

# The Path from Digitization to Digital Transformation: The Case of Two Traditional Organizations

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## **Abstract**

*Digital Transformation poses considerable challenges for organizations, especially for the ones whose origins go back to a pre-digital era. A misunderstanding of key concepts, capabilities involved in the process or expected outcomes can lead to confusion and costly mistakes. The objectives of the article are threefold: clarify the theoretical concept of digital transformation, understand its content and map the tactical approach for its execution. The paper's background is set on a theoretical approach, allowing an understanding of the key terms. The case study allows the understanding of this complex phenomenon within its context. The researches expected results are the identification of the key elements contributing to the success or failure of the transformation and the proposal of a framework useful for the evaluation of a company's digital maturity.*

**Keywords:** digitalization, digital transformation, digitization, business model innovation, digital maturity.

**JEL classification:** L2, L6, L15, M21

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## **1. Introduction**

Considered General Purpose Technologies and often assimilated to the third Industrial Revolution (Degryse, 2016; Tihinen et al., 2016), digital technologies are compared to major innovations like the steam engine and electrification, due to their transformative impact on economy (Jovanovic and Rousseau, 2005).

The development of Information and Communication Technology (ICT) has reshaped numerous economic domains, facilitated the emergence of new business models, transformed the way organizations and markets operate and revolutionized the way individuals interact. All firms and industries, be they private or public, have been affected by the digital transformation, although at a different pace and scale (OECD, 2019). Existing businesses and organizations alike are engaging in a transformative process that is rapidly and fundamentally changing their status quo (Burlea-Schiopoiu, 2014; Collin et al., 2015).

As the need to adapt to the new digital environment becomes all too apparent, academic scholars and business managers are showing a growing interest for the subject, as demonstrated by the increasing number of publications on the topic (Dos Reis et al., 2018).

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In an attempt to map this process, concepts like Digitization, Digitalization and Digital Transformation were advanced. The terms, as found in relevant literature, are used interchangeably. They are nevertheless not synonymous; their overlapping boundaries risk leading to confusion and costly mistakes (Ross, 2017). Furthermore, although professionals perceive the advantages of newly born digital technologies, the way into best using them in order to fully capture their potential is still unclear. In this context, the need to understand each concept and the way it is interpreted and executed by the business environment becomes legitimate. Our research questions evolve around three topics as following:

Q1: What are *the definitions* of digitization, digitalization and digital transformation and how are they understood and integrated by organizations?

Q2: What are the *key elements* on which depends an organization's successful evolution on its digital journey?

Q3: How does the *execution* of transformative digital strategy helps or hinders an organization's shift from one state to the other?

In order to advance an answer to our research questions, we will first attempt a literature overview in order to understand the concepts of Digitization, Digitalization and Digital Transformation. Questions 2 and 3 will be addressed by focusing on the two companies we have chosen to study, by analysing the way they engaged in the Digital Transformation process.

## 2. Theoretical Background

While academics and professionals seem to agree on the transformative impact of digital technologies, the understanding of digitization, digitalization and digital transformation as tools, concepts, visions or simply general terms naming their consequences is still imperfect (Burlea-Schiopoiu, 2008).

The confusion around the three is understandable given their recent nature and the multitude of authorities using them. Furthermore, as the concepts matured, their meaning has evolved, rendering a definitive definition all the more difficult.

### 2.1 Digitization

The foundations of digitization can be traced back to the 17<sup>th</sup> century, when philosopher Gottfried Wilhelm Leibniz (1705) described in his *Explication de l'Arithmétique Binaire* a base-2 numerical system representing two symbols of value: either 1 or 0. Leibniz's work set the historical foundations of later developments such as the Morse code or Stibitz's digital computer and paved the way for modern digitization (Khan, 2016; Leibniz, 1705).

Digitization operates by reducing to the "smallest atomic element", the bit - considered for practical purposes a 1 or a 0 (Pepperell, 2003) - massive amounts of information, allowing them to be collected, stored and reused in a universal format. This dissolves the barriers of time, distances or physical space and favours a greater interactivity between information and users. Furthermore, digital

information is considered discrete and *clean*, opposing the continuous and *noisy* character of analogue information (The Oxford English Dictionary). A parallel can be drawn to a company's flow, whose functions risk being disrupted in the absence of seamless digitized information. Digitization draws the need for digital infrastructures and applications, therefore being an imperative first step to digitalization.

