

Innovation in higher education; will there be a role for “the academe/university” in 2025?

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Abstract This paper focuses on the innovation management (or lack of it perhaps) of Higher Education as a sector, highlighting examples of practice from industry and private providers that suggest the university needs to start engaging in this agenda if it is to remain a sustainable entity beyond 2025. The paper presents five scenarios for the future of Higher Education underpinned by drivers of funding, the ownership and exploitation of ‘research’, the provision of good ‘teaching’, and the potential missing link of social innovation development. By refocusing on facilitating social innovation, the university can find a new means of adding value to society that will sustain its existence beyond 2025.

Keywords Scenarios · Universities · Higher Education · Innovation · Role of academics · Role of research · Social innovation

Introduction

The history and legacy of universities can make them resistant to change. Notions such as academic freedom, academic identity, and the nature of research have allowed those employed within the Academe to develop a privileged view from what is often metaphorically known as ‘the Ivory Tower’, i.e. the scientific canons established within the academic peer review process, the process of achieving graduation, and the professed production authority of ‘wisdom’ and ‘truth’. This is now being challenged

by many government funders, industry partners and future students. The production and dissemination of knowledge was one of the core foundations of the historic university. It still prevalent in the established university sector in Europe and Australia, and is an area growing in excellence for many ‘new’ universities. The essence of academic freedom is founded on the will of the academic to carry out research of their choice. The idea of universities being places of research is a residual of universities’ origins. Research, however, can simply stop at the point of invention, i.e. the discovery of a new idea, rather than innovation, the application of the new idea for a new outcome, and this lack of management of the latter could threaten the future of the University itself. Yet innovation is inherently risky, and the proxy of innovation adopted can determine the success or failure of an organization [1]. Universities therefore have to be as rigorous in their approach and strategies to innovation as they are to their research and teaching if they are to adopt this mandate [2], and failing to adapt and adopt will see institutions losing their future student and research base to those who are demonstrating success in this area.

It is becoming increasingly important for universities to identify their distinctiveness from other higher education (HE) providers in the future, and being the home of research and innovation through the research degree process (the award of the PhD) may have established this position in the past, but this may not be enough to sustain them in the future [3]. Equally the value of the PhD itself is starting to be questioned [4]. Research and the production of knowledge becomes innovation once the knowledge is applied in a new and novel manner to create a new outcome, and the intellectual property that accompanies such innovations is what adds value to industry and the economy, although innovation for purely economic benefit should not be the sole remit of the university innovation agenda. Social innovation, for example, is also important, particularly in some regions of the world, such as Latin America where contributing to democratic process and

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societal innovation sit on the higher education policy agenda [5]. Simply adding to the body of knowledge, however, may have little traction as an aim (it may be an outcome if no innovation occurs from the discovery), while it was the *raison d'être* of the idea of the university [6].

Knowledge economy policies are currently very powerful drivers of change in contemporary university approaches to research. They typically orientate universities to a national innovation system which both positions knowledge as the key factor of economic growth and sees the main purpose of knowledge as contributing to such growth [7]. In Texas, Arlington, for example, the universities have joined into an initially privately funded venture to bring technological innovations to fruition through a commercial entity TechFW [8].

This knowledge driven world is global and multidisciplinary, and is facilitated by new technologies. Digital search engines can select appropriate documents faster than any human could read through, make computations, synthesise and communicate the outcomes [9]. All this without necessarily involving the input of an academic. This seems to shift the university skills base to one of needing to be able to critically review and evaluate data rather than becoming reciprocals of knowledge. It will be the value we give to knowledge that we review that will be important rather than the knowledge set itself, and how this contributes to the generation of new knowledge. While this might be seen as solely an economic innovation paradigm it could equally apply as social innovation paradigm too. A social innovation paradigm considers developing responses to societal needs not currently met by existing types of public and private service [10].

Universities can also take something that starts out as an innovation and quickly turn it into something anodyne. We can see this in the much trumpeted push for universities to embrace the concept of the Massive Open Online Course (MOOC), a program freely available to anyone who wishes to study it over the internet. The academics who first implemented the MOOCs report that 'attitudes towards MOOCs are in a period of flux and that criticism is mounting because they are simply repackaging what is already known rather than encouraging creativity and innovation' [11].

