Digital Transformation of Academic Management: All the Tigers Come at Night

Marcel Simonette, Mario Magalhães, and Edison Spina

Abstract Latin America higher education institutions have been participating in several academic networks promoted by European Commission. There are cooperation, mobility, and research programs to help and support institutions development. However, the Fourth Industrial Revolution brings a disruptive scenario, challenging these institutions to go beyond academic cooperation and undergo a digital transformation, offering answers to this new revolution that is changing the world in never-before-seen form and speed. Tools and approaches originated in the business sector may help higher education institutions to promote their digital transformation. Nevertheless, these institutions have characteristics that differentiate them from the traditional managerial business. Moreover, these characteristics are a source of tensions, night tigers that are adversaries but invisible on a day-to-day transformation activity, impacting the digital transformation process. This chapter presents the double triad model: "rethink the business" and "rethink where is the business" to create an integrative framework, a strategic playing field to understand, manage, and overcome the challenge of dealing with adverse digital transformation scenarios.

Keywords Academic management · Strategic planning · Sociotechnical systems

1 Introduction

Since the First Industrial Revolution, technology has shaped our society, demanding new professionals and changing work nature. The current Fourth Industrial Revolution is not different. It gives rise to Industry 4.0, marked by intelligent environments

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in which humans and cyber-physical systems interact, exploring distributed resources such as cloud computing. It is a profound transformation in operation patterns, driven by a new human–machine interaction supported by artificial intelligence (AI).

The change promoted by AI in the way of work impacts the society and the academy. Frey et al. (2016) estimate that 47% of the US jobs—and a higher percentage in developing countries—will be at risk. Higher education institutions (HEIs) have been working in new courses, disciplines, and curriculum to prepare people for the unique demands of Industry 4.0. However, AI progress goes beyond the changes in the way of work; it impacts the economic mechanisms and business models directly (Loebbecke & Picot, 2015).

HEIs have a permanent relationship with society, impacting and being influenced by social and industrial environments. In the twenty-first century, they need to expand their focus, going beyond educating and tutoring students. HEIs need to generate strategies that match the institutions' skills and resources to the opportunities and associated risks in their environment. They must be attractive to the students, considering the market appeal without losing the rigour of the courses, programs, and academic autonomy. However, the challenges confronting academic management make it difficult for HEIs managers to allocate sufficient time and focus on substantive strategic thinking and planning without a radical solution.

Latin America higher education institutions have accumulated a significant potential, developed through an evolutionary path of several educational and cooperative networks promoted by the European Commission. The experience and knowledge resulting from this cooperation can be an essential management resource in Latin America higher education's strategic management system (eMundus Project, n.d.; Riccardi et al., 2012).

Through this path, it has been perceived that tools and approaches that originated in the business sector may help HEIs in the search for a solution. However, these approaches need to be adjusted to the higher education context and needs. The key relevant characteristic that differentiates HEIs from the traditional managerial business models is professional autonomy, a source of tension between top managers and academic professionals (Baldridge, 1971; Birnbaum, 2000; Meyer Junior et al., 2018).

HEIs face a disruptive scenario. It is necessary to transform their business to go beyond the integration into the local, regional, and global educational environments without losing individuality and autonomy. HEIs need to use technology and data to evolve, actively linking their stakeholders, increasing their commitment, and strengthening their experience to consider:

- the market attractiveness,
- the academic rigours of the courses and programs, and
- academic and research autonomy.

Several HEIs are adopting digital strategies in reaction to the scenarios imposed by Industry 4.0. However, although these strategies use new technology and data, there is a lack of vision, capability, or commitment to effectively implement them (Fleming, 2018; The 2018 Digital, 2018). In this sense, it is relevant to construct a

comprehensive vision of digital strategies to develop the digital transformation of HEIs (Benavides et al., 2020).

