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Building Resilience Through the Use of Intelligent Technologies: A Qualitative Research

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Abstract

In the actual business context, characterized by a high degree of volatility, uncertainty and complexity, resilience represents an important characteristic of any work system, regardless of organizational level (workplace, department/project, organization, network/alliance or industry). Resilience of a work system depends on how technical components, especially those based on intelligent technologies, are integrated with the social components of the system. Using the social-technical system theory, the authors conducted a qualitative research, in order to identify the relevance of different intelligent technologies and integration solutions for building resilience in organizations. Several managers, mainly finance chief officers, were interviewed, and their responses were analysed. The main findings of the research refer to the acknowledgement of the importance of the resilience within a limited organizational resources context as well as narrow short-term perspective, in connection with a digital transformation mindset and initiatives based on use of intelligent technologies.

Keywords: Resilience, social-technical system theory, intelligent technologies, analytics.

JEL Classification: M15, M21, O33.

1. Introduction

The concept of resilience, a frequently discussed topic in the present fierce environment, is becoming an essential part of a company's strategy, an objective to be achieved or even a new way a company should act and perform. When discussing about resilience as a concept, it is described as the company's adaptive capacity and its ability to cope with, adapt to and recover after a disruption (Gallopin, 2006). Moreover, it is discussed the fact that companies are required to reduce the complexity of their infrastructure in order to adjust to potential risks and

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tolerate disruptions.

Resilience, from the perspective of the financial field, and vulnerability are directly related one to another, given that they "are two sides of the same coin" (Jacobsen et al., 2009), thence building financial resilience starts by understanding the vulnerabilities that result from exposure to risk and lack of access to appropriate resources. Resilience helps top performers thrive through downturns and, furthermore, resilient companies enjoy gains that last longer after an economic crisis (https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/stronger-for-longer-how-top-performers-thrive-through-downturns). A key point mentioned by McKinsey consultants is how the organizations are handling the EBITDA margins – fast adaptation in reducing operating costs, building on the recovery momentum and taking advantage of the increasing revenues, once the recovery period has started. In addition to the operational agility, resilient companies have been part of internal digital disruptions, applying new ways of increasing productivity through artificial intelligence, advanced analytics, and digital techniques.

The paper aims to identify connections between digital transformation initiatives and resilience through the dimension of the financial area, which represents the place where most disruptions reside – either the triggering point where a change decision is taken or the end point where consequences have to be handled.

2. Problem Statement

Resilience, from a literature review perspective, is approached from different angles – either different means for measurement or framework proposals or connected with different other concepts that contribute to its enhancement – sociotechnical systems, competitiveness, and adaptive salesforce.

There are several measurement methodologies for resilience, as well as proposals for new modes of evaluation, by defining the company's resilience as how an enterprise can decrease the level of its vulnerability to expected and unexpected risks, the flexibility in reorganizing itself in a changing environment and the ability to recover in the least possible time as well as with least possible costs (Erol et al., 2010).

Based on this definition, three evaluation areas are targeted: – (1) the ability of a company to decrease its level of vulnerability to expected and unexpected events; - (2) the ability to change and adapt to a changing environment; (3) – the ability to recover in the least possible time from a disruptive event. The proposed metrics for measuring resilience refer to the following:

Recovery time, which is the time a company needs to overcome disruption and return to its normal state

Level of recovery, which can be used in connection with the time factor to create a dimensional understanding of predictable outcomes; for this metric certain premises are being discussed; recovery level is considered by comparison or timeframe of the recovery is taken into account.

Level of vulnerability to potential disruptions, which is based on a qualitative measure when considering two or more companies, with a debate on including the type of disruption that leads to various kinds of vulnerabilities.

The proposed metrics consider dynamic and organic features of the complex systems, but are limited to a somehow general approach since particular disruptive events have not been considered, leaving the field open to other extended modes of measurement as well as identification of the correlations between various aspects of a company's resilience.

