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How to build a regional university: A case study that addresses policy settings, academic excellence, innovation system impact and regional relevance

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A public university was established in 2014 as a cornerstone of Ecuador's sweeping higher education reforms. Four years later, Universidad Regional Amazónica Ikiam had developed internationally benchmarked teaching, research and community service missions within the Ecuadorian Amazon. The creation of Ikiam occurred during a period of broad international discourse on the importance to universities of academic excellence, innovation system impact, and regional relevance. This case study tests whether a top-down state-driven development model can establish a university on principles of excellence, impact and relevance. The creation of Ikiam is analysed qualitatively and the results are discussed in context with national and international policy settings for higher education and innovation. This study provides insights for low and middle-income countries to strengthen higher education and innovation systems through university creation. Internationally it provides practical insights for university master planning taskforces to build organisational strength and distinctiveness through excellence, impact and relevance.

Keywords: higher education policy; regional universities; regional development; innovation system impact; academic excellence; university establishment

Introduction

Universities are complex organisations that require major on-going investments and their creation necessitates detailed prior consideration of costs and benefits at local, regional and national levels. These considerations raise high barriers for the creation of new universities. Barriers are particularly high in regional areas where cost benefit analyses may be less favourable due to smaller or less mature student markets compared to major metropolitan areas. In low and middle-income countries (LMICs) these barriers can become insurmountable, because of the challenge of financing major investments in higher education (Ziderman & Albrecht, 1992). In developed economies start-up barriers for university creation are overcome through transfiguration of pre-existing organisations. Examples include many of the "new universities" of the United Kingdom (Pratt, 1992), most post-Dawkins

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reform universities of Australia (Harman, 2005), and two of the three new universities of South Africa's post-2000 higher education reform (Bunting, Sheppard, Cloete, & Belding, 2010; South Africa's two new universities, 2013). Alternatively, new universities are spun out of existing university systems, such as the Texas A&M University System (Texas A&M University-Kingsville, 2007) and the University of California System ('University of California to Acquire,' 2001).

Those strategies for university creation cannot be implemented in regions that lack existing tertiary education institutions, or if wholly inadequate institutional standards require their exclusion from a reform process. These challenges are highly relevant for regional areas of LMICs where higher education system actors are absent, or where institutional corruption in higher education can be experienced (Heyneman, Anderson, & Nuraliyeva, 2008).

Irrespective of challenges to university creation in LMICs, there is a clear need and appetite for higher-education policy development, to drive national innovation systems for sustainable economic development (Jung, Eun, & Lee, 2017; Lewin, 1995; Robertson, 2005; Saad & Zawdie, 2011). For example, successive World Bank reports on the acceleration of Sub-Saharan economic growth have highlighted the importance of higher education capacity (Dessus, Goddard, & Hanusch, 2017; The World Bank, 2009). Regional universities are cornerstones for driving regional workforce skilling (Charles, 2006), economic development (Goldstein & Drucker, 2006) and social change (Field, 2000), as drivers of regional innovation systems (Coenen, 2007; Kitagawa, 2010a; Tripl, Sinozich, & Lawton Smith, 2015; Wise, 2016). The importance of higher education as a contributor to economic development was legally recognised by the Ecuadorian national constitution of 2008 and the higher education law of 2010, which initiated sweeping reforms to align university productivity with the country's social and economic development needs (van Hoof, 2013).

Case studies of greenfield university creation are sparse. Education system policy makers and university managers could greatly benefit from the recent experience in Ecuador, establishing a public university in the Amazon that addresses quality benchmarks in teaching and research. The creation of Universidad Regional Amazónica Ikiam (Ikiam) provides a roadmap for higher education capacity building and regional development.

