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Learning to manage innovation

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Abstract: This paper looks back at the origins of 'innovation management' (IM) as a field of study, arguing that it represents a convergence of at least three important streams of thought. It shows how IM has moved centre stage to a point where understanding how ideas can create social and commercial value and drive growth are increasingly seen as 'life skills' and form part of the policy discourse in bodies like the European Union. This makes the role of higher education institutions increasingly relevant as key centres for enabling their development. The paper explores current challenges in the world of IM pedagogy in terms of design and delivery, curriculum development, assessment and skills capture and, in particular, the implications of generative AI for the future of the field.

Keywords: Innovation management education, skills, competencies, ISO56000 series, AI and education, VISION project

1 Introduction

Understanding how innovation happens is a key challenge in modern society. Observations about what works in practice have led to normative guidance; in particular, the idea that innovation – whether those parts concerned with the 'front end' like R&D or the downstream operations associated with production and distribution – can be organised and managed in a systematic fashion (Tidd & Bessant, 2024).

Central to this research have been attempts to understand the roots of success and failure and the identifiable patterns associated with them at the project and at the contextual level (Freeman, 1974; Rothwell, 1977; Carter & Williams, 1957; Langrish et al., 1972). Gradually, the idea of behavioural routines has emerged, highlighting patterns of behaviour linked to activity at various stages of the journey from idea/opportunity identification through to creation of downstream value, which begin as trial-and-error experimentation but gradually become embedded and codified into policies, procedures and processes) (Nelson & Winter, 1982).

The current interest in the International Standards Organisation guidance (ISO56000 series) reflects the progress of over a hundred years of such research (Hyland et al., 2022). It now becomes possible to specify the key elements and interactions in a viable

innovation management system and the skills and competencies needed to deploy one effectively.
Codifying such accumulated experience is valuable, but it raises the question of how to specify and train the skills needed to create and operate such routines within an innovation management system. And to do so in different contexts. This paper explores how IM education and training have emerged and continue to develop to meet this need.

2 The evolution of innovation management teaching (IM)

The process of identifying relevant skills and practices (through a mixture of research and reflective practice) and of codifying this knowledge into courses and training programmes dates back at least a century (Gillis et al., 1991).

The early history of teaching IM was one of fragmentation and gradual convergence. To take a metaphor, we can think of a river system which begins with small springs and sources which accelerate their way down different mountain slopes, growing in volume to become significant tributaries and eventually converging into a powerful mainstream.

Three major tributaries have been involved. One emerged from work in engineering schools, where concerns were around technological change aimed at productivity improvements and also the deployment of major process innovations. Lessons learned here were codified and taught in fields like operations management and industrial engineering.

In parallel, a second tributary could be found within business schools, where concerns centred on key functional areas such as marketing and product innovation, R&D strategy as a subset of business strategy, and the role of finance in accounting for and providing the risk capital to enable innovation. Human resource management was also involved in pockets, for example, around how to manage technical professionals or how to stimulate creativity; early studies in the ‘human relations’ movement, like the Hawthorne work, fed an important strand around employee engagement and productivity (Roethlisberger & Dickson, 1939). Organisational behaviour examined key themes such as functional organisation, handling differentiation, and integration. (Within this, a smaller and, for a long time, much smaller tributary could be found in the entrepreneurship field, which began with concern for the small business foundation and growth. The key role which entrepreneurs play and the potential for start-up-led growth only emerged during the 1990s.)

A third important tributary can also be plotted on our river system map. With its roots in the concern felt by scientists and engineers about the potential for misuse or deviant application of new technologies (not least derived from experience on two major world wars) a movement emerged concerned with the social impacts of science and technology (STS) This stream drew together researchers from many different disciplinary backgrounds concerned to articulate and understand the process of technological change and how it could be harnessed in responsible fashion (Owen et al., 2013).

