

Digital Transformation in FMCG and Automotive Industries – the Emergence of Digital Innovation Capabilities

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Abstract

Technological developments are disrupting the business environment, introducing new and more innovative, digitally-born competitors. Simultaneously, customer engagement with digital technologies, such as social media platforms, has altered behaviour and expectations. Established firms are under siege from these radical and disruptive changes and are responding by engaging in digital transformation using digital resources, including big data, to deliver product as well as process innovation. Such transformation requires new innovation capabilities, but the nature of these capabilities is not well understood. This study addresses the question ‘What are the innovation capabilities that firms require for digital transformation?’. This paper explores innovation capabilities development in four companies, in two industries that are facing significant technology-driven market and operational turbulence. We have collected data from the automotive industry and the fast moving consumer goods (FMCG) industries. Both sectors are experiencing industrial restructuring with new, data-driven competitors, digitalised business models, unconventional alliances, distribution challenges and changing customer expectations. For firms in these industries digital transformation includes process innovation through the introduction of digital technologies and new ways of working to leverage value from big data. It also involves innovation through increasingly personalised customer engagement and the commercialisation of data systems. Using a multiple case study design based on elite interviews, we compare the four firms’ approaches to digital transformation. Our study provides new insights into the digital innovative capabilities that firms apply to develop new knowledge within their digital transformation. From our findings we develop five specific propositions for the development of digital innovation capabilities theory.

Word count - 4710

Key words: digital transformation, dynamic capabilities, innovation, digital innovation capabilities, big data

1. Introduction

Technological developments, such as mobile computing, social media platforms, apps and artificial intelligence are changing customer and competitor behaviours which threaten established firms competitive advantage, and even their survival. Firms are responding innovatively through digital transformation, adding value to the firm through digitally-led product, process and business model innovation (Crossan and Apayadin 2010). Digital transformation involves firms in employing digital technologies to create more value for the firm. Digital technologies include digital resources, such as big data, which add to the firms' resource base. An essential consideration is how organisations transform these resources and develop capabilities to deliver the innovative responses that enable them to compete advantageously with their 'digitally-born' competitors (Vial 2019). Such transformation requires new innovation capabilities, but the nature of these capabilities is not well understood.

This study investigates digital transformation in two 'brick and mortar' industries, namely fast moving consumer goods (FMCG) and the automotive industry. Both industries are experiencing significant technological turbulence and competitive pressure which demand innovation and strategic renewal if incumbent firms are to maintain competitive advantage. The case study firms in these industries are balancing the legacy of delivering their traditional core activities, whilst seeking to be dynamic in exploring digital opportunities.

There is a breadth of management and information systems literature on digital transformation (Vial 2019), dynamic capabilities (Teece, Pisano and Shuen 1997; Teece 2007) and more recently on innovation capabilities (Mendoza-Silva 2020). However, there are few studies on how firms develop digital innovation capabilities. This study addresses the question 'What are the innovation capabilities that firms require for digital transformation?'. Our contribution is to improve understanding of the emergence of digital innovation capabilities and, based on this insight, to formulate a set of propositions for further research. The paper is structured as follows: Section 2 Literature Review; Section 3 Methodology; Section 4 Four Case Studies; and Section 5 Discussion and conclusion, which includes propositions for further research.

2. Literature review

To identify the potential for digital innovation capabilities this paper is underpinned by literature from the digital transformation, dynamic capabilities and innovation capabilities domains, which will be discussed in the following literature review.

2.1 Digital Transformation and digital resources

Digital transformation can be defined as "a change in how a firm employs digital technologies, to develop a new digital business model that helps to create and appropriate more value for the firm" (Verhoef et al. 2021 p.889). Digital transformation provides firms, with a response to changes in their operational environments, resulting from the emergence of new digital technologies, and the arrival of new competitive paradigms. For established firms seeking to improve their competitive position, digital technologies are more easily understood when deconstructed into their constituent parts, or digital resources (Henfridsson et al. 2014). Digital resources are the building blocks of digital innovation and can take four forms: devices, networks, services, and digitised content, such as big data (Holmstrom 2018). By viewing digital technologies as resources firms can investigate the creation of value through digital innovation with greater granularity (Holmstrom 2018).