Materials and Methods

Higher education system context

This case study is framed within the Ecuadorian higher education system and analysed in context with regional and international systems. Ecuador has 60 universities servicing a national population of over 16 million. All universities are held to national quality standards, and classified on a four-band quality scale with eight universities in the highest-quality band. Thirty-four of Ecuador's universities are public, 6 of them classified within the highest band (Consejo de Educación Superior, 2017). Ecuador's higher education system graduated 64,841 students in 2015 having a 47:53 male to female ratio (Secretaría Nacional de Educación Superior, Ciencia y Tecnología [SENESCYT], 2017). The UNESCO Institute for Statistics (2017) reported an Ecuadorian higher education gross enrolment ratio (GER) of 40.5 per cent in 2013. Public higher education in Ecuador is free of tuition fees, and enrolment is controlled by a standardised national entrance score. Comparable countries may be Thailand, Argentina, Chile, Turkey, Iran, Colombia or Serbia, termed as the "TACTICS" group by Times Higher Education World University Rankings for being well placed for rapid higher-education system improvement (Bothwell, 2016). Ecuador compares favourable with Serbia, Thailand, Iran and its regional neighbour Colombia, all having GERs within the 40 - 60 per cent range. However, Ecuador's performance lags well behind its regional neighbours Chile and Argentina, as well as Turkey, which have GERs in the 80 - 95 per cent range (UNESCO Institute for Statistics, 2017).

Experimental design and analysis

This study uses a retrospective longitudinal design, gathering qualitative data from document archives and conducting semi-structured interviews with senior managers of key organisations. The timeframe for this case study starts in October 2010 when the enactment of the *Ley Orgánica de Educación Superior* [Higher Education law] proposed the creation of Ikiam with Transitional Provision 15 (2010). The study period ends in February 2018, 4 years after Ikiam's legal creation, and five teaching semesters after the enrolment of its first undergraduate student cohort.

This case study analyses four types of documents: Government policy and legislation; strategic planning documents at national, regional and organisational levels; technical advisory and specialist consulting reports; and minutes of Ikiam's governing board meetings. Eight semi-structured interviews were conducted with: key members of the Ikiam Project, including a government minister, advisors to government ministers; government agency managers at a regional level; and executive leaders of Ikiam. All interviews were conducted face-to-face, recorded and translated verbatim. Data were grouped under four themes: (1) higher education and innovation policy settings, (2) academic excellence, (3) innovation system impact and (4) regional relevance.

Theoretical context and literature review

Academic excellence

Academic excellence in research and teaching is a fundamental underpinning for every university of renown. The pursuit of excellence is a central pillar that must guide the creation and development of any university that seeks to contribute to international science, or prepare students for international employment markets. Models for delivering excellence in teaching (Mumford, 2011; Kreber, 2002) and research (Altbach & Salmi, 2011; Benavent-Perez, Gorraiz, Gumpenberger, & de Moya-Anegón, 2012) are well understood and practised, as are national policy frameworks. For instance, Australian landmark policy instruments for higher education quality, which are reflected in US and UK policies also, are: a community-owned framework for learning standards; a quality-assurance regulator; and quality indicators for performance-based funding (Yorke & Vidovich, 2016). The challenges of achieving academic excellence in LMICs have also been recognised (Altbach, 2001, 2004, 2009; The World Bank, 2000; Ziderman & Albrecht, 1992). Different stakeholders in the university sector have defined various modern interpretations of excellence. Accordingly student satisfaction, graduate employment outcomes, volume or quality of published papers, research income, reputation among peers, numbers of Nobel Prize laureates and many other indicators have all been used as partial proxies for proof of excellence.

The authors of this article agree with the definition of excellence that is offered by the 2014 Working Party of the European Association for Quality Assurance in Higher Education, which states that 'it is important to consider excellence as a social phenomenon based on theoretical and cultural considerations', that 'the concept has practical applications in the context of management and technological development' and that 'there is a need to analyse excellence through the lens of different key stakeholders, including students and families, society and employers' (Brusoni et al., 2014, p. 9).

