bring together concerned professionals in this arena.

14.4 Current IR Tasks in MENA

Within a given institution in the MENA region, most IR or institutional effectiveness (IE) offices are involved in the standard activities described by US IR scholars and practitioners (Terenzini 1999; Webber 2008) including basic counting: census data; enrollment statistics; categories of students; career levels; course loads; intended major; biographical data (e.g., sex, age, nationality, county/town of origin); numbers of applications, admissions, and acceptances; yield, graduation, and retention rates; graduates per year by school, grade trends, facilities utilization; and tallying up events and mentions in the press. In some cases, IR officials would report information on faculty such as their qualifications, degrees attained, research and publication output, impact factors, honors, (e.g., Nobel prizes, Field medals), and perhaps faculty advancement and salary development.

However when it comes to sharing this type of institutional and study data, *most* institutions consider *most* data private. Despite the fact that salaries are either taxpayer or nationally funded through commercialization of national resource endowments belonging to a nation, comparative salary studies are rarely undertaken. This stands in sharp contrast to the abundance of data that anyone with access to the internet can find about US institutions whether through College Board or American Association of University Professors (AAUP) datasets that are released annually. In the MENA region, data are typically used for external reports as required and for internal reports, varying across institutions based on leader style and preferences. For example, the UAE's Commission on Academic Accreditation (CAA) requires all institutions to indicate salaries.

14.5 The Establishment and Growth of IR and MENA-AIR

As has been acknowledged in other chapters of this book, and as seen in other regions of the world, building capacity for IR may happen through local associations that often draw inspiration from the US Association for Institutional Research (AIR). In an effort to enhance knowledge and networking, the Middle East and North Africa Association for Institutional Research (MENA-AIR) was established. Among its several goals, MENA-AIR has sought to assist in the increasing demand for evermore sophisticated work demanded of IR professionals to provide a broader range of decision support for institutional planning as well as detailed compliance reporting.

Cognizant of the fact that resource and travel constraints made it difficult for many MENA residents to participate in conferences further afield, a group of

dedicated IR professionals exerted efforts to set up an affinity group that led to the establishment of the MENA-AIR) in 2008 as an affiliate group and with guidance and help from AIR in the US. The founding cohort was instrumental in setting up the regional organization and organizing the first regional conference. The aim was to foster local exchanges of experience and opinions and to pool information and resources, while assisting those colleagues in the region who might just be starting out in the profession, as well as countries that were just embarking on coordination of whatever IR had been done on a national level. The seasoned professionals who are members of MENA-AIR mentor and offer consultancy and education to peers and newcomers and explain the IR profession to local and international audiences. This, along with annual conferences have been of invaluable assistance and has rendered moral support, especially to junior staff, who may feel a bit isolated in this region.

The inaugural conference of MENA-AIR held in Dubai in 2009 saw the participation of more than 100 members from about 45 institutions representing nine regional countries and guest speakers from around the world. To better understand our colleagues and stakeholders concerned with IR in the MENA-region, a survey was administered in advance of the inaugural conference in Dubai in 2009, and the results from this survey remain fairly similar today. (El Hassan and Cinali 2009).

In terms of office designation, the names include:

- Institutional Effectiveness and Planning Support
- Office of Institutional Research
- Office of Institutional Research and Assessment
- Institutional Research and Strategy
- Office of Institutional Research, Assessment, and Planning
- Office of Institutional Research and Data Warehouse
- Office of Institutional Planning and Development
- Institutional Research, Assessment and Planning

In terms of tasks, MENA-AIR professionals are called upon to field a similar variety of functions as are their US counterparts - assessment, effectiveness and accountability studies, internal and external reporting, and database management. Fig. 14.3 indicates the range of tasks performed for survey respondents.

Due in large part to a downturn in the economy, there has been little expansion of institutional research in higher education in recent years except for a few countries such as UAE, due to a national mandate that any institution of higher education must have an Office of Institutional Effectiveness (IE). Hence, by the shear growth of institutions, the number of IR offices and professionals are up. However, the staffing, in terms of number and expertise varies greatly. Egypt has seen rapid growth in the number of universities in the early 2000s and while those are also obliged to report, there is not the same requirement at UAE to have an IR office.

In institutions or countries without a specific IR or IE office, the tasks in decision support may be subsumed under other offices. In most countries in North Africa, the names (even equivalent in French or Arabic) for institutional research, effective-

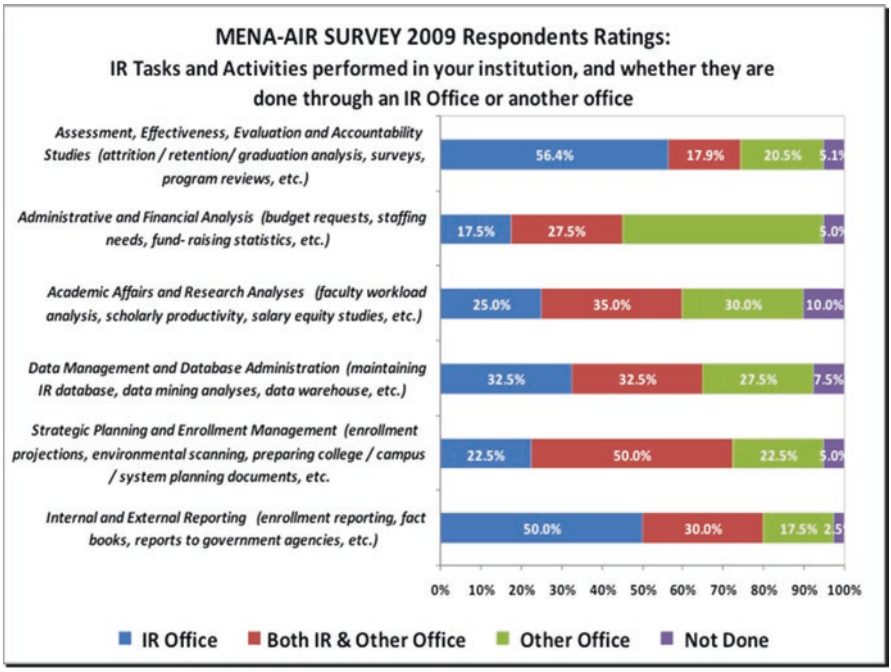

Fig. 14.3 IR Tasks and Activities

ness, or similar do not even appear. In Morocco, Al Akhawayn University is the only one that recently established an IR office (January 2016) as mandated by NEASC in connection with application for accreditation. These developments indicate that some counting and reporting occur, but that which is done is not well known, and definitely has gone uncoordinated until now, in terms of collegial information sharing, professional exchanges, and awareness within and across countries. This does not mean, however, that a need does not exist. Good information, techniques, and solutions to comparable concerns can be and have been shared, and more needs to be done.

From the 2008 survey, we saw that although more than 50% of the IR offices had been established after 2000, the survey indicated that 82% of respondents' institutions had a centralized IR office. A possible self-selection bias is acknowledged, as the individuals participating in MENA-AIR) are already galvanized around the work and the "cause" of collaborating and enhancing the field.

Since 2009, IR in the MENA region remains a functional unit in many institutions, although unfortunately, it has not grown recently as much as would be one might prefer – with the exception of the UAE as mentioned. Institutional budgets are much tighter today than those from 15+ years ago, and that has restricted opportunities for professional development travel to other locations as well as the ability to bring experts to the MENA region.

14.6 Professional Development for IR Professionals in the Region

By virtue of location and ease of travel and entry, Dubai is able to attract audiences from around the world for many conferences, training programs, symposia, and workshops. There are targeted seminars for presidents and institution leaders, and workshops on sustainability, corporate social responsibility, governance, and much more. All of these are relevant for IR professionals who participate as learners and as instructors. Among private, not-for profit training venues is the Center for Learning Innovations & Customized Knowledge Solutions – CLICKS – headquartered in Dubai – which attracts professional learners and trainers from across the region for intense workshops, including many on IR.

In addition, MENA-AIR continues to provide some professional support and collegial collaboration for officials in the region who endeavor IR and decision support tasks. Professionals in the region are interested in gaining more knowledge and mentored advice from other colleagues. As funds become more available, many hope that MENA-AIR activities can increase to help build the capacity of IR in the region.

14.7 An Exemplar of Institutional Research in One Comprehensive Institution

In addition to holding local licensure, many of the established universities also seek outside accreditation (US, Regional, and Institutional), as well as programmatic accreditation for programs that show particular strengths. Some MENA universities are even incorporated in and licensed to operate and grant degrees in the United States, but such markers of excellence entail additional compliance reporting.

One example, The American University in Cairo (AUC), is incorporated in the state of Delaware and has to undergo decennial reviews by the Department of Education in Delaware and the stringent decennial re-accreditation review from its US regional accreditor, the Middle States Commission on Higher Education. In addition to regularly performing extensive compliance reporting to the Ministry of Higher Education in Egypt, AUC's IR office also submits extensive reports to the Central Agency for Public Mobilization and Statistics (CAPMAS), established in 1964. The university also holds accreditation for the university, its schools, and its programs from Egypt's National Authority for Quality Assurance and Accreditation of Education (NAQAAE). AUC is the first University in Egypt to undergo the accreditation process from NAQAAE, a body created by the Egyptian government in 2007 to establish quality standards for its educational institutions. Additionally AUC holds programmatic accreditation from a number of US accreditors, including ABET, AACSB, CEA, as well as from AMBA and several others.

AUC presents a good example of a university with an established Institutional Research unit that has grown and matured. It has undergone several name changes, but has always been involved in accreditation, planning, compliance reporting, and is present at the table when decisions are made.

The State of Egypt has come to see AUC as a "partner" when new ways and methods of developing quality assurance and oversight are devised. This is a fine example of the IR profession serving the country and vice-versa. This is a symbiotic relationship that heightens the profile and prestige of the IR profession. It should be noted that an IR professional's identity reaches far beyond institutional research, per se, to encompass strategic planning, assessment, quality assurance, mission review, governance, and sometimes internal audit functions. Many IR/IE professionals at AUC also teach – thereby keeping the finger on the pulse when it comes to classroom dynamics and understanding the concerns of faculty colleagues. This versatility makes these professionals valued voices, and their insights are counted when new policies and adjustments have to be made. The respect and incorporation of IR professionals is seen worldwide, especially as use of technology often has to be decided by IT and IR/IE professionals in close consultation if systems are to be of value for decision making processes.

14.8 Challenges for the Future of IR in the MENA Region

In the Gulf, the United Arab Emirates has the largest number of higher education institutions, all established within a very short time. Following the comprehensive and venerated United Arab Emirates University, the past few decades have seen the establishment of more than 75 institutions of higher learning, 36 in Dubai and 31 in Abu Dhabi alone. The UAE-wide Commission for Academic Accreditation (UAE-wide) compels all institutions to have an office of institutional effectiveness and to supply extensive information twice a year (the CHEDS). It also arranges for audits, and invites leaders – including IR/IE officers – to meetings that contemplate ranking schemes in the UAE. The country is one of the most mature in the region in terms of devising stringent and meaningful quality oversight and in seeking input from IR professionals, who are at the table when new methods and measures are being considering. Additionally, the Knowledge and Human Development Authority of Dubai (https://www.khda.gov.ae) compels all schools and universities to report and to undergo examinations. UAE is very mature in terms of recording information, and refreshingly creative and inclusive of its stakeholders. This is an instance of inducing ever more sophisticated IR work - at the institutions and at a collective knowledge sharing level - and should serve as an inspiration to the rest of the region and beyond.

There are continuing challenges in terms of developing a common nomenclature, terminology, and naming conventions, that would allow for sharing and comparing across institutions **within** countries and **across** countries. Within one country we may find three-four different types of universities (German, French, Arabic, British/

American) and this presents challenges for admissions personnel and registrars, and often IR professionals are called upon to interpret previous experience and credits and to devise equivalencies. With the mix of public and private systems, such schools have differing reporting requirements. It is a tall order to bring such diverse systems together and develop meaningful commonalities. In addition, much activity has consisted of basic data gathering, fact and figures, and basic trend analysis, rather than deep research and correlative studies. Borden asserted in 2011 at a MENA conference that relational flow studies would help advisors and students predict success in a first semester, such as those used in sophisticated diagnostics to aid in fine-tuning recruitment, admissions packages, early intervention, or even targeted recruitment. Such studies are underutilized in the MENA region.

In some countries, even basic educational pipeline data is difficult to access, making it almost impossible to devise responsible enrollment forecasting. Add to this that many institutions are hesitant to share even the most basic information, and see such as "proprietary information," not to be shared.