Engaging with digital technologies provides different value creation opportunities, through new digital business models, methods of delivery, ways of working and interaction with customers. It also requires firms to adapt their existing resource base to accommodate a new value-creating resource in the form of big data (Ciampi et al. 2021). Implementing these changes requires new dynamic capabilities to reinvent and reshape the resource base and the related routines, processes, and systems (Luppicini 2020). Dynamic capabilities theory is a recognised lens for studying strategic changes in organisations that are responding to environmental disruption (Schilke et al. 2018). Vial (2019 p.133) argues "there is an interesting fit between dynamic capabilities as a conceptual foundation and digital transformation as a phenomenon of interest", as both facilitate an organisational response to the changing environment by adapting the firms resource base. The firm's ability to design mechanisms that enable its continuous adaptation in the face of such rapid change is an important issue.

Warner and Wager (2019) comment that: “digital transformation means that building dynamic capabilities is now a strategic imperative for incumbents to ensure survival in the digital age”. In line with Wang and Ahmed’s (2007) dynamic capabilities framework innovation plays a vital role in improving firms’ competitiveness, namely through innovation capabilities (Mendoza-Silva 2020).

2.2 Innovation Capabilities

Systematic literature review highlights that innovation is multi-faceted. Innovation can be defined as “production or adoption, assimilation and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services and markets; development of new methods of production; and establishment of new management systems. It is both a process and an outcome” (Crossan and Apaydin 2010 p.1155). Observing innovation as a process highlights the similarities with dynamic capabilities. Innovation may also be driven by external stimuli, such as new market opportunities or internal drivers, such as the availability of new digital resources. Innovation as an outcome indicates the successful exploitation of an idea providing an opportunity to contribute to the firm’s competitiveness (Helfat et al. 2007). Innovation outcomes may involve product or service innovation (Wang and Ahmed 2004), process innovation (Wang and Ahmed 2004), or business model innovation (Davila et al 2006). A firm’s propensity to innovate or adopt innovations is a type of dynamic capability which contributes to competitive advantage (Helfat et al. 2007). Scholars have used dynamic capabilities theory to investigate innovation (Romijn and Albaladejo 2002) as they are closely aligned, with both reflecting an organizational response to the changing external environment.

Innovation capabilities reflect a firm’s ability and competence to continuously transform novel knowledge and ideas into new products, processes, and systems for the benefit of the firm, its customers, and stakeholders’ (Lawson and Samson 2001). Mendoza-Silva (2020) notes that innovation capabilities may take an external perspective through product innovation and market innovativeness, and an internal perspective in the form of process innovation and organisational innovativeness. The adoption of digital resources to develop new process, products and business models increases the innovation capability of firms, enabling them to meet the needs of a continually changing market (Di Vaio et al. 2021). Innovation capabilities (IC) theory represents a new, but established sub-set of dynamic capabilities literature, however it has not been discussed in relation to digital transformation, which is an emerging body of theory and practice (Nambisan et al. 2017). More insight is needed to understand the development of digital innovation capabilities.

3. Methodology

Our investigation focuses on the innovation capabilities highlighted in recent management literature (Mendoza-Silva 2020), and how these capabilities were applied in the digital transformation of established firms. The novelty and lack of knowledge of the capabilities needed for digital transformation (Vial 2019) led to the selection of an empirical, case study research design. Case study design allows exploration of the contemporary, digital transformation phenomenon in a real-world context (Yin 2014). We chose four cases in line with guidance from Perry (1998), who proposed a guideline of between two and fifteen cases. The cases represent two industries, both experiencing well-documented, environmental and technological turbulence: the automotive and fast moving consumer goods (FMCG) sectors. The four participant case study firms were long-established, large, international companies who were undertaking digital transformation, evidenced by radical developments using digital resources. The multiple case study approach captured a breadth of experience of the digital transformation phenomenon (Dubois and Gadde 2002), underpinning the development of new theory.

We carried out elite interviews of senior managers with knowledge of the digital transformation of the case study firms. Key informant interviews led to snowballing recruitment of other participants. The interviews were carried out face-to-face, using a semi-structured format. The case study firm and interviewee identification were anonymised, due to the commercial sensitivity of the material provided in the elite interviews. Data were analysed using standard coding procedures to determine the relationship and constructs within each case and allow comparisons of these factors (Detert and Trevino 2010). A five-stage analytical process was followed: interviews were transcribed; coded in NVivo with reference to current innovation capabilities theory (Mendoza-Silva 2020). An intra-industry comparison was made of the codes to identify similarities and differences between the firms, followed by an inter-industry comparison. Interview data from the four case firms was contextualized

with reference to Mendoza-Silva's (2020) ten determinants of innovation capabilities. The findings were reviewed to identify research propositions for future research.