The international discourse on higher education excellence that is briefly introduced earlier agrees well with Ecuador's modern discourse on excellence in its rapidly maturing higher education system. Article 93 of the *Ley Orgánica de Educación Superior* [Higher Education law] (2010b) formalises the principle of quality in higher education, considering the perspectives of excellence, relevance, efficiency, knowledge transfer and improvement through self-reflection and external critical assessment. Dedicating much attention to its Principle of Quality, the *Ley Orgánica de Educación Superior* [Higher Education law] (2010a) establishes inalienable rights such as free access to high-quality universities. Moreover, considerable focus is placed on mechanisms to drive high performance including: minimum required qualifications for institutional leaders and professors; training for the development of teaching pedagogy; merit-based faculty recruitment; national accreditation and

categorisation of institutions; and institutional quality evaluations (Ley Orgánica de Education Superior, 2010a). The law further encourages excellence in higher education through performance-based funding that prioritises quality and academic excellence. National quality assessments were first implemented in 2014, resulting in the closure of 14 universities for failing to meet quality standards (Álvarez-Muñoz & Pérez-Montoro, 2016). While many years of continued improvement are necessary for Ecuadorian universities to rank internationally, it is clear that Ecuadorian legislative provisions for quality in university teaching and research are well targeted for achieving higher education excellence, as it is conceived internationally.

Internationally and in Ecuador, the policy frameworks and developmental strategies to create universities and establish their research and teaching programs must address the need for academic excellence. Specifically in regional areas of LMICs, planning for new universities must consider the development of a culture of academic excellence where none may currently exist, and how to harness academic excellence to deliver high quality teaching and research programs.

Innovation system impact

In addition to pursuing excellence in teaching and research, universities are expected to have economic, social and cultural impact (Arbo & Benneworth, 2007; Doyle, 2010), working as key elements within national and regional innovation systems (Charles, 2006; Coenen, 2007; Tripl et al., 2015). Modern universities operate under enormous pressure to adopt missions that are responsive to social and economic need, consequently driving the appearance of market-oriented university governance models (Boffo, Dubois, & Moscati, 2008; Brunner, 2011; Dobbins, Knill, & Vögtle, 2011; Huisman, 2009). In the bicameral governance systems of many UK universities, much power is now vested in external governing bodies rather than internal academic bodies (Taylor, 2013). These market-driven modern university governance structures are thought to diversify the range of external actors that have influence over university governance (de Boer, Enders, & Schimank, 2008). This arguably makes universities better able to have social and economic impact. Following its Research Excellence Framework 2014 national research quality exercise, impact scores from national assessments of research impact have been used for the allocation of performance-based university funding (Chowdhury & Koya 2016). Other countries are undertaking similar transitions, for example in 2016, the Australian Government accepted all of the recommendations of the Watt Review of Research Policy and Funding Arrangements, which seeks to align research funding more closely to impact and engagement (Watt, 2015). These are strong indications that we are entering a new era of impact-oriented higher education systems.

Ecuador's reflection of this international discourse on higher-education contributions to regional or national innovation systems is multifaceted. While its national law on higher education instils basic egalitarian rights that underpin academic freedom, this law also establishes requirements for the promotion and transfer of technological innovation to industry in support of national sustainable development (Ley Orgánica de Education Superior, 2010a). Tellingly, Ikiam is directly overseen by Ecuador's innovation and technology agency, SENESCYT. Ecuador's legislative framework, under Article 107 of the *Ley Orgánica de Education Superior* [Higher Education law] (2010c), establishes a Principle of Relevance, requiring the mobilisation of the higher education sector as a contributor to local and national development. Article 107 requires universities to respond to the expectations and needs of society and to contribute to national planning and development programs. The Article aims to integrate universities within Ecuador's innovation system by requiring them to contribute at local, regional and national levels. The law further encourages innovation system integration by granting to universities the freedom to generate income through commercial activities, intellectual property and donations. Ecuador's higher education policy setting firmly intercalates the

roles of universities into national planning for social and economic development, mirroring the international market-driven trend.