14.9 The Positive Externalities of Outside Pressure

Not unlike some other regions of the world, there are many challenges to expanding IR in the MENA region. Some deep-seated cultural norms (such as hesitation to express doubt, lack of knowing, or admitting error) inhibit an openness for collegial collaboration and data sharing. Perhaps the relative recent introduction of large-scale postsecondary education to this region requires additional time to find a balance within the history of the region and its culture.

However, the field of IR is slowly developing, although many IR /IE offices are engaged primarily in data and information gathering of facts and figures used for compliance reporting, data-driven decisions and, presentation of the university to external stakeholders. The following potential solutions from outside forces may help push or drive enhanced IR.

14.9.1 Accreditation, Foreign Incorporation, and Compliance Reporting

Accreditation requirements have done a lot to nudge along accurate and timely compilation and disclosure of data, and this in turn has illuminated the roles, prominence, and worth of institutional research professionals and offices. (Lange et al. 2013). The CAA in the UAE is an example of a good vehicle for progress in IR/IE, and its dedicated professionals deserve much credit for heightening the field.

Across the region, GCC countries have approximately 48% non-nationals (end of 2015 figures). Similarly, in 2015 the UAE had over 80% non-nationals and in the

Emirate of Dubai, the local population counts for less 10%. The countries are very young in terms of population and many individuals in each country seek quality education. As higher education expands, IR/IE is getting a tremendous boost from the necessity of having to demonstrate that an institution is complying with local/national standards and through the quest for international markers of excellence.

Three drivers in particular help force ever-increasing focus on numbers, facts, figures, data, information, analyses, forecast, and assessment of the state of higher education in the MENA region and worldwide: 1) quality assurance and oversight and adherent compliance reporting at national and international levels; 2) the quest to achieve national and international, particularly the coveted US regional accreditation; and 3) the desire to participate in ranking with the hope of heightening the profile of the institution.

Beneath this lies a genuine desire for continuous enhancement of education at all levels—a desire to educate the future workforce, enhance national human capital—and with this, national pride, self-reliance and confidence, and adapting to a changing world, new technologies, and modes of operation that require a well prepared and nimble work force positioned for success, continued learning, and understanding. A quest to develop a more diverse economy less dependent on mono-culture, mono-export economies over-reliant on fossil fuels (oil and gas) as well as developing a strong, well prepared indigenous cadre of educated workers (Davidson 2008) has created further incentives to change the educational structure and offerings, and in so doing, the need for better data, information, and understanding sprung to the fore.

National oversight and licensure bodies of several countries are often modeled on the on US regional accreditors, e.g. SACS, MSCHE, and NEASC andoften use their requirements for data sets. In some cases, they follow the US' IPEDS and some European approaches in their requirements for annual compliance reporting. Such is the case of the Commission of Academic Accreditation of the United Arab Emirates – whose core staff were, at least for some time, IR professionals from the US, UK, and Australia, or regional professionals well-versed in "Western" forms of compliance reporting. These require that each university have on-site an IR professional.

With a focus on improvements in transparency and integrity governments, institutions have been prompted to adopt policies and provide external reports. Solid numbers and comparison of what policies and enforcement methods work require the cooperation, and often the lead, of an IR/IE office that serves as a neutral/impartial repository of occurrences and adjudication.

14.9.2 Ranking Schemes

Whether met with enthusiasm and ire, rankings are here to stay in the MENA region and world-wide, and if nothing else, they may give an institution some exposure. It is usually the work of IR officers to conscientiously fill the questionnaires

requested by ranking bodies by a certain date. In past few years, *Times Higher Education THE, QS Quacquacarelli and Symmonds, US News and World Report College Ranking* have devised new components to ranking to better capture some features that might previously have been omitted, whose inclusion might redound to the benefit of non-Western countries, untraditional universities, or those not situated squarely in a US college/university setting.

Normally, it is incumbent on an IR professional to alert senior leaders as to the advantages and potentially disadvantages of participating in ranking data submission. IR professionals are well positioned to explain how rankings work, and if and when an institution might derive benefits from participating. There has been no attempt at devising a regionally appropriate and controlled ranking, albeit some initial attempts at local, country-wide ranking schemes.

14.9.3 Quality Audits

In their decision support function, IR personnel are deeply involved in providing information about educational outcomes. As in other parts of the world, IR practitioners in MENA walk a fine line in wearing one of the "Four Faces of IR" (Volkwein 1999), serving as the information authority, but providing a balance between information gathered for internal improvement versus external accountability reporting. A prominent example of serious and sophisticated quality assurance (QA) efforts are found in the UAE, with both the Commission on Academic Accreditation (CAA) obliging all higher educational institutions to submit CHEDS twice a year, while the Knowledge and Human Development Authority (KHDA) of Dubai requires institutions to submit reports. Palestine has made great strides through the Accreditation and Quality Assurance Commission (AQAC), and like CAA, features an interactive website for data submission and review. Egypt has long required extensive reporting to ministries and to the Central Agency for Public Mobilization and Statistics (CAPMAS), and Kuwait to the Ministries and its Private University Council (PUC). Other countries such as Qatar, Lebanon, and Morocco are far behind, with national quality assurance frameworks either absent or in a preliminary stage of development (Labib 2009). In these efforts, IR officials have and can continue to provide important and needed information.

14.10 The Way Forward for IR in the MENA Region

An institution seriously committed to knowing about itself can achieve that goal by hiring competent, dedicated, and ethical institutional researchers. The institution needs to understand that one individual does not constitute a viable and sustainable IR, much less an integrated IR, IE, Planning, and Assessment office. Although many institutions initially established an IR-type office to appease national or

international accreditors or auditors, hopefully those practitioners can now move to new challenges for data management, reporting, quality assurance, and other ways to provide effective decision support.

Efforts are underway in many parts of MENA to approximate international standards and systems. While the language of instruction may not change and deep-seated traditions are not changed overnight, the change in the Maghreb countries to the LMD system is an example of such a push towards internationalization and standardization. (Mohammed and Brahim 2010).

Standardization to a more universal understanding of degrees and thereby better mobility, ease of transfer, and value of degree would serve students, institutions, and prospective employers. International recognition and value of a degree is another area where IR professional can help in disentangling the many different modes of composing and counting and evaluating degree requirements.

14.11 Professional Development in IR for the Region

The physical presence of a MENA regional IR Association with a minimal staff and infrastructure would be very helpful in regional coordination and meaningful collaborative, regional research. Many good efforts have begun, but lack consistent movement across time. In addition, the regional turmoil and upheaval in various countries at any given time also presents challenges for students and institution leaders, and that then trickles down to IR practitioners and the tasks on which they focus their time.

While the local region seeks a stronger AIR presence, MENA-region IR professionals may wish to rely on the information and professional development activities available from AIR and other country groups such as Southern Africa AIR (SAAIR) or Australasian AIR (AAIR). From these groups, MENA's IR professionals can borrow models for data management, data sharing, and innovations in data analytics that are useful for decision making.

Many universities in the MENA region are obliged to perform compliance reporting in connection with achieving or maintaining licensure and accreditation status. There are good examples of university leaders who do value and emphasize IR and do so by hiring individuals with training, experience, and a passion for the IR field. These leaders also encourage continued training and professional development for IR practitioners, networking, and information sharing by funding conference participation, encouraging publications, presentations, and mentoring to and by IR/IE and planning professionals. Particularly, the "American-style" and US regionally accredited institutions have long seen the value of sending their IR/IE professionals to such conferences and workshops as those fielded by AIR, SCUP, and several other similar associations. For example the American University in Cairo funded the completion of SCUP's year-long three-module certificate in integrated planning for select practitioners, a program that has a clear emphasis on data-driven decisions.

Complementing the various training opportunities available in the US and Europe, some private for-profit or not-for-profit organizations in the MENA region have developed a series of workshops for professionals in various areas. Some are targeted specifically at university presidents to propagate the value of continuous training; others focus thematic workshops for professional in various areas of planning, decision support, and institutional research. For example CLICKS, a not-for profit organization in Dubai, attracts professional participants from the region and beyond for training, workshops, and seminars in various subject areas, including assessment and institutional research (http://www.cli-cks.com). Sessions are fielded by professionals – practitioners with academic credentials and track regards in the topic at hand - from the United States the United Kingdom, and elsewhere – many with knowledge of the MENA region and of regional and international compliance reporting and licensures/accreditation requirements.

Even among IR professionals, it is difficult to find a common language for everyone. Because professionals come from countries with different national, primary, and secondary school systems and ministries where the language of communication is not English (perhaps Arabic, French, Italian), there is a linguistic challenge in adequately capturing the essence, as well as the precise meaning, of terms. As any IR/IE professional knows, precision and consistence is the very essence of our profession if we are to compare across time within an institution, let alone across institutions within a country, or across a region. This is a tall order for a relatively new field in the MENA region.

In light of the variations in awareness, training, reporting requirements, and national oversight, it is understandable that professional preparation and qualification display similar variance. Most newly-appointed IR professionals, unless they come with training and experience from other locations, will have to learn by doing, on the job and out of necessity. They have to learn to "distinguish between tasks and skills" and discern "what preparation is required to discharge the tasks demanded of IR personnel" (Webber 2008).

14.12 Societal/Industry Drivers

In the US and Europe, educational institutions are increasingly being taken to task for lack of relevance or ability to prepare students adequately for the job market of today and for the future. This is no less relevant in the MENA region. We hear the same refrain from employers: graduates are often not "job-ready." Here liberal arts graduates seem to have an edge, borne out by testimonials from employers of our graduates, who state that they can think critically, think on their feet, be imaginative, work with others, and perform in teams and alone. IR professionals are asked to perform alumni and employer surveys, in large part to gather more information on graduates and their movement into the workforce.

14.13 Suggestions for Strategies, Practices, and Studies that Can Further Build Capacity in MENA

The need for collegial information sharing remains serious and acute. MENA-AIR conferences assist, but more opportunities for collegial networking would be beneficial. In addition, collaboration on large, multi-country studies, as well as case studies on MENA region institutions, will help induce some openness. Investigation is required into potential causal effects of various degrees of maturity of IR/IE/Integrated planning offices in universities and schools in the region compared with results from other parts of the world. Furthermore, surveys on IR professionals might be standardized and administered with more regularity.

Also needed are more information gathering strategies and better data repositories that allow comparisons of best practices in all areas of institutional research and planning activities. Studies that attempt to establish causal links between good/adequate IR/IE research offices, age/maturity, and size of such offices can provide examples of successful data-driven decision making that lead to efficiency, academic excellence, and costs savings.

Following models established in other regions, professionalization of IR practitioners in terms of formal education and training, continuous education, certificates, and degrees may help external stakeholders perceive their high value. There have been explorative conversations between some universities in Lebanon and Egypt and some US scholars and universities on the possibility of an IR Certificate program or some similar form of credentialing for IR professionals in the region. Getting colleagues in MENA-AIR more involved may be helpful.

IR professionals need to be viewed as valued decision support practitioners, at least as consultants and preferably as ‘voting members” of councils. True decision support means that senior officials look to and receive valued information from IR leaders. In the MENA region, some senior officials understand the value of their IR colleagues, but others do not. Therefore, further education about the role and value of IR with senior officials is needed. In addition, IR professionals should work with their institutions’ public relations staff to ensure that external stakeholders (government officials and laypersons in the community) know what information is available and how they can ask for relevant information.

14.14 Conclusion

The span of activities of an IR/IE professional has expanded exponentially across the globe, and this is true to some degree in the MENA-region as well. Accreditation and rankings will likely continue to push institutions to record their best performance and spur on enhanced focus on research, publications, and other intellectual contributions and output. There are many ways in which IR and decision support practitioners can contribute to higher education in the MENA region.

Variance in degrees of funding and a lack of common nomenclatures, terminology, systems, and habits present added challenges, but also exciting new opportunities. Accelerated growth in higher education sectors in all countries and regions, is evidenced by the different types of institutions (private, public, independent, for-profit, not-for-profit), and many models of learning (e.g., on-site, virtually, online, in open courses, MOOCs, blended learning, residential sessions). New forms will appear that we cannot imagine, and some that still seem futuristic. It is very possible that the more affluent and innovative locations such as Dubai and Qatar will break the mold and devise new settings, modes of delivery, and different ways of measuring and assessing success. Dubai already has enhanced focus on educational outcomes, coupled with a focus on "national happiness" measurements (https://www.happy.ae/en). Progress, education, and learning sit at the intersection of all the innovative approaches, offering education and planners quality assurance persons and agencies, and IR professionals have a crucial role in defining and measuring cutting edge approaches that can leave a lasting mark on higher education in the MENA region.

