Chapter 1
Bridging the Gap Between Industry and Academia: The Case of Indonesia

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Abstract As a country, Indonesia is becoming increasingly urbanized and has a large proportion of its population under the age of 25 years, at slightly over 100 million. Developing this fairly large proportion of its population from a human capital perspective is essential for the future of the country. Currently there is a 40% gap between supply and demand; and is expected to grow to 70% by 2025. Building an educational platform for effective learning and skills formation is urgently needed. This entry presents the outcomes of a case study aimed at understanding the disconnects between academia, industry and government in the context of Indonesia's built environment programs. In particular, the architecture profession and architectural education have been considered as one of several built environment programs under pressure to change. Built environment suite of programs have various disciplinary underpinnings: architecture, building, engineering, planning, quantity surveying, project management and others such as interior design and transportation engineering. The case study focuses on the results of a workshop in Indonesia, where various stakeholders responsible for city planning and building came together to determine the current challenges and seek solutions. The entry delves into the education of the architecture profession in Indonesia and presents the results of the workshop with some recommendations for the future. The results show that the various sectors and stakeholders are prepared to work collaboratively and support joint ownership of meeting curricular outcomes.

Keywords Education · Built environment · Climate change · Sustainability · Indonesia

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U. Iyer-Raniga (ed.), *Sustainability in the Built Environment in the 21st Century: Lessons Learned from India and the Region*, Environmental Science and Engineering,
https://doi.org/10.1007/978-3-030-61891-9_1

1.1 Background

The research presented in this paper is part of a broader research project examining how environmental, economic and social perspectives for sustainable development may be more systematically integrated into higher education institution built environment professional education in the Asia Pacific region. The project, Built Environment Curricula in the Asia–Pacific region: responding to climate change, aims to present a framework and an argument for a systemic greening of the built environment curriculum in higher education institutions in the Asia–Pacific. The project was funded by ProSPER.Net (https://prospernet.ias.unu.edu/) under the umbrella of the United Nations University, an alliance of leading universities in the Asia–Pacific region committed to integrating sustainable development into postgraduate courses and curricula. The network alliance was founded in June 2008 with 46 members (as of late-2018) mostly in the Asia–Pacific, committed to education and research focusing on sustainable futures (ProSPER.Net 2018).

The principal goal of Built Environment Curricula in the Asia–Pacific region: responding to climate change is to propose ways for increasing the capacity of future built environment professionals to design and build low carbon cities in the Asia–Pacific. Some work has already been undertaken in some higher educational institutions, but a lot of this work is very fragmented. The project does not distinguish between the various disciplines comprising the built environment as the related disciplines need to work together to ensure quality outcomes for the built environment. The countries and professions chosen for Built Environment Curricula in the Asia–Pacific region: responding to climate change, are Indonesia (Architects), China (Architects), Thailand (Architects and Engineers), Sri Lanka (Engineers) and Philippines (Planners).

While the goals of the overarching project are many, the ones specifically related to this paper are to develop a method for analyzing the institutional development of built environment professions and their relationship to higher education in the context of new expectations that these professions contribute more to climate change, mitigation and adaptation. Supporting this aim also requires improved capacity building of the academic staff that are involved in teaching in these universities and exploring pedagogies that support learning outcomes for students.

As part of this project, institutional analysis of built environment professions in five countries, including Indonesia was undertaken. The case study method was used to understand institutional disconnects between industry and academia; using this method enables better in-context and cultural understanding to be gained in the research. The findings arising from the Indonesia case study were then tested through a workshop. Hence, this paper focuses only on testing the findings of the research for Indonesia, undertaken through a workshop comprising industry, government and academic participants; limiting the scope to the final step of the Indonesian case study. Other papers have reported on the research outcomes leading to this point: architectural educational program in Indonesia (Iyer-Raniga and Dalton

2017a) and interviews with selected academics and industry professionals to understand the architectural programs and their structure (Iyer-Raniga and Dalton 2017b) and the gaps in the architecture educational program. A report for Built Environment Curricula in the Asia–Pacific region: responding to climate change has also been prepared (Dalton and Iyer-Raniga 2018).