## **2.2 Digitalization**

Negroponte (1995) advanced the belief that in the future, everything that can, will be digitized. Following this visionary prediction, digitalization has become a defining characteristic of the modern era (Castells, 2011). Digitalization is the topic of extensive literature, articulated in four main research directions: infrastructural, terminal, functional and market convergence (Brennen and Kreiss, 2014; Soava et al., 2017). For organizations, digitalization is understood as the adoption of digital technologies (social mobile, analytics, Cloud, Artificial Intelligence) throughout the company.

## **2.3 From Digitalization to Digital Transformation**

As presented above, digitization is a norm and digitalization, an operational necessity (Ross, 2017). As argued by Car (2003) digital solutions have become a commodity, thus losing their intrinsic quality as self-sufficient resource.

Moreover, business leaders tend to confuse advanced digitalization with digital transformation. Indeed, in organizations situated at the early stages of the digital transformation process, digital solutions have an operational focus, with the role of addressing individual business problems (Kane et al., 2015). In several authors' opinion digital transformation is more complex than a mere technological shift, going beyond the digitizing of resources and resulting in the creation and extraction of value from digital assets (McDonald and Rowsell-Jones, 2012; Parviainen et al., 2017).

## **2.4 Digital Transformation**

Although there is not a consensus regarding a definitive and formal definition on Digital Transformation, the concept is widely understood as a transformative process involving an organization's partial or entire capabilities, comprehending its operational processes, business model, value proposition, internal and external capabilities, culture and management style (Sebastian et al., 2017).

Digital Transformation affects corporate strategy, involving the whole organization. Designed to capture opportunities of the digital economy, it engages digital capabilities and digitally redesigns a company's multiple facets: business

model, customer focus, processes and corporate culture (Burlea-Schiopoiu, 2019; Ismail et al., 2017).

In this research paper, we will use digitization to refer to the process of converting analogue information into its digital version, digitalization to describe digital solution adoption by an organization and digital transformation to refer to digital solutions' impact on strategy, processes, business model and culture. Based on literature review, we advance several propositions, that we attempt to verify through research:

- The stages of digitization, digitalization and digital transformation are each an imperative prerequisite for the next.
- An adequate corporate culture is the basis for Digital Transformation. Its execution depends on an organization's dynamic capabilities and its success is reflected in the transformation of corporate and business strategy.
- The adequate functional strategy (tactics and process) is essential for success. In its absence, an organization might limit itself to the simple adoption of digital technologies and mistake Digitalization for Digital Transformation.

### **3. Case Study**

Two organizations, situated at the early stages of their digital journey, were observed over an extensive period. This approach offers the advantage of unveiling the contextual conditions proper to each company as well as understanding the links between specific contexts and objective success or failure.

Data was collected through various methods, ranging from public document consultation to on-site observations on strategy evolution along the rollout phases of major projects.

The research was conducted in two Romanian organizations, part of international groups with a strong history and established tradition, going back to the early 20<sup>th</sup> century. Here lies the first motivation in choosing these two companies. Indeed, organizations having built themselves up in a pre-digital era rate below average in terms of internal ITC capabilities, considered a basis for advanced ITC functions. Only 10% of organizations have them, versus a 20% overall average and 40% to 80% regarding IT, services or telecommunications companies (OECD, 2019).

Secondly, both companies evolve in the context of developing countries, as Romanian subsidiaries of international groups. This provides an interesting background for research, as developing countries face a particular set of challenges regarding digital economy growth. This is even more true for Romania, a country ranking, in the year 2019, 26<sup>th</sup> out of the 28 European Union member states in terms of digital competitiveness.

Despite a particularly challenging macro environment, both organizations enjoy a special set of opportunities. As part of major international groups, they

benefit from funding, technology and strategy input developed at headquarters level. As they are based in major Romanian cities, they benefit from access to robust hardware and software infrastructure.

The allure provided by the image of international groups facilitates the recruitment of digitally skilled workforce. Lastly, the premium positioning of both organizations allows them to address an urban, financially comfortable target, more inclined to digital service adoption (table 1).