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Chapter 15
Professional Development for IR Professionals: Focus on IR and Decision Support in Asia (China, Korea, Japan, and Taiwan)

Ching-Hui Lin, Yuan-Chih Fu, and Jang Wan Ko

15.1 Introduction

For the past 50 years, IR practices have made a major impact on higher education institutions in the US. Internationally, many IR organizations affiliated with the Association for Institutional Research (AIR), including CIRPA (Canada), EAIR (Europe), AAIR (Australia), MENA-AIR (Middle East Northern Africa), and HERPNET (Africa), now provide information and resources to guide best practices and professional development opportunities. Asian countries such as China, Japan, Korea, and Taiwan are not isolated from these global trends in postsecondary education. With increasing competition for financial resources and accountability demands, Asian institutions, like those in other global regions, are compelled to strengthen their internal and external mechanisms for supporting sound decision making in higher education policy.

Impacted by globalization and the internationalization of higher education, earning a postsecondary degree has moved from elite to mass status as a prerequisite for financial and social opportunities. Some countries in Asia have achieved almost universal access to higher education, while the level of access in the nations of the European Union is generally moving toward that of the United States (UNESCO Institute for Statistics 2009). As these trends continue, the limits of public funding

C.-H. Lin (✉)
National Sun Yat-sen University, Kaohsiung, Taiwan
e-mail: chinghui.lin210@gmail.com

Y.-C. Fu
Ministry of Education, Taipei, Taiwan
e-mail: fuyc20@gmail.com

J. W. Ko
Sungkyunkwan University, Seoul, South Korea
e-mail: jakosu@skku.edu

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K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1_15

compel increasing accountability in postsecondary institutions. As is the case in other parts of the landscape of higher education, institutional leaders and policy makers in Asia have come to see the value of IR. Consequently, there is a growing trend for the involvement of institutional research in higher education policy around the globe (Webber and Calderon 2015).

Taking Asian countries as the context, this chapter discusses the growth and expansion of IR and its implications in selected universities in Taiwan, China, Japan, and Korea that have shown an increasing interest in the value of IR capacity building in higher education. In particular, Taiwan has most enthusiastically promoted the practice of IR. Given the variability of IR movements and practices among those countries, the salient issue concerns the extent to which institutions strengthen the internal and external mechanisms of university governance and operations by providing evidence-based data for policy formations. To begin to address this issue, this chapter reviews the implementation of IR capacity building and leadership for institutional improvement and effectiveness in these four nations.

15.2 Taiwan

As the landscape of higher educational finances continues to change, universities and colleges face increased demands and social expectations with more limited resources. Along with this trend, the practice of Institutional Research (IR) is now being adopted around the world. However, the role of IR in Asian countries has not been emphasized until recently. In the context of Taiwan, given the declining student enrollments and governmental resources, the increased demands for accountability and institutional improvement have received much attention. In order to make the best use of governmental resources, the Ministry of Education (MOE) has been shaping IR in higher educational institutions (HEIs) starting in 2014 by facilitating such initiatives as symposia and workshops centering on student learning outcomes as the major theme to improve performance based on data-driven research for policy formation and institutional resource management. Since then, the MOE delegation and senior leadership from universities and colleges have traveled to the Association for Institutional Research (AIR) Forum to gain insight into IR capacity building and professional development. In 2016, the Taiwan Association for Institutional Research (TAIR) was officially established to promote professional development for institutional researchers and practitioners to pursue learning and share best practices nationally and internationally.

15.2.1 IR as Professional Practice in Taiwan

As institutional research (IR) is a new area of professional focus in Taiwan, it is experiencing transitions in its growth. The results of a national survey conducted by the Taiwan Assessment and Evaluation Association (2016) to investigate the development and practices of IR in universities and colleges in Taiwan higher education indicated that most IR offices report to the Academic Affairs Provost or Vice President (30%), followed by the department of research and development (R&D) (15%), and the President or Chancellor (8%). Such offices need a high level of information to inform policy formation and strategic planning; nonetheless, the structures and organizations of IR are highly contingent on staffing and financial resources. Although IR may have various tasks and projects, data management and warehousing are considered to be basic and essential for IR operations, while learning outcomes assessment and university accreditation are the primary focus for quality assurance. These priorities raise the fundamental questions of whether the current emphases are most appropriate and what the roles and functions of institutional research should be in higher education. In sum, the full potential of IR in Taiwan is not yet fully realized as leaders of universities and colleges are just now beginning to garner knowledge and good practices from overseas countries for IR capacity building and effective organizational learning in postsecondary education.

15.2.2 Capacity Building for IR Development in Taiwan

Higher education has received much public attention around the world with the need for greater accountability and transparency to ensure the value of college credentials (Altbach et al. 2016). This situation also draws attention to fundamental concerns regarding the practices of IR in postsecondary institutions. Influenced by U.S. higher education, the MOE initiated the development of institutional research in 2015 and called for proposals nationwide, highlighting student learning outcomes as the major theme to ensure quality of college education and institutional effectiveness. The purpose of IR is to provide scientific evidence to inform policy, practice, and administration at all levels within higher education. In 2011, the notion of IR was introduced to the national project for promoting teaching excellence universities. With these trends, TAIR seeks to act as a bridge between IR practitioners in different institutions domestically and internationally to support capacity building in higher education policy. To date, TAIR has held forums at international conferences and invited a number of international experts as keynote speakers. Many TAIR members are institutional leaders and professional practitioners who are in charge of institutional development and strategic planning for decision making in universities and colleges.

With the advancement of technologies, one of the most pressing issues is how to build an integrated institutional-level database system to enhance data governance

structures and ultimately decision making. Up to the present, IR has not been undertaken systematically across Taiwan's higher education system, and the lack of IR professionals is another issue. Since its inception, IR development has been dependent on the set of institutional characteristics and circumstances particular to each university or college. Regarding the functions of IR, many of them are united and fall under the auspices of information management and data analysis, research and strategic planning, external and internal reporting, or institutional development (Volkwein et al. 2012). As a result, as IR continues to develop in Taiwan, institutional researchers encounter many challenges, such as creating adequate data structures and interfaces and data-sharing for resource management. To sum up, although IR may have various roles and functions, only a few are fully involved in decision making processes (Lin et al. 2016).

15.2.3 Best Practices for IR: National Sun Yat-sen University

While IR is in its initial stage in Taiwan, much of what an IR office can do is dependent upon its place on an organization chart within the institution. As mentioned previously, the MOE funded the proposals of more than 50 out of 146 postsecondary institutions (including technological universities) to implement IR activities and strengthen practices to enhance organizational intelligence. Currently, the development of IR practices varies according to an institution's mission and orientation. Thus, public institutions tend to delve into IR issues in association with strategic planning and development, while private and vocational technology institutions are more likely to seek or strengthen the establishment of an integrated institutional data system. In spite of this move forward, most IR offices are still understaffed, and the field of institutional research in Taiwan higher education is currently in a developmental stage.

The following discussion of IR activities moves from the national to the institutional level for an example of best practices to illustrate the role of IR in supporting decision making. National Sun Yat-sen University (NSYSU) is a public research university founded in 1980 and located in southern Taiwan. Student enrollment is approximately 9600, almost evenly divided between undergraduate and graduate students. The Office of Institutional Research (OIR), positioned under the Center for Quality Assurance, was officially established in 2015 under supervision of the Academic Vice President. The two main pillars of the center's mission are to provide accurate, timely, and actionable information based on scientific evidence to support decision making and to produce high quality information and analyses to enhance institutional effectiveness and quality assurance.

As Leimer and Terkla (2009) stated, appropriate staffing is critical for building IR capacity. The OIR at NSYSU comprises two groups, data analysis and strategic planning, and information management and data warehousing. In order to provide value-added functions of the OIR for decision making, institutional researchers undertake proactive roles instead of being only reactive in response to administrative

requests. The OIR also partners with other affiliated offices to develop institutional policies, and more importantly, translate data into information with a clear focus that senior leadership can understand regularly (Lin and Chen 2017). In addition to collecting data and remaining current on the literature pertaining to higher education, institutional researchers build IR capacity by attending conferences and forums for presentations and discussions, as well as develop networking with IR professionals around the globe.

IR practices at NSYSU can be illustrated with a project relating to the issue of economic class disparities in college enrollment. It is generally acknowledged that higher education plays a critical role in promoting upward social mobility and mitigating educational disparities for low-income students, including financially disadvantaged minorities (Goldsmith 2010). Thus, the purpose for this project was to identify admission channels for recruitment of students to institutions that offer the best fit for their needs and situation. Data came from the NSYSU student record system, and the population of interest comprised first-time, first year baccalaureate degree-seeking college students who began undergraduate studies between 2007 and 2014. Admission channels included the Multi-Star Project, individual applications, the South-Star Project (limited to students residing in southern Taiwan), and national examination, which was the channel for the most enrollments. Employing descriptive statistics, the findings revealed that overall students from the Multi-Star Project academically outperformed their counterparts entering the other channels. The IR office reported findings to senior leadership including the Office of Academic Affairs, and it was decided to gradually increase enrollments of students from Multi-Star Project steadily, so now they constitute approximately 20% of all student enrollments. In this process, IR professionals contributed to their institutions by adding value well beyond providing data and analysis.

The most well-known project conducted by OIR is the online administration of the Collegiate Outcomes of Learning Assessment (COLA) survey since 2009, which collects data on undergraduates' participation in the institution's programs and activities intended to support their learning experiences and personal development. Different from the Cooperative Institutional Research Program (CIRP) freshman survey and the National Student Survey of Student Engagement (NSSE), COLA centers on student collegiate experiences from psychological perspectives to investigate attitudes, self-efficacy, motivations, learning strategies, and career pathways throughout the college years. For greater impact, data from the survey are integrated with institutional student data for analysis. Furthermore, after taking the survey, students receive responsive feedback (both quantitative and qualitative formats) to help them track the trajectory of their own personal development and learning experiences over time. COLA's results also help faculty members to improve their teaching and students' learning, and administrators to develop strategies for college enrollments.

In sum, the development of IR in Taiwan is still at the beginning stage, but recognition of its role in bridging institutional practice and policy is increasing. Most importantly, with support from senior leadership, the practices specific to IR have made a significant contribution to policy formation at NSYSU.

15.3 China

China is one of the Asian countries that piloted IR in higher education in the past two decades. Since the 1990s, a few Chinese scholars have introduced and led IR capacity building in higher education via well-organized workshops and conferences. Due to growing concerns for accountability and social responsibility in light of the massification of higher education, senior leaders and practitioners at universities and colleges came to see the value of IR. In 2003 the China Association for the Study of Higher Education was established and gained approval from the government in 2007. To date, over 80% of the higher education institutions in China have established some sort of campus-level units to carry out the functions of institutional research, while about 30% have an integrated administrative data warehouse (Liu and Zhang 2014). These units include administratively-oriented planning offices and research-oriented higher education research institutes.

According to with Chang's (2016) survey, the planning offices carried out the tasks relevant to internal data reporting; while the higher education research institutes were mostly involved in the study of factors that impacted the quality of college education. In general, IR professionals in China make little effort to disclose campus-level data that sufficiently reflect institutional effectiveness to external stakeholders.

15.3.1 IR as Professional Practice in China

The overall picture of IR in Chinese universities is characterized by a lack of centralized units. Two independent threads of IR professionals with varied professional backgrounds execute IR relevant tasks. Because having a centralized IR unit and a designated career path exclusive to IR practical professionals is rare in Chinese universities, the IR professionals denoted here are either administrative staff members working in planning offices or researchers serving in the higher education research institutes. Both are involved in the IR relevant tasks but in different ways.

The IR professionals working in planning offices are administrative staff members, most with a bachelor's degree but limited IR professional training. The administrative data collected by the planning offices and other functional units, are produced and extracted from various institutional operations, like financial management and human resources. The task of data management is mainly carried out by these individual functional units, while an information center is in charge of the storage of the institutional administrative data, which are used to keep the university leadership informed of the progress of operations as well as provide summary reports to funding agencies (e.g. MOE) for performance evaluation.

Compared to those IR professionals working in planning offices, the emergence of IR professionals serving in the higher education research institutes is more closely associated with the advocacy of institutional research. Today, about 800

campus-based higher education research institutes are operating, of which, about 300 higher education research institutes can confer the graduate degree.

Because these IR positions are affiliated with research-oriented institutes, these new IR professionals play roles like those of research associates or faculty and to a large degree are isolated from the institution's functional units.

Most IR professionals serving in the higher education research institutes have graduate degrees (i.e., master's degree or Ph.D.) concentrated on higher education. They are well versed in higher education theory scientific analytic techniques. In addition to carrying out IR tasks, they have teaching responsibilities and face enormous pressure to produce a body of refereed research publications (Chang 2017).

The isolation of the higher education research institutes from other functional offices makes conducting institutional level investigation inconvenient for IR professionals. In most cases, these research institutes have very limited connection with daily decision making. Their access to institutional data is constrained as well. If the IR professionals in research institutes are asked to conduct an institutional level investigation, they have to rely on the information center to provide the data they need on a project by project basis (Chen and Li 2012; Liu and Zhang 2014). The organizational arrangement that compartmentalizes research efforts and parcels out information inevitably prevents these new IR professionals with analytical expertise from constructing an institutional knowledge culture and developing contextual intelligence.