The workshop in Indonesia brought together forty built environment and higher education professionals from universities, industry associations, professional associations and government agencies with responsibility for city planning, building and economic development that were committed to the development of low carbon cities.

This chapter commences with an overview of the education system in Indonesia, followed by how architecture programs are currently situated, particularly, for dealing with real-world associated built environment problems. This is followed by a description and outcomes of the workshop in Jakarta. These sections are followed by the discussions and conclusions.

1.2 Education in Indonesia

Before delving into the education system in Indonesia, it is important to first consider the context of the country. As a country, Indonesia is rich in natural resources, minerals, oils and has fertile agricultural lands; yet also plagued by natural disasters. The country is an archipelago stretching between the Indian and Pacific oceans consisting of about 17,500 islands, of which around 6000 are inhabited. It is the third largest country in Asia and has a population of nearly 264 million (2017 figures) (World Bank Group 2018) spread over 34 provinces comprising of 502 regencies, 6543 districts and over 75,000 villages. In terms of economy, it is the 16th largest in the world and the largest economy in ASEAN (Association of Southeast Asian Nations) (World Bank Group 2018). It is the world's most populous Islamic nation (worldatlas 2018).

The country is becoming increasingly urbanized and has a large proportion of its population under the age of 25 years, at slightly over 100 million (OECD/Asian Development Bank 2015). Developing this fairly large proportion of its population from a human capital perspective is essential for the future of the country. Currently there is a 40% gap between supply and demand; and is expected to grow to 70% by 2025 (Thomases 2016). Building an educational platform for effective learning and skills formation is urgently needed.

The rapidly urbanizing context of Indonesia creates tensions with traditional educational programs and pathways responding to the current and future demands of a built environment that needs to incorporate new knowledge and professional practices mindful of environmental, social and economic impacts of the built environment. Built environment professionals need skills in appropriate design and planning responses for mitigation of greenhouse gas emissions and ensuring low energy and water use during construction and operation. In addition, materials, products and services need to systemically ensure low overall carbon inputs and outputs; and

consider the tensions between mitigation and adaptation responses as a result of a changing climate. To make matters more complicated, the country has been threatened by a series of natural disasters drawing urgent attention to the quality of current and future built environment.

The educational system in Indonesia is the third largest in Asia, after China and India. It is the fourth largest in the world, if the US is included to the list (OECD and ADB 2015, p. 69). The technical and vocational education and training centers across Indonesia are fragmented. They need to improve coordination and employer involvement, and they need to be more industry driven. In terms of higher education, about a third of the relevant aged Indonesian youth are enrolled (OECD and Asian Development Bank 2015). While the public universities fare okay, many of the private universities do not fare well. The facilities are poor, academic staff are not qualified and their remuneration rates are not on par with market expectations either. The country has 92 public and 3078 private institutions, and 52 Islamic institutions (OECD and Asian Development Bank 2015, p. 185). The large number of unaccredited higher education institutions of over 2500 in number have no clear outcomes for student learning and graduate attributes, quality of educational qualifications; all impacting on job prospects (OECD and Asian Development Bank 2015).

The main issue identified in the report by OECD and Asian Development Bank (2015) was that the graduate supply is not in sync with the emerging labor market requirements. Particularly with the built environment sector only 16% of graduates studied engineering, manufacturing and construction while growth in construction in the period from 2001–13 increased by 52% (OCED and Asian Development Bank 2015, p. 64). Employers complained that graduates lacked relevant language and skills and this siloed approach is largely due to a disconnect between institutional governance and industry. A key finding of the report was that outside the main island, Java, there is very little development in the educational institutions particularly in the far-flung regions of the country. Research budget for the country is one of the lowest amongst ASEAN countries, at less than 1% of the GDP in 2012 (OECD and Asian Development Bank 2015, p. 198). That said, the budget has increased by more than 3 times from the period 2006–12. The aim of the government is to reach 1% of GDP by 2025. As a result of expenditure on research and development in Indonesia being confined to the public sector, domestic Indonesian companies have not attracted research and development due to its low skills base.