Applied research centres began to emerge with a focus on action, primarily in national policy-making, but with some interest in the internal mechanics and decision-making within firms. One of their most important contributions was as a focus device, bringing together what was known from different disciplinary directions and creating a core curriculum, often offering specialist master 's-level courses or short courses targeted at increasing awareness and understanding in governments.

The relevance of this strand of IM teaching and its wider policy significance could be seen in, for example, concerns about the employment implications, particularly of microelectronics, during the 1980s (Bessant & Dickson, 1982). This gave new impetus to STS-related research and creating a demand side of firms and policy makers wanting to understand how knowledge translated into practice and how this could be effectively managed (Owen et al., 2013).

Whilst there was interaction between these tributary fields, the process of convergence was slow until the 1980s. It was accelerated by the significant explosion of concern focused around key technologies with potentially enormous transformative power – particularly microelectronics and biotechnology. These had moved beyond the lab to the point where their widespread application in products and processes became possible – but they needed to be situated within a strategic framework (Bessant & Cole, 1985).

2.2 Convergence and emergence as a distinct field

The growing interest in how we might effectively manage innovation found expression in an influential report published in 1987 by the US National Research Council, which talked about 'the hidden competitive advantage' which effective management of innovation could contribute (National Research Council, 1987). They used the term 'management of technology (MOT) to cover linking " engineering, science and management disciplines to plan, develop and implement technological capabilities to shape and accomplish the strategic and operational objectives of an organisation"

It came at an opportune moment; the external environment was shifting dramatically; amongst key characteristics highlighted by the study were:

- R and D expenditure was increasing, generating increasing technological opportunities
- The share of 'knowledge workers' was growing, with more involvement in the development and use of technology
- The mean time between new generations of technology was being reduced
- Hitherto unrelated technologies were being integrated into new products, making product technologies more complex
- The increasing demands for high product and service quality had extended R and D work over the company boundary to include suppliers as well
- The innovation process was seen as taking place in global or regional technology systems
- The dependency of firms on external sourcing of technology was growing
- New manufacturing technologies were available and were being used globally, often at a faster rate than prior technologies used to be
- Technological protectionism was increasing.

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The report highlighted concern that the existing provision of management training was not well-equipped to help provide the particular set of skills combining understanding of science, engineering, business and social science across a wide range, which would be needed to help deal with these challenges. The report commented that while huge resources were being devoted to developing technology - for example, the USA spent around $97bn/ year in projects involving over 1 million scientists and engineers at that time - there was little formal education or training available, which might guide managers in the process.

The implied call to action was somewhat exaggerated, but it did serve to accelerate activity in the field. Isolated courses had existed for many years (for example, a University of Miami survey identified several engineering management courses which date back to the 1930s, whilst the MIT Industrial Management programme was established in 1913). But the late 1980s saw rapid expansion; for example, an IEEE survey in 1989 found 184 specialist MOT courses and programmes reported across more than 20 countries, including both industrialised and developing countries. Previous surveys in 1976 and 1982 revealed the existence of 32 and 84 programmes respectively (Bell et al., 1992).

By 1992, there had been significant growth in the provision, both in the sheer number of courses and in their variety and geographical distribution. In that year, a review suggested most growth had been in post-graduate or post-experience courses; there were over 300 courses in over 30 countries worldwide, in addition to many short courses and in-company programmes.

That acceleration continued, and the field began to mature in terms of a subject being widely taught and with a growing number of faculty building on their own research work and evolving into teachers of innovation management. There are currently well over 1,000 courses available in IM at higher education institutions, and many other short courses are offered by consultancies, research institutes, etc. There has also (particularly as a result of pressures imposed by COVID-19) been a significant expansion in the number of online courses available, varying in length from short MOOCs to full-scale M-Level provision.

