

# Digitalization opportunities for the procurement function: pathways to maturity

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Digitalization  
opportunities  
for  
procurement

1685

Received 23 April 2020  
Revised 15 July 2020  
19 August 2020  
Accepted 13 September 2020

## Abstract

**Purpose** – This research aims at investigating the common practical problem of how procurement can be transformed from tactical and administrative to becoming an organizational strategic partner and indeed a competitive weapon, using modern technologies in particular. We investigated how procurement can be reinvented, from being digitized to digitalized to digitally integrated, ultimately contributing in business terms beyond supply chain effectiveness but also to profit generation.

**Design/methodology/approach** – A case study approach was designed to investigate three firms, each at very different stages of digital maturity in procurement. Interviews with managers, investigation of processes and documentary materials and in-depth follow-up discussions were conducted.

**Findings** – The iterative digitalization transformation discovered encompasses complexities rooted in organizational structure, supply chain design and the management of the technology for employees' uptake. There are both operations and strategy implications as a result. This initial research phase led to mapping a model of digital maturity as well as identifying its underlying constructs.

**Originality/value** – This research discovered that the implementation of digital technologies can lead the procurement function of the supply chain to completely grow out of its administrative and clerical shell into a strategic, consultative, value-adding and potentially revenue-generating function, thereby contributing to the well-being of not only the supply chain but also the entire organization.

**Keywords** Industry 4.0, Digitalization maturity, Strategic procurement

**Paper type** Research paper

## 1. Problem and background

The practice of procurement has been on a *slowly* evolving path yet to completely grow out of undertaking transactional, clerical and administrative tasks. Researchers specify that procurement needs to move away from undertaking extensive tactical activities of purchasing towards being a *strategic* contributor to overall supply chain effectiveness and business value creation (Tassabehji and Moorhouse, 2008). The current wave of technological advancements – also known as *Industry 4.0 revolution* – promises not only removal of clerical and administrative tasks but also process and information automation, optimization and efficiency. However, recent findings indicate low employment of emerging technologies in procurement (Handfield *et al.*, 2019). Further, the common reality witnessed in the practical world also appears to suggest that procurement is constantly compelled to undertake manual works with disentangled processes and information flow, inimical to its strategic purpose.

For instance, a recent survey (Allen, 2019) of 200 UK procurement function in organizations in most major industry sectors (including finance, manufacturing, telecommunications and retail) with over 1,000 employees found that over 70% of the procurement employees believed the digitalization occurrence is low in procurement, which is estimated to cost businesses on average nearly £2 million annually. Same study found that procurement teams are still spending a third of their time on clerical tasks dealing with



inefficient paper-based processes, with 80% of the respondents reported facing time limitations to undertake strategic contributions.

There is growing evidence, theoretically and practically, suggesting that digital technologies can pave the way for supply chain to transform its different functions. Recent research has documented compelling reasons such as cost efficiency, operational and financial performance, competitive advantage, innovation-based customer-centricity, agility, resiliency, traceability, transparency and customer satisfaction and demand shaping to create values for stakeholders – in particular for the downstream supply chain interface – to adopt digital technologies (e.g. Koh *et al.*, 2019; Tortorella *et al.*, 2019; Rubbio *et al.*, 2019; Hastig and Sodhi, 2020; Sousa-Zomer *et al.*, 2020; Martinez *et al.*, 2019). The specifics of what the utilization of such digital technologies can unravel for procurement effectiveness remains largely unclear.

Thus, we set out to examine and document how procurement activities can make use of new digital technologies in better supporting the supply chain by attaining transparency, compliance, efficiency and data sufficiency; qualities that are much appreciated in procurement. This can provide insights on how and to what ends procurement can transform into a strategic function of supply chains employing digital technologies. We, therefore, intend to identify the leading edge of practice employing recent digital technologies that goes far beyond just turning spreadsheets into online platforms. This will allow understanding how digitalisation of procurement can support supply chain effectiveness through providing a competitive edge for the business as well as how to create a procurement-centric new business model by becoming a direct revenue generator.

## 2. Methods

The research commenced in collaboration with a renowned global professional body, Chartered Institute of Procurement and Supply (CIPS), working in the procurement and supply chain realm who are interested in understanding whys and hows of the procurement function utilizing the digital technologies. First, we undertook careful considerations with in-depth discussions with the CIPS knowledge management team to choose firms in our exploration based on the large differences between them, in ownership, scale, continent location, sector/ industry, and their maturity with using Industry 4.0 technologies. After several sessions with CIPS, we were provided access to their database and contacts to work with three firms that have recently implemented digitalization for their procurement. This allowed us to understand the specifics of how the utilization of digital technologies can lead to procurement becoming a truly strategic function of supply chains. Table 1 summarizes the firms' profile.