4. Four case studies

This section presents four case studies; two from the automotive sector and two from the FMCG sector. It introduces the cases and outlines the drivers for their digital transformation and key transformation activities. The informants' experiences of digital transformation were analysed with reference to the innovation capabilities literature (Mendoza-Silva 2020), indicated in italics.

4.1 Automotive case study (Automotive01)

Automotive01 is a UK-based, physical and digital vehicle marketplace, operating across Europe. Established in the 1940s, it employs more than 7,000 staff. Recent flotation on the UK stock exchange led to a greater emphasis on meeting stakeholder and customer expectations. A strategic aim of their digital transformation was to support their supply chain by using cutting-edge, app-based technology to improve vehicle sales and profitability. Automotive01 combined sales data with social media commentary and insights in different distribution channels and from various dealerships. A key driver in the value creation process was to add value to customers by combining data sources to generate information that was not available to their competitors, for instance combining purchasing data and real-time stock data.

The main catalyst for innovation was *using digital technologies to support customer decision-making*. The firm used big data qualities such as variety and velocity to improve their customer knowledge and to respond swiftly. Although Automotive01 had a long-established, paper-based business model for *working with suppliers*, their incremental introduction of digital technologies allowed their suppliers to see the benefits of the digital approach. *The firm acted as a source of technological expertise, leading their supply chain* into use of new technologies and establishing the value of collaborative data sharing beyond a single organisation. *Idea generation in Automotive01 began with development of business intelligence*, with an in-house team using their own sales and customer relationship management (CRM) data, which included data from the supply chain. This was later supplemented with open source data on international tax and legislation. Analysis of the pooled data *provided the opportunity to generate new market intelligence* using 'blue-sky thinking' to develop new ideas from patterns in the data. It also provided an opportunity to share data-based information throughout their supply chain using data visualisation software.

4.2 Automotive case study (Automotive02)

Automotive02 is a family-owned firm with operations in all the Nordic and Baltic countries. Automotive02 imports and sell cars but only imports cars in Sweden. With 20,000 employees it is one of the largest players in the car industry in Norway. There are several fundamental trends hitting the firm due to digital transformation of the industry. These trends include the sharing economy among car users, with car-cooperatives changing customer behaviour and creating substantial competitive pressure. Data-led firms are also transforming the competitive landscape. One of the senior executives in Automotive02 described new player, Tesla, as an example of a software platform that takes the form of a car.

Customer-centricity was an important stimulus for Automotive02's digital transformation. Transformation began with streamlining of business processes to reduce costs and at the same time improve customer satisfaction and customer value creation. Better customer interfaces and improved customer interactions were key to development. Digital transformation *to develop new and better services, based on data-led idea generation* required the development of better IT systems. IT systems development involved online stores and the digitalization of trade. The firm focused its efforts on data-warehousing and developing a new core system using a modular logic to increase flexibility and reduce complexity. *Cooperation with external technology partners* was central to their innovation. *Knowledge management was central to developing more innovative services* by developing employee competence about technological and business activities

4.3 Fast moving consumer goods case study (FMCG01)

FMCG01 is a fast moving consumer goods company offering 400 branded products in 190 countries. The firm was established in the 1920s and has more than 150,000 employees. In 2017 the firm was subject to an

unsuccessful hostile takeover which stimulated a new strategy for change and growth focused on consumers. A strategic aim of their digital transformation was to increase business efficiency using artificial intelligence, in order to improve customer experience, for example through faster delivery of products-to-market. A further stimulus for FMCG01's digital transformation was pressure from aggressive, global competition adopting a direct-to-consumer business model using digital platforms. This approach focused FMCG01 on engaging more directly with consumers through social media to improve their responsiveness to consumers and to get products to market more swiftly. FMCG01 invested in creating 'data lakes' and embedding data visualization software to improve the company-wide availability of the organisation's collective knowledge. Combining consolidated data with open source content was a cornerstone in developing new practice. Transformation activities included using semantic software to interpret data from social media on trends and market development, which highlighted future development opportunities. At the same time FMCG01 used insights from consumers social media data for product enhancement and to improve process efficiency.