Perhaps of particular relevance has been the huge growth in entrepreneurship as a complementary field, dealing not only with the start-up perspective but increasingly with internal entrepreneurship inside larger organisations and with entrepreneurship as a core ‘life skill’ which is being taught from school level upwards (Katz, 2003). The difference has primarily been in perspective; much entrepreneurship teaching focuses on individual skills and capabilities, whereas IM has tended to look at organisational routines and capabilities (Aulet, 2013). (That line is increasingly blurred, as is the definition of ‘entrepreneur’. Peter Drucker perhaps captured the artificial nature of the separation, commenting that ‘innovation is what entrepreneurs do’; the main message these days is that they do it in many different contexts (Drucker, 1985).

Significant impetus was given in the USA in the early 2000s with the Kauffman Campuses Initiative, which provided hundreds of millions in funding to embed entrepreneurship across entire university campuses, not just business schools. At the same time, there was considerable growth in endowed chairs and the formalisation of entrepreneurship PhD programs, which provided research underpinning (Kuratko, 2005). While the US led much of the early expansion, there has been significant growth in the last 15 years in Europe, China, and India, spurred by government mandates (e.g., the

European Commission’s EntreComp framework) aimed at driving national competitiveness (OECD, 2008).

Curriculum and pedagogy also shifted away from a focus on the traditional business plan; the argument was that entrepreneurship should be taught as a method rather than a linear process that ends when a business is launched. Influential alternative models emerged like Lean Startup and the theory of Effectuation, which emphasises starting with available means rather than fixed goals (Ries, 2011; Sarasvathy, 2008). This was accompanied by a shift towards experiential learning and the rise of incubators, accelerators, and "venture creation programs," in which students were encouraged to start real companies as part of their assessment.

Over the past decade, entrepreneurship has moved beyond venture creation to become a "mindset" for all disciplines. Programmes are now deeply embedded in STEM, the Arts, and Social Sciences, focusing on "entrepreneurial thinking" as a tool for career resilience. In parallel, has come a significant pivot toward purpose-driven entrepreneurship with courses focused on the UN Sustainable Development Goals (SDGs) and B-Corp models arguing for more than pure profit maximisation. Universities themselves have changed, now acting as hubs for regional economic development through technology transfer offices and campus-based venture funds.

The growth of a distinctive field around I&E has also meant an expansion in communities of practice for teachers to share experiences and ideas. Across all major management academies, there is now a strong representation of innovation and entrepreneurship, with much of it focused on the teaching challenge. This has led to a growing suite of resources to support IM teaching – cases, toolkits, and, increasingly, video and audio material. Significantly, until the mid-1990s, there was no textbook covering the field of IM in an integrated fashion; instead, it was left to teachers to assemble their offerings from a mixture of sources and articles reflecting different disciplines and tools.

Whilst the above discussion focuses on formal qualifications delivered primarily by educational institutions like colleges and universities, there has been a parallel growth in specialist training offered within organisations and by the consulting sector. These offerings tend to be more topic-focused, delivering short-term and highly focused training around key elements within the broad IM range – for example, in creativity techniques, product development, intellectual property management and business model creation and deployment.

2.3 Changing perspectives

IM education has continued to develop as an increasingly important field, characterised by specialist programmes as well as complementary short courses and ‘add-ons’/electives to existing study programmes. At the same time, new developments in the wider sphere of research and practice have drawn new topics and approaches into the field. These include:

- ***open innovation*** – innovation as a multi-player game has been recognised for a long time; however, the focus on systems and interactions amongst different players remained less well-developed, with emphasis being placed on the individual enterprise and later on its immediate strategic partners, collaborators and competitors (Rothwell, 1992).

Multiple trends were accelerating and converging to create a 'knowledge-rich' world with a massive increase in the range and volume of potential trigger signals for innovation (Bessant & Venables, 2008). It brought recognition that the creation, accumulation, and ownership of knowledge were less important than the ability to manage knowledge flows into and out of the enterprise strategically (Chesbrough, 2003).