A case study approach was designed as an exploratory research method, and interviews were conducted with managers and executives from these firms in addition to the investigation of their processes and documentary materials provided, as well as in-depth follow-up discussions with managers and implementers of such digitalization strategies. For exploratory research, where phenomena are being “discovered,” developed and conceptualized, we chose to not control for firms' differences, but aim to be inclusive of diversity in them so as to provide confidence in the power, robustness and potential generalizability of case study findings (Yin, 2017). This made for a much richer set of findings than if for example, three similar organization were studied.

## 3. Results

Motivated by connectivity and process seamlessness, we found that *Case X* obtained a significant degree of efficiency by moving from *digitized* to *digitalized* procurement processes

	Case X	Case Y	Case Z
Size	Large/National	Large/Multinational	Small & Medium Enterprise (SME)
Sector	Not-for-profit	Private	Private/Government
Industry	Environmental charity	Information technology	Campaign management
Location	UK	US	Australia
Number of suppliers	>20,000	>25,000	>500
Procurement extent	>150 dynamic projects at any given time including > tens of thousands of purchase orders per year	>350,000 purchase orders per year	>20,000 purchase orders per year
Personnel details	>12,000 staff and >60,000 volunteers	>150,000 employees with 240 procurement personnel in 30 locations globally serving 80,000 internal staff	>200 employees
Digitalisation phase	Very recent digital technology implementation including cloud computing and artificial intelligence	Full digitalisation with connected SRM, ERP and CRM using cloud computing, artificial intelligence and big data analytics	Digitally transformed with fully integrated upstream and downstream flow of information and transparency utilising cloud computing, descriptive and predictive analytics, and intuitive platforms with autonomous execution abilities

**Table 1.**  
Firms' profile

consequently enhancing value for money, improving risk assessment and mitigation capabilities, delivering on environmental policies and promises, financial benefits and above all, identifying instances of *non-compliance*. As articulated by one procurement manager:

When someone raises an order on the (digital) system, they have to use a product code . . . as soon as they choose the code, and put in the work flow, we can say actually we already have a national contract for this, you should buy it from (this) supplier. We have limits for how much you can control people. We probably have an 80–90% accuracy, it is not perfect, but our (digital) system allows us to impose strategies. So now we have that control, and that visibility of our spend, we are able to impose things like carbon accounting.

Digitization is “the act of replacing a physical thing with a digital version” (Orellana, 2017); for example, paperwork into Excel spreadsheets for analysis is one common example in firms. Digitization is an “operational necessity” for digitalization to take place (Gobble, 2018; Ross, 2017). Digitalization, on the other hand, affords opportunities to reinvent and re-define business models and establish connected, aggregated and interactive models and processes (Adner *et al.*, 2019; Holmström *et al.*, 2019).

We discovered that digitalization in *Case X* led to cost and lead time reduction and performance improvement. Centralized data analysis was begun, and reports can now be generated, supporting managerial decisions and control of procurement, all of which were dependent on effective digitization. Procurement is, however, still a reactive function, responding to internal requests and placing orders, albeit more efficiently than previously.

We uncovered that the primary motivation of executives in *Case Y* was to simplify procurement then automate operational, tactical and repetitive tasks. By *digitalization*, managers desired to produce business values broadly instead of narrowly securing a better purchasing deal, become customer-centric and stakeholder-oriented, and serve as a seamless,

efficient, compliant and an internally boundaryless procurement function. *Case Y* executives fully agreed that digitization was a fully implemented step on its way to digitalization. This boundaryless environment has led to a more efficient performance (e.g. agility, sustainability, flexibility) where product development will no longer take two years to complete, thereby rendering time and cost-efficiency. One global procurement manager articulated:

On our digital transformation effort... we started about three years ago, an initiative that was just simply called 'simplified procurement', we really started focussing on making things easier, eliminating redundancies, rationalizing processes, rationalizing requisition checks, a lot of the manual requisition checks that were happening.