Universities could also play in key role in societal innovations. There are myriad global social problems that seem beyond the scope of the traditional public sector, and Scharmer and Kaufer see that universities could play a key role in the addressing of those social problems through constituting a new learning and innovation ecology that could assist change-makers from all sectors to pioneer new pathways [12]. The relationship of universities to change is a key emerging element. If universities once saw themselves as bulwarks against change by creating places of stability and then adapting to change in a measured way, then maybe the new relationship of learning institutions is to embrace change as a fundamental enabler of learning, innovation and

development [13]. This would shift universities to being the advocates and drivers of change rather than just the critics or victims of change.

In terms of disseminating research and knowledge, electronic publishing has severely challenged the publishing model and with it the role of the academic and the journals. It is possible that academic authors will be less reliant on mainstream publishers and so gain greater freedom and exposure [9]. This could lead to a switch to non-exclusive copyright licensing for research [14]. It also extends the scope of authorship to anyone who wishes to upload a paper to the web, as not all electronic publishing arms engage in the discipline of peer-review. The disruptive forces stemming from technology with regard to knowledge production are challenging the university's position as an institution that provides access to knowledge including unbundling, taking and merging of different sources of knowledge to create new knowledge [15]. With public funding and accreditation systems tied to journal rankings, the 'future' that emerges here will be a key driver of university futures.

Miller & Miller [16] in their attempt at classifying types of innovation, note that all case studies on innovation 'involve invention or discovery, one or more phases of scientific study and engineering assessment of technical feasibility, prototype development and evaluation, market assessment and manufacturing cost evaluation, technology transfer and commercial start-up, and finally the diffusion and maturation of the manufacturing technology.' This is a far greater range of activities than the simple research and knowledge generation that the university provides as a matter of course, and suggests that universities need to extend their scope in supporting the application of new knowledge if they are indeed to contribute to the innovation process. While many typologies of innovations exist (*ibid.*), the two which offer a workable classification when combined for considering innovation in universities are that by Tidd and Bessant [17] who define four broad categories, and that by Bower and Christensen [18] who divide innovation into: (1) disruptive innovations and (2) sustaining innovations, which may be either transformational (discontinuous) or evolutionary (continuous).

The Tidd and Bessant categories are: (1) product innovation, which describes changes in the things (i.e., the products/services) that an organization offers; (2) process innovation, that is changes in the ways in which products/services are created and delivered; (3) position innovation, that is changes in the context in which the products/services are introduced, and (4) paradigm innovation, that is changes in the underlying mental models which frame what an organization does.

By mapping these categorisations against each other it is possible to audit the types of innovation to which universities are contributing.

Much of the rhetoric around knowledge production and generation is discussed in terms of product and position

innovation, that is generate new ideas or do new things with existing ideas, as noted as ‘CURRENT’ in Table 1. However, the elements of process innovation and paradigm innovation are arguably the areas where the university could make a unique contribution if it were to position itself differently in the future (noted as ‘Future?’ in Table 1). Universities have a privileged position in society that allows them to challenge paradigms and the ways in which we behave unlike any other institution. They do not have the responsibility of government; the mission of charities or lobby groups; the zero tolerance to failure of industry; or the strict economic imperative of private enterprise. Universities can contribute to and influence all of these agendas, and all will impact on them, and their unique structure, history and epistemology allows them to contribute to innovation in a unique manner.

This leads to the question what value does the university really add to society and will this value continue beyond 2025? And how does the university need to innovate to remain relevant beyond 2025?

Universities need to embrace an approach to innovation and its management that reestablishes them as the perceived centres of innovation [19]. The practice of peer-review approval of contribution to knowledge published in the public domain and accessible to everyone may have contributed to establishing the perception of universities as centres of innovation, but is arguably now a practice which is holding them back. While they may be publishing studies that are used by other organizations in an ‘open innovation’ process [20], this will not generate a sustainable income source to ensure their survival. Due to the time taken for the knowledge to reach the public domain, and partly due to the sharing of the knowledge prior to it contributing to innovation within the sector itself first. This questions the notion of the university as a ‘public good’; and while it may have stemmed from this model, the financial viability of it being able to continue in this model is highly doubtful [21].

