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Successful digital transformations enabled by technologies or by open mind? Italian case studies

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Abstract

Nowadays, Digital Transformation represents one of the most important and promising challenges for the modernization of Small, Medium and Large Enterprises. The adoption of the correct technologies (and solutions) offered by the Digital Transformation process can literally represent the success key to interpret the modern and dynamic global market context and adapt to its rapid changes. Aware of this critical path, the present study aims to analyze the approach to Digital Transformation of different type of enterprises and, as preliminary research, it proposes a methodology which has been tested for three Italian corporates. The four pillars of Digital Transformation (IT uplift, Digitizing operations, Digital Marketing and New Ventures) are firstly introduced and discussed. They are the main object of the survey that has been administered to the three Italian companies to understand the relevant steps that can be applied in order to achieve a successful Digital Transformation. The results highlight the relevance of sensing and learning capabilities as triggers of digital transformation, moreover a fifth pillar should be added: training. It is our intention that this article will spark and encourage continued debate and discussion around these topics.

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1. Introduction

Industry 4.0 (I4.0) is playing a fundamental role in enhancing industry competitiveness with new technologies and digital applications that help improve the management, effectiveness, and sustainability of the production and distribution processes at the different organizational levels. Digital Transformation (DT) is a shift in a company's business model, goods, or organizational structures caused by digital technologies[1][2]. Digital technologies enabled the creation of new ventures and digital start-ups, incorporating novel technologies in their business model and operations [3]. Examples of such transformation are online ventures able to engage with customers and stakeholders through new channels (e.g. Netflix), connect multivariate demands and highly personalized offerings (e.g. Uber and Airbnb), use social media to outsource activities and collect money (e.g. Upwork and Kickstarter), or test the potential of a business idea (e.g. Quirky). However, non-technological aspects such as leadership, culture, and employee training were found to be as important as technology [4]. A 2-year case study [5] concluded that technology enabled organizational change but did not cause it. Digital transformation is a multi-faceted journey with differing goals depending on industry and digital maturity. [6] outline four pillars of digital transformation: IT uplift, Digitizing operations, Digital Marketing and New Ventures.

Nevertheless, as underlined by many researchers, "Digital Transformation is not about technology" [7], but it's related to CEO's vision and how the members envision to be the future of the organization. What factors do make the difference between a successful transition and a failure? [6] analyzed stories from different companies that faced DT and suggestions to achieve a successfully such a goal.

"Leaders put in charge of a digital transformation feel pulled in many different directions, with competing demands from IT, marketing, sales, and operations. Without a clear understanding, the wrong people are often put in charge, with the wrong resources, and the wrong key performance indicators (KPIs), setting the digital transformation project up for failure"[6]. Starting from point of view in [6], we consider DT divided in four pillars (IT uplift, Digitizing operations, Digital Marketing and New Ventures) and we asked if these steps can be applied to Italian companies. There are some studies that explores about how Italian organizations are facing DT, some examples are in [8–11]. As a preliminary study, we address this research by conducting exploratory cases study of three Italian companies, one is a "born-digital" company (DC) and the other two are digital service suppliers (DSS).

The main contribution of this work is twofold. We investigate how the four pillars of digital transformation, supported by Industry 4.0 technologies, are implemented in the selected companies to understand which pillar is the most important, but also how companies' digital maturity affects their finalization. We also analyze how the pillars can be combined in different ways to highlight the synergies Industry 4.0 can bring to the various areas of a company.

Moreover, the impact that Digital Transformation has on workflow (whether positive, negative, or other) is investigated in order to understand how it affects the transformation.

As a consequence, with no attempt to be exhaustive, two research questions have been put forward:

- RQ1. Digital Transformation can effectively be outlined within these four pillars?
- RQ2. What are the enablers or the barrier for a successful Digital Transformation?

In this paper, we contribute to the literature by showing that there is no one-size-fits-all solution to getting a successful DT, but a collection of good advice.

This manuscript is structured as follows. Section 2 provides an overview of the four pillars of Digital Transformation. Section 3 describes the research methodology adopted and the questionnaires; Section 4 summarizes the responses; in Section 5 we report the discussion; in section 6 conclusions are presented.

2. Digital Transformation framework

The process of "digital transformation" involves rethinking and redesigning every area of the organization leveraging the power of digital technologies. It is a disruptive process that aims at innovating the organization substantially in many of its functions, from strategy formulation to real production processes and marketing activities, including new and more effective engagement models and new data analysis tools. To generate noticeable and disruptive effects, digital transformation must be applied to critical processes and operations, the outcomes are bound to be modest and not very appreciable otherwise.

