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RESEARCH ARTICLE

Operational excellence, organizational culture, and agility: bridging the gap between quality and adaptability

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Operational Excellence (OpEx) is understood by the quest to continuously improve performance. While used by organizations worldwide, the capacity of OpEx programmes to make organizations successful in unstable business environments has been challenged. This article aims to answer the research question of what the nature of the relationship between OpEx and Organizational Agility truly is. The authors have previously proposed a theoretical framework supporting the link between Operational Excellence, Organizational Culture, and Organizational Agility. While built on a strong conceptual background, this framework lacked empirical validation. Following the conclusion of ten industrial case studies, this article provides a summary of the key findings obtained in each case and integrates them into an updated conceptual model. As key findings, this study shows how Operational Excellence enablers and cultural orientation have an important role in the development and scaling up of Organizational Agility capabilities, highlighting how different contexts may influence these dynamics. This article offers a better understanding of the balance needed to maintain high operational performance levels while dealing with change. It connects and upholds the importance of Organizational Agility and of the cultural paradigm in the management of Quality in technical and technological organizations.

Keywords: Operational excellence; organizational culture; organizational agility; adaptability

1. Introduction

Major industry transformations, such as the digital or the green transitions, are generally discussed as business opportunities for Europe's industrial sector (Breque et al., 2021). However, they also mean challenges that organizations must be prepared to address, while maintaining high levels of quality, innovation, and operational performance (Carvalho et al., 2020; Pigosso et al., 2013). In increasingly unstable business environments, organizations face ongoing pressure to improve, innovate, and adapt without

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compromising long-standing objectives. However, for many organizations, this reality means finding a delicate balance between two apparently distinct strategies: (1) the maintenance of high level of quality and performance, and (2) the development of capabilities to quickly adapt and respond to changes in demand.

The aim of this paper is to conclude the theory development efforts developed to explain the dynamics between the concepts of Operational Excellence, Organizational Culture, and Organizational Agility, thus addressing the perceived tensions between quality and adaptability. The broader research question which synthesizes the project's scope, structure and goals is to understand: '*do companies incurring in sustainable operational excellence initiatives have more capacity to be agile, through the transformation of their organisational culture?*'.

Operational Excellence refers to a set of principles and practices that foster the continuous improvement of an organization (European Foundation for Quality Management, 2018), while Organizational Agility is understood the ability to adapt to changes and to use them as opportunities to gain competitive advantage (Arteta & Giachetti, 2004). Together, they may contribute to the betterment of an organizations and to its ability to be successful in the long-term. However, there is still an often perceived gap between the two (Carvalho et al., 2019), as there, is more general terms between Quality and Adaptability.

Tensions between Operational Excellence and Organizational Agility have been reported in the past. It has been argued that process and operations management activities are beneficial for organizations in stable contexts, but that they are unreliable in change contexts, where they may even be counterproductive (Benner & Tushman, 2003). Complementary, Bertels and Buthmann (2013) suggest that there is no evidence that engaging in excellence programmes is sufficient to ensure long-term success, as it does not guarantee of the ability to adapt.

There is growing interest in addressing this question, as proven by some past attempts to theoretically frame it. Vinodh et al. (2010) argue that the volatile conditions that prevail in the globalized world make agility an indicator of organizational excellence; Gleich and Sauter (2008) suggest operational excellence as a key to develop the organizational resources and create the necessary enablers of adaptability. Several studies have started to explore this relationship. Organizational Agility factors have been proved to have a positive impact in operational excellence (Wageeh, 2016); and theoretical frameworks have been advanced to support the joint pursue of operational excellence and adaptability (Saleh & Watson, 2017). Our previous research work amounts to these perspectives: following an extensive literature review, we have proposed a conceptual model that suggests Organizational Culture as the link between Operational Excellence and Organizational Agility (Carvalho et al., 2019). However, and while built on strong theoretical foundations, these frameworks lacked practical confirmation. Such limitation was through the conclusion of ten industrial case studies, which were thoroughly reported in two articles. Based on the findings of these ten case studies, the authors found the need to return to the original conceptual model (Carvalho et al., 2019), and update them considering the case study studies' results. These efforts culminated also on the review of the model. While many of the link proposed where validated, others were added or updated. Results support the existence of a 'functional balance' between Excellence and Agility, and show how Organizational Culture plays a critical role in supporting it. It is shown how different organizations may favour Excellence or Agility in different contexts, but how there are clear benefits in promoting both, to avoid stagnation in pursuit of sustainable business success. In the case of organization with well-established Operational Excellence enablers, it was shown that they support the effective adoption or further development of Organizational Agility capabilities. In a contrasting scenario, young organizations or those

that have undergone a recent, large-scale transformations find it necessary to look for Operational Excellence as they begging to stabilize their operations, including to further develop their Organizational Agility capabilities.