15.3.2 Capacity Building for IR Development

Two issues regarding the capacity building of IR professionals in Chinese universities require concrete actions. The first is the integration of IR tasks under a centralized unit, like the office of institutional research at most American universities. In today's Chinese universities, the tasks involved in institutional research to support decision making are distributed among several offices with their own responsibilities. There is no single unit with the authority and capacity to manage the institutional data and explore the intelligence inherent in the data. To solve this problem, the data management system within a university should be a coherent entity that is centrally managed. The IR professionals with expertise in data analysis, higher education issues, and contextual factors (Terenzini 1993) should collaborate closely via a well-defined reporting chain. These IR professionals should be empowered with a high level of authority to access data as well as to be involved in the design of data structures. Only when IR professionals have insider understanding of the data structure can the centralized data management system effectively support IR professionals' efforts to identify the factors affecting the institution's effectiveness.

Having a career path that establishes the identity and promotional opportunities of IR professionals and guarantees compensation commensurate with their contributions is crucial as well. In today's China, there is a large pool of talented IR professionals who are well-educated in the IR field. Some of them even have practical

experiences in the office of institutional research at American universities. Their knowledge and experiences are valuable to IR capacity building in China. Establishing a well-defined professional track in the context of Chinese universities would encourage IR professionals to see IR as a permanent professional career rather than a transition to a more academically legitimate position. With that step forward, IR in China can begin to cultivate a sizable number of first-line experienced practical professionals.

The second issue relevant to capacity building for IR in China is the quality assurance system in higher education. In today's Chinese higher education system, the quality of education is still mainly assessed by the resources the institution obtains instead of how these resources are effectively used to add value for their students through the education they provide. This tendency drives the attentions of leadership toward resource competition rather than studying carefully the factors that may be deterring institutional effectiveness. As a result, the importance of institutional development and quality education, along with the contributions IR can make to these aspects are easily underestimated and ignored in the university governance.

The proposed quality assurance measures should put more weight on institutional effectiveness and provide transparency of data to external stakeholders. Only when the university leadership switches from a decision making style based on personal experiences to one that is evidence-based will the value of the contributions of IR professionals be fully realized. And the driving force facilitating this institutional cultural change must be a quality assurance framework that embeds the principle of data-driven decision making into accreditation criteria.

15.4 Japan

In the face of a declining birth rate within the country, universities and colleges encounter a number of challenges that must be addressed at the university-wide level both nationally and internationally. The development of Institutional Research (IR) was initially associated with program evaluation and university accreditation (Yang 2014). In 2001, along with the implementation of higher education accreditation, the notion of IR was introduced in Japan. With shrinking public funding and increasing demands for accountability from stakeholders and the public, the government (Ministry of Education, Culture, Sports, Science and Technology, MEXT) came to realize the need for and the importance of IR and proposed the establishment of an IR office to ensure institutional accountability and quality assurance, so that decisions could be made and implemented effectively and resources used more efficiently (Yeh 2016). Moreover, the government strongly encouraged the formation of IR offices in postsecondary institutions to reinforce university governance, so a few IR offices were established within institutions at that time.

With government support, the number of institutional IR offices grew rapidly. Since 2007, IR functions have received attention as a set of institutional activities

that provide the evidence for strategic planning to ensure the quality of postsecondary education. It became accepted that institutions should play active roles in providing accurate information for policy makers and to the public. In 2012, MEXT charged the Center for Research and Development of Higher Education (CRDHE) at the University of Tokyo with the task of investigating the current state of IR and related activities in higher education and seeking ways to develop this area further. A national survey conducted by MEXT in 2013 revealed that more than half of Japan's postsecondary universities did not have designated IR units, while approximately 12% had offices that performed some IR functions. For those universities with established IR offices, the focus tended to be on accreditation purposes and monitoring educational reforms. In general, IR offices lacked functions to support decision making for policy formation (Funamori 2016). Also, in 2004, the government funded a college student survey as a project of the Japanese Cooperative Institutional Research Program (JCIRP), facilitated by Doshisha University. The JCIRP, which was adapted from the Cooperative Institutional Research Program (CIRP) at the University of California-Los Angeles (UCLA), links student learning outcomes with a culture of quality enhancement in undergraduate education (Yamada 2013).

15.4.1 IR as Professional Practice in Japan

Institutional research has become a powerful way to demonstrate institutional effectiveness and accountability. In Japan, IR activities are usually dependent on cooperation with other research centers within an institution and are influenced by perceptions of IR, which vary from institution to institution (Taiwan Assessment and Evaluation Association 2016). Because IR in Japan is still in the developing stage, active collaboration is required for practitioners to learn from each other (Yang 2014). To facilitate learning, three examples are introduced as best practices for IR in Japan.

15.4.2 Waseda University

The first example is Waseda University, a private research university in central Tokyo, established in 1882. Student enrollments in 2016 were approximately 54,000. In 2014, the Center for Higher Education and Institutional Research (CHEIR) was founded, which is responsible for carrying out institutional research and higher education studies; infusing institutional research into higher education policy-formation; and informing strategic planning, outcomes assessments, programs to improve teaching and learning, and other reforms to enhance educational quality and university management. There were about 8–10 staff members working in the CHEIR, but few had relevant prior experience in IR. In fact, although the institution sponsors a variety of activities related to IR, such as student surveys and

benchmarking studies of issues of retention and persistence with comparison groups, institutional data were stored in individual administrative units, resulting in the poor quality of data management and fragmented views of the big picture for policy-making.

Therefore, the IR goal at Waseda University was to establish an integrated data management system to play a critical role in institutional operations and strategic planning. To be specific, the data integrated system would combine data from major functions such as finance, admissions, and registration to produce multi-faceted information that could be shared as necessary to make informed decisions. Additionally, the CHEIR was placed in charge of data analysis of assessments of student learning outcomes for decision making to improve the quality of undergraduate education. In sum, the CHEIR has provided institutional researchers with a starting place for establishing an integrated institutional data system to address accountability and transparency demands at all levels.

15.4.3 University of Tsukuba

The University of Tsukuba (UT), founded in 1872, is one of the oldest national comprehensive research universities, comprising 28 colleges and departments serving approximately 16,500 students. The university offers academic strengths in STEM fields, with emphasis on interdisciplinary pursuits. Although the university does not have an IR unit, IR activities are conducted by the Research Center for University Studies (RCUS) (Taiwan Assessment and Evaluation Association 2016). The staff of the RCUS, which was officially founded in 1986, comprises a director, visiting researchers, administrative staff, and affiliated faculty members. The principal mission of IR at UT is to perform research on university governance and the structure of higher education settings to produce scientific, interdisciplinary, and policy-oriented evidence for policy decisions. Also IR activities were introduced in 2006 to achieve quality assurance for student learning outcomes.

The IR staff in RCUS was officially assigned responsibility for establishing an integrated database system for data collection and analyses. These IR studies are associated with the three modules of input (educational resources), process (learning experiences), and output (learning outcomes and assessments) to provide institutional strategic planning for university governance and management. To be specific, the module of input refers to university curriculum and educational resources; process represents two critical features of collegiate quality, formal learning experiences, and other educationally purposeful activities; and output refers to post-graduate employment outcomes and career performance.

15.4.4 Toyo University

Toyo University is a comprehensive university founded in 1928 with several branches in Japan, serving a student body of over 30,000. The primary mission of the university is to foster education that enables students to develop their own perspectives and insights and to act on the basis of their philosophy. Additionally, Toyo University is committed to globalization and student career preparation, which call on such IR practices as assessing the effectiveness of overseas study programs. The Office of IR (OIR) was established in 2013 under supervision of the President. The OIR developed the Integrated Higher Education Data System (IHEDS) only for the use of Toyo University through a variety of descriptive and predictive analyses, officials in OIR can provide specific information about aspects of the institution and the quality of undergraduate education such as students and their progression toward degree completion. The OIR also collects both national and international data associated with university rankings and performance for benchmarking and institutional self-improvement.

With the privatization of national universities in Japan, the role of university governance has become a primary issue, and IR has evolved to play a critical role in informing policy and strategic planning. The responsibilities of the OIR at Toyo University include data collection and analysis, development of performance indicators (PIs) for university administrative and academic purposes, and establishment of a database and data management system. In order to build IR capacity and foster interdepartmental collaboration, affiliated administrative and academic units were invited to be represented on a central IR committee, which also ensures that all institutional data from different areas are connected and shared through IHEDS. With an effective data governance structure, the IR office is in a strong position to build a culture of data-driven decision making and university governance. Additionally, the OIR at Toyo University provides IR certification of skills that that support institutional planning and policy formation (Lin and Chen 2017).

15.4.5 Forging an Alliance for IR Capacity Building in Japan

With continued funding from the government for the college student survey, Doshisha University has become allied with Hokkaido University, Osaka Prefecture University, and Konan University, forming what became known as the "Four-University IR Network," to gain more experience with collaboration through participation in the student survey of Japanese Cooperative Institutional Research Program (JCIRP). To date, more than 13 institutions have participated in the survey, including national, public, and private institutions. The purpose of the IR alliance is to improve learning outcomes through assessment and quality assurance in postsecondary education. The IR Network System (IRNS) was then developed as a collaborative effort among universities and colleges as data providers for comprehensive analyses (Taiwan

Assessment and Evaluation Association 2016). In addition, the government advocates the development of a University Portrait to disseminate information and assist in the utilization of educational information concerning higher education (Omoto et al. 2015). As these trends continue, postsecondary institutions have responsibility to provide university reports on admissions, enrollment, retention, graduation rates, degree completions, and financial assistance to the public. As a result of the increasing use of institutional data, there has been a major upsurge in the practice of IR in Japan's universities (Omoto et al. 2015).

Overall, the development of IR in Japan is still in a transitional phase. While administrations and IR offices in some institutions have built their capacity to support decision making, they are still on unstable grounds, while in other institutions IR may still not be well known (Funamori 2016). The cases given above exemplify the best practices of IR in Japan's higher education; however, some issues remain to be addressed. First, providing professional development and a career path for institutional researchers is essential to build their capacity, such as providing stable positions for IR staff and training courses to enhance their qualifications. Moreover, establishing an IR platform like the Association for Institutional Research (AIR) in the United States would be beneficial to assure quality and also promote the identity of IR in postsecondary institutions around the globe and establish the status and professionalism of IR practitioners.

15.5 Korea

Higher education in Korea has undergone many changes in recent years, one of which is the strengthening of the evaluation system for restructuring and financing higher education institutions. The government has initiated many projects linked to funding based on university evaluation, and accordingly, universities have started paying attention to quality management and accountability systems to improve their performance. This tendency naturally leads to a focus on the importance of institutional data and research. Higher education institutions (HEIs) in Korea have used internal data and information and conducted self-studies of university management for the past three decades. Yet, these institutional studies have been produced mainly for only limited purposes in limited areas such as accreditation and university strategic planning.

15.5.1 IR as Professional Practice in Korea

In Korean HEIs, the University Planning Offices traditionally provide data and information and conduct in-house studies. The Planning Offices collect relevant information from each department, reorganize it, and report the information to both internal and external agencies. For example, the Planning Office in a university

often conducts in-house studies such as student drop-out report and student satisfaction survey, and utilizes the data to develop the university strategic plan and provides information to the college ranking report published by the *Joongang Daily* newspaper. HEIs are also required by law to provide data to the University Information Disclosure System, which is a national level data collection system about student characteristics, educational conditions, education and research outcomes, as well as institutional finance and expenditures.

Since 2010, internal organizations have been established to collect and analyze internal data, conduct self-studies and report the results, and manage performance indicators, performing similar functions to those of institutional research (IR) units. The first IR office in Korea, the Center for Institutional Effectiveness (CIE) at Sungkyunkwan University (Ko 2015), was established in 2010 for the purpose of providing institutional data and conducting internal studies. Rather than data management, however, the major roles of the CIE were focused on assessment and internal research, including assessment of teaching and learning, overseeing the implementation of internal projects, developing tools for measuring student development and experiences, conducting evaluations of institutional and program effectiveness, and monitoring institutional performance indicators. These functions reflected the situation Korean universities faced. This center was particularly famous for its usefulness as Korean universities focused on quality performance management in the university. As a result, benchmarking against CIE, many universities have established similar centers and organizations. Currently, these organizations are collectively called performance management centers. Those centers focus primarily on institutional self-studies, addressing such issues as students' learning experiences, institutional development efforts, and diagnosis, evaluation, and dissemination of core competencies, as well as ad hoc studies needed for institutional management.