This chapter explores the elements that are essential to the planning and implementation of digital transformation on HEIs. This exploration deals with HEIs distinctive characteristics as internal and external dimensions, purpose, structure operations, business model, society, and stakeholders. It is a socio-technical construction of the planning of HEIs digital transformation with a social constructionism approach. It is organised as follows: In Sect. 2, we present the digital transformation concepts we adopted, especially its triads; Sect. 3 is about digital transformation in the HEI environment. In Sect. 4, we characterise the risks; the tigers present in the transformation process need to be considered and treated for the endeavour's success, which is discussed in Sect. 5. Section 6 brings the conclusion; the references follow it.

2 Digital Transformation

Digital transformation uses technological resources, mainly related to data digitalisation, storage, search, and communication, to rethink the business and where the business is positioned.

2.1 Triads

Although the research on triads originated in sociology (e.g., Caplow, 1956), management and business researchers developed several triads studies. Havila et al. (2004), Madhavan et al. (2004), Phillips et al. (1998), and Ritter (2000) are some examples. Smith and Laage-Hellman (1992) and Ritter (2000) argue that analysing triads in networks is sufficient to understand network elements' interrelations. Furthermore, triads allow the generalisation from the micro to a broader network level (Easton & Lundgren, 1992). Consequently, a triad is the tiniest unit that supports the simplification of inter-organisational network analysis.

A relevant characteristic of a triad is that it is never stable. There is no perfect balance between all the three dyads that compound the trio (Carson et al., 1997; Gutek et al., 2002).

2.2 Digital Transformation Triads

There are internal and external relations in all businesses. Power struggles and influences need to be analysed to explore the depth of the digital transformation impact.

2.2.1 Rethink the Business

Internally, the business digital transformation only occurs when the triad established by business purpose, structure, and operation (Fig. 1) is profoundly affected in the process. The transformation result is a new business that may or may not have technology as one of its essential parts.

Digital transformation affects and redefines business. Moreover, it affects both individuals and society, individuals, in their daily activities and how these activities are perceived, and society, in the understanding and valuing of the business and its regulation concerning how it is carried out traditionally.

An example of digital transformation—and its impact on individuals and society—is the personal transport business rethought in its purpose by Uber. The business purpose changes from private transportation to personal vehicle-sharing business, valuing a minimalistic operation and less concern with traditional structures of people, associations and government. An operation dependent on digital resources for easy access, communication, and information storage. In general, individuals perceived this transformation as positive, but it is not necessarily perceived as positive for society. The term "society" considers all forms of associations relevant to the business, for instance: tax structures, legal basis, government procedures, drivers' associations, taxi, and transport companies.

Changes are inherent to business, which contribute to business triad's instability (Holma, 2009). Changes in any of the three forces of the triad represented in Fig. 1 transform the business. More or less intensely, the results of the changes will hang towards two of the three vertices of the triangle that represents it (Fig. 2):

- The prevalence of purpose and structure drives an operation that can be cumbersome, affecting operational profitability (**bureaucrat vision of the business**).
- The prevalence of structure and operation jeopardises the understanding and realisation of the business purpose (**pragmatic vision of the business**).
- The prevalence of operation and purpose can lead to disconnected or inefficient structures that can hinder business growth (**liberal vision of the business**).

Any business visions (bureaucrat, pragmatic, or liberal) result from the business triad's instability. The digital transformation in organisations does not improve at the