2. Methodology

A case study methodology was used across this project, with a structured case approach (Carroll & Swatman, 2000) supporting the theory development. Case studies are adequate for research aiming at building theories about phenomena occurring in tangible environments (Yin, 2003). However, the theory building process is not always straightforward, especially when requiring multiple cases. The structured case approach offers a structured and iterative framework for inducing theories from field work (Carroll & Swatman, 2000). It involves the development of a literature-based theoretical framework which is iteratively checked against the evidence collected in the field. The structured case approach is deployed in a recurring way, being repeated for each case. Each case thus encompasses a cycle with four phases: (1) plan; (2) data collection; (3) data analysis; and (4) reflection. The structured-case approach intends to assist in the development of high-quality case study research. It is composed by three elements: a conceptual framework to provide the theoretical foundations of the research, an iterative cycle that continuously refines the research efforts and the conceptual framework, and a final analysis that ties the research results to the original theory (Plummer, 2001).

Accordingly, this methodology uses a theoretical framework to guide the research work, namely in what concerns the collection and analysis of empirical evidence. This theoretical framework, presented and sustained in our previous work (Carvalho et al., 2019), is sustained on a board literature review (summarized in Section 2.1) and is composed by two elements: a conceptual model (see Figure 1) that establishes the proposed relationships between the concept under study, and a list of enablers and success factors (Tables 3–5) that guide our data collection and analysis.

2.1. *Theoretical framework: literature review and development*

The conceptual framework forms the basis for a new research cycle (Carroll & Swatman, 2000). Structured-case builds theory from multiple cases that are used to sequentially enrich and revise a conceptual framework which depicts the key concepts and relationships. The first version of the conceptual framework is drawn from the literature, and it

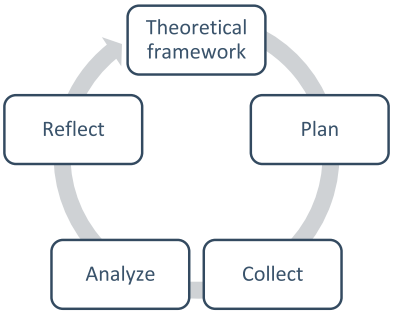

Figure 1. Recurring cycle used for each case study according to the structured-case research methodology (adapted from Carroll & Swatman, 2000).

is then critically examined and revised to incorporate the understanding gained from the field. The next few sections summarize the relationships identified in the literature and the development of the conceptual framework.

2.1.1. *Organizational culture and cultural orientation*

Organizational Culture has been described as a complex set of shared values, beliefs, assumptions and symbols that are reflected in behaviours and norms of an organization (Deal & Kennedy, 1982). It is in the light of the Organizational Culture that different strategies are formed, with organizations selecting and prioritizing different approaches and initiatives to support and connect to the needs of the market (Schein, 1984, 1995).

Barney (1986) argues that if a Culture is to be a source of competitive advantage, it cannot be completely manageable since it alters the concept of being valuable, rare and inimitable. However, there is some agreement that it is manageable to some extent (Armenakis et al., 2011; Quinn & McGrath, 1985). This leaves us with the concept of cultural orientation (Gebhardt et al., 2006; Homburg & Pflesser, 2000b), which Gebhardt et al. (2006) describe as a process for creating a new cultural orientation in an organization. Cultural orientation thus consists of a transformation in some of the patterns and practices of a Culture in search of further alignment with a certain idea (Mehra et al., 2011).

2.1.2. *Cultural orientation to quality and excellence*

In line with the principle of cultural orientation, there have been several works on the impact of Culture in the performance of an organization (Barney, 1986; Chan et al., 2004; Deal & Kennedy, 1982; Sadri & Lees, 2001). Warne (1987) highlights a series of success factors that fit it, including the definition of Quality goals and responsibilities, the creation of a cultural commitment to Quality, and the idea of sustaining an orientation over the long run. Furthermore, the author refers that sustaining a Quality orientation demands the commitment of the entire organization – with top leadership and management committed to using that orientation as a part of the company's strategy and having a Culture that is conducive of the commitment of everyone.