Methodology

How does one research the future? The very notion of researching the future is a paradox. The word research lies within the time boundaries of the past and the present so to

research the future appears a logical impossibility. However, achieving an understanding of a future state as an abstract research target is possible. When researching the future, no one method is appropriate in isolation [22] and a mixture of methods need adopting as a form of triangulation of the abstract target being achieved. Quantitative forecasting, extrapolation and time series has proven useful where there is raw numerical data to work with, such as demographic trends. However given the nature of ‘the future’ itself, such raw quantitative analysis needs contextualising and interpreting in light of the assumptive constructs.

Drawing on a collaboratory process [23] from an Australian Business Deans Grant, a HEFCE funded project in the UK which was based on an extensive cross-disciplinary literature review [24], and a rework of a University of Melbourne study [25] on the future academic in Australia. This paper combined the drivers identified in these studies to develop a range of scenarios for the future of the sector, focusing on the elements of knowledge production, research and innovation. The scenarios were drawn together over time from work carried out in Europe and Australasia and hence the scope and relevance of the scenarios are deemed to be international. As the university sector is global, these scenarios could apply equally in any country.

The scenarios present the ‘extreme’ positions that would arise if certain drivers dominate the future direction of the sector, and are written in deliberately provocative language to evoke an emotional response. The scenarios can then be used to help senior managers, policy-makers and strategists ‘experience’ what the sector would ‘feel’ and ‘look’ like in 15 years’ time, to allow them to generate ideas, actions and strategies to ensure that universities could be successful in the scenario conditions and still meet their mission and purpose or they could seek to prevent or minimise any particular scenario from occurring.

These scenarios differ from other work that has been carried out in the field as they are sectorial scenarios rather than institutional scenarios [see for example 26, 27]. This means they set out what the whole HE sector might look like in 15 years’ time rather than what any single institution might look like. This then allows institutions the opportunity to position themselves within the scenarios and use the scenarios to help their strategic planning process. As such they take many of the issues that are used to determine institutional

Table 1 Main areas of current University contribution to innovation

Categorisation	Disruptive transformational	Disruptive evolutionary	Sustaining transformational	Sustaining evolutionary
Product innovation		CURRENT	CURRENT	
Process innovation	Future?	Future?	Future?	Future?
Position innovation	CURRENT			CURRENT
Paradigm innovation	Future?	Future?	Future?	Future?

scenarios as given assumptions for the whole sector. The workforce focus throughout this report is on the academic workforce, with some mention of the professional workforce in terms of new hybrid roles emerging. This has been deliberate as it is the academic workforce that differentiates an university from any other organisation. This recognises the flexibility and adaptability within the technical, administrative and professional staff groups within universities that may not be so prevalent amongst academics. Consideration of the total workforce employed would detract from the specificity of the sector scenarios.

The process of selection of the literature to review was based on searching academic databases, relevant government department websites, and various futures journals and publications using the terms ‘future’, ‘Higher Education’ and ‘University’. The literature provides an overview of what the future might look like from which the scenario building team draw down the features that they view as being important for each scenario. This is not as random a process as it might appear. It involves a process of discussion and sharing expertise, to highlight the factors most impactful in each of the areas of expertise, looking for synergies, overlaps and areas of conflict. The discussion of the literature takes the form of making sense of the ideas stemming from the literature in the respective areas of expertise and working through how these then impact on the future of the sector. A process of exploring the factors underlying the issues in the literature, in search of the drivers for the changes suggested, gradually filters through to a limited number of issues to take forwards into the scenarios for the university sector itself [23]. The ‘obvious influences’ that are currently dominating the agenda that were discounted as core factors, as they are unlikely to be the dominant factors influencing differentiation in the development of the sector beyond 2025, are digitalization/ICT, internationalisation and the impact of demographic trends. These factors will be embedded in all surviving institutions in 2025 and hence are not key differentiators in the development of the scenarios.