Regional relevance

The concept of regional relevance for universities has been adopted broadly. Studies across Australia, Europe, Canada, Korea, Mexico and Brazil show that universities are acknowledging and addressing the need for regional engagement and distinctiveness (Arbo & Benneworth, 2007; Jongbloed, 2010; Lepori & Kyvik, 2010). For example, in a survey of eight Australian regional universities, senior managers of all universities recognised the absolute need for regional universities to be focused on flagship areas of relevance for their region. The strategic plans of those eight universities confirmed their attention to the regional relevance of their teaching, research and service missions (Wise, 2016). A focus on regional issues builds trust and respect within regional communities and businesses. This in turn reduces the transaction cost of knowledge transfer, thereby increasing the effectiveness of university contributions to regional economies (Fukuyama, 1995; Putnam, 2000; Putnam, Leonardi, & Nanetti, 1993).

Recognising the challenge of matching international aspirations for excellence with the need for regional relevance is particularly important when considering the construction of a university in a region with a strong distinctive character. In the distinctive Italian region of Lombardy, the “nestedness” of innovation systems at national, regional and increasingly smaller local areas has been highlighted (Muscio, 2006). Muscio’s concept of nestedness means that addressing regional relevance need not contribute to a loss of national and global focus. For example, Kitagawa (2010b) represents universities as ‘multi-scalar network organisations’, addressing regional, national, and global issues individually, or as collaborators within larger university networks.

This multi-scalar capacity of universities is critical for regions such as the Amazon, where issues of environmental conservation and sustainable development have direct regional, national and global dimensions. Historically, the curriculums of Latin American universities have been highly national in focus, although increasingly, internationalisation is broadening that focus (Avila, 2007; de Wit, Jaramillo, Gacel-Ávila, & Knight, 2005). The authors are not aware of major studies of regional distinctiveness among Latin American universities. However, a broad trend towards international excellence with regional relevance is indicated by the appearance of 51 Latin American universities in the Times Higher Education World University Rankings 2016-2017, and leadership shown by Latin American universities in global challenges having regional importance such as Zika virus detection and characterisation.

Ecuador’s higher education law supports the growth of regionally distinctive universities, through its requirement to contribute at local, regional and national levels, with specific reference given to engagement with local demographic trends and the regional character of the industry sector (Ley Orgánica de Education Superior, 2010). The impact of this policy support for organisational distinctiveness is evident in the creation of Ecuador’s four new universities: Universidad Nacional de Educación, Universidad de las Artes, Yachay Tech and Ikiam. The separation of these universities from the nation’s capital and their distinct organisational missions indicate that the need to address regional relevance has been recognised by Ecuadorian policy makers.

Case study results

In February 2018, 4 years after Ikiam’s greenfield creation in Ecuador’s Amazon region, and 2.5 years after admission of its first undergraduate student cohort, Ikiam had 643 students and an indigenous enrolment rate of 33.2 per cent. Ikiam employed 83 academic staff, 100 per cent holding masters degrees or higher, 65 per cent holding PhDs. Ikiam’s undergraduate student population in 2021 is projected to approach 4400. The roll out of postgraduate programs is anticipated in 2019, supporting a

projected 2025 postgraduate population of 1000. Ikiam was created with a unicameral governing structure consisting of a governing board of five international academic experts. Each founding governing board member held considerable international academic or professional esteem, having individually published between 46 and 80 Scopus listed scientific studies or having individually attracted over \$65 million dollars in research funding. This broad overview of organisational data illustrates the rapid development of a university to meet international benchmarks for staff qualifications and performance.

While there are undoubtedly other greenfield universities rapidly growing, and at a similar stage of development, Ikiam is distinctive because of its location in an indigenous Amazon community (Lat. -0.9506967, Long. -77.8666751), eight kilometres from the regional town of Tena, in Ecuador's Napo Province. This challenging regional backdrop for the development of an international university was chosen, specifically to build relevant higher education and innovation system capacity from within the Amazon region. A very strong policy setting was necessary to overcome Ikiam's challenging development environment, providing unwavering support for the establishment of the university.