It requires a considerable changes of the company's cultural approach as well as a new set of technology and techniques to be used.

It is challenging to provide a precise and unambiguous description of such a pervasive phenomenon, which has its roots in the ever-changing and dynamic digital world.

The words digitization, digitalization, and digital transformation are often used interchangeably. [12] emphasized the distinctions. The transition from analogue to digital is called *digitization*. *Digitalization* represents the second stage and consists in the application of digital technology to the processes. The widest term is *digital transformation*, which encompasses the entire organization rather than just a particular function or activity. It's a customer-driven strategic company transformation that leverages digital technologies [12]. The adoption of digital technologies implies a pervasive transformation stemming from digital information.

The choice to execute a digital transformation process results in technological, organizational, and cultural changes that accelerate business growth. This modification is needed to retain market competitiveness and a flexible organizational architecture. Successful digital transformation implementation demands a stand-alone strategy. A comprehensive strategy is needed to digitalize resources, revise operations, goods, and processes, and create a new business mode [13].

This strategy must go beyond functional thinking to holistically embrace both opportunities and risks of the transformation and support the organization on its digital transformation journey.

Management is unsure which processes and topics to invest in. This uncertainty is fueled by the lack of a cross-industry framework able to represent the primary actions and digital transformation initiatives [14].

3. The four pillars of the Digital Transformation in a nutshell

This section resumes the four pillars of the Digital Transformation that are the most known and discussed in recent literature (Fig.1). They have been thoroughly reviewed according to the state of the art and presented in order to explain what steps are likely to be undertaken from an enterprise in order to achieve a successful DT of their systems and processes.
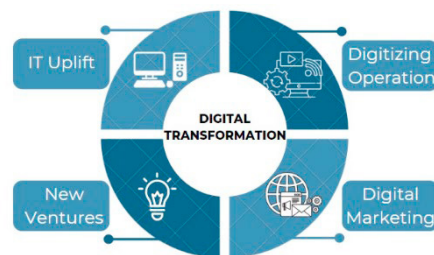

Fig. 1. The four pillars of DT

3.1. IT uplift

Digital transformation is a holistic approach aiming at incorporating technology into all areas of business. Therefore, technology itself is a key components of this change [1]. The ability to manage and exploit massive and rapid flows of information, is what differentiates companies in today's competitive environment. A modern IT architecture is what allows the company to respond to market changes and outperform the competition.

For these reasons, digital transformation usually starts with upgrading the company's IT infrastructure. Some companies need only a simple modernization, like increase server capacity, adoption of wireless and mobile equipment or other smart devices. For other companies, in particular for public administrations (PA), it's the beginning of a revolution! It requires IT architects and time. Updating IT infrastructure will give more effective tools to serve customers and lowering cost maintenance.

Gartner and Deloitte argue that the main technology trends are Artificial Intelligence (AI), machine learning (ML), modern architectures such as the cloud, increasingly fast or even real-time analytics and data security [15].

Digital companies invest in artificial intelligence (AI). International Data Corporation (IDC) reports that the organizations that had begun Enterprise Resource Planning (ERP) cloud migration before COVID-19 pandemic, prevailed over non-adopters. COVID-19 and the necessity to implement smart working in PA, universities [16], schools [17] and other sectors, strongly pushed many organizations to start or accelerate the IT uplift.

3.2. Digitizing operation

The second pillar is using digital tools for optimizing, simplifying, and rationalizing existing processes. These tools can be more advanced like AI, 5G, and IOT. At the beginning, it can mean exchanging analogue activities with digital ones, but more often it means restructuring organization and system. To fulfill this step, the company has to manage in a new way the entire processes to serve the customers better, so they don't get left behind.

The real challenge is not the adoption of technologies within individual business functions, but the ability to adopt an integrated approach that involves the entire value chain and leads to a renewal of relationship management with all stakeholders, such as suppliers, partners and customers [18].

Fulfilling this pillar allows companies to unlock possibilities, offering new services or products.

3.3. Digital marketing

Marketing department is dramatically affected by digital transformation processes and faces a strategic imperative: it cannot avoid implementing an updated strategy and new tactics to satisfy customers and remain competitive. To be successful, marketing strategies need to establish one-to-one connections with every single customer leveraging the power of Big Data and digitalization. It is a modern marketing paradigm which allows to boost customers' satisfaction, thus increasing their lifetime value [19].