Indonesian universities do not do well in international rankings (OECD and Asian Development Bank 2015; Thomases 2016). Traditional didactic teaching is the main form of educational delivery and underpins the teaching and learning model of education in the country. To support critical thinking and higher cognitive skills, the current approaches to teaching and learning need to change. The current capacities of higher education teachers need to be harnessed and nurtured to support such change. The government needs to support this by undertaking a major programme of diversifying tertiary education and improving the quality and selectivity of research aligned with the country's national priorities. The government also needs to expand the accreditation capacity of the BAN-PT (*Badan Akreditasi Nasional Perguruan Tinggi,* National

Board for Accreditation of Higher Education) set up in 2008, and to ensure that independent professional accreditation boards (LAM-PT) are also included as part of this process (OECD and Asian Development Bank 2015). LAMs have been planned for health, engineering and agriculture.

Accreditations of various programs usually last for 5 years. Among other recommendations by the report are building capacities through higher degrees such as doctorates catering to both industrial and professional doctorates, development of institutional capacity building and increase in the proportion of external experts and professionals in university board appointments. Particularly for polytechnics, practical industry experience needs to become a pre-requisite criterion for appointment in polytechnic institutions.

Setting up the National Qualifications Frameworks in Indonesia by the government is a fairly new undertaking but one that the country urgently needs. Under the Higher Education Law in Indonesia, there are flexible pathways to achieve various qualifications. For degrees, the current system provides bachelors (S1), masters (S2) and doctoral (S3: PhDs) degrees (academic or applied) and professional degrees (e.g. architecture). The length of study for a bachelor's degree is four years, with a further two years for a master's degree. PhD degree is three years on top of a Masters' degree. For vocational qualifications, programs provide diplomas after one to four years of study (D1–D4).

The next section examines how built environment programs, in particular architecture programs have responded to current challenges and how these are situated in the educational context of Indonesia.

1.3 Architecture Programs and Indonesia

As already noted, environmental disasters have plagued Indonesia since the last millennium. Indonesia has had its fair share of natural disasters such as earthquakes, tsunamis, volcanic eruptions, typhoons and other human related environmental challenges such as floods and landslides as a result of environmental degradation. These are expected to continue to affect lives currently and in the future.

At the time of writing this paper a recent natural disaster hit the country on Oct. 1 2018. Palu and Donggala in Indonesia was hit by a powerful earthquake and tsunami with deaths (as of Oct. 3) at over 800 and over 50,000 people displaced by the disaster (Associated Press 2018). Just a few months earlier, multiple earthquakes also hit Indonesia, the most recent one hit Lombok on July 29, 2018. Over 10,000 homes were destroyed in this earthquake. The Indonesian government announced assistance for supporting houses damaged by the earthquake to rebuild their own homes without the support of a builder or a building contractor. The ministry of Public Works and Housing were training residents to build their own homes (Nugroho 2018). The government has agreed to provide funding to procure building materials such as cement, wood, etc. The training for building houses takes 1–2 days and male and female residents are expected to contribute to house building. Thus, a

strong educational platform is required to ensure appropriate skills for building and rebuilding in the country.

UNESCO, being the specialized agency for education is leading and coordinating the Education 2030 agenda. Sustainable Development Goal 4 aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" by 2030 (UNESCO 2018). The International Union of Architects (UIA) is the only global organization representing the world's architects. It was founded in Lausanne, Switzerland in 1948. UIA is representing approximately 3.2 million architects globally. The aim of the UIA is to advance policies and programs that improve communities through design (UIA 2018).