For the Australian Business Deans Grant, the 50+20 project outlines the philosophy of the collaboratory involving a circular space that is open to concerned stakeholders for any given issue [22]. It represents an open-source metaspaces: a facilitated platform based on open space and technologies designed to build conscious awareness. Once understood, a collaboratory can be established anywhere, virtual or real, within companies, communities – or within a management school. Its primary strengths lie in enabling issue-centered learning, conducting research for a sustainable world, and providing open access between academia and practice. The collaboratory offers a powerful alternative for public debate and problem solving, inclusive of views from business and management faculty, citizens, politicians, entrepreneurs, people from various cultures and religions, the young and the old.

Everybody must have a voice, hence the need for a *trans-disciplinary* approach.

The scenarios are therefore based on the nature of research and innovation, the changing perception of the value of higher education, and the ability of universities to respond to social dilemmas in society. As such, the scenarios presented are:

1. The public academic champions the MOOC
2. Leading knowledge creation
3. Responsive knowledge creation
4. Collaborative partners for local sustainability
5. Innovation think tanks for hire (project based clusters)

Scenarios: Imagine the year is 2025 ...

1. The public academic champions the MOOC

The explosion of MOOCs by 2015 saw most of the top 25 global universities in the world rankings offer ‘free’ education, and combined with ‘TED talks’, the expansion of executive coaching, and the consultancies offering online provisions (e.g. The Deloitte Academy on Qantas), the university curriculum started to look dull and lackluster. Students started asking what value were they getting from attending their course.

Many lecturers started using the materials available on the web in their mainstream teaching, and the ‘public academic intellectual’ appeared. By 2020, traditional enrolment numbers were dropping significantly and the model of provision needed to change rapidly if ‘second tier’ universities were to remain viable.

An online offering has developed collaboratively between universities which promoted the public academic intellectual MOOC with the opportunity for enrolment, assessment and certification through a new centralised national accreditation body which started awarding degrees in 2025. Online tutorials/coaching can be booked with ‘academics/pracademics’ at a cost related to the online reputation level of the person involved. Pricing is not standardised but market based.

Assessments are personally designed to draw on the student’s work/life situation to ensure immediate relevance and application of learning. MOOC presenters and designers are given ‘celebrity status’ and they receive adequate remuneration for their teaching but the real money is to be made in executive coaching and tutorials. For the non-celebrity academic the hours are long and the pay is relatively poor.

The universities that survive have models that collaborate well, are at the cutting edge of technology and head-hunt academic celebrities to promote their MOOCs. Publication of ideas is almost instantaneous and peer review occurs after publication through public review rather than prior to publication.

The career path to becoming an academic within this model is a peculiar hybrid of the old and new. Academics are still expected to have a PhD and this is still the biggest hurdle to entry. There is also the added requirement of technology enablement such that the academic can manage their own MOOC. The better they manage the MOOC, the more successful they are likely to be in their career. In addition, they need some ‘real world’ experience of how their knowledge can contribute to practice in order to legitimize their standing as the public intellectual.

For industry, the situation is bliss. They can access a range of free top-end learning materials and use them as and how they wish within their organisation. Staying up to date with the latest ideas is relatively easy and highly accessible, and the opportunity to gain academic credit is an option that can be taken up within a prolonged time period. This separation of learning and assessment means that organisational needs can be met as and when they arise, with the individual need for accreditation being satisfied in a timeline that better suits the individual concerned.

In terms of innovation, especially process and paradigm innovation, the importance of the ‘buzz factor’ and eye-catching elements that is central to drawing an audience does see innovation here more evolutionary than revolutionary in nature. A radical idea that is too far ahead of the curve will just not draw a crowd. But different ideas in thinking and ways of doing things can be tested and this is a very democratic participation space that is well suited to addressing large scale social innovations.

2. Leading knowledge creation

The university sector is much smaller than it was, with the transference of undergraduate provision to industry and the further education (FE) sector. Undergraduate (UG) education has been commodified to small, transferable modules that can be combined with work based learning to accumulate to degree awards. Undergraduate students are mainly part-time. FE colleges have degree awarding powers at undergraduate level. Call centres provide tutorial support.

A few, niche institutions – those that generally take the form of the ‘ancients’ with ‘castles on a hill’ – survive by offering the traditional full-time undergraduate experience to the upper middle classes and those who can afford to attend on this basis, offering an elite educational experience to the small percentage of the population who can afford it, with the remainder of the population engaging in more vocational and work-based qualification routes as the foundation for their careers. These ‘castle’ institutions can award undergraduate, postgraduate and doctoral qualifications.