The link between Operational Excellence and Organizational Culture has been well explored, with studies highlighting the importance of managing OpEx with a socio-technical systems perspective (Found et al., 2018; Saha et al., 2018). The importance of a cultural orientation to Quality is highlighted in several Quality frameworks and models. The European Foundation for Quality Management states that the best results are achieved as the principles and practices promoted by the programme are assimilated into the culture (European Foundation for Quality Management, 2018). Similarly, the Shingo Institute (2016) states that the Quality and Operational Excellence frameworks do not change organizations by themselves, rather providing 'guiding principles' that support the people to promote change in their daily activities. As such, the focus of the Shingo Model itself is not to achieve specific results, but to improve the organizational systems and culture in order to better achieve and improve them in the future (Shingo Institute, 2016). The Model provides an essential framework for the assessment of a cultural orientation to excellence, defining a series of cultural elements and behaviours. These include the frequency of behaviours, their duration (whether they are being seen for the first time, or have repeated for years), the intensity (defined as the 'sense of passion', or the importance given to a certain behaviour or its absence), the Scope (how cross-sectional

these elements behaviours are in an organization), and, finally, the role that leaders, managers and associates have in promoting such behaviours (Shingo Institute, 2016).

2.1.3. *Balance and relationships between organizational culture, operational excellence, and agility*

Several works argue that there is a positive relationship between Quality and Agility. For some authors, high levels of Quality and Performance Excellence are an indicator of success even in an environment where organizations deal with highly volatile and unstable marketplaces (Saleh & Watson, 2017; Vinodh et al., 2010). For others, Quality is a key to develop the organizational capabilities and resources of Organizational Agility (Gleich & Sauter, 2008). This happens as Organizational Agility needs to be built on previously developed capabilities, many of which fall within the scope of Quality and Excellence (Zhang & Sharifi, 2000). At the same time, Organizational Agility, Knowledge management and Strategic Human Resource Management are proposed as key factors for enhancing an organization's effectiveness and help it achieve sustainable Operational Excellence (Saha et al., 2017a, 2017b).

There are also views of a clash between Agility and Excellence. Some authors mention trade-offs such as quality or speed (da Silveira, 2005), process rigour or agility (Lee et al., 2010), or agility and process maturity (Vinekar & Huntley, 2010),

The integration of Excellence and Agility is also constrained by the Organizational Culture. Different authors claim that amongst the main reasons for not pursuing Agility is the inability to change the Organizational Culture (Spayd, 2014; Vinekar & Huntley, 2010). However, and as argued by Vinekar and Huntley (2010), this may happen essentially because practitioners understate the importance of the Organizational Culture in this shift.

Conforto et al. (2016) studied how improvisation capabilities, traditionally related to the ability to innovate and rapidly respond to changes in the marketplace, may be used by organizations that pursue more disciplined approaches to project and programme development efforts. The authors conclude that any organization can develop and enhance improvisation competencies if it is able to create the right team structure and project environment, provide management practices and tools, and build a Culture that recognizes and views changes positively.

In the past, we have proposed it has been proposed that it is through the development of a cultural orientation towards operational excellence that organizations will develop Organizational Agility capabilities. Such development is done in an effort to align operations with the changing business environments, and the development of a supportive culture is key for the establishment of an enduring capacity to cope with change and become agile (Carvalho et al., 2017; Carvalho et al., 2019). However, tensions have been reported in the relationships between Operational Excellence and Agility, and there to this point limited practical evidence of this relationship (Carvalho et al., 2021).

2.1.4. *Development of the theoretical framework*

Considering the impact of Organizational Culture on both Quality and Agility, and pursuing a positive relationship between Quality and Excellence, we have previously proposed the conceptual model in Figure 2 (Carvalho et al., 2019). It advances a cyclical relationship of influence between Operational Excellence and Organizational Culture that leads to the

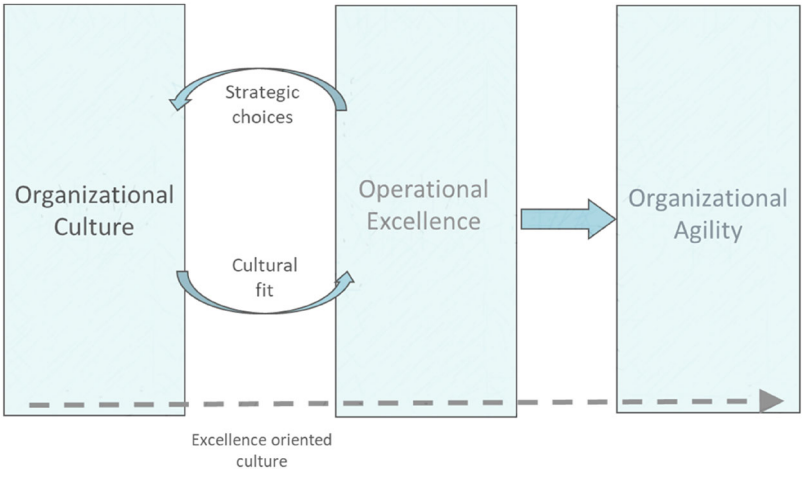

Figure 2. Theoretical framework, based on the review of the existing literature on the relationships of Organizational Culture with Operational Excellence and Organizational Agility (Carvalho et al., 2019).