Taking as a starting point the metrics proposal described above, together with other similar papers which consider the same premises, Sanchis and Poler (2013) have defined a framework to support strategic decisions to improve the resilience connected with aforementioned areas – vulnerability, adaptive capacity and recovery ability. The framework aims to identify properties of resilience to determine different indicators for each of the identified areas and to sketch a global overview of a company's resilience, as follows:

Vulnerability is connected with predictability, likelihood/frequency, preparedness, coverage, criticality and degree of tolerance

Adaptive capacity relates to flexibility, agility, robustness, and redundancy.

Recovery ability depicts the level of recovery, time to recovery and cost to recovery.

Still, the proposed framework is lacking the implementation of a pilot in a real scenario with the inclusion of other fields (e.g.: finance, business continuity, risk management) for a complete picture of what resilience should look like in an integrated approach of a company.

A necessary step in further conceptualizing a framework around artificial intelligence, big data, flexibility, agility, and resilience is underlined because information systems like big data analytics may be fundamental and give some preliminary insights on the importance of such transformations in achieving organizational resilience (Ciampi et al., 2018). The focus of this approach is mainly to review the existing research in this field by formulating findings that emerged in the existing literature, thereby having a gap in addressing the practical/business part, further investigation with qualitative methodologies being one of the necessities.

When considering a company a large sociotechnical system with multiple stakeholders and different perspectives that lead to an overall resilience, new insights about relating system interfaces, types of change, and interaction between social and technical systems are brought into perspective. By comparing stakeholder angles, different understandings have been depicted as to what resilience means with respect to system domain, stakeholder purpose, system abstraction and timescales (Taysom and Crilly, 2017).

Although the study is based on a development project, by approaching the sub-systems – social and technical, and using the three dimensions of resilience – resisting influences, recovery from influences and changing to accommodate influences – the authors expect that the findings would have a general applicability

to all sociotechnical systems.

Another concept connected with resilience is competitiveness. By using qualitative analysis, Sabatino (2015) builds a rational model to understand resilience of the manufacturing facilities, identifying some principal determinants categorized in two variables: organizational structure of the company and relationship with the reference market.

The identified elementary factors of resilience from an organizational structure point of view are structure of costs, timelines – anticipation and rapidity of business decisions, involvement, and efficient system of the incentives with strategic objectives, simple organizational structure, and control system on a clan model. Within the variable relationship with the reference market, the following factors can be mentioned: ability of focusing on the customer, product focalization and quality management, business culture of national imprinting and value system, geographical focalization, and internalization strategies.

As a conclusion, the paper builds a model to identify the vulnerable factors and the reaction abilities of a company, and proposes new ways of measuring resilience. The research presents limitations when generalizing the conclusions, but provides an opportunity of adaption of the theoretical framework of resiliency to specific company necessary abilities.

One last significant concept linked to resilience identified in the context of COVID-19 pandemic is adaptive salesforce with an emphasis on flexibility of the sales process and its contribution in building resilience (Sharma et al., 2020). The paper presents the results of a qualitative research addressed through academics who are active in sales executive education and sales executives and consultants, hereby underlining the most important aspects of adaptive selling from both academic/theoretical perspective and practical/business viewpoint. The result of the analysis suggests that adaptive sales force should focus on improvements in the following areas: flexibility and adaptiveness in the salesperson functions, adaptiveness of scales, and technology adaptiveness.

The cited papers ensure a proper starting base for future research as well as for tackling a wide range of resilience approaches - definition of resilience and ways to measure it, artificial intelligence and big data analytics and their contribution to build resilience, sociotechnical systems and multilateral stakeholder perspectives on resilience, competitiveness, and adaptive salesforce as integrative parts of organizational resilience.

The niche addressed by the authors of this paper is the perception of resilience and digital transformation as linked components within a company and what these two concepts look like from a financial perspective with a focus on identifying particularities for this field while addressing sustainable growth in the described context.