With the UN SDGs coming into effect in 2016, the role of architects has become more important than ever. With impacts of climate change and population shifts becoming more and more urban, the challenges to the architecture professionals and other professions related to the built environment are enormous. Planning, construction, development, management and improvement of cities weave a complex web of linking the physical built environment with socio economic opportunities and supporting better quality of life. The UIA aims to support architects through a responsive and responsible roadmap supporting prescriptive implementation of the UN SDGs (UIA 2018).

Broadly, within the literature, there is not much by way of knowledge exchanges between academia and industry. This is not restricted to the construction industry alone and can be seen in other professions, for instance, health (Lomas 2007). However, it is possible to bring academia, industry and government together. In the industry research schools set up in Sweden, it has been shown that industrial doctoral students can act as innovator and bridge connectors (Dahlgren and Owe 2007). However, the process has not been particularly smooth for all the students. A similar study over a decade ago in the UK also showed a similar degree of success (Williams 2004, 2005; Broadfoot and Philippa 2003), as has been the case with the Cooperative Research Centres (CRCs) in Australia.

With reference to construction in particular, Moncaster et al. (2010) indicate there is very little empirical evidence to show the impact of research on construction practitioners and their practices and vice versa. But, they say that industry and academia need to work together and ensure efficient and effective knowledge production. They also show that there is a strong traditional approach of knowledge access through academic journals and attendance at academic conferences, and given our current challenges are not effective for innovation, change and co-production of knowledge. They suggest that industry and academia should work together, particularly in the context of developing research knowledge. They also suggest that programs should be developed, that directly benefit growth and integration of not just knowledge networks but also communities of practice.

Using the case of Malaysia, Tan and Sarimin (2011) discuss the significance of universities in contributing to a knowledge-based economy in a developing country context. To develop and support a fully functioning knowledge city, a coordinated effort from public and private sectors, and academia is needed not just for the physical planning but also for development of a functioning city from social, economic,

environment and institutional perspectives into the future. Another example in Thailand (Chookittikul et al. 2011) discusses the impact of gaps between education and industry in the context of IT education. They suggest the interests of both education and industry may be possible if agile technologies are used. In a study of India, it was found that industry-academia collaboration was particularly weak, considering the growth of the building and construction sector and the rising interest and pressures on green building (Arif et al. 2010). There is a lack of industry-academic collaboration in India and young graduates are not 'armed' with knowledge to deal with green building challenges. Curricula has not changed to meet with the changing industry expectations and research agenda does not really work towards bridging the existing gaps.

Franz's (2008) paper considers practice, pedagogy and partnership central to the issue of employability and continuing relevance of professional education. Teaching, learning, research and application are integrally interconnected at both undergraduate and postgraduate levels. Work integrated learning models for built environment students represent an untapped opportunity that needs to be fully explored for the benefit of students and the profession.

Chau et al.'s (2017) paper discuss the misalignment between university-industry in the UK. They say that the strategic visions of the university and industry are not aligned, and coordination within universities is essential. Universities need to rethink their role in knowledge transfer and think clearly about the role of universities in the twenty-first century. Another study states that for university-industry collaboration to be successful, individual rather than institutional levels of motivation are required (Rajalo and Vadi 2017).

An example of academic-industry collaboration can be seen by interior design students where recycled materials were used to design and build light fixtures for a company's product line using social media. While the experience was beneficial for the students across several pedagogic, teaching and learning fronts; the primary limitation of the industry-academic collaboration was the duration of the timelines for the course (Asojo 2013).

Historically, the link between environmental or sustainable design and architectural education in Indonesia is quite weak. As indicated by Tanuwidjaja and Leonardo (2016), Indonesia has a long way to go in terms of integrating environmental challenges in the architectural education system. The socio-economic context underpinning sustainability solutions also needs to be included in this understanding.