Soonchunhyang University, which is the only institution that has used the phrase institutional research in its office title, is one of universities that has utilized institutional data and research for university management. Soonchunhyang University, a medium-sized, four-year university located in the middle of Korea, having recognized the importance of IR, has conducted various internal studies and utilized data and systematically generated information for decision making. The reports of these studies include enrollment management, student dropout reports, and other performance indicators.

15.5.2 Capacity Building for IR Development

Gaining momentum over the past six years, Institutional research in Korean universities is now emerging. Two issues regarding capacity building are relevant for the development of institutional research at Korean universities. The first is about human resource, especially the cultivation of institutional researchers. Currently, many people in HEIs are not knowledgeable about institutional research, thus there

are few experts. Traditionally, the collection and analyses of data have been done by the staff of the Planning Office, who lack adequate technical and other skills needed to extract, supplement, and manage data and information in order to produce valuable and meaningful information. The desired qualifications for IR directors or chief institutional officers include interpersonal skills, communication skills, and use of database software. For regular institutional officers, the qualifications include both technical skills (i.e., use of desktop software, databases, statistical software, and data management system) and IR competencies (i.e., interpersonal skills, project management skills, and communication skills) (Eimers et al. 2012). Therefore, it is necessary to cultivate professionals with expertise in institutional research and provide educational programs and other development opportunities to reinforce their professionalism.

Second, the data management systems within a university should be interconnected and centrally managed. As discussed above, without centralized management of an institution's data and information, the tasks involved in institutional research to support decision making are distributed among several offices with other responsibilities. Like Japan, Korean HEIs have adopted decentralized data management spread across departments and offices without a campus-level integrated system. As a result, the departments produce their own data and information, but the ability to compile and analyze those data and information at the institutional level is limited. Thus, establishing an integrated data management system should be a top priority.

The concept of institutional research is new to Korean HEIs although they have been utilizing data and information for university management. Three central roles have been introduced into Asian IR: management and analysis of data as the basic and essential functions of IR; provision of valuable data and information to support the decision making process; and finally, delivery of outcome assessments, performance evaluations, and accreditation functions to fulfill an institution's quality assurance needs (Ko 2015). Although those roles are all important, Korean HEIs are mainly focused on outcome assessments and performance evaluations rather than data management and analysis, which are considered to be basic and essential functions of IR due to its role in supporting decision making as well as routine management of the institution. The institutional research office should have control over all basic functions as well as other expected tasks in order to operate as a formal and independent institutional research office in the Korean context.

15.6 Conclusions

As college participation has expanded rapidly in Asian countries during the past decade, economic and political forces have impacted public funding for higher education, resulting in greater need for accountability to stakeholders (government, funding agencies, students and parents) and the public (Altbach et al. 2016). IR is a new professional area in Asian countries and still in early development, and the

functions and roles of IR do vary given different perspectives on institutional research and a wide variety of contexts.

Nevertheless, some key issues related to IR within postsecondary institutions are broadly similar, including IR activities and professional roles (Webber and Calderon 2015). As this brief review suggests, most IR offices conduct studies through survey research emphasizing learning outcome assessments for quality assurance and organizational efficiency. As illustrated above, good practices for IR capacity building depend on the support of senior leadership and professional staffing, and on fostering collaborations with other affiliated units as well as practitioners in policy-focused activities. However, this discussion has also demonstrated that IR offices in Asian countries are often understaffed, lack a clear career path, need training experiences and professional development, and require closer contact with affiliated faculty members, resulting in the current weak capacity of the IR profession. Consequently, the need for more collaboration with affiliated both administrative and academic units is crucial that will also inform decision making with an institution.

Furthermore, as IR continues to develop in Asian countries, building an integrated institutional-level database system is critical to strengthen data management and analytics in higher education. To be specific, one of the critical issues for Asian countries is to build a national integrated higher education data system like the Integrated Postsecondary Education Data System (IPEDS) in the States that allows institutional researchers to conduct studies in a longitudinal and comprehensive perspective based on data-driven evidence for decision support. Moreover, such a system allows institutional researchers to do benchmarking analyses with comparison groups for self-diagnosis and improvement, so they become even more useful as universities and colleges conduct strategic planning to determine future directions.

15.7 Issues to Be Addressed and Challenges Ahead

In Asian countries, IR, though young, has great potential to build its capacity as an indispensable asset in higher education. With recent tightening of public sector funds, the importance of IR has received increasing attention, and IR is inevitably becoming a key mechanism for legitimizing higher education policies and promoting accountability for funding. For example, the practice of IR in Taiwan was considered as the complementary with accreditation process (referred to external accountability) for quality assurance. Although activities undertaken by institutional researchers depend on the regulatory responsibilities of their organization and the salient policy concerns of their country, emphasizing data analysis in support of decision making, the fundamental mission common to all IR units, will strengthen the capacity of IR. Furthermore, establishing a national integrated institutional data system (like IPEDS) is critical for data management and benchmark comparisons. With the growing demands for accountability from various internal and external constituencies, universities and colleges are required to be more responsive,

emphasizing the need for a much wider array of decision supports through IR. In our review, we found that few institutions take advantage of IR resources to inform policy making decisions for university governance. The four countries we represent have divergent policy concerns that impact the practice of IR, along with quality assurance, the effectiveness of institutional performance and accountability that has pushed postsecondary institutions in Asian countries which further highlights the critical need to better understand the value of IR., and the future of institutional research capacity and professional development lies in collaborative efforts in assisting with decision support within local contexts.

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Part III
Advancing IR and Decision Support

Chapter 16
The Future of IR and Decision Support: Ensuring a Seat at the Table

Karen L. Webber

16.1 Introduction

In the proceeding chapters, knowledgeable colleagues from around the world have discussed a number of important issues related to building capacity in institutional research (IR) and decision support. The authors provide brief but thoughtful comments on the current status of IR and decision support in regions around the world. Some discuss broad issues in higher education that affect IR, and they all detail how IR practitioners can provide good decision support. A substantial portion of many chapters detail current professional development activities that as well as additional professional development activities that can build IR capacity by strengthening its role and perceived value of IR and decision support. The term used throughout this book, 'decision support,' signals the collective activities and often, the cadre set of campus colleagues that bring subject matter expertise to the solution of an issue under study.

We know that the tasks related to institutional research vary by region of the world and take on a variety of names. As is mentioned in Chapter One of this book, decision support practices around the world roughly follow Volkwein's Golden Triangle (Volkwein 2008, Volkwein et al. 2012) but there are vast differences in the composition, governance structure, and funding arrangements of higher education institutions (HEIs), and that makes a single IR typology difficult if not impossible. Yet the tasks related to IR are increasingly important to senior administrative officials and we see a subsequent increase in recognition of the IR function across many parts of the world. In recent years, there is increased attendance at professional IR conferences and at least in the US, there are graduate level students who specifically

K. L. Webber (✉)
Institute of Higher Education, University of Georgia, Athens, GA, USA
e-mail: kwebber@uga.edu

© Springer International Publishing AG 2018

K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1_16

enroll in their graduate program with the goal to become a higher education official who engages in IR and decision support work.

Generally, the scope of IR and decision support has generally been confined to the boundaries of an institution (Maasen and Sharma 1985), although increasingly with important dialogue to external stakeholders that may impact state and federal policy considerations. Across the world, the focus of IR has been to provide information acquired and transformed from data for institutional improvement and effectiveness. In many instances, IR practitioners engage in specialized research to investigate relevant issues that have an impact on the institution. However, this scope is now being further broadened by the growing number of institutions that operate beyond and across multiple national borders. Additionally, institutions are part of national systems of education and respond to varying national policy imperatives, plus institutions have formal strategic alliances with like institutions (either within region or within national borders or even internationally) as well as external partners.

The massification of higher education, goals for diverse student access, diminished funding from governments for higher education, and the continued or growing needs for accountability push senior leaders at colleges and universities around the world for more and more nuanced information. Leaders in today's higher education institutions (HEIs) are faced with new challenges including: economic reductions; debates on the public versus private good or value of higher education; rapidly changing technologies that require substantial funds for the purchase of new equipment and for personnel training; the need to balance the missions of teaching, research, and service; increasing requirements for quality assurance and institutional rankings; and the role of online education, MOOCs, and credit for prior learning.

The information needs that can facilitate good decisions have only increased in our globalized world of higher education, and it offers leaders in IR and decision support an opportunity to further cement their role and value in higher education administration. When IR leaders are valued for their knowledge and skills, they are sought out, perhaps so much that the senior IR leader may juggle multiple tasks and feel challenged to complete multiple important requests that sit before him or her. Although it might be something of a double-edged sword, it seems the more preferred position to be busy because it indicates value. Finding ways to fulfill all tasks in a thorough and thoughtful way is a challenge, but one that many senior IR leaders can do. The perceived value that is bestowed upon valued IR officials does not come overnight; it represents hard work, dedication, scholarly knowledge, and skills. IR leaders who have reached this level of value may be offered a seat at the table of senior leader decision making because it serves the institution well, and I believe that is where future leaders of IR and decision support should strive to be.

16.2 Goals of the Previous Chapters

The previous chapters in this book shared ideas and comments on the state of institutional research and decision support across the world and more importantly, what is needed to ensure its growth and value within higher education. The decision support function rests on and in a global world of education that finds change as the norm. Today's HEIs must consider internal and external forces that affect the higher education enterprise including massification, technology, and needs for accountability. The local and global economy have an effect on all other issues; in most cases the ~2008 downturn in the economy has provided subsequent challenges and opportunities.

Higher education practitioners that engage in tasks related to IR have the opportunity to be on the 'inside track,' to help think about and forge a way for higher education in the decades ahead. Chapters in the first part of this book (Chaps. 2 through 8) offer ideas and discussion on important topics that broadly affect IR and decision support. Acknowledging and accommodating for the internal and external constraints require IR practitioners to have a strategy in how to continue their practice in the future. For example, proactive thinking related to new modes of instructional delivery and its impact on a campus requires IR leaders to be aware of local and regional issues on non-traditional instruction, its impact on faculty and support staff, its contribution to institution goals such as graduation and retention, and issues that must be considered such as prior learning credits.

Frameworks that articulate the facets of IR help determine daily work and collaboration strategies. Knowledge of theory and current scholarship are critical for the valued IR practitioner. The use emerging technology tools and visualization capabilities can facilitate the application of the IR practitioner's analytic skills, mindful of guiding principles from topics such as organizational theory, demographics, economic trends, institutional leadership, finance, students, and the teaching-learning process. With IR at the helm, data that is organized and managed strategically can be used properly, with fewer opportunities for misinterpretation. Ideas on the global forces that affect IR, the value of scholarship, models for IR organization, the need for good data management and governance, and the potentials for data misuse and misinterpretation are included in Chaps. 2 through 8.

Although it may not be called 'IR' in all regions or countries, many core duties associated with IR are being accomplished in higher education around the world. Some might argue that higher education administrators have been doing select IR tasks for centuries, ever since higher education leaders have been examining the daily activities and long term plans for the organizations. For certain, some regions such as North America, Australia, South Africa, and parts of Europe have been endeavoring IR tasks in a formal way for up to or over a half century. However, I am equally excited for the increased interest in IR in other regions or countries. Growth of IR tasks is seen in many parts of the world including Asia, the Middle East, Eastern Europe, and Latin America. Chapters 9 through 15 share brief comments on

the current status of IR and then focused on the current and needs for additional professional development that can strengthen and build further capacity for IR in that region. Some regions such as Latin America see a wide range of decision support tasks, and other regions are investing heavily in growing the number of staff members. Regions or countries that are new in building their IR capacity can learn from models being implemented in other countries, taking the practices, policies, or organizational structures that may fit for the specific circumstance. Although it was developed with primary considerations of the US, AIR's *Duties and Functions of Institutional Research* (AIR 2017) can be useful document when considering what is needed for the expansion of IR across the world. The final document is a thoughtful blend of five areas of tasks and strategies that seek to define the work of IR, its functions in higher education, and as a guide that can be used to assess IR. Although information that was gathered for this document came from primarily US officials, the duties and functions listed are important for all IR units and care applicable in most all settings around the globe.

16.3 Why Does IR Need a Seat at the Table?

That fact that higher education is rapidly changing in today's global world is not news. Some of the issues faced by institutions around the world include: the diversity of students seeking entry and the skills (or deficits) in knowledge they bring with them; the reduction in government financial support to higher education and its implications for institutional resources such as greater reliance on tuition and fees; and balances sought for the delivery of instruction via face-to-face, hybrid, or distance learning. Although higher education institutions select skilled leaders, there are, and will continue to be, frequent internal and external changes that require thoughtful discussion prior to decisions made by senior leaders.