3. The Research Aims

An essential difference between holding financial information and understanding financial data is the fact that the former is based on uniformity and

structure as compared with the latter, which is the starting point on identifying opportunities and furthermore making use of digital tools to discover the unseen from a bundle of figures.

Traditional finance role has emerged in the last couple of years into a central position within a company by incorporating knowledge from market, sales, finance, and digital technologies, thereby confirming a paradigm shift of how finance could contribute to developing and achieving attributes like agility, flexibility, and resilience.

The questions addressed in this paper refer to how companies perceive resilience as a concept, the linkage with digital transformation and more specifically, how this is seen from a corporate finance perspective with the possible identification of particularities of the field.

4. Research Method

Considering the limited theoretical background on the research topic, the authors decided to use the inductive inquiry, as research approach. Data was collected using four semi-structured interviews. Table 1 presents the interviewees' profile.

Table 1. The interviewees' profile

No.	Position	Experience (no. of years)	Industry	Company size (MM euro)
1	Head of accounting and controlling	> 15	Technology	> 100
2	Internal audit manager	> 10	Automotive	> 100
3	Service center leader	> 10	Technology	> 100
4	Fintech company co-founder	> 10	Digital learning	< 10

Source: Authors' contribution.

The following interview sections were defined:
1. Resilience and digital transformation perception (How is the resilience perceived? Is resilience important? Which are the difficulties during building the resilience?)
2. Digital transformation strategy, as defined or being defined (Did the company already define or is interested in defining a strategy for digital transformation? Which are the determining factors that would lead to a digital transformation strategy? What kind of technologies can be considered as part of the digital transformation? Which are the relevant changes when implementing different tools/technologies/applications? How does the actual mindset/culture of the company fit to the digital transformation trends and digital transformation strategy, if there is one? Are there any initiatives designed for a cultural transformation, too, and if yes, could you please provide an example?)
3. Digital transformation and financial resilience (How does financial resilience contribute to an overall company resilience? How does the digital

transformation process lead to building resilience in the finance field? Are there any particularities of digital transformation in the finance field? Which are the emerging digital trends in the finance field?)

4. Build resilience through digital transformation (Would resilience lead to sustainable growth of the company? How can it reshape the future of the company for the next 5-10 years?)

Before starting the interviews, a verbal consent (by phone) for participation was obtained, along with an agreement of non-disclosure of the name or company to be used for the current research. The interview protocol was sent via email to each of the respondents before the interview. The interviews took place in March 2021 either via online meetings or over the phone with direct transcript of the conversation. On average, an interview lasted between 30 to 40 minutes.

The transcripts of the interviews were analysed using the coding technique. Based on the first codes, the groups of codes and the associated concepts were defined. These results were used for discussing the research findings.

5. The Research Findings

The analysis was divided into several parts oriented on resilience connected with digital transformation at a company level and from the perspective of finance field. The following tables present the coding results for the resilience definition and the digital transformation perception.

Table 2. The coding results for the resilience definition

Preliminary Codes	Code groups	Category
• Process assessment and changing • Positive and efficient reaction to change • Overcoming the resistance to change	Dealing with changes	Resilience definition
• Efficient solutions for challenges/risks • Risk management • Survival, especially in the case of young business • Business survival in VUCA environments • Continuing to provide added value	Dealing with challenges	
• Holistic view about the business • Long term approach • Organizational, team and. individual levels • Multiple perspectives • The need for a strategy • Proper allocation of the resources	Approach	
• Increasing the market share • Organizational learning • Cultural transformation • Effects are achieved in time • Depend on the size of company and its inertia	Effects of resilience	

Source: Authors' contribution.

All the respondents agreed that resilience has a key position within an organization, but it is also seen as a competence that requires continuous improvement, either being part of a long-term strategy or addressing short term necessities like adaption to disruptive events and agility to identify opportunities created by such an event. The main obstacles in achieving resilience refer to the lack of a long-term approach, limited resources, resistance to change and building confidence connected to achieving resilience on a company level.