Iyer-Raniga and Dalton (2017a) discussed and mapped the importance of aligning educational curricula with other institutional agencies to drive, complement and support changes for low carbon futures in Indonesia, particularly driven by the peak architecture professional body, the Indonesian Architects Association (*Ikatan Arsitek Indonesia*, IAI). This research focused on understanding how the architecture education in Indonesia evolved. Following this was an exploration, through semi-structured interviews of the educational concerns with the current approaches as to how architecture programs are taught, the quality of graduates, engagement with other built environment disciplines, the structure of the building code, lack of self-regulation of

the profession and quality of the professionals themselves, reported in Iyer-Raniga and Dalton (2017b).

Thus, the two phases of the research provide the background to the next part of the research continuum, the workshop. The next section focuses on the workshop as the final step in the case study research on the architecture profession in Indonesia. The workshop was designed to seek ideas from participants on how to systematically integrate environmentally sustainable development thinking into a university's built environment professional education in the rapidly urbanizing context of Indonesia.

1.4 The Workshop

The workshop was designed to seek ideas from participants on how to systematically integrate environmentally sustainable development thinking into a university's built environment professional education in the rapidly urbanizing Asia–Pacific region, with a focus on Indonesia. The authors engaged an Indonesian project manager on the ground to support the organization of the workshop, identify the right participants and organize formal invitations in Bahasa and follow up with various government and industry participants.

Participants in the workshop were drawn from:

- Indonesian government agencies with built environment, environment and education responsibilities.
- Professional and industry associations including the Indonesian Institute of Architects, Indonesian Association of Schools of Architecture and the Indonesian Green Building Council.
- Academics from architecture and engineering departments in Indonesian universities.
- ProSPER.Net member universities undertaking case studies on built environment professions. These universities were from China, Sri Lanka, Philippines, Thailand and Indonesia.
- International agencies including the International Finance Corporation.

The work undertaken during the earlier phases of the project examining the nature of built environment professional education stakeholders, attendant opportunities and constraints assisted with a really good understanding of the background of the project with respect to the role of built environment professionals and identification of possible gaps with industry. This led to an understanding of what possible actions need to be taken to ensure currency of built environment professional education. It was also possible to establish a set of priorities for possible actions that could maintain support for developing a collaborative change program.

While the workshop was held in Indonesia and most of its participants were from Indonesia, the workshop also had a regional orientation informed by the participation of representatives of the ProSPER.Net universities from some of the countries involved in the project.

1.4.1 Workshop Design

Arising from the background work undertaken, three main observations guided the current context for built environment professions in the Asia–Pacific region and provided a starting point for the workshop.

- A priority policy objective for all governments in the rapidly urbanizing Asia–Pacific region is to meet global commitments to mitigate and adapt to climate change by decarbonizing the built environment, making it more energy and water efficient, and more resilient for changes due to the climate.
- Professionals who design, procure, finance, renew and maintain the built environment are being challenged to incorporate new knowledge and practices into the way they produce less carbon and water sensitive built environments.
- Universities that educate professionals, such as architects, engineers, project managers, and planners, are being challenged to renew their curriculum so that graduates can produce less carbon and water intensive built environments.

The workshop was facilitated by the project leader and the lead author of this paper. Four short presentations were used to set the context for the workshop and support the workshop outcomes. These presentations focused on four main areas to set the scene for the workshop. These were, reshaping higher education in the region, the work undertaken by the authors in understanding the academic-industry context explored through the background to the current project, setting the context, the assumptions and primary arguments underpinning the research, and knowledge sharing from other ProSPER.Net case study countries on the built environment. With respect to the knowledge sharing, architects and architecture education in China, and engineers and engineering education in Sri Lanka were considered.