creation of an Excellence-oriented culture, which then substantially improves the ability of an organization to move towards agility (Figure 2).

The cyclical cultural evolution represented in the model finds matching perspectives in the literature, most notably the theory of Edgar H. Schein (1995) under which an Organizational Culture is shaped by the strategies and initiatives that, over time, prove to be successful in responding to the needs of the market. As these are repeated and updated, they will set into the Organizational Culture, contributing to the long-term success of an organization. Accordingly, Operational Excellence is suggested not as an approach to promote change, but rather as a framework to deal with it, and its integration within the Organizational Culture will set the potential for pursuing long-term, sustainable operational success. To do so, Operational Excellence needs to be promoted beyond the single used tool and seek cultural fit to act as a long-standing strategy, deployed in continued iterations (the deployment of different strategic choices and initiatives, represented in Figure 2 as the cyclical relationship between OE and OC). Once established, an excellence-oriented culture will support the search for this long-term operational success, seeking new and better ways to adapt and deal with change – thus offering a clear opportunity for alignment with the principles of Organizational Agility. If these conditions are met, the sustainability of Operational Excellence should be achieved, with organizations being able to push for the promotion of Organizational Agility (Figure 2) based on an adaptable Culture (Carvalho et al., 2019).

2.2. *Plan*

To ensure a simple, transparent, and repeatable process for performing multiple cases, a case study structure was designed. This structure defined the expected duration of a case study, as well as the organizational areas with the most potential of interest for the collection of relevant data. A fixed timeline was avoided, as each case study has specific characteristics that make it unique, its context demanding case-by-case adaptation of tools and

schedules. However, to ensure maximum consistence and allow repeatability, lines for orientation and a roadmap were drawn.

Part of this effort was the partner organization selection. The first step was to define the pool of potential partners companies. Based on today's quickly altering business environments, we looked for sectors and industries that are in the frontline of exposure to change. Next, organizations operating in highly technical and technological industries were identified and approached in these sectors, which included automotive, electronics/household appliances, software and web-based services, healthcare and pharmaceutical industries, and energy, environment, and waste management. In order test and further develop the theory under different cultural, regulatory and environmental contexts, cases were planned both in European and American-based companies. The characteristics of the ten organizations selected for case studies can be seen in Table 1.

Before initiating the case studies of each organization, there was an effort to define the departments and areas expected to be involved, and the groups and level of detail to be used in analysing the difference in the roles of the workforce. Typical areas to be studied were set to include (but not be restricted to) activities related to Quality, Operations, Production, and Innovation/Research and Development, both from a technical and management point of view. Although some subclasses can be further defined within each group, the workforce was divided according to three main roles: leaders, managers and associates.

Case studies were designed to be rolled out during a period of time summing up to 50–120 h, depending on the organization's size. This time frame could be continued or split for periods of between 4–8 weeks. These numbers were considered as being essential to allocate all interviews and focus groups, run questionnaires, and allow consistent observation

Table 1. Cases: Industrial activity and sector, size, and location.

Name	Industrial Activity	Sector	Size (People) (European Commission, 2012)	Location
Org. A	Energy and Environment	Services, Power Generation	Medium (~200)	Portugal
Org. B	Product Development and Manufacturing	Electronics: Automotive, Household appliances	Large (>2500)	Portugal
Org. C	Software Development	Information Systems and Technologies	Large (>300)	Portugal
Org. D	Pharma and Healthcare	Pharma, Research	Medium (~200)	Portugal
Org. E	Product Development and Manufacturing	Electronics: Household appliances	Large (>1000)	United States of America
Org. F	Pharma and Healthcare	Healthcare, Research	Medium (~100)	United States of America
Org. G	Digital Services for Industry 4.0	Industry Services	Small (<20)	Portugal
Org. H	Software Development	Information Systems and Technologies	Small (<20)	Portugal
Org. I	Digital Services for Industry 4.0	Industry Services	Small (<20)	United States of America
Org. J	Energy and Environment	Services, Power Generation	Small (<20)	United States of America

of the daily work life. Direct interpellation of the workforce was defined to meet a minimum of 20% of the staff. Further information on the data collection methods is described next.