FMCG01 interviewees described how their digital transformation had led to a *shift in culture from operating in functional silos to cross functional working*. A more *innovative organisational climate* was being achieved through greater *collaboration with both internal and external partners*. Internally, the firm was using a matrix structure to empower small groups to work on key data-driven projects, which provided greater agility and captured knowledge from the broader network. The innovative organisational climate was also being enhanced through creative approaches to meeting digital skills gaps, through *external collaboration* with specialist micro firms. Prior to their digital transformation these small technology firms would have been considered highly risky partners. FMCG01's digital transformation began by pooling of its product data and using data visualisation software *to improve the firm's knowledge management*. These two activities enabled company-wide access to the organisation's knowledge, and ease of movement of ideas between, and across, business functions. The digital transformation of FMCG01 commenced with using their own data to deliver cost savings through production efficiencies. The firm's knowledge was *shared company-wide* and unconstrained by functional silos. Viewing their data in a more holistic way gave the firm *new insights into customers and generated new ideas* for products and services, and improving customer experience. Having built confidence with their own data, they introduced open source data from legislative, consumer and economic sources, which introduced further opportunity for efficiencies in packaging and labelling which improved product to market response times.

4.4 Fast moving consumer goods case study (FMCG02)

FMCG02 is one of Norway's largest players in the retail market, with 28,000 employees and 1250 stores around the country and a market share of approximately 30%. The company is owned by its customers, as a cooperative and the customer-owners are represented on the Board and within executive committees. Both digitalization and innovation are very important for the cooperative, and they focus on new digital services to enhance customers' everyday lives. FMCG02 have been innovative in three different areas: developing apps for mobile phones; developing inventories with digital robots; and creating 24 hours digitally-accessed stores.

FMCG02 demonstrate an extremely *innovative organisational climate*; they developed one of the most hypermodern inventories in the Nordic countries with advanced automatic robot technology. *Compared to their competitors*, the cooperative is one of the most innovative firms in the fast-moving consumer goods industry in Norway. FMCG02 was one of the first to develop their own mobile phone application, and to launch an integrated payment solution with direct payment in Norway, with external technology development partners. Their customer orientation led to development of self-scanning and self-payment in their stores. Using a trust-based system, FMCG02 opened an automated 24-hour store using self-service and self-payment. Key informants argued that digital transformation provided the key to improve value creation for internal efficiency. The firm focused on improving customer experience, using digital technologies in an effort to solve customer problems throughout their shopping journey, with online search, online retail and mobile apps. Digital technologies were used to ensure the right kind of goods were available to customers to optimise sales and to reduce the number of staff to improve efficiency. Improving and *optimising the value chain* was an essential part of digitalisation and relied on developing *individual as well as collective knowledge*, through knowledge management approaches.

5. Discussion and conclusion

The ability to undertake digital transformation is essential for firms wanting to maintain their competitive advantage, or even to survive, in a technologically turbulent environment. Our study shows that digital technologies are changing competitor and customer behaviours and, in so doing, stimulating firms to innovate using digital resources, such as big data, apps, social media platforms and digital marketplaces. Carrying out this digital innovation requires new dynamic capabilities to accommodate the new digital resources, and to reconfigure firms' historical routines, process and systems (Teece et al. 1997).

Our empirical cases evidence how digital transformation, innovation and dynamic capabilities work in unison to create competitive advantage for the future. Cross case analysis of the four case studies, with reference to innovation capabilities literature (Mendoza -Silva 2020), identified that within their digital transformation the firms exhibited five digital innovation capabilities. These digital innovation capabilities were: *Customer and competitor orientation*, *Innovative organisation climate*, *Collaboration with partners*; *Idea Generation*; and *Knowledge Management*. In line with Eisenhardt and Martin's (2000) theory of equifinality, an intra- and inter-industry comparison of the case studies indicated that whilst all five digital innovation capabilities were evident in each case, the firms responded differently because of their unique strategies and resource base. To further the research beyond the chosen industries and the four case study firms, we make five propositions for further research into digital innovation capabilities.

Customer and competitor orientation – The external stimulus for digital transformation was driven by stakeholders (Automotive01 and FMCG01), competitors (FMCG01) and customers (FMCG02, Automotive01 and Automotive02). The four firms' digital transformation was customer-centric, with the automotive firms emphasising adding value to customers through improved IT systems and enhanced data-based market intelligence, whilst the FMCG firms prioritised customer experience. In all four instances the firms' digital transformation balanced digital innovation to make internal processes more customer responsive through improved efficiency, with delivery of customer-facing product and service innovations. In addition to customer orientation, the firms were also competitor-responsive; Automotive01 and FMCG02 positioned themselves as techno-centric market leaders, whilst Automotive02 and FMCG01, were market followers responding to aggressive digitally-born market competitors.

Based on our empirical findings we suggest *Proposition 1: Customer and competitor orientation is essential in order to develop digital innovation capabilities (DIC)*.