**Comparative presentation of organizations A and B**

**Table 1**

	<b>Organization A</b>	<b>Organization B</b>
<b>1</b>	<b>2</b>	<b>3</b>
Structure and environment	Subsidiary of an international group, evolving in a developing country	Subsidiary of an international group, evolving in a developing country
History	100+ years	Little under 100 years
Sector	Energy	Transport
Employees (worldwide/locally)	7.000 / 100	140.000 / 90
Sales	1,5 billion dollars	33,1 billion dollars
Distribution model / market	Business to business (B2B) / Business to business to consumer (B2B2C)	Business to business (B2B) / Business to business to consumer (B2B2C)
Corporate culture	Top-down management style, siloed communication, risk aversion. Limited customer-centric approach, strong focus on process.	Collaborative management style, open communication, risk tolerant. Limited customer focus but conscious efforts for a more customer-centric approach.
Current state of digital solutions	Enterprise resource planning (ERP) business management software Other internal digital platforms dedicated to operational efficiency	Enterprise resource planning (ERP) business management software Other internal digital platforms dedicated to operational efficiency
Triggers for transformation	Proactive: improve operational efficiency; create and extract new digital-driven value. Defensive: correct company-lagging image; correct unsatisfying commercial performance.	Proactive: benefit from macro-level shifts, such as technology, regulation and customer behaviour; better operational efficiency and improved data-driven decision process.
Digital transformation piloting	No particular prioritization was defined for the projects listed above. Independent departments assured their management.	A group of managers in charge of digital transformation coordinated advancement for the projects listed above.
New digital solutions	Product-as-service business model, based on an innovative application	Product-as-service business model, addressing the (B2C)

	<b>Organization A</b>	<b>Organization B</b>
(project-based)	using the Internet of Things (IoT) technology, with different value propositions for B2B and Business to consumer (B2C) customers; Value creation for B2B clients thanks to a digital platform aiming at helping them better manage their activity; Better management of interactions with current and potential customers through the implementation of a Customer Relationship Management (CRM) system; Sales force activity improvement by equipping them with tablets and deployment of an internal application, regrouping different resources;	market Value creation for B2B clients thanks to the deployment of a digital solution aimed at helping them better manage their purchases, stock and B2C product offerings; Value creation and efficiency for sales force, thanks to a data-driven internal application dedicated to commercial management; Sales force activity improvement by equipping them with tablets and deployment of an internal application, regrouping different resources;

*Source:* Author' contribution

As argued previously, digital transformation goes beyond new technology integration, considered more as a means for business transformation (Yoo et al., 2010). The digital solutions listed above had the potential of transforming both companies' business model, which we consider, for the purpose of this article, as one of the outcomes of successful digital transformation. In that perspective, value creation, delivery and capture are crucial for business model transformation. Its achievement is conditioned by a company's dynamic capabilities. Adequate culture is key for strategy execution.

We will analyse organizations' A and B performance at each of these three levels in order to measure the stage at which the companies are situated in the digitization – digitalization – digital transformation process.

#### **4. Research Findings**

We can observe that among the main digital initiatives of both companies can be found one with the potential of transforming business model (shift to product-as-service). As we have already argued, digital transformation is sometimes triggered by the fear of being pushed into irrelevance by new digital-born competitors (Dudézert, 2018). According to Levitt (Levitt, 2013) our findings are in consensus and we can affirm that this is a result of organizations' tendency to define themselves by the product they manufacture rather by the answer they provide to customers' needs, subject to rapid change in a digital context. Gupta (2018) argues that in an environment where entry barriers are lowered and organizations can no longer base their strategy on cost or product differentiation, a shift to a vision focused on value creation and extraction is necessary. This may

prompt organizations to shift to a new business model, defined as a strategy architecture enabling firms to create and deliver value to its customers and operations consistency allowing them to capture a share of that value (Bouwman et al., 2018; Teece, 2018). Business model is a key element linking strategy and processes (Osterwalder and Pigneur, 2002), allowing planning, communication and improvement of business activities, a source of innovation and competitive advantage. Business model innovation is described by some authors as innovative advances that reshape (Mitchell and Coles, 2003) or completely replace (Lindgardt et al., 2009) an organization's traditional business model.

If we focus on business model transformation under the impact of digitalization, we can observe that the most affected areas are value proposition, internal infrastructure and interactions with business environment (Arnold et al., 2016). In this context, the notion of business value is central to an innovative business model's viability. Taking the shape of an answer to customers' newly (un)defined needs, is a delicate balance between the ability to seize the potential created by a new consumer's digitally shaped expectations and the capability to create new market segments, based on innovative usages. Value creation, delivery and capture mechanisms are ever more important in a business world where digitalization has contributed to value chain fragmentation and volatility increase, due to lowered entry barriers and disruptive competitors.