This has led to a significant expansion of what is considered the 'core' of IM teaching, drawing in a range of new or modified IM skills (Bogers et al., 2018). These include:

- Managing knowledge flows rather than focusing on creation and accumulation
- Enabling knowledge trading via different mechanisms
- IP management issues raised by such trading
- Managing asymmetrical relationships based on knowledge power
- Finding, forming and enabling performing networks
- Elaborating and enabling absorptive capacity in an OI landscape
- Creating and governing ecosystems
- Platform business models and their organisation and management

- ***The digital transition*** – Increasing emphasis on a digital sphere of operations with implications for a 'boundaryless' networked world where 'richness' (the content of interactions no longer had to be traded off against 'reach' (the number of people involved). The rapid rise of the internet, with an estimated 6 billion people now connected, has enabled business models that transcend geographical boundaries, and platform businesses that evolved with this expansion now dominate the world economy.

- ***Growth in globalisation*** and the rise of industrial economies like China, India, and Brazil have meant that innovation and its management now play out on a global stage with significant geopolitical influences as part of the story.

- ***Sustainability as a core strategic priority*** – living and working in a world of 9 billion people with rising expectations, providing energy, food and resource security, dealing with climate change, tackling pollution and a host of other issues will require massive change in products, service, processes, marketing approaches and the underlying business models which frame them (Kaplinsky, 2021). These changes – towards new models such as 'the circular economy' – imply a new set of skills to add to the core IM canon.

- ***Users as key actors*** – growing evidence supports the case for user inclusion in innovation. Users are central to the innovation process and demonstrably have a great deal to contribute; ignoring their voices seriously weakens any innovation strategy (Von Hippel, 2005). Their involvement offers advantages in at least three core areas:
    - expansion of idea generation capacity; Eric von Hippel and colleagues have aptly labelled this 'free innovation', arguing that for companies this represents a powerful but rarely tapped resource which can complement existing R&D and market research efforts (Cordeschi, 2007).

- impact on downstream adoption and diffusion; moving innovation to scale requires addressing issues of 'compatibility' – how well does an innovation fit within the context for which it is targeted? (Rogers, 2003; Moore, 1999) By definition, user innovators understand the context and are able to access key tacit knowledge about it so that their designs are likely to fit more effectively.
- costs of exclusion; participative design, which has its roots in the socio-technical systems design work of the 1950s, has become a key element in change management around large-scale process innovation (Trist & Bamforth, 1951; Mumford, 1979).

3.0 The AI challenge

The term 'artificial intelligence' (AI) was coined at a conference in 1956, when it was used to refer to "any aspect of learning or any other feature of intelligence can be so precisely described that a machine can be made to simulate it."(Cordeschi, 2007). Whilst this puts current artificial intelligence (AI) close to its 70th birthday, the resulting developments were slow and of little interest beyond the realm of computer science. That is, until 2022, when OpenAI launched its ChatGPT transformer model and sparked a massive acceleration in both interest and applications. Some see the technology as 'revolutionary', offering a solution looking for a problem. Andrew Hargadon captures this kind of emergence as being characterised by a 'long fuse, big bang' pattern (Hargadon, 2003).

In terms of innovation management practice, AI has made massive and significant advances in capability, but along a frontier which Ethan Mollick memorably describes as a 'jagged edge' (Mollick, 2024). This 'jagged edge' is matched on the demand side by a differing picture of adoption and impactful implementation; there are a handful of impressive cases where AI has been used to powerful effect, but in many other areas, while the potential appears to be there, the actual experience so far is limited in impact.

Potentially, AI could have a significant impact on the many activities which constitute an organised innovation process, improving or, as some suggest, transforming the way we organise and manage it. Table 1 below summarises this potential range of AI applications.