According to Lexicon of Financial Times [20], digital marketing can be defined as "the marketing of products or services using digital channels to reach consumers. The key objective is to promote brands through various forms of digital media". Digital marketing includes internet sales, brand exposure, and client profiling. Invest in data, apply AI to comprehend data, and develop omnichannel experience to approach this pillar. AI can forecast client behaviour, organise viral campaigns, and geotarget. Customer Relationship Management systems (CRM) become fundamental in effective digital marketing. The returns of the investment are: reduced customer acquisition costs, generation of valuable data that can be used to acquire new customers and better serve existing customers, increased retention time, and timely intervention of customers likely to leave.

Let's set an example of how a small company can approach pillars 1, 2, and 3: a physical store has invested in a warehouse management system to synchronize products (information, prices and quantities) between stores, marketplaces and ecommerce (created later). This enables for more fluid internal work and reduces the chance of simultaneous purchases (physical and online). After launching ecommerce, it invests in social media, email marketing, and advertising. Over the years, the expansion of online businesses has made it possible to reach new markets and customers. In other cases, success did not come or it came slower because one of the pillars was missing.

3.4. New Ventures

Once a company completed all the tasks, it'll be ready for new business opportunities. Pillars 1, 2, and 3 can be used to develop innovation to test new sources of growth, to create new business models, new products, new services and new collaborations. What is often misunderstood by leaders is that the digitalization journey is a circular process in which, upon reaching the 4th step, one cannot stop but must start again to constantly improve one's resources in order to stay competitive and reach new market shares.

4. Methodology

Given the intent of this research, the methodology chosen is the multiple-case study y[21]. In fact, as suggested by these studies for preliminary research, when investigating a poorly researched and intricate phenomenon, the most suitable methodology is the empirical investigation to be performed using a case study approach, which allows an in-

depth exploration of the phenomenon, by examining it within specific contexts [22,23]. [21] affirms that the case research strategy is well-suited to capturing the knowledge of practitioners and developing theory from it. This methodology is considered in the International Systems (IS) literature when the studies discuss the societal transformation enabled by technologies [21,24–26]. The case study approach claims for an analytic generalization of a phenomenon which should allow the identification of some theoretical propositions that can be further tested in future studies [27].

The methodology requires the fulfilment of two different activities: case selection and data collection.

Fig. 2. Flow chart

4.1. Case Selection

For the purposes of this research, three companies have been selected to conduct the interview.
Table 1 depicts some characteristics of the companies which have been interviewed.

Table 1. Case studies.

Name of the company	type	Main business	Role Interviewee	Headquarters
C1	DSS	software solutions for PA	Computer consultant	Bologna (Italy)
C2	DSS	software solutions, digital business advisor	CEO	Catania (Italy)
C3	BDC	Sports subscription video streaming service	Territory Planner Italy	Milan (Italy)

Two categories of companies were chosen: digital services supplier (DSS) and "born-digital" companies (BDC). Digital Server Suppliers refer to an IT companies that design and implement cutting-edge software solutions aimed at simplifying customers' processes and sharing information. Born Digital Companies refer to companies that originate in a digital form.

The first company (C1) produces software solutions, one of the first in Italy to believe in digital transformation. The group is leader in application solutions for public institutions (PA) and healthcare public body. One of the Computer Consultant answered to the questionnaire. The second DSS chosen (C2) is a young company that operates in Catania (Sicily); they are also digital business advisor for private. In this case it was the CEO and co-founder to answer to the questionnaire. The third company (C3), a BDC, is a global over-the-top sports (OTT) subscription video streaming service. The service carries live and on-demand streaming of events from various properties as well as original programming. All the services are digital and the structure and workflow are too. For this company, the Territory Planner Italy was interviewed.

4.2. Data collection

Exploratory case studies typically address questions about the how and why concerning the dynamics of a particular contextual setting. The main objectives is to develop an initial understandings of a phenomena [22,27].

For this preliminary research, the study was conducted in Italy, from March to May 2022. Two different questionnaires were prepared. Due to the COVID19 pandemic, the article [6] and the questionnaire were send them by email.