**Organization A** deployed an innovative solution enabling equipment's remote control and predictive maintenance, based on the Internet of Things. Value creation was supported by customer behaviour and regulatory shifts. Market research promised a strong adoption of the solution in the following years. A strong technological base sustained the solution: Organization A was the first in the market to propose a full-service solution to professional clients and end-users, thus gaining competitive advantage on less mature competitors. Furthermore, the solution answered a real need in both target audience (better service, cost and time optimization for professionals, comfort, safety and cost reduction for end-users).

Despite its technical performance, the solution failed to convey its benefits to targeted clients. Value proposal, essential to new market segment creation and penetration, was unclear and insufficiently sustained. Failure to address core target (by lack of seamless customer experience) and inability to shift traditional customers to new consumption model limited adoption. A reason for the underachievement can also be found in the organization's reduced training of professional clients, which should have played the role of ambassadors and sales channel for end-users. In this context, both targets privileged more user-friendly, less complex solutions, offered by digitally native organizations with a real expertise in digital customer experience.

Furthermore, fuzzy pricing strategy and the inability to properly invoice certain features of the solutions limited value capture. Another blocking factor resided in the B2B2C distribution model. In absence of support from professional (B2B) external partners (due to lack of training and added value

misunderstanding), the solution was not properly made available to end-users (B2C) potential customers.

**Organization's B** determination in evolving its business model was reflected in the shift made in their presentation that changed from a transport goods manufacturer to a solutions provider. This was enhanced by acquisitions of companies with an expertise in digital service, such as predictive maintenance, remote tracking and transport optimization. This powerful change in framing was not observed in organization A.

Organization B experiments product-as-service business model, relying on its integrated physical distribution network and extensive digital communication. Solution addresses a new segment of clients, with a strong preference for on-line shopping and product-as-service consumption. Value creation relies on a shift in consumer habits, from products to service. Synergies between on-line and off-line channels, supported by professional clients who perceived the solution as a means to develop their core and secondary business activities, provided needed support.

Value proposal is two-fold, based on the promise of tranquillity and flexibility for end-users and added business for professionals. The offer is clear and can be subscribed on-line, enjoying a seamless on-line customer experience. Organization B has the advantage of being the sole competitor proposing this type of service in the market.

Value capture by the organization is enabled by a clear pricing strategy and flexible subscription offers. Therefore, professional partners can have to increase value by selling additional offerings.

## 5. Discussions

Results indicate that an innovative business model, which thrives on digital assets and delivers expected results, can be considered a landmark for digital transformation. The issue of value creation, proposition and capture is therefore central for organizations. Its delivery depends on the company's dynamic capabilities. Management plays an important role in creating the right corporate culture and empowering employees in using digital solutions to their fullest.

Business model innovation was a path undertaken by both organizations. They both disposed of technological innovations with the potential of building digital competitive advantage. As argued, organization A did not manage to propose or capture value driven by digital assets. Its dynamic capabilities, weakened by insufficient internal digital competencies and frail relationships with the external environment, were unable to sustain the complex process of digital transformation.

Traditional management principles, valuing control and process, did not manage to set a new stage for an organization with a perceivable nostalgia for an analogue era. We argue that organization A is at the final stages of digitization and in the full process of digitalization. Resources, corporate culture and an overall

vision of external business environment should be adjusted in order to pursue the goal of digital transformation (table 2).

**Framework evaluating organization's A and B digital maturity**

**Table 2**

	<b>Digitization</b>	<b>Digitalization</b>	<b>Digital transformation</b>
Focus	Technology	Process	Business model innovation
Business model digital innovation	Absent	Low	High
Dynamic capabilities	Weak Focus on digital possibilities	Moderate Focus on digital development	Strong Focus on digital value
Management style	Traditional	Focus on process and control	Focus on vision, resource and culture realignment
	Organization A		Organization B

Source: Author's contribution

Organization B managed to successfully innovate its business model. Necessary resources were allocated to internal digital training and growing win-win relationships with external partners. Management emphasizing cross-function communication, flat network collaboration and openness to business environment created the appropriate culture organization for digital innovation (Burlea-Schiopoiu and Remme, 2017). Nevertheless, technological innovation only affected a narrow part of business model. Scale-up should be pursued, in order to fully capture the potential of an industry whose future will certainly be driven by digital innovation. Furthermore, we remind that internal digital training was limited to new solution rollout and has not yet been deployed on a general level. Only a few visionary leaders, inspiring transformation in the department they manage, drive management efforts. We consider that organization B has successfully accomplished the digitalization process and is at the early stages of its digital transformation journey.