Reshaping higher education: Responses to twenty-first century challenges and demands, was presented by a peer undertaking research on quality assurance in universities for the ASEAN region. SHARE is the European Union Support to Higher Education in the ASEAN Region, and is a four-year EU and ASEAN initiative. SHARE is supported by a consortium of the British Council (leader), Campus France, DAAD, EP-Nuffic, ENQA, and EUA. SHARE aims to support ASEAN in harmonizing regional higher education by sharing European expertise (Neidermeyer and Pohlenz 2016). It does this through strengthening regional cooperation, enhancing the quality, competitiveness, and internationalization of ASEAN higher education for institutions and students, and thereby contributing to a closer ASEAN Community in 2015 and beyond.

The workshop began with the higher education context and the fluid nature of quality assurance in the Asia–Pacific region. The ASEAN region in particular is characterized by a rising number of programs and universities to respond to the education needs of large numbers of young population. The first presentation explored the possibilities for integrating the science of climate change and sustainability knowledge into teaching and learning in the educational institutions. The key question underpinning the presentation was the future of higher education in the region in relation

to competencies, balanced with technical knowledge, co-production in teaching and learning, study programs, thinking and learning, and development of curricula in a way that is qualifying students to understand and practice in a sustainable paradigm.

Broader issues and challenges of the built environment professions and professional education in the Asia-Pacific Region was then presented with a specific focus on Indonesia, followed by the state of the profession and education in Sri Lanka and China. The key themes guiding the development of each of these presentations were:

- *Built environment regulation*: the development and implementation of regulations and their systems of administration
- *The profession*: the development of the association and engagement with urban sustainability issues
- *Curriculum governance*: arrangements used for the revising curriculum in higher education (HE) built environment professional programs
- *ESD (Environmentally Sustainable Development) in the curriculum*: sustainability integration in case study undergraduate and post-graduate professional programs
- *Expectations of the profession*: evidence from stakeholder debate about challenges in the context of climate change.

For the general context of the Asia–Pacific region, and focus on the architecture profession in Indonesia, the project co-lead presented to the workshop participants. The presenters for the Sri Lanka and China case studies were the invited ProSPER.Net participants from the relevant universities in these countries. The Sri Lanka study focused on the engineering profession and the China study focused on the architecture profession.

These presentations were followed by three facilitated sessions of round table discussions. Each table was briefed before-hand on their role by the workshop facilitator to maximize interaction and exchange of ideas in each group. As government organization representatives were included in the workshop, representatives of two government organizations; the Ministry of Environment and Forestry and the Ministry of Public Works and Housing formally 'opened' the workshop.

Five discussion groups were formed out of the 40 participants with approximately 8 participants in each group. Care was taken to ensure there was a balance of industry, government and academic stakeholders in each group. Group membership was adjusted across the three rounds of discussion so that group-think was avoided and interactions between the participants was maximized.

The three main themes of the workshop (as outlined in the assumptions) were discussed in the groups over three main sessions, each lasting about 1.5 hours in a logical progression. Prior to each round, the facilitator posed questions to the workshop participants to be further discussed in each group, with 3-minute presentations following from each group; shared with all the participants of the workshop.

For the first round (Round 1) of discussions, the following questions were posed:

- Who are the stakeholders that need to be considered for built environment higher education?
- What are the opportunities?

- What are the constraints?

Participants moved to the next round (Round 2) of discussions, while table facilitators remained the same. Care was maintained to ensure that the diversity of participants was maintained in this round. For the second round of table discussions the following questions were posed:

- What bridges can be connected between the stakeholders?
- What actions can be taken?
- What is realistic?

For the final round (Round 3), participants were requested to also undertake some personal reflections before undertaking discussions at their table. The guiding question for this last activity was:

- What are the possibilities for action?
- Participants had to come up with up to three action items, which they then discussed within their groups to be presented to the wider workshop.