The university sector is therefore mainly a postgraduate sector, offering postgraduate qualifications, doctoral

supervision and engaging in post-doctoral research. Entry into the university workforce is through the traditional research career entry route and the sector is returning to an academic workforce that has no experience of working outside of the university sector, focusing on cutting edge theoretical research that reframes societal problems for alternative solution development.

This small sector is largely government funded, but there are requirements for knowledge transfer and hence a new workforce has emerged in the sector of the professional who can manage the interface between the outside world and the university. This is a new role and involves public relations (PR), communications with business, brokering and selling the knowledge created in the university. This new role is highly qualified as the individuals need to fully understand what they are selling, but the individuals are not involved in creating what they are selling (i.e. they do not actually do the research themselves, but have the knowledge base to disseminate it to others). This is a highly paid new job role and is rewarded more highly than that of the professors who are creating the knowledge themselves. There are also a considerable number of administrators, project managers and technicians employed to manage the knowledge production process.

The job of an academic becomes highly privileged as those tasks that fall outside the realms of the individual immediate expertise are picked up by others. The academic is thus allowed to indulge themselves in the knowledge creation process in the comfort that others will manage and leverage their findings. It is not the most highly paid job because academics are unlikely to want to leave this position.

The university sector is concerned with leading innovation and contributing to policy, offering high level, conceptual development in an increasingly specialised manner. The job of building a critical mass of knowledge workers has transferred to the FE sector and the undergraduate provision of the university sector is concerned with developing its own future workforce.

This is a scenario that has conditions that support disruptive and transformational innovation, in part due to the concentration of a smaller number of institutions doing highly focused research work that has a significant buy-in by industry. This is not a scenario that is well suited to tackling social innovations due to its elite status in society. It has achieved this focus on high impact innovation by leaving the large scale education process to other providers.

3. Responsive knowledge creation

We have a dual sector which is crudely split between ‘pure’ and ‘applied’ provisions. Both sectors provide all levels of degree, with the pure specialising in the arts and

liberal subjects, leading to the doctoral qualification of PhD, while the applied specialise in vocational and professional qualifications, leading to professional doctorates such as the Doctorate in Business Administration (the DBA) or the Doctorate in Education (the EdD). A business school would not be located in a pure institution, nor would history be found in an applied institution. Law and medicine are situated in applied institutions.

The pure element of the sector is characterised generally by the ‘castle’ institutions, offering liberal arts, politics, philosophy and economics (PPE) and history. Research is funded by research councils, and can be described as ‘just in case’ knowledge production and is Mode 1 [28], that is knowledge creation for the purpose of answering a question. Institutions in this category represent the minority of the sector, accounting for 20 % of the workforce and 10 % of the students. The staff:student ratio in this side of the sector is higher than for the applied side. Academic careers are developed along traditional routes with undergraduate students remaining within the academe to study full-time for a PhD, obtaining very little work experience outside of the university sector.

Contractual terms are rigid and performance related and pay levels are determined by the minimum required in order to be able to recruit staff. There is some movement of staff from this sector to the applied sector, but no movement in the other direction.

The applied sector represents 80 % of the sector in terms of workforce and 90 % of the student population. This element of the sector is characterised by the redbrick and post-92 institutions and has a workforce that consists of individuals with a combination of academic qualifications and professional experience. Most of the workforce in this segment have experienced work outside the university sector.

The institutions operating in this area of the sector have strong links with industry and professional bodies and offer a wide range of undergraduate, professional and work-based learning qualifications, with only a small number of students undertaking doctoral research through professional doctorates. Postgraduate provision meets the continuous professional development (CPD) requirements of professional bodies.

Research in this sector is Mode 2 [28], that is knowledge creation to answer a specific question that meets a need, and can be described as ‘just in time’, being funded to problem solve and innovate for corporations, as well as to contribute to societal development through EU funded programmes and the public sector.

Contractual terms are variable, with flexibility in terms and conditions and performance related pay. Pay levels are determined by market forces, hence those employed in

the pure sector are likely to be paid less than those employed in the applied sector.

Innovation in this world is largely limited to the ‘castle’ institutions and is a scenario that is weak in paradigm innovation relative the other categories. Nor is this scenario propitious for social innovation.