Fig. 1 Business internal relations. The internal business triad forces: purpose, structure, and operation
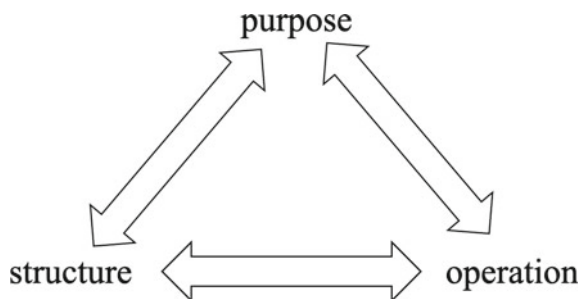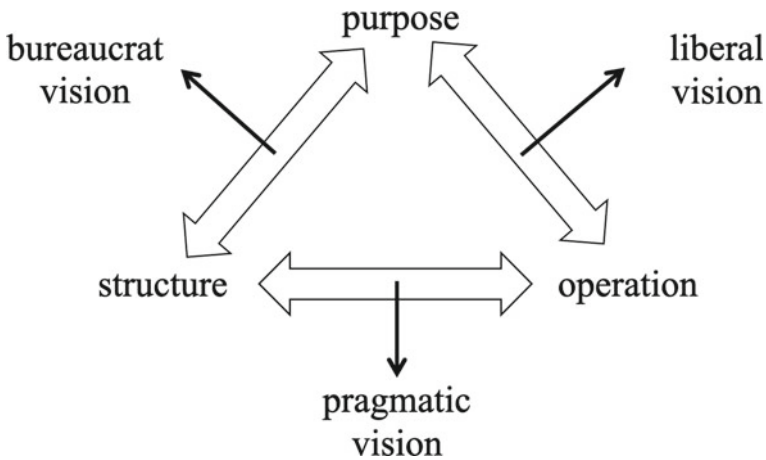
Fig. 2 Business internal relations. The business triad forces purpose, structure, and operation with the resultants stabilising business visions ("rethink the business")

same time the business and equally their purpose, structure, and operation. However, the prevalence of dyads is not a problem for business success and acceptance. It is necessary to align the business vision with the rethinking of where the business is, or where the institutions or organisations want to reposition or focus the business and resulting potential conflicts.

2.2.2   Rethinking Where is the Business

In a vision external to the business, the triad determined by the business, individual, and society (Fig. 3) determines the business transactions' success and acceptance. As usual for triads, there is no stable solution that meets the three forces:

- The prevalence of the business and the individual is a situation in which there is a lesser interference of the organised society or government on individual rights and business regulation. There is the possibility of abuse of the business's power over the individual (**unbalanced transactions view**).
- The prevalence of the business and organised society results in restrictions and limitations of individual options or collusion cases (**unfree transactions view**).
- The prevalence of organised society and the individual over the business can create situations that make the new and innovation unfeasible, reinforcing the maintenance of comfortable but inefficient and static solutions (**non-innovative transactions view**).

The business internal relations triad (Fig. 2) and the external business visions triads (Fig. 3) are powers and influences that need to be analysed to explore the depth of the impact of digital transformation. These two triads are as Yin and Yang; a
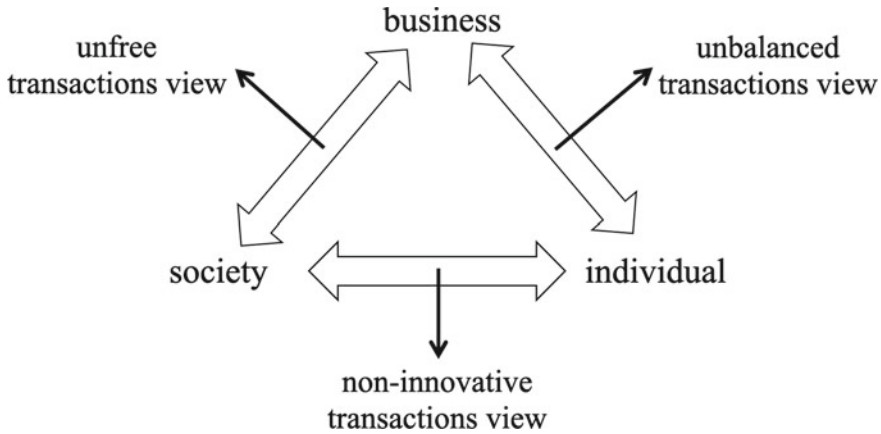
Fig. 3 External business visions triad: business, individual, and society. The resultants of triad instability establish how the business and its transactions are perceived by individual and society, which may determine the business's success and acceptance ("rethink where is the business")

kind of dualism, powers and influence that are complementary, interconnected, and interdependent (Yin and Yang, n.d.).