Policy setting

In March 2010, the enactment of the *Ley Orgánica de Educación Superior* [Higher Education law] (2010a) initiated a nationwide reinvention of Ecuador's higher education system. In accord with international higher education excellence trends (Yorke & Vidovich, 2016), the most immediate and significant consequences of this reform process were: the establishment of a national higher education quality assessment agency; a nationally regulated career structure for university professors, subject to quality assessment and providing regionally competitive remuneration (*Reglamento de Carrera y escalafón*, 2012); the closure of underperforming universities; and the establishment of four emblematic universities, each focused on distinct areas of national importance. Multiple interviewees responded that the personal sponsorship of the President of Ecuador was a key factor for the successful implementation of this legislation. One interviewee responded, 'without the personal endorsement of President Correa, the higher education reforms could not have happened'. Another commented, 'the commitment of the President was critical for the success of the reforms'. These responses are consistent with published scientific reports on higher education reform in Ecuador, with Johnston (2017, p. 3) maintaining that Correa spent 'much of his tenure as president attempting to improve the quality of higher education in Ecuador.' Bernasconi and Celis (2017, p. 6) went further to comment that 'President Correa's personal efforts have mobilised structural changes to the entire sector.' Respondents also reported that during a period of initial systemic change, negative public commentary was experienced, responding specifically to the closure of universities, despite their underperformance. The Presidential endorsement of these nationally significant changes provided an important support for ministers who had the responsibility to respond positively to transient negative public pressure, maintaining the long-term conviction that was necessary to fundamentally improve Ecuador's higher education outlook. Respondents reported, 'Strong commitment was necessary to overcome public reactions to unsettling changes in the sector'.

Bernasconi and Celis (2017, p. 8) have further commented, 'The comfortable congressional majority and favourable poll ratings enjoyed by President Correa during most of his administration did much to overcome opposition by universities. A weaker, or less determined government would have probably had to contemporise with the political forces that higher education institutions are able to mobilise in their interest, especially when the perceived threat affects them all.'

In September 2011, the responsibility for the formative development of the Ikiam Project was handed to the Minister and Vice Minister of the *Ministerio Coordinador de Conocimiento y Talento Humano* [Coordinating Ministry for Knowledge and Human Talent] (MCCTH). The significance of

this delegation was that ministerial and vice ministerial advisors and senior management teams were directly responsible for executing all strategic planning and day-to-day activities necessary for the development of the Ikiam Project. Such high-level ministerial sponsorship of the Project within an authoritative “Coordinating” ministry was a critical factor for its success. The Ikiam Project was afforded a short line of sight to the President of Ecuador and budget documents show that its need for strong financial resourcing was matched with appropriate budgeting processes at a ministerial level. Case study interviewees confirmed, ‘the requirement for a strong knowledge base within the development team of the Ikiam Project, was met by the significant human resources represented by internationally experienced ministerial advisors.’ In addition, ‘with prior research experience from international universities like Caltech, the project team had exceptional expertise’.

As the national government of a unitary state, the government of Ecuador has national and regional authority through a framework of decentralised government bodies, facilitating action at provincial and local levels. All interviewees agreed that this national governance oversight for the six Amazonian provinces of Ecuador provided the necessary framework for coordinated decision making at a provincial level, regarding the location, size, types of degree programs and other factors of regional importance. Specifically, ‘there was no need to manage competing views at a regional level... provincial authorities were directed by the government’.