In most instances, senior higher education leaders rely on a small cadre of associates who provide context-based information. These colleagues are those who are knowledgeable of the big issues that senior leaders are facing and they consider policy implications that may result from potential changes. These valued colleagues think about how similar issues are being addressed at other institutions. They understand the nuances, the implications, and the multiple and often competing needs that may be involved. Because of their years of experience, each key associate has a strong network of colleagues that can be called on to learn how similar challenges are being addressed in other settings. They valued colleagues also consider how senior leaders approach problems and seek to communicate in ways that resonate with senior leaders. One member of this small core of senior advisors can and should be the institution's senior IR leader. Without the IR leader, the senior leader may miss select nuances, insights into data quirks, or policy implications not yet considered. Without insights that come from the skilled IR leader, the institution may not be served well.

When the senior IR official participates in regular, on-going discussions they can offer relevant and important information that can contribute to decision making. With their level of knowledge of higher education and of the institution, senior IR leaders can provide important comments on the issue at hand. Not only can they consider how the specific issue fits within other institution needs, but if the senior IR leader has a seat at the table, s/he can offer immediate, real-time insights into data or other information that should be considered. In such conversations, the leader and the institution benefit from the knowledgeable IR leader who provides the nuances of many data points and the context that can lead to selection of the best data elements or overall solution. Too often, a senior leader or other colleague on campus may request data on a particular topic. Sometimes, the colleague may ask for one item (for example, the number of new students admitted this year), but after some discussion with the IR official, what that colleague may really want is something a little different.

16.3.1 Organizational Intelligence Is Important in Having a Seat at the Table

Regardless of the range of tasks endeavored, I remain firm in advocating for all higher education practitioners to engage in aspects of IR strive toward mastery of the three tiers of intelligence (Terenzini 1993, 2013). These skills and knowledge resonate well with many IR professionals and thus why the three tiers are mentioned in several chapters of this book. Terenzini (2013) reminds us of the value in understanding and mastering the ***technical and analytic skills***. He reminds us that it is equally important to understand the ***issues*** that are fundamental to higher education. And it is critical that all who wish to be or become effective IR professionals deeply understand the specifics of higher education in the particular context to integrate the issues within the appropriate ***context***. In achieving that coveted seat at the table, senior leaders in IR and decision support have become masters at all three levels of organizational intelligence; they possess the ability to offer synthesized information, are aware of the nuances and unique features for the issue under discussion, and are be able to communicate concisely in ways that resonate with senior decision makers.

While some skills that are critical to the effective practice of IR may be learned in a formal education setting, many nuances such as an understanding of the unwritten politics and culture in an institution are acquired only through work experience. While long-term experience in one institution offers deep understanding of that setting, broad knowledge and experience in multiple settings can be extremely helpful to illuminate the similarities as well as differences in the practice of higher education. Practical experience is critical, as is remaining informed about higher education trends, practices, external influences, and challenges for the future. Regardless of sector or type, all higher education institutions in today's world are

influenced by external stakeholder concerns, and in many cases, mandates. One can think of examples in many parts of the world that affect higher education (e.g., the US President's partial travel ban from select Muslim countries and its impact on international student enrollment; student demonstrations in the UK related to substantial increases in tuition fees; student protests in South Africa over the need for more financial aid; concerns of faculty freedom of speech in some regions of the Middle East; and student demands in multiple countries for name changes to buildings to do away with honor to individuals who represented discriminatory policies or actions). Indeed, higher education officials must work with a variety of stakeholders to ensure strong and vibrant higher education in the future, and one important strategy is the provision of information about the benefits of higher education to society. In all of these needs, IR and decision support practitioners can provide valuable information that has been masterfully transformed from data they access.

16.4 Big Data and Data Analytics

New technologies and the need to respond to global actions and strategies have made the world of higher education geometrically more complex than even a few decades ago. Storage capacity has fed the frenzied demand for large volumes of data. Big data and data analytics predominate daily news stories and have prompted new academic programs. Analysts promise us that Big Data can yield new insights into our sticky questions in higher education, and predictive analytics promise to help improve college student success by identifying new or new combinations of variables that may be related to student and institution success.

'Big Data' is an emergent field of research that uses data analysis to inform decisions (Daniel 2015). It seeks to combine or aggregate massive amounts of data to identify patterns of behavior or meaningful trends that can be seen in the data. Similarly, Boyd and Crawford (2012) see Big Data as "less about data that is big than it is about the capacity to search, aggregate, and cross-reference large data sets" (p. 663). Although business, government, and health care have been the largest explorers of Big Data (Daniel 2015), higher education analysts are quickly taking on the challenge of interrogating data, particularly via data mining to determine results that can improve student and institution success. Douglas (2001) proposes three common properties of big data: the large (and increasing) size of data; the high rate at which it is produced; and the large range of formats and representations used to identify the data. Douglas (2001) calls these three properties ***volume***, ***velocity***, and ***variety***. In addition, big data must have data ***validity*** (accuracy of the data), and ***volatility*** (longevity and relevance to analysis outcomes). All of these properties are important and contribute to the value of big data: ***analysis***; ***visualization***; and ***application*** (Daniel 2015). In most cases today, data are stored in institutional databases, ideally linked by key variables, following institution-wide data management and governance plans, and with specific users named who have access. Both Virginia Polytechnic and State University and Georgia Institute of Technology have good

examples of data management plans that detail procedures for campus-wide plan for data collection, individuals responsible for which processes, and names of individuals and units who have access (see: Virginia Tech's Standard for Administrative Data (2017) and Georgia Tech's Administrative Data Access Plan (2015) and Administrative Plan for Data Privacy (2015)). One aspect of the larger analytics movement, ***predictive analytics***, seeks to estimate the likelihood of future events by examining trends and identifying associations among related issues and events, or by identifying risks. Predictive analytics, in part due to the large volume of data being analyzed, may reveal hidden relationships that might not be apparent with current descriptive models.

IR practitioners have a tremendous opportunity to contribute to all three stages of Big Data and the opportunity to be involved in predictive analytics. Perhaps IR practitioners are in the best position to do analyses with Big Data because they are schooled in the need for organizational intelligence (Terenzini 2013) that requires one to understand the policies and practices or higher education generally and to situate information in the context of the specific environment. The role for IR in institutional policy and planning is important, and takes place in many key conversations, including those that emerge from the interest in Big Data.

Closely aligned with Big Data is an increased use of predictive analytics. The access to large stores of data enable the analyst to perform sophisticated and statistically accurate analyses to examine relationships between individual, institution, and even external factors that may contribute to student access to college, student success, effectiveness of faculty members, and broader institutional success. Interestingly, Boyd and Crawford (2012) believe that Big Data is changing the way we think about numeric information being collected and it is also changing social theory in many fields. This comment – that Big Data is changing social theories - gives me the opportunity to pause and think; in graduate school I learned to value and use theory to guide research design, the selection of variables, and to situate my interpretation of findings. As discussed in Chap. 4, Vic Borden reminds us that data mining is atheoretical. This is counterintuitive to what most academics learn in graduate school, and gives me pause. However, I am mindful of Boyd and Crawford's (2012) suggestion that Big Data is changing our theoretical frames we used to understand human (and student) behavior. And if that is the case, perhaps there is a good middle ground to be explored. Since many theories that guide IR's work, particularly those related to students and their success were built on white, middle and upper class students, particularly men. Today's student population does not conform in all ways to the students of a few decades ago, and perhaps some data mining results can offer educational researchers an opportunity to see additional factors that have important contribution to today's students and/or today's HEIs.

Following good data analysis, data visualizations have also grown more impressive, and again offer an opportunity for IR professionals to shine. The increased availability of current visualization technologies allows IR professionals to create greater means of conveying information to our consumers. There now exists the opportunity to provide highly interactive, explorable visualizations of data. However, for the benefit of this work to be realized it will continue to require thoughtful IR

practitioners who have the technical skills to build appropriate visualizations, possess the understanding of the fundamental issues that can be addressed in a visual medium, and convey the correct context to convey information.

16.5 The Call for Federated IR

Mainly due to new technologies and user-friendly software, many colleagues across campus have access to tools that can summarize, analyze, and present data. Swing and Ross (2016a) observed that many US colleges and universities have active data users in a wide range of location across campus, and that institutions are becoming more decentralized in their capacity for IR, allowing decision makers across campus to develop their own data reports, frequently setting up their own data repositories. Envisioned in part from their earlier work on the *Statement of Aspirational Practice for Institutional Research* Swing and Ross (2016b) propose a 'federated' network that suggests that other units on a campus take on some of the traditional IR responsibilities.

I agree with Swing and Ross (2016a) that technology and tools have facilitated the ease of data collection, and I agree that many pockets of data exist on most college campuses (and beyond in system level offices as well as some government units). Furthermore, many current vendor products offer the illusion of simple yet beautiful data visualizations that require little work. In Swing and Ross' (2016a) 'federated network' model, they suggest that various administrative units on campus should have increased access to tools and technologies for use with data, thus allowing for a larger overall scale of institutional research. These authors also acknowledge that institution leaders would re-allocate some resources within campus units enabling other units to take on some tasks previously done by IR, thus ideally freeing up IR to do other tasks.

Although Swing and Ross (2016a) argue that such expansion would not diminish the perceived value nor strength of the IR office, I believe that such a federated network model in US institutions, as described in the *Change Magazine* (2016a) article, has the strong potential for increasing the misuse and misunderstanding of data and consequently, a lower perceived value of IR. The misunderstandings that come from an unregulated dissemination of data to untrained users without IR in a central role will lower the perceived value of the IR unit, likely leading to its reduced stature and staff size. I offer three concerns that contribute to my hesitancy on federated networks as proposed by Swing and Ross (2016a).

1. *Misuse and misunderstanding in data reported.*

While the level of work demands might tantalize IR leaders to agree to broadly-distributed data, I believe that unregulated dissemination or open access to large data stores will lead to erroneous conclusions that cannot be controlled if IR leaders are not in a position to know who has access to and is using specific campus data. Models in which data is simply opened up to colleagues on campus without IR

leaders in clear training, guidance, and interpretation can lead to misunderstandings and misinterpretations. Even if some initial training occurs, staff turnover leads to new staff members who are unlikely to receive needed data coaching. While seasoned IR practitioners understand a fundamental rule related to data use, not all campus colleagues may be aware that data users must begin with an understanding of their purpose for use of the data and that it must be presented in a clear, thoughtful, and objective manner. Too often, data is reported inaccurately, it may lack adequate data definitions, it may not be securely stored that leading to possible data breaches, it may be misapplied which allows one to come to wrong conclusions, and/or may be shared haphazardly in ways that violate policies of data privacy.

A respected, central IR leader who works collaboratively with deans, department chairs, and other senior leaders on campus can provide regulated access after these colleagues are equipped with training and knowledge about data definitions and context for specific data points that can thwart misuse and misunderstandings. The knowledgeable IR leader serves the institution best because s/he can avoid the misuse or misunderstandings. Chapter 7 provides many good examples of misuse and misunderstandings that can result if the user is not fully aware of data definitions or nuances of the context.

2. *Loss of authority for data governance.*

Knowledge of general higher education practices, the specific HEI, and the multiple ways in which specific data are defined and used is critical in data collection, management, and analysis. Knowledge of nuances in the multiple definitions of a student, for example, is important in reporting to internal and external stakeholders, but equally important is the senior IR official who know timelines for data sharing or data freezes, unwritten connections between two or more data points, and issues about data sharing based on federal laws and regulations. Indeed, policies on an institution's data governance plan can be established, but a quick search on numerous peer institution websites identified only a few (at least that are available publicly on the web). With a focus on a US model, the interested reader may wish to review many important points in by Kelly Briner and John Rome in Chap. 5 on the value and need for good data governance.

With a campus-wide perspective, I suggest that IR leaders should be positioned *centrally* to data governance for one's campus. In such a central role, IR leaders should work collaboratively with others in campus, partnering with key colleagues, and particularly with colleagues in IT to determine roles that let each unit oversee the responsibilities that align with that unit. In this model, IT leaders can contribute their knowledge and expertise in data management, installation of equipment, data storage, and data security while IR leaders can contribute their knowledge and expertise in knowledge of the data (definitions), how to analyze it correctly, the need to consider implications, and how to transform the data into information that can be used effectively by decision makers.

Seasoned IR leaders with high organizational intelligence know (or know where to go to learn about) the correct data sources and definitions. They know the value of clean data, the challenges of missing data, and how to develop or where to find

crosswalks for data across program changes. IR leaders are also valuable because they provide balanced and objective perspectives on the data; they don't play sides but instead they remain unbiased, interested in the best solution for the whole institution (Saupe 1990). When IR leaders are positioned in a central role in data governance, they work as one member of a small but valued team of data oversight colleagues who can serve as an oversight committee to data stewards and data custodians on campus. As a member of a campus-wide data governance team, the IR leader takes the broad perspective—synthesizing knowledge of higher education broadly, the institution specifically, and its data needs. If a campus moves too far into a decentralized data model the lack of an IR leader in a central role will be to the disadvantage of the institution and informed decision making.