3 Digital Transformation in the HEI

What can or should be done to explore the depth of the impact of digital transformation in HEIs? The success and acceptance of the HEIs in the Fourth Industrial Revolution as a social-technical problem go beyond traditional project scope and relations.

3.1 Beyond Students—Teachers Relations

Digital transformation in the HEIs is holistic. It is a transformation that changes higher education and changes academic culture, impacting individuals and society. Benavides et al. (2020) conducted systematic literary research about digital transformation in HEIs, identifying that digital transformation changes HEIs formative activities and evaluations, the institutions' administration, research, extension processes, and individuals and society.

The mere adoption of technology to support educational processes, and to formulate simple administrative processes to meet the market demands or buzzwords, does not promote the necessary transformation of HEIs business model to deal with the Fourth Industrial Revolution's challenges.

Considering the HEI business internal triad, operation and structure are deeply changed by technological resources—mainly related to data digitalisation, storage, search, and communication—and are the basis for rethinking business. These resources allow the improvement, enhancement, or replacement of the HEIs business processes to promote the institution's transition to a new way of thinking their business, simplifying the processes of education and research services (Gafurov et al., 2020; Tay & Low, 2017; Thoring et al., 2018). Moreover, these resources allow a new kind of academic–society–industry relationship, although HEIs main purpose should be preserved.

Digital transformation in HEIs goes beyond new technologies in learning and teaching. It is an academic, curricular, organisational, and structural innovation, as these technologies enable new roles for teachers and learners, the last searching and achieving more autonomous and collaborative roles (Bond et al., 2018; Fleaca, 2011).

3.2 Beyond Research

Digital transformation is aware of learners, teachers, researchers, and people who work in or with HEIs. These individuals have to reposition themselves facing the new way of working for the digital transformed HEIs business and society, with new behaviours facing education and research. New digital technologies contribute to the academic perspective concerning the promotion of research collaboration. This perspective is differential among HEIs with a competitive positioning in the academic market, searching for the best researchers (Faria & Nóvoa, 2015). HEI's digital transformation may offer researchers disruptive tools and approaches without time and space barriers, promoting agility in research and interactions with internal and external organisations (Bresinsky & von Reusner, 2018).

However, as a kind of paradox, the innovation in research brought by digital transformation processes also changes individuals, groups, behaviours, and processes. These changes may affect the power relationships among departments, institutions, or both. Innovation and research require attention, sensibility, and care, as people that are researchers, sources of innovative behaviours, and creators are paradoxically resistive to change.

Digital transformation may become an active support component of research and innovation in HEIs; therefore, two simultaneous issues need to be considered:

- One internal to the HEI, which is the innovation of HEIs operations and structures as a meta-transformation. A perspective that considers the HEIs processes to deal with the challenges and opportunities to support learners, teachers, researchers, and staff, facilitating their relationship.
- One external to the HEI, which enable and reinforce the HEIs role as enabler and motivator of research and innovation. It is a perspective that considers the HEI's process to bear the business as a whole. The institution takes part, as the society in its many forms: industry, companies, institutions, and public image.

The internal issue is related to how digital transformation in HEIs can maintain the autonomy to perform research, innovation, and entrepreneurship. The external issue is related to research opportunities and engagement of HEIs with the market. The last has some reservations from the academics, as the private sector may focus innovation to specific economics sectors or private demands, strengthen the research opportunities, or deal with society's misunderstanding or misleading behaviours limiting the autonomy of research actions and results.