There is international discussion regarding the emergence of ‘radical left’ governments in Latin America during the first decade of this century, for example see Ellner (2012) and their missions to ‘rebuild’ or ‘reclaim’ centralised authority (Grugel and Riggirozzi, 2012). However, specific commentary on whether strong state authority can have a positive impact on broad scale higher education reform is absent. We maintain that the strong state authority of the Ecuadorian Government was essential for implementing the positive higher education reforms that have been seen in Ecuador. Specifically, the central control over regional actors, demonstrated by MCCTH and SENESCYT during the implementation of the Ikiam Project, greatly facilitated the Project’s progress. One case study respondent stated that ‘the coordinating role of MCCTH was important for sustaining the original vision of the project throughout its implementation’. As a regional mediator, SENESCYT was an important entity to ensure that the vision and conceptual development of the Ikiam Project co-aligned with regional and local education and innovation needs. Interviews confirmed that buy in from SENESCYT at a provincial level, was secured at the earliest stage of project conception, engendering a sense of provincial ownership and reducing the risk of regional disenfranchisement from a nationally coordinated project. One interviewee commented, ‘the role of SENESCYT as a regional mediator was important at a very early stage in the project’.

The policy setting for the creation of Ikiam produced a national executive directive that had sufficient authority and scope to overcome barriers to higher education sector reform at national, regional and local levels. Ecuador’s use of a major national reform setting to underpin university creation is mirrored by major international examples of modern university creation. In China, the 211 and 985 Programs of the 1990’s seeded the development of 151 of China’s most competitive universities (Wu, 2007). The Further and Higher Education Act of the United Kingdom in 1992 is responsible for the subsequent creation of the 42 “new universities” in the United Kingdom. In Australia, many new universities were formed in the 1990s following the Dawkins Reform of universities (Harman, 2005). Historically the US Government Morrill Acts of 1862 and 1890 gave birth to over 70 US Land-Grant Universities (Geiger & Sorber, 2013). Most recently, the systemic restructure of South Africa’s higher education system founded three new universities in 2014 and 2015 (Establishment of a public, 2014; South Africa’s two new universities, 2013). In developed economies and LMICs alike, for the creation of metropolitan or regional universities, a policy setting of broad-scale reform provides the systemic momentum required to overcome the significant political, regulatory, financial and local barriers that governments must overcome to establish new universities.

Regional relevance

At every stage of Ikiam's development, the challenge of creating a university that is responsive to the distinct nature of the Ecuadorian Amazon region was addressed. Early consulting briefs, ministerial plans and later strategic plans of Ikiam University all served to build relevance for the natural environment of the Amazon and its communities. All interviewees stated that the location of Ikiam in the Amazon is its greatest asset, due to the global visibility and importance of this region, and its desperate need for a quality higher-education system and innovation system actor. Some respondents also recognised Ikiam's location as being its greatest challenge, due to remoteness, the limited skill base of the local employment market, and the early-stage maturity of academic culture in the Amazon region.

One respondent directly acknowledged that 'Ikiam had to be located in the Amazon region, to serve local communities that had limited access to quality higher education, and to position the university globally' and succinctly stated 'the location of Ikiam in the Amazon is its greatest strength and its greatest challenge'.

A review of strategic planning documents of Ikiam has revealed that recognition of the need to build a regionally relevant university during Ikiam's development has been translated into its structural and operational frameworks. Ikiam's mission statement is tightly focused on 'conservation and use of natural resources' and the development of 'evidence-based policy for sustainability' and a 'commitment to the environment'. Similarly, its organisational vision aspires to create a 'global reference for biodiversity research' with 'academic excellence in the areas of life sciences, water sciences, geosciences and biotechnology'. These defining top-level organisational statements demonstrate that Ikiam is extending its academic scope within strategic areas of regional relevance. Furthermore, the strategic plan of the Vice President of Innovation has the stated purpose to 'identify world best practices and place them in a context that is useful for Ikiam's Amazonian environment.'

The operation of Ikiam's teaching and research programs, provide further evidence of how Ikiam has translated its regionally relevant policies into practice. Ikiam's 2017 undergraduate program portfolio documented four undergraduate degree programs in water sciences, environmental sciences, biotechnology and geosciences, all programs drawing on the natural resources of the Amazon environment to reinforce syllabus material. In addition, a program exists to integrate the teaching of innovation and entrepreneurship into Ikiam's undergraduate degree programs to produce graduates who are better prepared to establish their own sustainable enterprises, thus expanding the constrained employment market that exists in the Amazon.