Table 1 Potential AI applications in innovation management

Stage	*Key activities*	*Specific AI Applications / Capabilities*
Search	Trend spotting, Market intelligence, Idea generation, User need identification, Research	Data mining, NLP, Sentiment analysis, Pattern recognition, Generative models, Literature synthesis
Select	Idea screening, Evaluation, Forecasting, Feasibility assessment, Portfolio balancing	Predictive analytics, Machine learning classification/ranking, Simulation, Risk analysis
Implement	Prototyping, Design, Development (Code/Physical),	Generative design (visual/code/physical), Code

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	Project Management, Testing, QA	completion/debugging, Automated testing, Process automation, Simulation, Robotics
Capture	Market feedback analysis, Performance monitoring, Value assessment, Knowledge capture, Predictive support	NLP, Sentiment analysis, Usage analytics, Predictive modelling, Automated reporting, Knowledge synthesis, Chatbots

Such application potential raises major questions around the role of AI as opposed to human intervention at various stages in the process and the skills which will be required to operate in this context.

4.0 Beyond the curriculum – how should we be teaching?

So far, we have been reviewing the changing landscape of IM teaching in terms of the core curriculum – what is the content of skills development programmes that are now available? With the advent of the ISO 56000 series of standards around innovation management we are now moving towards a competency model which captures the skills and knowledge required of someone practising in the field and this maps well on to the above curriculum.

But we need to look beyond the content of what needs to be delivered in I&E education and towards challenges in the ways in which such learning can be enabled. Growth in demand for IM skills has been significant, especially in the area of entrepreneurship and is distributed increasingly across the public and not-for-profit sectors as well as commercial operations. This is drawing in an increasing number of diverse actors on the supply side, and this diversity is matched by considerable expansion in the delivery systems, from full-time traditional education to part-time and short-term courses made available in face-to-face, online and hybrid formats. Enabling delivery technologies (particularly since the COVID-19 pandemic) has proliferated to enable new modes of learning. And AI is increasingly present as a developing and challenging force, offering considerable scope for innovation in learning design, delivery and assessment.

A major attempt to capture and explore these shifts was made in 2019 with an EU-funded project under the auspices of the Erasmus Plus programme. The VISION project brought together a mixture of university researchers, practitioners from a variety of public and private sector organisations, policy makers and support organisations, and was designed to explore the changing landscape for IM education and training (Papageorgiou et al., 2022).

Using an integrated and proven suite of tools for systematically exploring the future, the VISION team engaged with over 130 stakeholders, built a variety of scenarios and explored them in depth through workshops, webinars and other tools to create a detailed picture of the emerging challenges and opportunities in this space of learning facilitation around innovation, creativity and entrepreneurship.

The process highlighted challenges for many different actors – learners themselves, of course, but also those who facilitate learning, teachers, trainers, coaches, and consultants, who do so in many different settings.

The project identified a number of dimensions along which change will continue to occur, setting the agenda for adaptation in the IM skills delivery system. These include:

- ***Purpose*** – developing knowledge and capability needs to be linked to a shift in thinking about the underlying purpose – what is innovation for? Increasingly, its purpose is being questioned and reframed, with a growing concern for principles like responsibility and inclusion and a focus on social innovation as much as commercial.
- ***Crossing knowledge boundaries*** – a second shift is a world where learning and the education process underpinning it moves from a narrow discipline-based approach to one which recognises the need for interdisciplinary collaboration. Not surprisingly, this shift towards seeing IM as a cross-disciplinary, challenge-led practice is leading to changes in the structures of institutions designed to facilitate learning. These are already converging, and the trend towards collaboration and mutual exchange is likely to accelerate.
- ***Bridging different worlds*** – this idea of knowledge collaboration links with a third major shift – towards cross-sector, cross-institutional collaboration. Increasingly, the 'ivory tower' notion of universities and other 'seats of learning' does not play well with the realities of our challenging environment. Rather than being connected to their communities by a narrow causeway, they are increasingly embedded in those communities, supporting innovation by facilitating the flow and utilisation of knowledge and experience across different sectors.
- ***Beyond the classroom*** – learning spaces is where we find another shift. With innovation as a practice targeted at grand challenges and drawing on multiple strands of knowledge woven together in a collaborative fashion, the question is inevitably raised around the physical environment in which learning might take place. The current model is still predominantly one that has been around for centuries, in which learning takes place within a physically defined space – a classroom or lecture theatre- and where key roles are embedded in the architecture. That has begun to change with growing interest in alternative models such as the flipped classroom or project- or challenge-based learning. There has been considerable acceleration in experiments around alternative approaches (and the environments they imply). Coupled with this has been the dramatic shift (accelerated by the Covid-19 pandemic) to learning, which takes place increasingly online. This has long been seen as a potential site of disruption; online technologies enable massive reach (in terms of accessing students) but without compromising on the richness of the learning experience. Examples include otherwise unknown institutions like the University of Phoenix (located in the middle of a desert but with a huge student base), the University of Southern New Hampshire (with its degree programme targeted at thousands of displaced people living in refugee camps) or Monterrey Tech, which numbers a student base close to a million strong from the mountains of Mexico. The future is almost certain to involve some kind of hybrid provision rather than a return to the 'business as usual' of face-to-face learning.
- ***Changing the content of IM learning*** – the VISION study also underlined future challenges to the IM curriculum. In particular, it suggests that possession of 'hard skills' – know-how – may not be enough in a future context in which being able to effect change will be a key part of being a successful IM player. This requires much more understanding of people, whether in terms of why they might or might not adopt new ideas, or in being able to empathise with them. Design thinking has

already made a big impact in IM education by introducing the concept of empathy but there is considerable further scope for bringing in other 'soft' skills around emotional intelligence, influencing people, understanding diversity and enabling inclusion.

- ***Changing role of the 'teacher'*** – the research suggests that this is likely to move away from simple information provision towards teachers being designers and facilitators of learning journeys. The role will involve several components - a curator of knowledge, a coach, a mentor; in the process we may find ourselves rediscovering the old models of universities as places where the bulk of activity was student-centred 'reading' for a degree. The role of the professor was to help students make sense of what they had earned – less 'broadcasting' of knowledge and more enabling its acquisition through tutorials and other forms of engagement.
- ***Assessment and evaluation*** – learning in traditional models is usually accompanied by some form of assessment and evaluation, measuring progress against external metrics like passing an exam or successfully completing a quiz. But in the future, there is likely to be a shift in this whole evaluation structure – learners become what they produce, they become the changes they make. Demonstrating the ability to reflect on practice and to utilise key concepts acquired during training might offer fruitful alternative pathways. Given the pattern outlined above, with more boundary-crossing, project-based activity, and the development of skills in the context in which and how they will be needed, traditional evaluation models like examinations and essays are unlikely to be appropriate. Instead, a move towards more project and outcome-based models, involving a wider range of stakeholders in the assessment process, is needed.
- ***Technology as a key enabler*** – there are clear and significant opportunities to enrich the learning experience, although the cost and scale of investment required will make it an issue of strategic priority. The shift towards online learning has already spawned a flurry of start-up activity bringing new ideas to the educational space, and platforms to support video, audio and extended learning are amongst the biggest areas of growth in the late-COVID economy.

So far, many of these have integrated what is currently available, making it possible to prepare and deliver mixed-media learning inputs at scale and distribute them to a wide, remote marketplace of learners. But other developments are still to come – for example, in the field of virtual and augmented reality (VR/AR). Here, it will be possible to configure learning environments of different kinds, transporting students to workplace settings and classrooms, integrating virtual participants from different geographic regions, introducing avatars and even virtual 'doubles' of lecturers to enhance the learning experience. AI will also play a key role in both delivery and assessment; for example, offering interactive simulations which allow students to explore complex and challenging innovation situations as a rehearsal for the real thing.

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References

Aulet, B. (2013). Disciplined entrepreneurship. Wiley.

Bell, M., Bessant, J., & Hoffman, K. (1992). Technology management in the new industrial environment: Strengthening India's capacity ofr training and research in the management of technology. Sussex Research Associates.