The questions for a DSS were:
• According to your work experience, do you agree with the schematization of the transition in 4 pillars / step? (Q1)
• Can you tell me about some customers you have supported in their digitization process? (Q2)
• Did they manage to reach all 4 pillars? (Q3)
• If not, what prevented him from moving forward? (Q4)
• If so, what is the key to success? (Q5)
On the other hand, the questions for BDC changes slightly:
• According to your work experience, do you agree with this schematization of the transition in 4 pillars/step? (Q1)
• What is the key to the success of the company where you work? (Q6)
• Did your companies face "new ventures"? (Q7)
• Did your companies implement any new tools or channels to acquire or retain your customers? (Q8)
Given the very discursive nature of the responses received, a summary is reported in section 4.

5. Responses

5.1. Digital transformations and public administration: C1 responses

Q1. They agree with the schematization despite they mainly help companies for the fulfilment of 1st and 2nd pillars.

Q2. Their main customers are public institutions and healthcare public body that need different solutions for their DT. The applications generally under the focus are: IT protocol management, interoperability management, resolution and determination management, transparent administration, praetorian register, contracts, multifunctional counter, replacement storage. Before starting a project, a serious reconnaissance and revision of the organizational structure and of the tasks / roles to be given to the components is almost always necessary, in such a way as to accurately trace the flow of a document.

Q3. IT uplift and Digitizing operations are the only applicable to PA.

Q4. The PA must first tackle the problem of digital literacy of manager and counter operators, and then the 'resistance' of the staff who most of the time feel the 'change' as an insurmountable event. The lack of a clear organizational structure is a barrier.

Q5. The key to success in public bodies is twofold: capable, courageous and far-sighted managers and willing collaborators.

5.2. Digital transformations and private companies: C2 responses

Q1. Companies cannot deal with digitization following a 1 to 1 order, like filling with communicating vessels, by now. You can't wait to complete the 1st pillar to start the 2nd. In practice, it is essential to develop a general project, entrust each pillar to a manager and carry out each of them together in a harmonized way with respect to the company, therefore accelerating and decelerating according to the moment and the people.

Moreover, they proposed a fifth pillar: training. The aspect of staff training and education is the basis of the whole process because there will never be a DT if you do not prepare and adequately follow the company organization, training people for the transition and making them understand the reasons and objectives.

Q2. They took care of the digital transition of an industry with six production lines. The primary objectives were: to collect procurement data from the warehouse for raw materials and semi-finished products; insert plc and tablet online to record production times, rejects, errors, interventions, maintenance, etc. at each stage of production. Unfortunately, the whole production process was totally "unglued" from the accounting and sales one.

Q4. They were not able to complete the digital journey because of the lack of real intention from top management, no transparency towards the second lines and the workforce. Moreover, the management did not understand very well that to "digitize" a company is like sewing a tailored suit, not necessarily the less expensive solution is the best. Well-developed projects will never see the light if they are not correctly interpreted by the forces at play.

Q5. The key to success of any company is communication and spirit of collaboration.

5.3. Digital companies: C3 responses

Q1. They give more importance to the measurement phase of digital activities.

Moreover, they proposed a fifth pillar: measurement. Without constant, efficient and always optimized measurement, through different KPIs, it is impossible to understand digitalization status as well as the response of users to business activities.

Q6. Flexibility and always look ahead. The company has managed to create a strong brand; it has a data-driven marketing approach. The tone of voice used in social media is very fresh and suitable for the target it is aimed at. The employees are mainly sports enthusiasts, and the company takes great care of their well-being, for example all employees are equipped with the tools to work from home as well. C is a young company and the managers are proactive and concrete. It operates on a constantly growing market and does not shy away from challenges.

Q7. The product team is constantly working on building new features in the app. Through phases of A/B testing, different improvement scenarios in the app are tested, which are continuously monitored and measured in order to be optimized. Often, a new feature in beta testing phase is proposed to a group of customers to verify how much it is appreciated.

Q8. The digital channels, like social networks, used to intercept and communicate with stakeholders are fundamental. Targeted digital marketing campaigns are essential for creating leads and therefore the possibility of having new customers. Through social network it is possible to tell stories of employees and internal activities, attracting high-level candidates, which is always one of the priorities for a company of this caliber. Equally important are other channels, such as website, which in addition to providing information on programming on the platform, provides information and deals with news from the sports sector. Similarly, channels activated by PR activities, such as collaborations and publications on external sites, are equally important to increase the popularity and visibility of the company. Finally, even the notifications or email communications that we send to customers, in a targeted manner according to interests and sports programming, are essential to attract users and direct them to the app.