4. Collaborative partners for local sustainability

The sector consists of regional universities, dispersed across a range of campuses, providing education at all levels to anyone who is beyond school age. Degree awarding powers are centrally held within the region and institutions lose their individual identity in favour of a regional identity, meeting regional needs and widening participation within that region – however a region might be defined. Competition within the sector is therefore between regions rather than within regions, allowing the various institutions that make up the regional conglomerates to play to their strengths. Institutions become mutually dependent as they specialise in certain areas of provision, working in partnership with others to provide a complete programme of study or learning experience.

Contractual terms are harmonised to encourage everyone to play to their strengths and career paths are much flatter but transferable and flexible. It is easier to move between teams and institutions as there is little pay differential between individuals and institutions within the conglomerate. Indeed, movement around the region is actively encouraged to enhance collaboration and increase knowledge transfer. Further education is subsumed into higher education as the application of knowledge through skills becomes paramount in the HE agenda.

Overall, being an academic is lower status than it currently is in society and less specialist. There is no benefit in making knowledge scarce or inaccessible, so the culture is one of knowledge sharing and networking; knowledge is managed generally as a team based expertise rather than having individual stars. In theory, anyone within a specific discipline can walk into a classroom and deliver the class as the curriculum is detailed down to the lesson learning outcome and activity plan.

The purpose of the conglomerate is educationally driven for a sustainable society and the contribution to the region, democracy, individual communities and the environment is greater than is currently the case. Funding is distributed through a regional core fund and then additional funding according to the need of the region. Efficiencies are achieved through regionalising services and quality functions and partnership working to the point that the conglomerate becomes embedded in the region and it is the obvious point of call for industry, the public sector and community groups, whatever their knowledge, education or research needs.

International activity occurs through partnership arrangements for development purposes which are mutually beneficial to all parties concerned, with neither party making a profit from the other.

Innovation in this scenario emphasises sustainability rather than disruption. It is relatively strong in regards to both Process and Paradigm innovation and would also be quite well placed to tackle social innovation, albeit with a regional focus.

5. Innovation think tanks for hire (project-based clusters)

Following the global financial crisis, the old university model no longer met industry’s needs. Employers no longer viewed holding a degree or an MBA as a premium as they were finding graduates to be too theoretical and generalist, ‘know it all’, and lacking in the practical skills of management and collaborative working. Graduates were generally finding well-paying jobs very competitively sought; no longer did a ‘degree’ virtually guarantee a job and the value of the degree was diminished. Securing employment became more of a priority for the younger generation than having a degree – studying became an ‘add-on’ you could do afterwards. Student debt was a real concern especially if further study did not result in a salary payoff.

Universities were shrinking their offerings by 2020 and by 2025 many schools/faculties were unviable and shutting courses. Those that survived did so by embedding themselves within industry partners to offer industry focused education relating to their subject discipline within the workforce, drawing on the organisation’s training staff and managers as part of the ‘delivery team’ while the traditional academic had reduced relevance.

As such, university education is now offered within corporate organisations, industry bodies, peak bodies/professional associations and government agencies rather than remaining exclusively within the university per se. Many of the traditional academic workforce retired early or took redundancy; those who can survive in this new world of ‘relevance’ are now employed by the new deliverers earning good salaries and are regarded as ‘thought leaders’ in their fields, publishing open source articles on the web to disseminate their ideas widely and seeking almost instant impact.

This is a highly exciting, responsive and innovative environment for these ex-university staff to be working in.

The career path to becoming an ‘academic’ is now one of years of work experience and part-time study culminating in the development of a knowledge, skill and expertise base that is seen as important enough to sustain in the development of the next generation coming up through the organisation. There is fluidity to the ‘academic workforce’, and the PhD is not an essential hurdle to entry, but rather a way of celebrating a significant contribution to a field of practice.

For industry, the benefit of developing talent within the workforce is realised both socially, economically and with regards to knowledge management and development within the organisation. As staff ‘graduate’ they contribute directly to the development of the organisation and ultimately give back to the organisation their wisdom and ideas through the development of others if they reach ‘academic’ status.