3.3 Beyond HEIs—Business Entities Relations

HEIs face a disruptive scenario established by digital transformation in businesses, which changes the traditional industries and, with the same principles, rethinks the business and   rethinks where is the business. A scenario in which there is a dynamic relationship among all the players, internal and external to organisations, increasing commitments and potential conflicts strengthening individual autonomy and potential social influence.

Digital transformation in the business entities demands new professionals and recycle and extension programs for old ones. The role of HEIs in society demands that these institutions provide professionals to the productive sector. However, it is not an easy task. The Fourth Industrial Revolution imposes new paradigms, demanding HEIs to develop curriculum modernisations, satisfying new pedagogical methods and technological possibilities, personalising courses and experiences according to the restructure of the working process (Bresinsky & von Reusner, 2017; Fleaca, 2011; Panichkina et al., 2018; Rodrigues, 2017; Stolze et al., 2018).

Curriculum modernisations, flexible curriculum, or even minor changes in HEIs curriculum are not only a technical issue; it is also under the current structure as described when rethinking the business (Sect. 2.2.1, above). Moreover, legal issues bring implications and consequences in HEIs management, practices, and processes (Petersen, 2009). Diaz-Barriga and Barrón (2014) state that curriculum changing constitutes an intervention action, as it mobilises imaginations, power relations, different ways of participating, and positions within the institution.

University business entities integration enables a useful new world that allows numerous advances in various fields of humanity. The digital revolution experienced is intense and causes extreme changes in individuals' lifestyle, culture, and society in general. On the other hand, this integration allows HEIs partners to access a massive amount of data and information that can bring consequences to HEIs professionals. Rodrigues (2017) states that digital transformation challenges HEIs to implement the necessary level of security data, compliance, and regulations.

4 Night Tigers

Digital transformation impacts the HEIs as a whole. It challenges stakeholders, from learners to society (Benavides et al., 2020). The education sector, in which HEIs are a relevant player, is characterised by intense competition, a continuous search for market niches, and quality in learning, teaching, research, and integration with productive sector and society. The same technologies that support the digital transformation of current HEIs players are the key factors of new educational organisations in the competition to attract students and market opportunities (Navitas Ventures, 2017).

There are different ways to implement digital transformation. Benavides et al. (2020) present a systematic literature review that brings several examples. Rof et al. (2020) bring several references arguing that HEIs face challenges similar to those encountered in other business sectors, and it is possible to overcome tensions in HEIs. However, HEI's context has specific characteristics that are often not considered. They are night tigers: strong adversaries but invisible on a day-to-day basis, or, paraphrasing Rost and Glass (2011), they are the dark side of HEIs transformation. They challenge the digital transformation process:

- **Disruptive rivalry**—Digital transformation is how HEIs reorganise their structures and processes to better fit their learners, teachers, researchers, and staff in the Fourth Industrial Revolution context. However, in the HEI's environments, the strategies to implement digital transformation suffer from the continued competition between the institution's top administration and the academic staff (Meyer Junior et al., 2018).
- **Reality distortion**—Digital transformation aims to transform HEIs to reach the actual demands of the society. However, HEIs need to take care of the rupture between the transformation strategy and academic autonomy. It is the academic staff who must transform their classrooms, the way that learners learn, and transform how they interact with society. There are tensions between HEI's top managers and academic staff related to intentions, organisational complexity, political contexts, and the loose interrelationship among departments and laboratories. Léon (2018) argues that these tensions are relevant in Latin America, resulting from low coverage and quality due to inequities and socioeconomic gaps.
- **Gap hinder**—Digital literacy of HEI's stakeholders is another challenge. HEI's learners are young people—future professionals—and old professionals who need to recycle or extend their knowledge. It is a diversity of digital skills and behaviours that demands different approaches (Rodrigues, 2017).
- **Status-quo lingerer**—Another challenge present to traditional HEIs is to change the existing business (branding, rankings, specialisation). Traditional HEIs need to deal with digital transformation changes to avoid becoming "the dinosaurs of education"; the building processes are a continuum construction for the future (Kaplan & Haenlein, 2016).
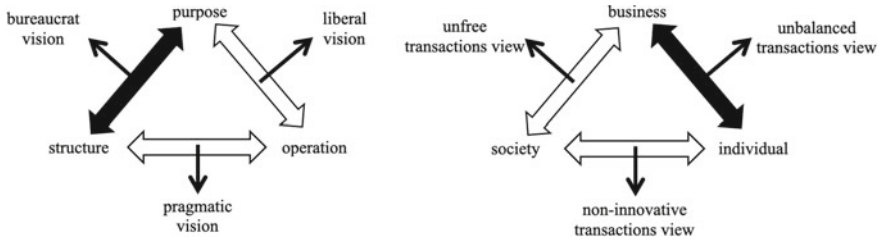
Fig. 4 Highlighted edges identify the situation favourable to the appearance of the disruptive rivalry. To deal with this situation, HEIs must privilege the purpose and operation, seeking a more collaborative, liberal approach