Perhaps due to the high reliance on data visualizations, a select few institutions made a recent organizational revision to formally affiliate IR with the division for information technologies (IT), in some cases to have IR supervised by the chief information officer (CIO). This is not an advantageous model; IR experts can and should be responsible for strategies on data collection, analysis, and reporting within the context of the institution while IT experts are and should be focused on enterprise-wide needs and solutions for data storage, data security, and emerging trends and needs for the institution's research and teaching missions. Technology tools and software are important to both IR and IT experts, and there is plenty enough for each set of experts to accomplish in each respective area of expertise.

3. *Budget reallocations will mean fewer funds for a central IR office*.

In most instances, institutional budgets are tight and in some instances, struggle to achieve balance. If additional resources (personnel or supplies) are needed to expand decision support tasks in other units, those funds will be taken from another location. Especially in performance based budget models, it seems logical that the implementation of a fully decentralized model would take funds *away* from a central IR office, since budget officials would argue that if IR staff members are no longer doing certain tasks, and thus the unit would not need the funds. Indeed, individual departments or colleges within the institution can and should be doing some of their own data analysis and reporting, but clear and accurate results will occur best when a central IR unit has provided the training and access to data that has been reviewed first by IR. With reduced IR staff, lost are the opportunities for cross-training and knowledge transfer.

While this position advocates for more involvement of IR staff members, I also acknowledge the need for balance in IR staff not assuming the majority of data checking and cleaning. Data custodians should be the primary agents to ensure initial data collection procedures and data accuracy. IR staff members should have less involvement with this initial capture and accuracy checks for data, but then later as they seek to use the data for analysis, they take on a secondary role for tertiary checks in data accuracy.

Instead of spending a high proportion of time in data cleaning, IR staff should use more of their time in analysis and interpretation, tasks that align with valued academic planning. Also as part of academic planning, and as discussed in Webber

and Calderon (2015), IR staff, and particularly IR unit leaders needs to be more involved in conversations with senior officials. In a best-practice model of good data management and governance, the IR leader is working with a team of senior colleagues who oversee a campus-wide plan replete with data custodians who ensure the accuracy of the data and data stewards who use and know how to use the data within the right context. Thus, particularly in the US with its current set of organizational structures and practices, I believe that a best-practice data governance model includes the IR leader in a central role who oversees and helps other select data users on campus. This requires campus finance officials to allocate adequate funds to a central IR unit.

16.6 Collaboration Is Important

Should IR work collaboratively with other colleagues on campus? Absolutely! Having the IR unit in a central role that is less decentralized does not mean that colleagues will not have access to data, nor that IR staff members should be expected to complete *all* campus data requests and analyses. What it does means is the need for thoughtful planning that must be implemented on what data is shared broadly and to whom, and only after adequate training has been completed to ensure that campus users understand the ways in which the data can be used and in what context. Once the institution has knowledgeable and informed select users around campus, then there can be coordinated data use and analysis across campus. This is a model that serves the institution well. In the context of data needs institution officials involved with *Achieving The Dream,* a recent discussion acknowledges the need and possible opportunities for IR to be seen and valued on a campus, as well as the need for interdependence between the institution's IR and IT units.

One creative model includes having an IR staff member assigned to other locations around campus who can provide necessary training and education to other data users. At one US institution, an IR staff member spends two days a week in another major academic planning/support office. On those two days, the IR staffer helps with (or completes alone) data requests that are of specific interest to the needs of that unit. With a physical presence, the IR practitioner not only assists with access to the correct data points, but also shares important information on the data, why specific data elements were chosen, and how the results should be interpreted in the context of the specific setting. The IR professional thus serves an important education function to colleagues in the unit, (one of the five *Duties and Functions of Institutional Research*; AIR 2017), and also returns to the IR unit to share information on what's happening in other units on campus.

Collaboration with the Information Technology (IT) office is particularly important,[1] but I believe that IR and IT should remain the lead in their respective

[1] Comments herein on the relationship between IR and IT are mine and are not in response to Swing and Ross's (2016a) comments, but the unavoidable next step that requires attention in my argued position.

areas of expertise. IT leaders are chosen for their expertise and assumed responsibility for campus-wide strategies for data storage, data security, and perhaps campus-wide software solutions. IR leaders are chosen for their expertise in knowledge of specific data situated in the institutional context. Effective decision support will happen best when IR and IT leaders work side by side, not confined by barriers or with one unit subsumed under the other. Both IR and IT support the teaching-learning and research missions of higher education.

In Chap. 9 of this book, Bramblett and Broderick propose that shared networks of institutional decision support can be created to effectively distribute the use of analytics across campus to inform decision making, planning and policy formation. Georgia Tech's Decision Support Group (DSG) seems to be an excellent model of effective collaboration of colleagues across campus who provide good and needed information for decision making. In my opinion, The DSG at Georgia Tech is using an appropriate model of collaboration in having IR positioned at the center (see Fig. 9.1, Chap. 9). As officials in IR collaborate with many other key leaders on campus, they must serve as ***leaders*** for tasks related to data analysis, interpretation of information and recommendations of actions. Although institutional decisions are typically made by senior leaders, confidence in those decisions is rooted in good data and value-added information that comes from IR and the DSG process. The fine balance of collaboration and distribution of data requires IR to remain positioned at the center of the collaboration wheel, and in doing so, IR can retain value and confidence from senior officials. While collaboration with colleagues on campus is essential, it seems critical to me that distributed models of data keep the skilled and knowledgeable staff in IR at the center of any distributed models, as does the DSG at Georgia Tech.

Indeed, the access to and use of data in higher education is changing rapidly, and advanced in technology make it easy for campus colleagues to have access to or to collect data for their own use. Little time has elapsed since the Swing and Ross model of federated data was published in 2016, and I am unaware of specific campuses that have sought to implement a fully decentralized model of data access and use. It is possible that Swing and Ross envision a model of access to and use of institutional data that would differ depending on the particular administrative culture and practices of each campus, thus allowing for a range of decentralization. That, however, is not clear in the written document, and my interpretation of the model as shown requires further interrogation from many knowledgeable practitioners, a primary goal for this chapter as well as the entire book.

16.7 Building Capacity Through More Staff Members and Professional Development

At the heart of building capacity is the addition of more professional staff members and regular on-going professional development for IR and decision support practitioners. As a central unit, the IR staff will likely add more tasks to their list. One (or

more) staff member may be focused on internal and external data reporting, while another (or others) may complete analytic analyses for a variety of stakeholders, and another staff member may assist campus users with appropriate ways to use and interpret the data. Knowledgeable and skilled staff can perform decision support tasks at a wider and deeper level. Indeed, a stable or enlarged staff allows for better cross-training and transfer of knowledge, and requires even more support and more funds from senior leaders. Additional staff members will likely happen gradually over time, as senior leaders and the institution in general experience the benefits that come from additional IR staff members.

The Association for Institutional Research, while based in the US, warmly welcomes colleagues from around the world to attend its annual forum gathering as well as to participate in online and face-to-face seminars and trainings. Along with a rapidly increasing number of administrative practitioners who work directly on tasks related to IT and decision support, there are a growing number of postsecondary faculty members who teach courses related to the principles of IR. The US Association for Institutional Research (AIR) served over 4000 members in 2016, and more than 2000 attended the annual Forum in May 2017. Similarly, The European Association for Institutional Research (EAIR) hosted over 325 conference attendees in 2017, the Australasian Association for Institutional Research (AAIR) hosted nearly 300 in 2016, and the Southern African Association for Institutional Research (SAAIR) recorded about 250 association members in 2016. Clearly, there is growing interest in IR in higher education around the world.

Further, the growth in affiliate AIR) groups around the world is a testament of the expansion of IR; the list of affiliated groups can be seen at: http://www.airweb.org/Resources/AffiliatedOrganizations/Pages/default.aspx.

These organizations offer professional development on issues related to tasks typically associated with IR and decision support, strategies for effective communication, other information about the context of higher education, and professional networking with colleagues near one's home location as well as across the world.

In Chap. 9, Bramblett and Broderick detail a number of professional development activities that are currently offered through AIR) or affiliate groups. Of note, is AIR's Holistic Approach to IR for newcomers to the field, the Data & Decisions Academy, and Courses for IPEDS keyholders. AIR publications offer information on specific topics that are specifically focused on decision support and quality assurance. Documents such as AIR's *Duties and Functions of IR* (2017) are broad enough to apply in most all settings, and serve as goals for IR or institution leaders that seek expansion of the unit. Face-to-face conferences and professional development workshops occur in the US and many other regions around the world.

Professional development activities play an important role in providing specific skills and knowledge that assist in the daily practice of IR, but other actions must also be taken to ensure that IR leaders have a seat at the table. For instance, as mentioned above, today's opportunities for data visualizations abound, but we must be mindful of the need to ensure accuracy in the visuals rather than simply dazzling the reader with pretty pictures.

Having a seat at the table necessarily means that the institution's senior leaders must value and want decision support from IR. Good work from IR officials who possess and show evidence of organizational intelligence through their work products and other communications is a primary way to let senior leaders know of IR practitioner skill. IR leaders must be sure to manage the IR office well, balancing proactive and reactive analytic needs and be aware of current and future higher education trends. IR leaders should strive to be involved in academic policy and planning conversations. Their knowledge of higher education and the institution positions them to offer important points that can inform academic policy decisions. Importantly, IR leaders must also possess skills in effective communication to verbally and in writing provide succinct information that has been transformed from the data.

In addition to seeing the quality of decision support from the IR professionals themselves, executive in professional organizations such as the US and other region's Association for Institution Research can (and do) share printed materials and hold face-to-face meetings with senior officials on IR and its decision support role. Beyond the individual campus, the leader for the IR professional association (for example in the US, that is AIR's Executive Director) has the opportunity to engage in further information sharing with key policy officials at the national or regional level. Conversations at national meetings such as the American Council on Education, EU Commission, or other gatherings for senior institution leaders (e.g., provosts, presidents, rectors) can take place to affirm the ways in which IR practitioners serve an important and needed role in ensuring institutional effectiveness.

16.8 The Future of IR and Decision Support

It goes without saying that IR practitioners needs to attend to detail, have statistical and technical expertise, and understand issues that are embedded in the specific HEI context. As more information is collected, data management and data governance become similarly more complex. However, it widens the scope for analysis and it provides opportunities for institutional innovation. Good analytic work requires IR practitioners to have a very good understanding of the data as well as the ability to interpret and draw inferences about the data, and the ability to synthesize information from a variety of internal and external data sources. It also requires that decision makers provide support, vision, and commitment in resources for the objectives institutions seek to achieve. IR practitioners need to develop and enhance their skills so they effectively combine qualitative and quantitative approaches to problem solution. It requires IR practitioners to have a good understanding of public policy, and the forces of change that impact on higher education.

New technologies for data management and visualizations present challenges to an institution's central versus distributed models of action. If an enterprise-level philosophy is pursued, policy typically creates mechanisms for central software purchase and use. Data visualization packages, should be discussed collaboratively

by both IT and IR leaders knowing enterprise-level data management and governance would strive to have IT units focus on acquisition and use of these tools and technologies for users across campus, including IR.

Having that prized seat at the table also entails having senior leaders that understand and see the value of IR as a source of needed information. IR Leaders who practice at Tier 3 (Terenzini 2013) can provide thoughtful information on assessment of student and institution performance, implications, and thoughts about possible future policies and practices. IR leaders themselves may need to articulate or reinforce these concepts with senior administrators, and professional groups like the Association for Institutional Research can advocate for the value of IR. All of these efforts to build the capacity for IR and decision support do not happen overnight, yet intention, collective efforts can contribute to the strength and value of the profession. When IR leaders possess high-level organizational intelligence they are in the right position to produce effective decision support and thus ensure their seat at the table.

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Author Biographies

Victor (Vic) M. H. Borden is Professor of Higher Education at Indiana University Bloomington, where he also directs the Carnegie Classification of Institutions of Higher Education. Previously, he directed the institutional research operations of four higher education institutions. Dr. Borden's general area of scholarship is on the assessment of institutional and program performance within higher education institutions. He has published over 150 research articles and book chapters, and delivered over 275 workshops, seminars, keynote, peer-reviewed and invited presentations, internationally. Dr. Borden was a Fulbright Specialist in South Africa and is a Past President of the Association for Institutional Research.