Improved internal collaboration with other departments such as finance and operations, resiliency, responsiveness, scalability, ubiquitous, time-efficiency, access to synchronized and live data, all-in-one place information, visibility and cost-effectiveness are among the benefits we discovered by analysing *Case Y*. Another procurement manager noted:

In the FinOps (Finance and Operations) side, we have seen an evolution in the last two years, in particular, the procurement partnership has improved, growing continuing from before, in particular from pointing the finger at each other historically, to an extent, but today there is definitely a partnership, collaboration approach, in the divisions, to make it easier and more compliant in terms of buying and the supply side.

We uncovered that the (data) boundaryless procurement function now allows the procurement personnel to act as higher level and strategic thinkers and problem-solvers in their organization, no longer engaging mainly in conducting repetitive operational tasks. Instead of trying to find, gather and categorize information, the procurement team at *Case Y* have evolved into strategy implementers utilizing advanced digitalized processes. A global procurement manager noted:

In the past it (a procurement project) took so long, by the time we completed the request for information, by the time that we got it. Then six months or up to a year later we might need to do it all over again to ensure we got the most up to date information. Now we have a very simple capability, we can simply send a link to a supplier and have supplier refreshing that information however frequently we need it. A massive time-saving, it connects so well, integration with all our other technologies, very easy and seamless. Whatever technology we implement, it should eliminate all the operational steps or a lot of the operational, tactical, day to day repetitive things that people spend a lot of time on, so they can focus on big strategy, big picture, and be more consultative to our customers.

*Case Y* executives pointed out that both training/education and behavioural change initiatives were implemented in parallel with the process changes and Industry 4.0 adoptions. A procurement manager mentioned:

I do feel like a significant part of this was just cultural change, the great (internal) partnership we now have, across our different partners. I think there is just a kind of a key tenet within the company, that just pushes us to think how things can be accelerated, optimized, efficient and that often leads to technology. So, now more than ever, we are embracing the use of technology. It is quite like an organic development for us in a lot of ways.

We identified that for *Case Z* serving the government, transition from digitized into digitalized business was initiated for internal efficiency and capability to manage suppliers and was mainly motivated by data-driven relationship management with suppliers. The digitalization led to the replacement of the digitized practices with *all-over-the-place* spreadsheets, disintegrated data, disorganized communication records with stakeholders and manual processes. Turning into a *digitally integrated* firm enabled *Case Z* to realize the potentials for renovating and changing its business model and reinventing its wheel to become a specialized value-adding practice by streamlining the boundary structure of its

procurement function. The value propositions for this innovative business model lie in the removal of (data and information) boundaries between customers and suppliers and full integration of customer relationship management (CRM) with supplier relationship management (SRM) functions. This boundaryless condition has bridged information gaps and overcome significant procurement and supply chain challenges, including complexity, probity, compliance, responsible sourcing, transparency and auditability. A chief executive officer articulated:

We have a sourcing platform, where we have all our supply chain components and sourcing components, there is a long list of value add around probity, compliance, transparency and auditability. There is a star rating that allows us to allocate, specifically, a supply chain to the needs or preferences of a customer from a pre-approved supply chain, or qualified supply chain as well.

Lowering and removing the boundaries between buyers and suppliers have resulted in a more scalable, risk mitigated, flexible, agile and consolidated procurement process, thereby significantly improving performance. The new business model has procurement effectiveness at its heart, and in the same way as in logistics, *Case Z* offers 3PP and 4PP (third party and fourth party procurement) services to clients. This has been a holistic and comprehensive business model innovation from when it was competing in a tough, commodity-driven industry. A manager noted:

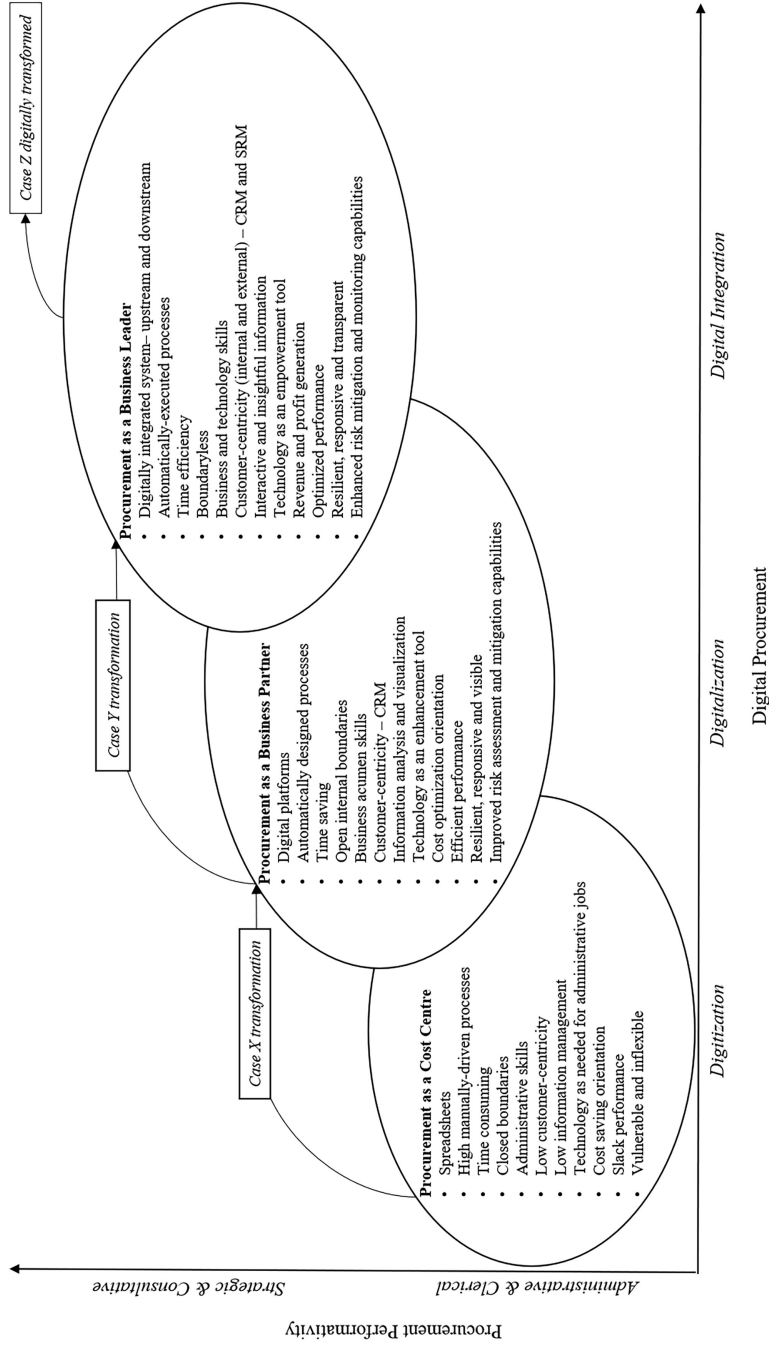
When a chief marketing officer needs to do a national campaign for a retail store, our technology calculates precisely all the items needed . . . and produces and communicates to all the suppliers and produces a single national quote, with all costings, all products and distribution for a single PO (purchase order) sign off. That is a very smart technology that takes away a lot of clunky, inefficient areas of software, Excel spreadsheet based, historically.

The main pillars of this digitally enabled and led procurement practice of *Case Z* are contestability, sustainability and cost-saving, where customers were reported attaining the best practice as well as reaching over 20% year on year procurement saving since onboarding. *Case Z*'s ingredients to differentiate themselves in a highly commoditized marketplace lie around removing duplications, centralizing communications to and from customers and suppliers, agnosticism to customers' preferences for suppliers, strict compliance and governance, contestability and the approved chain of custody of the sustainability-driven processes. A manager articulated:

(our digital platform) is immensely scalable, flexible and agnostic to (customer) preferences. In the first year we benchmark at 22% savings for our customers, so if you take a disparate and fragmented method of sourcing and centralize it, take it from tactical to strategic, and you introduce credible, competitive alternatives through contestability against last price paid, on average you save 22% in the first year. That is what our platform does.

Utilizing findings and cross-examining them with the available scholarship on Industry 4.0, a model for digitalization was developed, shown in [Figure 1](#), comprising three *iterative* and *sequential* stages by which firms can traverse pathways through to fully realize digital procurement, starting from *digitization*, to *digitalization* to *digital integration*. [Figure 1](#) parallels and is consistent with the well-regarded [Hayes and Wheelwright \(1984\)](#) approach to the whole production function that described its approach as maturing from being functional and internally focused through to externally supportive. In keeping with Hayes and Wheelwright's strategic approach to operations and supply chain, C-suite executives can benefit from their knowledge of our framework and the potential for moving from stage 1 to 2 to 3, both to improve procurement and supply chain efficiency, then effectiveness, then business model innovation.