These are common challenges to all institutions facing digital transformation. It is necessary to deal with these night tigers rethinking the business and rethinking where is the business, which allows building a balanced position fostering an effective strategic vision to a digital transformation.

5 Discussion

Any solution addressing the night tigers is a complex and challenging effort to reinforce both triads (Figs. 2 and 3) in complementary directions. Moreover, any effort faces hidden resistance, much more than expressed and clear positioning.

5.1 *Disruptive Rivalry*

The disruptive rivalry is at the same time a change confronting the institution bureaucratic vision and unbalanced transition view perceived by the individual. Consequently, any opportunity that appears to foster a more liberal vision attracts the individual, whether a researcher, teacher, or student, independently of HEI purpose (Fig. 4).

To react against this perception, HIEs need to empower and gain commitment to their purpose and operation, which is a driver that can attract professionals with similar values.

5.2 *Reality Distortion*

HEIs do not receive immediate and robust feedback from the market. HIEs have a bias to perceive the world according to the individuals' position and opinions that they
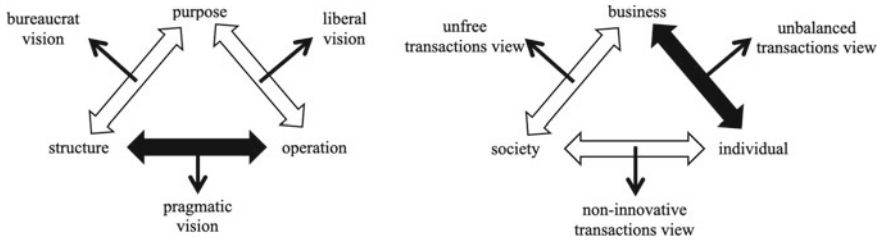
Fig. 5 Highlighted edges identify the situation favourable to the appearance of the reality distortion. To deal with this situation, HEIs must privilege business and society, seeking a less open view—reflecting society's demand

encompass (Fig. 5). This bias of reality varies according to HIE's interpretation and influences that can be originated internally (such as ideology or political positions) or externally (such as funding and patronage).

Implementation of digital transformations processes needs to face this bias. Therefore, HEIs need to develop efforts to compensate and realign their operation with what is perceived as an unfree transaction view that reflects the society and the business. A challenge is that the HEI's people with a biased view of reality are usually the same group with the power to foster digital transformation.