1.4.2 Workshop Outcomes

As a result of the desktop research, anticipated outcomes planned were:

- Commitment for built environment curriculum change that extends beyond current bottom-up approaches to a system wide change.
- Commitment from an agency or agencies for leading initiatives promoting system wide change.
- A modest list of feasible initiatives with the potential to inform and develop system wide change in built environment professional education.
- Review of the methodology being used in the ProSPER.Net project to research and analyze built environment professional education.

A summary of the workshop outcomes of the table discussions in each round are presented here. For Round 1, where participants had to come up with a list of stakeholders, with opportunities and constraints, almost all the groups identified a similar set of stakeholders. Not surprisingly, the stakeholders identified were similar to the stakeholders present at the workshop. Other stakeholders in particular that participant's felt needed to be included were a range of building industry developers, owners, manufacturers in the supply chain, and specific types of consultant stakeholders. Some of these are provided below:

- Building owners and the community
- Ministry of Energy, Ministry of Higher Education and Ministry of Manpower
- Professional bodies such as IAP (Institute of Planners), IABHI (Institute of Green Building Professionals) and APTARI (Building Science teachers in universities)

Table 1.1 Opportunities and constraints identified

Opportunities	Constraints
Better access to global knowledge	Lack of alignment of codes and regulation
Development of a locally customized curricula	Outdated standards
Cooperation with other stakeholders and professionals in developing curricula	Lack of specialists
Collaboration with local and international universities	Lack of harmonization of professional standards and qualifications
Dissemination of case studies and best practice	Resistance of curricular change from universities
Involvement of practicing professionals to create interest and awareness among students	Lack of professional lecturers
	Lack of elective courses
	Local wisdom not incorporated
	Fragmented decision making
	Fragmentation/siloed approach to building design and construction

- Non-government organisations (NGOs) and development institutions such as BISA (Association of Building Science educators in Indonesia), LPJK (Professional Regulatory Authority), WALHI (Environmental organizations)
- Supply chain manufacturing industry
- Experts: built environment experts and related such as environmental experts
- Consultant/contractor organizations such as INKINDO (consultant companies), GAPENSI (Contracting companies) and GAPENRI (Energy performance contracting Companies).

The Table 1.1 presents the opportunities and constraints identified by the participants.

In the second round, where connections with stakeholders were sought, there were some diversity of outcomes and this is presented in Table 1.2. Overall seventeen different ideas were presented by the participants.

The final round (Round 3) on prioritizing actions were surprisingly quite consistent amongst the groups and a list of these has been provided in Table 1.3. A total of eight priorities were narrowed down by the five groups.

1.4.3 Workshop Evaluation

An evaluation form was provided to the participants to seek feedback on all stages of the workshop. All the speakers were considered to be good and the participants felt overall that they got value for the time spent at the workshop. The participants supported the workshop outcomes. Improvements for workshop included; ‘excellent

Table 1.2 List of realistic actions to be taken to bridge the gap between academia and industry

1. Clearly defined learning outcomes for specific courses and programs
2. Strengthening licensing procedures
3. Providing incentives for uptake of green buildings where possible
4. Balance between theory and practice in university education
5. Developing quality through ESD competencies and curricular development
6. Creating and maintaining knowledge materials from specific industries
7. Forming partnerships with industry on research projects
8. Creating a repository of knowledge materials on green buildings (to be shared within, and between universities nationally and globally)
9. Encouraging and supporting interdisciplinary and multidisciplinary thinking and practice in the university programs
10. Capacity building for professional development/Online training for continuing education
11. Building research capacities in universities
12. Capacity building for academics, government officers with respect to standards and certifications
13. Capacity building for the construction work force
14. Setting up campaigns where appropriate to bring awareness and support for green buildings
15. Knowledge sharing through benchmarking/demonstration/pilot projects and technology transfer
16. Aligning construction companies and their work force, government agencies at national and regional levels (and also local levels), NGOs, academe, and goods and services industries
17. Investment in design and performance evaluation, with learning by doing and demonstration activities