Jan Botha is Professor in the Centre for Research on Evaluation, Science and Technology (CREST) and the DST/NRF Centre of Excellence in Scientometrics and Science, Innovation and Technology Policy (SciSTIP) at Stellenbosch University in South Africa. He is co-author of the book *Institutional Research in South African Higher Education – Intersecting Contexts and Practices* (SunMedia, 2016). Earlier in his career he was Senior Director of Institutional Research and Planning at Stellenbosch University. His research interests include higher education policy studies, postgraduate supervision, and research integrity.

Sandra (Sandi) Bramblett is the Assistant Vice President for Institutional Research and Enterprise Data Management at the Georgia Institute of Technology. She began her career at Georgia Tech in 1989 and has served in various leadership roles within IR-related professional organizations, including Council chair for the Association of American Universities Data Exchange (AAUDE), president of the Association for Institutional Research (AIR), the Southern Association for Institutional Research (SAIR) and chairperson of the University System of Georgia's Committee on Institutional Research and Planning. Her research interests include decision support, strategic planning, benchmarking, and higher education policy.

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K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1

Kelly Briner is the Director of Data Governance and a 30+ year employee of Arizona State University. An accountant by training Kelly career has focused on administrative systems. Currently he is leading the Business Intelligence and Data Warehouse aspects of the Workday Financials implementation at ASU.

Michelle Broderick completed her Ph.D. in Physical Anthropology at the University of Toronto. After graduating in 1994, she taught a variety of courses at Sheridan College, McMaster University, and the University of Toronto. In October 2000 Michelle's career path led her into the challenging field of institutional research. In her current role, she is a Senior Academic Research Analyst in the Office of Planning and Budget at the University of Toronto. She provides analytical support to various VP offices, and also represents the University on several data exchanges. Michelle has been a member of AIR since 2000–01.

Angel J. Calderon is the principal advisor planning and research at RMIT University Melbourne. He is also an associate member of the Centre for Global Research at RMIT. He has worked as a journalist and foreign correspondent in several countries. Between 1998 and 2007, he was co-editor of two higher education journals. His research interests include higher education policy, international education, impacts of trade liberalization on educational services, emerging markets, graduate outcomes and satisfaction, benchmarking, and university rankings. With Karen L Webber, he is co-editor of a book on institutional research and planning in higher education, published by Routledge in 2015. He has also co-authored another two volumes on higher education. He is a regular speaker on international forums on global megatrends, university rankings, higher education competitiveness, strategy and development.

Maria Pita Carranza is Director of Institutional Quality at Universidad Austral, Pilar-Buenos Aires, Argentina. Maria is an Architect, Master in Politics and Management of Education and PhD candidate. The thematic areas of her research are related to quality in higher education, institutional evaluation and accreditation, information management for decision-making in universities and university rankings in Latin America. She has published several book chapters and articles in national and international journals.

Yuraisha Chetty has worked in institutional research for 15 years. She started her career in institutional research in the Strategic Planning Division of the University of the Witwatersrand and worked in this space for 8 years, for the most part as a senior institutional researcher. She then ventured into the distance education arena and served as the Director of Institutional Research at the University of South Africa for 7 years. She has served on, and contributed to, various university committees supporting teaching, learning and research. She has presented papers at national and international higher education conferences on the profession of institutional research and institutional research studies related to teaching and learning issues, and has related publications. She is a member of SAAIR, AIR and E-AIR.

Gina Cinali is Associate Vice President for Institutional Research and Effectiveness and Faculty in Political Science at Al Akhawayn University in Ifrane, Morocco. She has more than 35 years' international work experience, 25 of which have been in international higher education in 14 different countries. She has served in many positions including Acting Director, Institutional Effectiveness, American University of Dubai, Associate Vice President, Institutional Planning, Assessment, Research and Accreditation, Faculty, American University of Nigeria, and Executive Director, Academic Budget and Planning, King Abdullah University of Science and Technology (KAUST), KSA; Executive Director, Institutional Planning, Assessment, Research and Testing, American University in Cairo. Her pre-academic experience includes business, banking, diplomacy and NGO work as well as business start-ups. Gina is past President of MENA-AIR, and past board member of AACSB's Executive MBA Council, USA and serves on the Board of the International Center for Academic Integrity.

Brent M. Drake is Vice Provost for Decision Support at The University of Nevada Las Vegas. Prior to August 2017, he was the Chief Data Officer at Purdue University overseeing the Office of Institutional Research, Assessment, and Effectiveness. Prior to this appointment he served as Assistant Vice Provost and Director of Enrollment Management Analysis and Reporting at Purdue. He began his employment at the University in 2001 as the assessment coordinator for the Lily Endowment Retention Initiatives. He presents and publishes on higher education topics including motivational models related to student success, retention enhancing programs, business intelligence and data analytics, enrollment modeling, recruitment, enrollment trends, and student success efforts.

Yuan-Chih Fu received his Ph.D. degree in Higher Education and graduate certificate in institutional research from the Pennsylvania State University (2017). He serves Taiwan's Ministry of Education as a policymaker in higher education, dedicating his professional work to the construction of national data infrastructure and its application in higher education governance. Collaborating mainly with Professors David P. Baker and Liang Zhang, his research focuses on the impact of higher education policy on scientific production and collaboration. Recent publications address the estimation of return to the college education by using the quasi-experiment design. With a dual identity of an empirical scholar and a policymaker, he translates knowledge into action, also as the founder of the Taiwan Association for Institutional Research (est. 2015).

Nicholas Hillman is Associate Professor of Educational Leadership and Policy Analysis at the University of Wisconsin-Madison. Dr. Hillman's research focuses on postsecondary finance and financial aid policy, primarily as they relate to college access and equity. This work includes research on student loan debt and default, performance-based funding, and college affordability. He teaches courses on higher education finance, politics of education, policy analysis, and introductory statistics. Nicholas is a faculty affiliate in the La Follette School of Public Affairs and Wisconsin Center for the Advancement of Postsecondary Education.

Gina Johnson is Strategy Director for IR Capacity Initiatives at the Association for Institutional Research. Prior to this position she served as the Executive Director of Institutional Research & Analysis at the University of Denver. She has more than twenty years of experience in the field of education, including teaching, policy analysis, and institutional research. At AIR, Gina's focus is on the needs of the association membership and expanding the capacity of IR functions in higher education through professional development of IR professionals and other institutional data users, and collaboration with higher education associations and organizations focused on improving the use of data and information to inform decision making.

David Kane is Senior Research Fellow at Birmingham City University, UK. David has written extensively on the use of student feedback and its role in informing institutional improvement processes. David is particularly interested in the development of student and staff feedback processes in higher education. David is a member of the Editorial Board of the international journal, *Quality in Higher Education* and regularly reviews for this journal. He is a long-standing member of the European Association of Institutional Research (EAIR).

Adam Kindschy is a doctoral student in Educational Leadership and Policy Analysis at UW-Madison. Adam began his professional higher education career as a postgraduate enforcement intern at the National Collegiate Athletic Association. He then worked in Academic Services at the University of Chicago Booth School of Business, before transitioning into higher education philanthropy at CU Boulder and UW-Madison. Adam's research interests are focused on higher education finance and public policy. Adam earned a master's degree in Higher Education Administration from Loyola University Chicago, and a bachelor's degree in Legal Studies and Sociology from UW-Madison.

William E. Knight is Assistant Provost for Institutional Effectiveness at Ball State University. His responsibilities include leading institutional research, providing leadership and support to for assessment of student learning, supporting the strategic planning process, facilitating institutional- and department-level accreditation, and coordinating the academic unit review process. He is a founding member and past president of the Association for Higher Education Effectiveness and past president, past forum chair and a past member of the Board of Directors of the Association for Institutional Research. He received the NASPA Region IV-E Outstanding Contribution to Higher Education Award in 2010 and the AIR Outstanding Service Award in 2013. He serves as an accreditation peer reviewer and team chair for the Higher Learning Commission and has consulted at several institutions.

Jang Wan Ko is a Professor and Chair of the Department of Education and a Director of the Center for Teaching and Learning at Sungkyunkwan University in Korea. He also serves as an Executive Director of the Korean Association for Higher Education, a member of the Advisory Committee for the Higher Education Division of the Ministry of Education, the President of the Korean Association for Adult and

Continuing Education. He holds a BA and an MA from Sungkyunkwan University, and a Ph.D. from University of Missouri-Columbia in the USA. He is a coauthor of many books including The Handbook of Institutional Research and his research papers appear in many recognized journals including *Educational Policy* and the *Journal of Korean Education*. His current research interests focus on higher education, education policy and finance, internationalization of higher education and Institutional Research.

Ching-Hui Lin is Assistant Research Fellow in the Office of Institutional Research at National Sun Yat-sen University. She served as the role of session chief for the center of institutional research and development and also a tenured faculty at Asia University for the first year moving back to Taiwan. Prior to her work in Taiwan, she worked in the Center for Evaluation & Education Policy at Indiana University and also served as data analyst in the Office of Institutional Research and Decision Support and Undergraduate Admissions Office at Indiana University Purdue University Indianapolis. She has published research on a number of issues about IR and institutional effectiveness, postsecondary equity and student learning outcomes, financial aid policy and student success.

Charles Mathies is an Academy of Finland Research Fellow based at the Finnish Institute for Educational Research in the University of Jyväskylä. Previously he has held multiple university management positions in Europe and the United States primarily focused on strategic planning and institutional research. Dr. Mathies has published, taught, and facilitated workshops globally on topics ranging from international student migration and mobility to strategic planning and institutional data management. In 2015 he was named a *Global Ambassador* for the Association for Institutional Research (AIR) Forum. He is also a co-founder and partner in an international higher education consulting firm specializing in data management and assisting universities in linking data to strategic decision making.

Nicole (Nicky) Muller is Director: Institutional Planning at Durban University of Technology. She has a long career in public and higher education librarianship, research management and administration, and institutional planning. She is currently undertaking her doctoral studies in Leadership and Complexity. She is the project driver at Durban University of Technology for the Kresge Foundation funded *Siyaphumelela* Project (We Succeed), which aims to improve student success through evidence-based interventions informed through the lens of data. Nicky currently serves as the Vice-President and Secretary of the Southern African Association for Institutional Research.She co-edited, together with Jan Botha, *Institutional research in South African higher education: intersecting contexts and practices* (SunMedia 2016).

Monal Patel is the Director of Institutional Research at Purdue University. She began her career at Purdue working with Space Management and Academic Scheduling office as a programmer/analyst. Her experience in the student scheduling systems led her to a position in the Office of the Registrar as an Assistant Registrar. Monal's vast knowledge of student systems and its connection to other Purdue data sources has pushed her efforts leading a team of Data Scientists in student success initiatives through predictive analytics.

Ian Pytlarz is a Senior Data Scientist in the Office of Institutional Research, Assessment, and Effectiveness at Purdue University. He received his Masters Degree in Computer Science and Statistics while working as an analyst before moving into his current position. Prior to joining Purdue, Ian worked as an analyst at ThinkVine, a market research firm in Cincinnati.

John Rome is the Deputy Chief Information Officer and a 20+ year employee of Arizona State University. His career started at ASU in the University Technology Office (UTO) and he has worked closely with a variety of departments including: Data Administration, Institutional Research, the President's Office, Budget Department, and the Provost Office. John has led ASU's Data Administration, UTO's Business Intelligence (BI), UTO's Application Development and ERP Systems (PeopleSoft), and UTO's Academic Technologies. John is a pioneer of data warehousing/BI in higher education, building ASU's first Data Warehouse around 1992. He also introduced dashboards to ASU in 2006. John has coached higher education institutions and industry on best practices, including the strategic importance of Bl. He is frequently asked to speak on the topic of analytics.

Karen L. Webber is Associate Professor of Higher Education in The Institute of Higher Education at The University of Georgia. Prior to her current role as a tenured faculty member, she served as interim Associate Provost for Institutional Effectiveness at UGA after working in Institutional Research at The University of Delaware and The University of Georgia. Karen teaches graduate-level courses related to IR and US national datasets, she has published research on a number of issues related to IR and institutional effectiveness in higher education. She collaborates with colleagues around the world on IR, decision support, and academic planning in higher education. She remains active in several professional organizations including AIR, regional AIR groups, and affiliated international organizations for IR.

James Williams is Senior Research Fellow at Birmingham City University, UK. He has written widely on student feedback as part of the quality improvement process in higher education and has published extensively in the area. James is Associate Editor of the international journal *Quality in Higher Education* and regularly contributes to various forums in this field. More generally, James is interested in the wider contribution of higher education to society and how institutions engage with their publics. In addition, James is a long-standing member of the European Association of Institutional Research (EAIR) and has been a member of its Executive Committee.

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K. L. Webber (ed.), *Building Capacity in Institutional Research and Decision Support in Higher Education*, Knowledge Studies in Higher Education 4,
https://doi.org/10.1007/978-3-319-71162-1