5.3 Gap Hinder

The generation gap brings conflicts related to knowledge and experience, and time to act, which opens up a pitfall among professionals in all organisations. HIEs, by nature, are the typical environment in which these gaps are presented; traditional researchers and young new professionals are the archetypes of this conflict. The generation gap impairs the transmission of knowledge and experience and stimulates early drop-off of young professionals (Fig. 6).
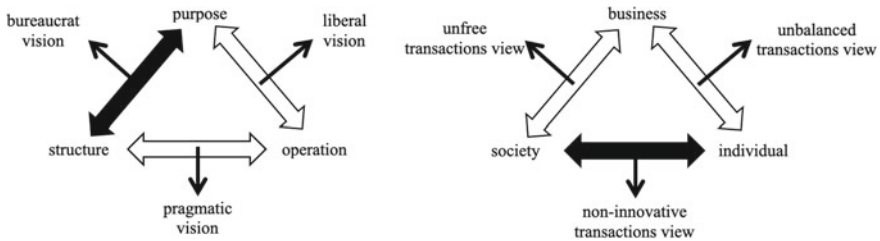

Fig. 6 Highlighted edges identify the situation favourable to the appearance of the gap hinder. To deal with this situation, HEIs must privilege purpose and business, fostering a more liberal or bureaucratic view and a more unfree or unbalanced external view
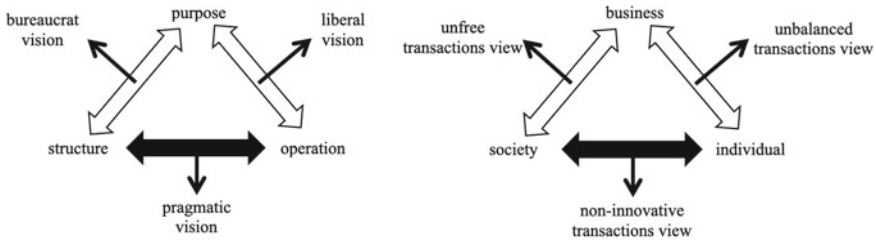
Fig. 7 Highlighted edges identify the situation favourable to the appearance of the status-quo lingerer. To deal with this situation, HEIs need to privilege an external vision: business and society (unfree vision)—focusing on the purpose and operation for a more liberal vision

The middle point to revert the generation gap is to rely on the purpose and business vertices of the two triads; only sharing the purpose and the business will be possible to attract both sides of the gap. Transactions will always be perceived as unfree or unbalanced by both sides of the gap regardless of a more liberal or more bureaucratic vision.

5.4 Status-Quo Lingerer

Status-quo Lingerer is probably the more common and one of the hardest to supplant. It is a natural behaviour that is hard to differentiate between a natural and reasonable reaction to change and a stubborn passive–aggressive reaction to change. Inaction is a typical behaviour. It reinforces a particular pragmatic vision that maintains the current status quo with non-innovative efforts (Fig. 7). An individual can always fall back to a position where he or she considers himself or herself in a weak position vis-a-vis a strong business, or as a professional limited in action due to defined processes.

In such stalemates, a possible approach is to encourage the need to foster a liberal vision, valuation of the business purpose with an efficient operation, and maintaining control through a set of new defined transactions.

6 Conclusion

The Fourth Industrial Revolution brings significant opportunities, challenges, and complexities to HEIs, which need to prepare individuals to work in this new context and harvest the benefits of technology. It is a socio-technical context in which the technological determinism imposed by the traditional rational and linear thinking does not allow complete success. This approach considers that people and society are only components of a system without values and desires.

There is no silver bullet or complete analyses that assure a successful digital transformation, even more on Latin American HEIs dealing with the more than necessary researchers' autonomy. The double triad models "rethink the business" and "rethink where is the business" create an integrative framework, a strategic playing field to understand, manage, and overcome the challenge of dealing with adverse digital transformation scenarios. Our open analysis proposal in a strategic playing field allows a constructionist approach to dealing with perceived and covered forces and agents. Digital transformation is business decisions following business strategies, a heterogeneous set of processes and practices to improve business efficiency as a whole.

It is necessary to not fall into the temptation of implementing digital transformation only in some departments or HEI's administrative areas. It is needed to address those professionals whose autonomy and independence are the keystone of the quality and innovation of HEI's research and, at the same time, prepare the needed new professionals and researchers to support the Fourth Industrial Revolution.

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