

JPIM Special Issue

Digital Transformation and Innovation Management: Opening Up the Black Box

Guest Editors:

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Motivation for the Special Issue

Digital transformation describes the deep-seated changes in industrial and organizational activities, processes, and competencies required to seize the opportunities and respond to the challenges engendered by the new digital paradigm, including a vast array of enabling technologies, such as the Internet of Things, Additive Manufacturing, Big Data, Artificial Intelligence, Cloud Computing, Augmented and Virtual Reality, and Blockchain (Rindfleisch et al., 2017).

Digital transformation has attracted the considerable interest of both scholars and practitioners given its enormous potential impact on products, services, innovation processes, and business models (e.g., Andal-Ancion, 2003; Lyytinen et al., 2016; Nambisan, 2017), signaling a radical departure from the effect of the so-called web 2.0 paradigm on innovation, enabled by technologies such as social media, virtual worlds, and content management systems. Examples of this radical departure are smart and connected products (e.g., cars, machines, appliances, thermostats, watches, and many others) with profound and wide-ranging effects on the competitive dynamics, business models, value chains, and requisite competencies of manufacturing and service firms (Porter and Heppelmann, 2014, 2015; Iansiti and Lakhani, 2014; Svahn et al., 2017).

The radical impact of digital transformation is evident when considering the changes in the ranking of the ten largest listed companies by market capitalization in the USA in recent years, now including firms such as Alphabet (Google), Amazon, and Facebook, which have seized the opportunities of applying digital technologies to enter a variety of more traditional industries, including IT services, cultural heritage, mortgages, news, energy (to name but a few). The effects of this transformation can also be disruptive in established industries. The automotive sector is a pertinent example, as a recent Financial Times article reported (25 January 2017), “[...] in the future, 50-60% of the value of a car will consist of digital devices and tools” (Peter Altmaier - Chief of Staff of the German Chancellery and Federal Minister for Special Affairs).

This transformation has the potential to affect the different stages of the innovation process in ways that are complex and causally ambiguous due to the vast array of enabling technologies and the multitude of ways in which they can "augment" product and service performance (e.g., Hui, 2014; Iansiti and Lakhani, 2014; Barrett

et al., 2015). Digital transformation reduces the time needed to develop and launch innovations, shrinks the lifecycle of new products and services on the market (e.g., Marion, 2015), and requires companies to cross-fertilize their knowledge base with technologies they are not familiar with. The boundaries between industries and product categories become blurred, and competition is increasingly shaped by multi-sided platforms and their related ecosystems. Successfully responding to these challenges requires agility as well as dynamic capabilities in product and service development (e.g., Kock and Gemünden, 2016), which in turn requires bold changes in the way the innovation process is managed, how innovation activities are organized and governed, and the competencies and attitudes of those involved in innovation processes.

Despite broad awareness of the changes that digital technologies bring to innovation processes, several gaps hinder a more complete understanding of how digital transformation affects product and service development. Likewise, gaps exist in relation to the strategic implications of decisions in these processes in domains such as technological partnering, product/service design and engineering, organizing product development specialist teams, and new product market positioning. Some of these gaps stem from the fact that the role of digital technologies in supporting innovation management or new product value propositions may not always be necessarily positive. In this sense, the information systems discipline has always been at the forefront of informing our understanding of how digital technologies can become a source of unintended rigidity and vulnerability (Lu and Ramamurthy, 2011; Ransbotham et al., 2016).

These new and still relatively unexplored challenges for the innovation management discipline have recently been described in some editorials and essays. Nambisan et al. (2017) argue that digital technologies favor more fluid and complex boundaries (at the spatial, technological, and organizational level) of the innovation process, enabling a shift toward more distributed organizational forms, structures, and processes for innovation, and creating more complex and dynamic interdependencies between innovation processes and their outcomes (products/services). Bharadway and Noble (2016) document new operational and strategic issues related to the role of (big) data in new product and service development, implying changes in the role of managers and specialists, customers and complementors, in relation to their direct or indirect involvement in the innovation process. Teece (2017) adds more granularity to the concept of technological complementarity and how this affects value capture and specialization in the value chains of industries more affected by digital transformation.

The difficulties in extending the knowledge of these contributions also stems from the fact that the theoretical categories widely used in innovation research were developed well before the effects of digital transformation became visible in innovation management practice. Hence, how digital technologies sustain - and change - the foundations of organizational learning, absorptive capacity, combinative capabilities, dynamic capabilities, or shape open innovation and technological complementarities, remains underexplored. Big data and simulation approaches can engender new micro-foundations for absorptive capacity and organizational learning. For example, applying IoT and big data tools to the analysis of the mechanical and structural properties of 3D-printed objects may have a complementary role to additive manufacturing, supporting learning needed for the replicability and scalability of such manufacturing processes.

In sum, further theoretical and empirical research is needed to illuminate the intricate relationship between digital transformation and innovation processes. This special issue is aimed at advancing our knowledge on the topic by encouraging multidisciplinary research that refines, broadens, and develops novel interpretative frameworks and theories which will hopefully inform innovation management practice.