Idea generation – The firms experimented with a variety of digital resources as the basis for innovation to improve their competitiveness. Idea generation depended on the firm's strategy, so that Automotive01 focused on apps to improve customer service via their supply chain; Automotive02 emphasised online retail and digitisation of trade, and FMCG02 used digital innovation to improve service access and delivery to solve customer problems. FMCG01 was more internally-focused using digital innovation to enhance operational efficiency through improved knowledge.

Based on our findings we suggest *Proposition 2: Idea generation in line with organisation strategy is key to developing digital innovation capabilities (DIC)*.

Collaboration with partners – The firms described increased collaboration with external partners, which extended the boundaries of the traditional organisation structure. For Automotive02, FMCG01 and FMCG02 partnerships were used to stimulate digital transformation as the collaboration involved external, technological partners who could innovate in areas where the firm had less technical expertise. In contrast, Automotive01 cascaded their own digital expertise to their supply chain to strengthen the capabilities of their broader network. FMCG01 described how their digital transformation led to improved internal collaboration by drawing on cross-functional expertise to develop new path-breaking solutions.

In response we suggest *Proposition 3: Collaboration with partners that extends organisational boundaries is central to developing digital innovation capabilities (DIC)*.

Knowledge management – For the firms using big data as the basis for innovation pooling data and sharing it across their network improved whole firm customer knowledge, stimulated innovation and improved customer responsiveness and experience (Automotive01 and FMCG01). Risks were managed by starting digital transformation with internally-held, VRIO data (Barney 1991) and subsequently adding open source and social media data relevant to the strategy. The firms also used digital innovation projects as the basis for knowledge development, which allowed them to build experience and confidence in the benefits of the approach, leading to greater stakeholder support for further digital innovation.

In response we suggest *Proposition 4: Knowledge management based on incremental know-how development is essential to developing digital innovation capabilities (DIC).*

Innovative organisational climate – The developments highlighted in *Idea generation* evidence that the firms had developed an innovative organisational climate. Multiple examples were provided of the current and planned digital developments, indicating a culture of experimentation, not simply one-off digital projects. The case firms implemented internal changes in matrix management (FMCG01), extensive network knowledge driving further innovation (Automotive01, FMCG02) and a more collaborative infrastructure (Automotive01) which indicate the development of innovative organisational climates.

Based on our empirical findings we suggest *Proposition 5: An innovative organisational climate is central to the development of digital innovation capabilities (DIC).*

This paper makes three contributions. Firstly, it addresses the research question ‘What are the innovation capabilities that firms require for digital transformation?’ by identifying five digital innovation capabilities evident in the case firms’ digital transformation, as outlined above. Secondly, it identifies propositions for further digital innovations capabilities research. Finally, the study positions digital innovation capabilities within existing literature. We find that digital innovation capabilities emerge at the intersection of digital transformation, innovation and dynamic capabilities theory, as represented in Figure 1.

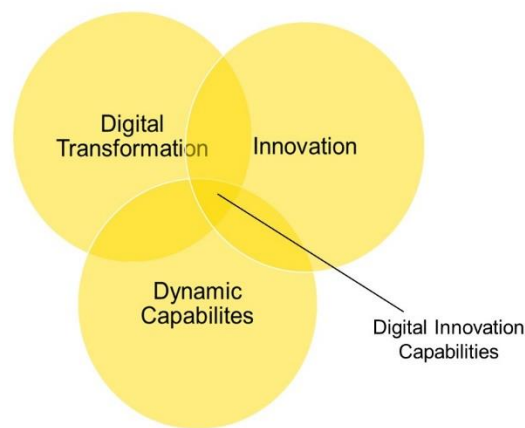


Figure 1: The emergence of digital innovation capabilities (DIC).

The study has several limitations. Utilizing an existing framework may hinder a fine-grained exploration of the empirical data, however our choice of framework provides guidance and direction based on up-to-date, extensive, innovation capabilities literature review (Mendoza-Silva 2020). Selecting a sample of four cases from two industries inevitably constrains the scope of insights generated, however, it is appropriate to qualitative analysis and provides a structure for the data collection and analysis. It is noteworthy that the inter- and intra-case analysis showed that while the capabilities required were universal the firm and industry responses were all distinct. The limited number of cases mean that the findings, discussions and concluding remarks must be interpreted as theoretical, and not numerical, generalisations. To provide additional insights on the nature of digital innovation capabilities, further studies could be carried out with digitally-born or less digitally mature firms.

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