Bessant, J., & Cole, S. (1985). Stacking the chips: Information technology and the global distribution of income. Frances Pinter.

Bessant, J., & Dickson, K. (1982). Issues in the adoption of microelectronics. Frances Pinter.

Bessant, J., & Venables, T. (2008). Creating wealth from knowledge: Meeting the innovation challenge. Edward Elgar.

Bogers, M, Chesbrough, H, & Moedas, C. (2018). Open Innovation: Research, Practices, and Policies. 60(2).

Carter, C., & Williams, B. (1957). Industry and technical Progress. Oxford University Press.

Chesbrough, H. (2003). Open innovation: The new imperative for creating and profiting form technology. Harvard Business School Press.

Christensen, C., Johnson, C., & Horn, M. (2010). Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns. McGraw Hill.

Cordeschi, R. (2007). AI turns fifty: Revisiting its origins. Applied Artificial Intelligence, 21(4–5), 259–279.

Drucker, P. (1985). Innovation and entrepreneurship. Harper and Row.

Freeman, Chris. (1974). The economics of industrial innovation. Penguin.

Gillis, A, Macrossan, W, & Miller, C. (1991). 'Management of technology: An emergent discipline?,. Industry and Higher Education, 5(3), 179–186.

Hargadon, A. (2003). How breakthroughs happen. Harvard Business School Press.

Hyland, J, Karlsson, M, Kihlander, I, Bessant, J, Magnusson, M, & Kristiansen, J. (2022). Changing the dynamics and impact of innovation management. World Scientific.

Kaplinsky, R. (2021). Sustainable futures. Polity Press.

Katz, J. (2003). The chronology and intellectual trajectory of American entrepreneurship education: 1876–1999. Journal of Business Venturing, 18(2), 283–300.

Kuratko, D. (2005). The Emergence of Entrepreneurship Education: Development, Trends, and Challenges. Entrepreneurship Theory and Practice, 29(5), 577–598.

Langrish, J., Gibbons, M., Evans, W., & Jevons, F. (1972). Wealth from knowledge. Macmillan.

Mollick, E. (2024). Co-intelligence. W.H. Allen.

Moore, G. (1999). Crossing the chasm; Marketing and selling high -tech products to mainstream customers. Harper Business.

Mumford, E. (1979). Designing human systems. Manchester Business School Press.

National Research Council. (1987). Management of technology—The hidden competitive advantage. National Research Council.

Nelson, R., & Winter, S. (1982). An evolutionary theory of economic change. Harvard University Press.

OECD. (2008). Entrepreneurship and Higher Education. Organization for Economic Co-operation and Development.

Owen, R., Bessant, J., & Heintz, M. (2013). Responsible innovation. John Wiley and Sons.

Papageorgiou, K, Kokshagina, O., & Bessant, J. (2022). Envisioning the future of leanring for creativity, innovation and entrepreneurship. De Gruyter.

Ries, E. (2011). The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses. Crown.

Roethlisberger, F., & Dickson, W. (1939). Management and the worker. Harvard University Press.

Rogers, E. (2003). Diffusion of innovations (5th ed.). Free Press.

Rothwell, R. (1977). The characteristics of successful innovators and technically progressive firms. R and D Management, 7(3), Article 3.

Rothwell, R. (1992). Successful industrial innovation: Critical success factors for the 1990s. R&D Management, 22(3), Article 3.

Sarasvathy, S. (2008). Effectuation: Elements of Entrepreneurial Expertise. Edward Elgar.

Tidd, J, & Bessant, J. (2024). Managing innovation (8th ed.). John Wiley & Sons.

Trist, E., & Bamforth, K. (1951). Some social and psychological consequences of the longwall method of coal-getting. Human Relations, 4(3), Article 3.

Von Hippel, E. (2005). The democratization of innovation. MIT Press.

Von Hippel, E. (2016). Free innovation. MIT Press.