Organization's A corporate culture had all the characteristics of traditional companies: stable and closed, it did not favour interactions with external business partners (such as start-ups, universities, innovation platforms, etc.). Work was centred on the interior, favouring established procedures and a general shutdown from the outside world. Siloed communication and organization in specialized departments favoured little interaction between employees. Micro-management, focused on quantifiable results and the failure in communication a vision for a digital future caused disengagement among workforce.

Organization's A management accompanying new digital solution was based on a "need-to-know" basis communication and individual tracking of new software usage. More generally, the company practiced a top-down management with an imperative for physical presence at work.

A relevant example is the communication accompanying projects CRM implementation and tablet and app rollout: sales force were imposed a minimum daily usage quota and warned that activity was individually tracked. Worst in class usage examples were communicated to managers for corrective actions. As a response, users adopted a refractory attitude towards the new digital solutions and developed avoidance strategies. Similar attitudes were registered regarding the physical presence at work, resulting in an above-the-average sick-days absenteeism and minimum mandatory presence. Limited communication was also ill perceived, resulting in a faulty understanding of the company's vision, disengagement and resentment.

**Organization B.** An important difference with company A resided in the formulation and sharing of their vision for the company in a digital era. Internal deployment of digital solutions was not focused on control but rather on the advantages they would offer and accompanied by user training and support. Changes affecting the external environment (projects related to product as service and B2B digital platform) were accompanied by an explanation of their reasons, advantages and roadmap. Furthermore, organization B encouraged work from home, flexible working hours and valued collective intelligence, built through network interactions. In that sense, office space was designed in order to favour inter-departmental exchange and silo breakage. We have been able to observe that organization B met less resistance to change, better comprehension of the digital strategy and greater overall success in its implementation. Partnerships with local start-ups and academic research centres reinforced openness to external business environment. Tolerance to risk and the willingness to resonate on a test-and-learn basis meant that new projects, born from these collaborations, were integrated and submitted to real market testing.

## 6. Conclusion and Future Research

In this research, we have attempted to clarify and establish a common ground for the understanding of the concepts of digitization, digitalization and digital transformation. We contribute to the discussion on digital transformation by identifying the three major levels that need to be activated in its deployment as well as the tactical success route and pitfalls associated with their execution. Based on this work, we propose an evaluation capable of pinpointing an organization's status on the digital journey.

The results of our study are also relevant for practitioners. We provide a framework for the execution of digital transformation by tracing a roadmap and identifying the essential do and do not. Based on our findings, practitioners can evaluate their company's maturity level as well as identify the areas in which they need to alter the status quo.

We have argued that the rise of Information and Communications Technology had a deep transformative impact on individuals, organizations and society. As the subject gained interest from practitioners and academics, extensive literature was dedicated to its comprehension. Due to their relative novelty,

concepts such as digitization, digitalization and digital transformation do not enjoy a general-accepted definition and interpretation frame.

This paper gives an overview of their key defining characteristics and establishes their differences and dependencies. Digitization is understood as the evolution from analogue to digital format of all mediums that support this change, digitalization as the adoption of digital solutions and digital transformation as a the implementation of digital capabilities, with consequences on an organization's business model, management style, digital capabilities and vision (Burlea-Schiopoiu, 2009). Although every concept is more than just an extension of the previous, there is a strong dependency between the three, each one being a necessity for the following.

We considered successful business model innovation as one of the marks of an accomplished digital transformation. We argued that business model innovation is conditioned by a firm's ability to create, propose and capture value from digital assets. We have also identified three key factors with a strong influence on an organization's digital journey: business model innovation, dynamic capabilities and management style (Burlea-Schiopoiu and Burdescu, 2016). Our research highlighted the role of these elements in a traditional organization's successful path to digital transformation. Based on our findings, we evaluated the stage at which the two organizations are situated in their digital journey.

Future research could be extended by interviews with all the parties affected by the different aspects of digital change, in the objective of conducting a comparative analysis. Research can also be widened to better understand the role of each company's organizational culture, as a basis and consequence of digital transformation (Burlea-Schiopoiu and Balan, 2018). A third axis of future research can be focused on the development of a diagnostics tool, useful in measuring an organization's digital-maturity level. Due to the complexity of this topic, both from a theoretical and practical point of view, extensive study, based on several organizations across different fields, would be necessary.

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