In relation to its research mission, Ikiam's 2017 strategic planning documents report six research fields of interest that have multi-level global and regional relevance. These fields are Global Change, Water, Energy, Health, Education and Food Security. Further quantitative evidence for the regional relevance of Ikiam's research mission exists in the focus of its Scopus-indexed research publications in 2016. While the number of publications is low due to the small size of Ikiam's faculty at that time, all of Ikiam's Scopus-listed publications fall within 12 Scopus Subject Areas of direct or applied relevance to the Amazon region, with most publications listed under Agricultural and Biological Sciences or Environmental Sciences.

Academic excellence

The 2.5-year operational period of Ikiam is insufficient to permit assessment of the quality of its academic outputs through academic publication metrics, international university rankings or other internationally benchmarked metrics. However, documented evidence of its development path shows

that Ikiam has been established with the intent to create a framework for international performance that will be measurable in the future.

In February 2012, during the early development of the Ikiam Project, MIT was contracted to provide a detailed situational analysis, to advise on how to strategically position the future Ikiam University, and to build international competitive advantage. MIT's consulting report was submitted in June 2012 providing an independent, internationally grounded roadmap for the development of the Ikiam Project. This report also included an initial proposal for the development of each of the faculties and academic programs. Topics relating to campus infrastructure and design were also briefly discussed. While the MIT report provided an important international context for development of Ikiam's international competitiveness, project development team members felt that the realities of delivering higher education in the Amazon region and the needs of that region were not adequately considered, saying 'the "MIT solution" lacked relevance for the Amazon region'.

The MIT report was closely followed by an in-country workshop for invited international experts. Fifty-three foreign and 10 Ecuadorian scholars were drawn from renowned universities and research centres from the United States, the United Kingdom, Germany, France, Australia, Canada, Spain, Brazil and the Netherlands. These scholars were brought to the future location of Ikiam to advise on all aspects of the functioning of high performing international universities. The memoirs of the workshop recorded complex discussions on a wide range of developmental and operational challenges for establishing a university. Most importantly, international and local perspectives were not only accommodated in the discourses, creating a forum that addressed both the need to adopt international best practice for higher education sector excellence, but also the need to develop unique local responses to regionally distinct political, cultural and geographical challenges. The significance of this activity was stated by one interviewee, saying that 'the Ikiam workshop was a turning point in its development. The experts we invited provided a lot of information and experience that we would not have had access to otherwise'.

The immediate outcomes of these international consulting activities were the incorporation of international knowhow into Ikiam's development process and the adoption of international best practice into its structure and strategic frameworks. A downstream corollary of this activity was the creation of an international network of eminent scholars who were also committed to the success of Ikiam's development. As an example, four of Ikiam's five founding governing board members were participants of the international workshop (Desígnase miembros de la Comisión Gestora, 2015). Three of those members hailed from Stanford University, Columbia University and Brazil's national institute of Amazon research INPA. The Ecuadorian Government's international consulting strategy not only injected world best practice into Ikiam's development, it provided the means to convene a university governing board that embodied the highest level of academic excellence, and seeded engagement with the world's best universities.