Digital transformation applies to all aspects of human society (Kaplan et al., 2004) and forces companies and industries into organizational changes and critical business adaptions if they want to survive and prosper (Porfirio et al., 2020). Even so, the answers of the qualitative research underline mostly specific, short-term needs, sometimes part of a centralized company strategy, mostly with a silo orientation, required by the market, industry or by the customers.

When discussing digital transformation technologies, most of the respondents mentioned robotic process automation, cloud-based technologies and share point or they mentioned digitalization as a part of the products and services that the company offers, proving that the concept of digital business strategy is associated either with organization's exploitation of its digital resources to develop market differentiation (Bharadwaj et al., 2013) or to the improvement of its operational efficiency (Matt et al., 2015), as shown in Table 3.

Table 3. The coding results for Digital transformation perception

Preliminary Codes	Code groups	Category
• General strategy and specific initiatives	Approach	Perception of the digital transformation
• Silos approach		
• Impact on customers and partners		
• Related to risk management, regulatory changes (such as audit approach) and competition		
• Covering and transforming the entire business model		
• Payroll, payments, tax reporting,	Examples of applications	
• Applications for remote business		
• Cloud technologies	Technologies	
• Collaborative technologies		
• Green technologies and connectivity		
• Profitability	Effects of adopting technologies	
• Increasing the market share		
• Organizational learning and employees' professional development		
• Cultural transformation		
• Effects are achieved in time		
• Depend on the size of company and its inertia		

Source: Authors' contribution.

When discussing about a digital transformation culture, management characteristics like democratic leadership and higher levels of coherence related to the company's mission can counterbalance the characteristics of the company (Porfirio et al., 2020). The respondents' answers mentioned there is a limited orientation towards digital transformation due to the time that needs to be spent in this direction, to the inertia of the company due to its size and external factors (pandemics) that pushed the company into a digital transformation process.

The resilience coming from finance area is seen as a key point in connection with the rest of the company by providing mechanisms for survival, as well as addressing the human level by reducing stress and building confidence. Digital transformation in finance is seen as a contributor in providing the necessary information for decisions or adjustments in disruption period, and the main means mentioned as part of the digital finance are robots, AI, neuronal systems, cloud computing, big data, and predictive analytics.

Related to the future of companies in the context of digital transformation, it is expected that it will increase flexibility to respond faster to market and shareholders requirements, and will enhance knowledge transfer, technological innovations, and sustainable growth.

6. Conclusions

The intent of the present research was to bring to attention present-day concepts like resilience and digital transformation, focusing on the identification of the linkages between them with a particular interest in the corporate finance area. One of the limitations of the study is represented by the narrow domain in which the respondents' profiles concentrate - technology/industry and fintech solution provider as well as the fact that the profiles cover different responsibilities within the organizations – the only common point being the full or partial financial responsibility.

Despite acknowledged limitations, the results of the interviews reveal joined points in each of the sections of the interview – resilience is a key point in a company, and the difficulties in achieving it refer to change resistance, limited resources, and narrow short-term perspective.

Digital transformation strategies do exist at a company level, but actually most of the initiatives in this field address limited, stringent needs or just parts of the company. As for the mindset, there is still a finite orientation towards digital transformation coming mainly from restrained resources or from the fact that achieving results in this field may be difficult due to inertness of large-sized companies. Even so, the commonly used technologies in the field of digital transformation refer to robotics, process automation and cloud-based technologies.

As for the finance area, the identified means as part of the digital transformation actions are AI, predictive analytics, neuronal systems; in an organizational approach, finance is considered a main pillar in building resilience mainly to the predictive component, which used for rapid decision making especially in disruptive situations.

A proposal for future research includes respondents from a wider range of industries, with a focus on full financial responsibility positions (chief financial officers, head of finance etc.) concentrated on gaining a deeper understanding on how digital finance contributes to overall company resilience and on formulating a general statement on this subject.

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