Academics sustain their personal development and research base through being invited into project based think tanks which tackle specific issues that need innovative solutions. The societal value and recognition of engaging in these think tanks is high and employers release staff to engage in them as it ensures they are kept at the leading edge of innovation in the field.

Innovation here often occurs in a place like ‘Google Labs’, discontinuous innovation around Process and Paradigm is a major focus along with the traditional innovation areas. This is not an especially suitable scenario for tackling social innovation.

Discussion

If we map the scenarios against the same potential categories of innovation (Table 2 below), we can see that our potential future states cover more of the innovative possibilities than the current state is contributing to. While universities might once have been the leaders in disruptive transformation, being the underpinning foundations of societal revolutions, and the centres of research and development, the lessons for innovative practice both for the sector and other institutions is one of how failure to change with the time can make your competitive advantage a future disadvantage. The strict boundaries of ethics committees, for example, can prevent social sciences research being undertaken in universities that can occur easily

Table 2 Areas of potential contribution to innovation for Universities: mapping the scenarios

Categorisation	Disruptive transformational	Disruptive evolutionary	Sustaining transformational	Sustaining evolutionary
Product innovation	S5	S3	S3 S5	S4
Process innovation	S2 S3 S5	S1 S3	S2 S4 S5	S1 S4
Position innovation	S4 S5	S4	S4 S5	
Paradigm innovation	S2 S5	S1	S1 S4 S5	S2 S4

in consulting and private practice. The boundaries to knowledge exchange and the requirement to publish in peer reviewed articles delays dissemination and utilization of research findings to a point that they are almost obsolete before they are published. The slowness of the implementation of accreditation process across universities means that changing the curriculum to remain innovatory and evolutionary is all but impossible, i.e. by the time one set of curriculum changes have been approved, developed and implemented, the curriculum has already moved on. The bureaucratic process that operationalizes the university has all but killed the idea it was trying to sustain.

While no one scenario will ever occur as it is written, as they are not predictions, there are elements from each scenario that clearly indicate that shifting the university from its current paradigm and *modus operandi* will enable it to contribute more fully to innovation in the future.

Universities need to now start changing their practice and behavior in order to prepare for these future scenarios so they are robust enough to survive should such a future emerge, or indeed they should start to shape the path towards such a future in an effort to secure their own longevity. While the focus to date in university management has been on the management of the teaching, research and the functions of the university bureaucracy itself, the focus on innovation and the management of such has been lost. As such, the sector needs to move away from focusing on managing operations towards a focus on managing outputs and outcomes. Innovation would result from this shift in direction.

Conclusions

The university can play a passive or active role in supporting, sustaining, developing and promoting innovation in society going forwards. Chesborough recognizes the need for external sources of knowledge in developing innovative ideas so that organisations do not become too inwardly focused in a process of open innovation [29]. GPEARl suggests that the sources that provide useful information for new innovation projects or those that contribute to the conclusion of innovation projects in progress are the most useful sources of innovation information [30], and again, these can be found externally, such as in an university.

Janeiro et al. found that successfully innovating firms use universities to a greater extent in their innovation activities and this might indicate the firms' recognition of the role that universities play in knowledge development [31]. Although access to universities can be difficult for some and was found to vary in intensity from industry to industry. The social innovation process is greatly enhanced and local network clusters are formed [32].

But this is about more than just economic innovation – it is about society and the future of the world we want to live in. Urama & Acheampong of the African Technology Policy Studies Network claim 'Social innovation has become even more important for sustainable economic growth in recent times. This is partly because some of the barriers to lasting and sustainable economic growth (such as climate change, youth unemployment, aging populations, and increased social conflicts) can be overcome only with the help of social innovation, and partly because of rising demands for alternative models of economic growth that enhance rather than damage human relationships and well-being' [33]. And this does not apply to Africa alone. Most Western economies have the same social problems impacting on societal well-being.

There is a need to continually review innovation management as a process to ensure it remains innovation. In essence, can innovation be managed or is it managing the conditions in which it occurs. Loogma et al. illustrate how a social innovation process itself can be adopted to bring about the change process in education that then further facilitates social innovation itself in a cyclical arrangement [34]. Their example of education in Estonia required a significant shift in education provision which may not be dissimilar to that required now if the university is to add value beyond 2025.

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