6. Discussion

The division of the DT into 4 pillars can be considered effective for Italian companies, but only the 1st and 2nd pillars for PA. Training of workforce should be introduced as 5th pillar. As already stated by [28,29], working in Industry 4.0 will "require workforces to continuously develop new knowledge and capabilities" to create innovations and develop improvements. From a technical point of view, the measurement phase of digital activities and the right KPIs were underlined.

As shown in Table 2, the most important enabler for a successful DT is "Human factor" and all the possible activity linked: team working, communication, flexibility, motivation and training.

Indeed, consistently with the centrality of human factor, for a digital transformation project to succeed, employees at all levels must have digital skills (information, media, and technical abilities). Along with cognitive capabilities, communication, teamwork, creativity, and critical thinking are gaining importance [30]. According to the "DigiTransComp" framework developed by Blanka et al. (2022), vertical dissemination of digital competencies is crucial. These skills need to be present from the highest levels to the bottom to guarantee that strategic corporate decisions are made with proper awareness of digital transformation and all employees contribute to the company's capability to change. In particular, all employees, also outside of IT department, should possess digital skills and be able to apply them in different end evolving contexts (horizontal dissemination of digital competencies) [31].

Worry of the changes is the biggest obstacle for workers, that feel a "greater psychological stress (emotional and mental)" because of decreasing of jobs [32–35]. Management perceives instead lack of real intention, organization structure not well defined, poor communications and no transparency as main barriers.

Table 2. Enablers Vs Barrier

	Enabler	Barrier
Human	Continuous training	Decreasing of unqualified jobs
	Team working	Wrong person in the wrong place
	Communication	No transparency
	Flexibility	Worry of changes
	Motivation	Lack of real intention
Technical	Measurement	Not defined organogram
	Right KPIs	

To summarize, we collected a list of good suggestions for an unsuccessful digital transformation:
- start the digitization process in any of its steps without properly analysing the company and the market;
- start this process just because it "needs to be done";
- assign people who do not have the adequate knowledge to face the "digital journey";
- unawareness of the processes and company organization;
- unawareness of how your offices are structured, which components are part of which unit (especially in PA);
- avoiding the facing and confronting 'resistance' of the staff who most of the time feel the 'change' as an insurmountable event;
- do not chose properly KPIs or do not measure at all;
- be not clear with your workforce;
- do not "tailor" digital transformation on your business.

In 2021, the European Commission formally called for the Fifth Industrial Revolution (Industry 5.0, I 5.0), by releasing the document titled "Industry 5.0: Towards a Sustainable, Human-centric, and Resilient European Industry" [36]. Industry 5.0 recognizes the power of companies to become resilient providers of prosperity by focusing on respect for out planet and workers' wellbeing [37]. While I 4.0 is a technology-driven revolution, I 5.0 is a value-driven initiative, where "Human factor" will have considerable weight and importance.

7. Conclusion

By digitising operations, organisations may boost automation and smarten human work. Studying how firms handle DT and how employees perceive it can assist researchers, academics, and practitioners develop novel research proposals for the "real" world of work. Only then can basic research become applied research and help improve industrial processes, transforming them to I 4.0 and Industry 5.0.

This study has been motivated by the lack of research addressing how DT, and its four pillars, is faced by Italian companies. We addressed this gap by conducting three case study analysis, two digital services suppliers and one "born-digital" companies. The results show that DT with a worker-centric strategy helps organisations succeed. Workers need lifelong paths to acquire proper competencies to deal with I 4.0 technologies. Managers need to be capable, courageous and far-sighted. We acknowledged that our study has limitations. The generalizability of the findings may be limited due to the selection of three organisations. We believe our results could be significant in terms of external validity. C3 is the Italian department of a multinational corporation and C1 is leader of its sector in the Italian context.

In the next research, the case study campaign will be extended to other Italian companies in order to collect a valuable amount of data to depict more consistent results about the Digital Transformation process in Italy. The idea is to analyse not only the gap of types of company with respect to the four basic pillars (plus the fifth emerged in this research), but also the difference among the various areas of this country (North, Centre and South).

Future research could examine how organisations from different industries and levels of digital maturity approach digital transformation. It would also be possible to analyse how the approach to DT and the willingness to invest in DT solutions alter depending on whether the firm is listed and the degree of ownership-management overlap.

Fundings

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