Scope and Focus of the Special Issue

In line with JPIM's research priorities (Barczak, 2014; Biemans and Langerak, 2015), the theoretical and empirical papers published in the special issue will aim to elucidate how digital transformation affects innovation ecosystems, how industries and firms compete and organize for innovation under the effects of digital transformation, how the processes for developing new products and services change under the effect of digital transformation, and the implications of digital transformation on managing people involved in innovation.

For each of these pillars, potential topics and research questions for the special issue may include but are not limited to:

- *New product and service development process:*
 - How does digital transformation influence the speed and effectiveness of the product development process? What new agile development opportunities are offered or required when firms leverage digital technologies to innovate their offering? How can such agility be deployed in manufacturing sectors where standards and regulatory compliance entail more linear approaches in the go-to-market?
 - How should a firm combine its core knowledge assets with digital technologies to develop new products and services? How should a smart connected product be designed to prevent disintermediation from partners or limited value capture?
 - How do digital technologies, such as additive manufacturing, virtual prototyping, or simulation of production processes foster greater agility in innovation processes, enabling new types of experimentation, exploration, and “fast fail” approaches? By contrast, what are the “flexibility traps” that in the digital world lead companies to wrong choices with limited strategic reversibility?
 - How does the addition of enhanced digital technology features affect engineering, manufacturing, and marketing complexity? Which dimensions of complexity increase and which decrease?
 - How does digital transformation change the role of customers, opening doors for the adoption of a more customer-centric approach, hence contributing to reducing the market uncertainty of new product and service development?
 - Does digital transformation lead to new technological epiphanies? Which companies are more capable of proposing such discontinuities in meanings and value propositions?
 - How does digital transformation change product lifecycle management approaches?

- *Organizing for innovation:*
 - How does digital transformation pave the way for new types of learning and new approaches to developing dynamic capabilities?
 - What changes does digital transformation entail for the organizational functions and structures involved in innovation? Which types of inter-departmental collaborations and innovation cultures are required to develop smart and connected products? How should firms organize to effectively combine their core “traditional” knowledge assets with digital technologies? Are new types of spatial, organizational, and professional connectedness needed in smart and digitalized companies to accommodate the fluid boundaries of their innovation processes?
 - How does digital transformation affect the role of gatekeepers and boundary spanners in light of the availability of new tools for market and technology intelligence?
 - How do the roles and importance of R&D and marketing change under the effect of digital transformation? By contrast, is the role of manufacturing processes becoming relatively less important in value creation and capture, thereby prolonging the trends of global value chains in the last three decades?
 - How are open innovation activities organized to take full advantage of the opportunities digital transformation offers?

- *Innovation ecosystems:*
 - How does digital transformation influence horizontal collaboration (co-development and co-creation with partners at the same level of the value chain) and vertical collaboration (with partners at different levels of the value chain) for innovation?
 - How does digital transformation impose developing new alliances, entering new ecosystems, reducing or increasing the degree of vertical integration in the firms’ value chain?
 - Under what circumstances does digital transformation enable more distributed – self-emerging – business ecosystems and when do these lead to ecosystems with a high degree of centralization? How do platforms control the new ecosystems?

- How can SMEs leverage assets in new product development that are available within or outside their traditional ecosystems? What role does cloud and high-performance computing have on eliminating frictions to access assets that are critical to the product development process?
- *Competing through innovation:*
 - How do the new agility approaches enabled by digital transformation change the competitive dynamics? Does the increased agility of the product development process remove entry barriers for startups and SMEs? Under which circumstances?
 - To what extent does digital transformation help companies with their competitive intelligence endeavors?
 - How does digital transformation impact industry structures and its boundaries? How does it influence disruptive innovation processes?
 - Do the mechanisms used to capture value from innovation change under the effect of digital innovation?
- *Managing people for innovation:*
 - How do digital transformations impact the way work is carried out in the innovation process? Are new T-shaped competence profiles needed in the new product development team?
 - To take full advantage of digital transformation, what type of new capabilities/skills do workers involved in the innovation process need?
 - What tensions ensue from combining traditional assets and capabilities with digital ones? How can they be overcome? Is there something beyond connectedness?

Submissions to the special issue should be sent electronically through the JPIM ScholarOne System (<http://mc.manuscriptcentral.com/jpim>). Authors need to clearly indicate in their submission information and letter that their manuscript is for the Special Issue on “Digital Transformation and Innovation Management”. All submissions will be subject to JPIM’s double-blind review process. All manuscripts must be original, unpublished works that are not concurrently under review for publication elsewhere. All submissions should conform to the JPIM manuscript submission guidelines available at [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1540-5885/homepage/ForAuthors.html](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1540-5885/homepage/ForAuthors.html). Questions related to this special issue may be directed to the guest editors.

Review Process Timeline

Call for papers announcement: March 2018
 Submission due date: 31 January 2019
 First round decisions: 30 April 2019
 First revision due date: 30 September 2019
 Second round decisions: 30 December 2019
 Second revision due date: 31 May 2020
 Third round decisions: 31 August 2020
 Third revision due date: 31 October 2020
 Final editorial decisions: 31 December 2020

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Guest Editors

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