Digital integration requires digitalization and implementation of multiple digital technologies; however, it is more focused on cross-functional changes within and across



**Figure 1.**  
Procurement digitalization and functionality

departments and divisions to become customer-centric end-to-end (Bloomberg, 2018). Unlike digitalization, which is mostly manifested as data-driven (big data analytics, machine learning, artificial intelligence, etc.), digital integration's affordance lies on its qualitatively-driven impacts on new business models and ecosystems, growth in scale, change in scope and potentially new organizational design and operations (Adner *et al.*, 2019).

The foregoing discoveries and the developed model point to a complex mechanism of adopting and implementing digital technologies for procurement specifically and supply chain in general, much in need of further research.

#### 4. Future research agenda

The burgeoning line of research of digitalization in supply chain management has so far proved valuable with much further research needed into how the phenomenon is understood from both theory and practice. In fact, the iterative digitalization process and the underlying constructs extracted present solid avenues for theory building and theory testing as well as practical investigations. The implications of a fully *integrated* and *boundary-less* function that are achieved by digital integration present an important research stream. Advanced technologies are bringing the walls down and paving the way to de-silo intra- and inter-organizational processes, functions and ways of collaboration. This can have significant implications on the system and process configuration and relationship dynamics, both internally and externally. Phenomena such as transparency, visibility and connectivity can change the way firms interact, which need to be investigated in future research.

The administrative tasks of information gathering, processing and refinement, to an extent, can now be outsourced to technology. This potentially changes the market dynamics by providing a more symmetric transaction environment thereby preventing opportunism, removing trust creation barriers and leading to stronger contract management among other effects, understanding of which can have significant theoretical and practical values. This lends itself to agency and transaction cost economics theories. Further, digitalization can potentially change our perspectives on how boundary roles should be (re)shaped to cope with changes in the dynamics of information processing conferred by digitalization. This provides important opportunities to investigate the phenomenon of digitalization from the boundary management perspective to understand how the boundary structures are changed in the new digital transaction environments. Further, Baines *et al.* (2017) point to advances in servitization and include connections to advanced (Industry 4.0) technologies, with which we concur, in the sense of the boundaryless internal and external connections that digital integration involves. Yet further specific investigation is warranted to specify these connections and their benefits, costs and risks. Similarly, Han *et al.* (2020) recently pointed to Industry 4.0 and social network theory, as being related because of the connectivity that each refers to. This raises yet another relevant research question going forward of how the maturation of procurement activities from digitization towards digital integration can best make use of social networks.

The foregoing future research agenda can help understanding of how procurement and supply chain can contribute to managing information, cost, relationship, boundary and network in organizations in the light of digitalization.

It was also discovered that implementing digitalized procurement is not without obstacles and challenges, which is another potential avenue for further research. We identified that changing executives' perception on the potential strategic contribution of procurement, getting *buy-in* and support from the strategic leadership level, internal change management and having to justify starting the change at the highest organizational level were among the most common obstacles. The complexity of the organization, implementation duration, technical resources and securing and justifying the necessary funds were also among barriers

and obstacles that firms encountered. We also found that some soft challenges had to be dealt with such as resistance to change, lack of technical knowledge and expertise, frustration, and getting personnel to use the system for what it has been designed to do instead of what they desired it to do. Further work is also suggested to broadly identify the barriers and obstacles to moving from stage 1 to 2 to 3. From our exploratory observations, we would expect them to be related to human factors, resources, capabilities and leadership commitment. Addressing these behavioural challenges of digitalization implementation also present areas for future research.

## 5. Conclusion

While our research helped in discovering important insights into developing a model and its underlying constructs, undertaking further multi-perspective research opportunities can result in understanding how to utilize advanced technologies to achieve full strategy-orientation in procurement as well as enhanced efficiency and performance for the supply chain. This will have significant contributions to both the supply chains and organizations. For procurement and C-suite professionals, there is considerable potential to transform procurement into a competitive weapon through its effectiveness or through developing new business models such as via servitization.

Procurement is on the cusp of both practical and conceptual advances well beyond making existing processes more efficient and effective but transforming into the firm being procurement centric. The promise of Industry 4.0 technologies can go well beyond process efficiency in procurement, when creativity and innovation are applied to the whole business model. Supply chain participants can potentially make procurement effectiveness as one of the centrepieces of their value proposition, yet this brings many questions such as procurement's relationship with marketing activities, how such new business strategies can be best formulated, and what digitalization technologies, human capabilities and organizational arrangements and structures will work best.

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