Table 1.3 List of priorities identified by the workshop participants

1. Need to identify funding agencies/resources
2. Undertake a mapping exercise to determine gaps to commence with capacity building
3. Align with and prepare a clear roadmap including all the relevant stakeholders
4. Enforce regulation
5. Capacity building/continuing education for all stakeholders
6. Support the development of private projects for benchmarking/showcasing/awareness
7. Development of a knowledge platform
8. Industry and government engagement in curriculum development with incentives where appropriate

job', 'keep up the good work', 'keep contact and share knowledge, information', and 'include life [sic] streaming and audience from various universities network, e.g. UN Sustainable Development and Solutions Network Indonesia (26 universities)'.

1.5 Discussions

As indicated, a large proportion of Indonesia's higher education institutions are unaccredited and there is an urgent need to address low quality providers, according to a recent report by OCED/Asian Development Bank. Capacity in higher education institutions and institutes of technology need to be strengthened by taking a focused approach to internationalization of research (OECD and Asian Development Bank 2015).

Lifelong learning requires a coordination and collaborative process of long term thinking and far reaching changes to be put into implementation. Formal and non-formal education system and workplace and other social organizations need to be designed, organized and used as learning opportunities. This is not easy to achieve; there are natural tensions between models of lifelong learning and higher educational institutions that operate on a narrow economic perspective. Currently, there is fragmentation in the provision of higher education and there is also a disconnect between demand and supply touted by key documents and reports by multilateral agencies such as the Asian Development Bank and the World Bank (OECD and ADB 2015, p. 242–243). While the formal education system is critical, the non-formal and the vocational system of education are important particularly with respect to the development of skills and training for the built environment.

Within this background the research was undertaken with the aim of exploring how best to integrate sustainability in built environment higher education programs, with a particular focus on Indonesia. It was anticipated that there would be a common focus on building a commitment for built environment curriculum change that extends beyond current bottom-up approaches in individual universities or programs to a system wide change. From this perspective, there was alignment amongst the workshop participants to focus on working together with various stakeholders, beyond universities, with government agencies and industry to build a programme of change together.

In addition, it was also acknowledged that commitment from agencies are required, not just the universities. To this end, the International Finance Corporation (IFC) has undertaken a commitment to re-engage with BISA (Indonesia Building Sustainability Alliance) to take the project forward.

Engaging with government departments; in particular, the Ministry of Housing and Public Works and the Ministry of Environment and Forestry supported the idea of bringing government, industry and universities together. Further discussions with other government departments—the Ministry of Higher Education and the Ministry of Energy are planned in the near future.

Overall, the discussions amongst the workshop participants presented a priority for capacity building, developing knowledge sharing platforms and aligning government and industry with academia in curriculum development.

1.6 Conclusions

The paper has attempted to understand the fragmentation between academia, industry and government with respect to the nature of built environment programs in Indonesia, focusing particularly on architecture. The current disconnects between the various sectors that comprise the way education in Indonesia, particularly built environment education needs to be developed and implemented for meeting current and future challenges of climate change and sustainability needs to be carefully considered. It was therefore imperative to seek input from various actors to share ownership of curricular outcomes.

To make the curriculum renewal meaningful, a workshop was proposed to understand how industry and government agencies may be able to support the development of curriculum renewal. While certain competencies need to be met, it was also critical that potential built environment practitioners are able to ground their theoretical understanding with practical applications where possible. The workshop undertaken with academic, industry and government stakeholders support the foundation for institutional engagement for sustainability in higher education. The workshop confirms engagement and alignment with a range of diverse but related stakeholders to commit to sustainability and climate change thinking and practice in built environment higher education programs.

This research supports previous studies demonstrating the gaps between pressures to meet current built environment challenges and the status of built environment education currently. Urgent attention is needed to focus on curricular engagement; not from a traditional perspective, but one that is cognizant of stakeholders' needs now and in the future. A long-term approach is needed to set the course for planning now before it is too late.

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