Innovation system impact

Governing a dollarised economy that is unable to devalue its currency locally, the Ecuadorian Government under the Correa administration (2007-2017) placed heavy emphasis on developing an active trade policy that prioritised national production and international exports, as described in the national development plan drafted by Secretaría Nacional de Planificación y Desarrollo (Senplades) (2013a). Trade controls are just one element of the post-neoliberal expansion of state control that is a central pillar of the plan, and have been critically viewed by some commentators (Conaghan, 2015; de la Torre & Ortiz Lemos, 2016; O'Donnell, 2011). However, others have highlighted that irrespective of political ideology, reform planning and effective policy making in Ecuador is based on a much more traditional understanding of development (Caria & Domínguez, 2016). Specifically, policy development for university participation in the Ecuadorian innovation system closely reflects

international patterns. For example, the development of a knowledge economy and reduced dependence on the primary resource sector is a widely expressed theme of the national development plan's proposed productivity restructure (Senplades, 2013a, 2013b, p. 63, 2013d, p. 82, 2013e, p. 232, 2013f, p. 235, 2013g, p. 292). More broadly, the plan outlines a roadmap for cross-sectoral integration of higher education and industry sectors, for more efficient knowledge transfer for new products and systems development (Senplades, 2013c, p. 68). Three years after the publication of the national development plan, Cypher and Alfaro (2016) concluded that Ecuador's subsequent construction of industrial policy and the consolidation of a national innovation system stand as proof that the aspirations expressed in the national development plan have translated into positive impacts on Ecuador's socio-economic structure. In their comparative analysis of higher education quality assurance in Colombia and Ecuador, Álvarez-Muñoz and Pérez-Montoro (2016) went further to say that the policy setting of Ecuador has resulted in a quantum leap in higher-education productivity.

Ikiam's response to Ecuador's policy setting for innovation system participation is reflected at all levels of its organisational governance, dating back to the beginning of its development. At a senior management level, the existence of a Vice President of Innovation indicates the high priority that is given to innovation system impact at Ikiam. At a governing board level, planning and approval for the creation of a hybrid commercial entity for direct engagement with the industry sector actors is very significant. One case study interviewee confirmed that 'integration with local and national innovation systems was a central pillar for Ikiam's development from the beginning.' Ikiam and its commercial entity function as an integrated system for innovation and impact, providing the structural and financial mechanisms necessary to efficiently work across the multiple sectors that each contribute to a productive innovation system.

Discussion

While the creation of new universities can be achieved efficiently through spinout from existing universities or systems, Ikiam was a greenfield development because of the nascent academic culture of the Amazon. Four years after its conception, Ikiam's continued adherence to principles of academic excellence, regional relevance and innovation system impact indicate the utility of a top-down state-driven model for greenfield university development. Additionally to a state-driven impetus, one case study respondent explained that 'the critical mass of multiple new universities is necessary to change academic culture', explaining that this was the reason for Ecuador's simultaneous creation of four universities.

A strong state-driven impetus together with the momentum of broad scale reform, are also important factors for the two known pre-existing case studies of the greenfield creation of internationally ranked universities (Altbach & Salmi, 2011). The Higher School of Economics in the Russian Federation was established with strong state support in 1992, during the reform period following the dissolution of the Soviet Union (Froumin, 2011). Similarly, the Hong Kong University of Science and Technology was established with strong state support in 1991 during the reform period of Hong Kong's handover to China (Postiglione, 2011).

Together these case studies demonstrate the importance of a state-driven impulse, along with the momentum created by broad scale reform, to overcome the significant barriers for university creation. Other countries that seek to strengthen their higher education systems could use a similar approach; however, consideration must be given to the maturation of emergent universities as independent entities having academic freedom. Perhaps an on-going challenge for the sustained independence of new universities established using a state-driven model might be their depoliticisation. In 2018, the Ecuadorian Government is normalising its four "emblematic" universities, transitioning them to the same regulatory environment that oversees all other universities

in Ecuador. In 2020, when their scheduled transitional period for establishment is complete, the utility of a state-driven development model for building independent universities will be clearer.

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Disclosure statement

In accordance with Taylor & Francis policy and my ethical obligation as a researcher, I am reporting that I am employed by Universidad Regional Amazónica Ikiam as a governing board member and Vice President of Innovation. Ikiam is an organisation that may be affected by the research reported in the enclosed paper. I have disclosed those interests fully to Taylor & Francis, and I have in place an approved plan for managing any potential conflicts arising from my employment.

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