2.3. *Data collection*

In this work, and given the nature of the three concepts under study, we followed two modes for engaging in organizational research: the science approach, related to the technical side of an organization and focused on understanding the organizational phenomena and uncovering patterns that help to explain them; and the humanities approach, which minds the human side of an organization and focuses on portraying the experience of its people. The science approach looks for empirical objects, evidence with well-defined proprieties which can be studied from an outside position; the humanities approach, on its turn, focuses on the discourse of the workforce as a source of information (Romme, 2003).

In order to identify the presence of the concepts of Operational Excellence, Organizational Agility, and a Cultural orientation to Excellence, we used the enablers and success factors previously defined by Carvalho et al. (2019), as listed in Tables 2–4.

In this sense, a series of data collection methods were considered. Observation and the review of organizational documentation and archives were identified as possible sources of evidence focused on the understanding of the organizational dynamics under study. The use of interviews, questionnaires, and focus groups was identified primarily in the scope of portraying and understanding the human experience of the workforce but also

Table 2. Enablers of a cultural orientation towards excellence, and their success factors.

Enablers	Success Factors	References
Principles	Values and Beliefs	Schein (1984), Mintu (1992), Shingo Institute (2016).
	Norms	
	Vision and Mission	
Practices	Use of Quality tools	Schein (1984), Mintu (1992), Dahlgaard-Park (2009), Shingo Institute (2016).
	Engagement with excellence initiatives	
	Commitment to excellence	
	Commitment to organizational culture	
Behaviours	Role	Warne (1987), Mohr-Jackson (1998), Mehra et al. (2011), Shingo Institute (2016);
	Frequency	
	Duration	
	Intensity	
	Scope	
Artefacts and Creations	Built Environment, layout, and decoration	Deal and Kennedy (1982), Peters and Waterman (1982); Dahlgaard-Park and Dahlgaard (2007), Schein (1984), Mintu (1992), Dahlgaard-Park (2009), Shingo Institute (2016).
	Internal Communication and Media	
	Stories, Symbols and Heroes	

Table 3. Operational excellence enablers and success factors.

Enabler	Success Factors	References
Leadership and Management Commitment	Sustainability of excellence initiatives	Liker (2007), Lu et al. (2011), Brown (2013), Jaeger et al. (2014), Shingo Institute (2016).
	Leadership Development	
	Silo Reduction	
Workforce Engagement and Empowerment	Suggestions and Ideas Programmes	Dobni et al. (2000), Liker (2007), Hafeez et al. (2006), Abdullah et al. (2008), Lu et al. (2011), Lin and Tseng (2016).
	Managing the Potential for Engagement	
	Motivation, reward, and recognition	
Organizational Learning	Training Plan and Individual Development	Johnson (1992), Kanji (1998), Olhager & Persson (2006), Evans (2010), Luo et al. (2018), Sony (2019).
	Mentoring and Coaching	
	Recruitment and succession plan	
	Talent Management	
Workforce needs and expectations	Satisfaction & perceptions over benefits	Chodkowski (1999), Dobni et al. (2000), Liker (2007).
	Health, Safety & Hygiene	
	Teamwork	
Value Chain	Supply Chain Integration	Kanji (1998), Liker (2007), Lu et al. (2011), Lin and Tseng (2016), Luo et al. (2018).
	Focus on value creation	
	Customer Relationship Management	
	Stakeholders' involvement in process design	
Product and Market Development	Design for manufacturing/ usability	Lin and Tseng (2016); Luo et al. (2018).
	Stakeholder participation in product design	
	Cross Functional Integration	
	Market Development	
Quality Systems	Quality assurance and error proofing	van der Wiele et al. (2000), López-Fresno (2014).
	Maintenance Engineering	
	Quality Management	
Management, control and optimization	Process Revision	Kanji (1998), Liker (2007), Lu et al. (2011).
	Lean Management	
	Process control and optimization	
	Scheduling and capacity management	
Process assessment and data validity	Data Reliability and Fact Driven Decision	Hides, Davies and Jackson (2004), Batini et al. (2009), Moriarty (2011), Brown (2013), Kenett and Shmueli (2016).

(*Continued*)

Table 3. Continued.

Enabler	Success Factors	References
	Benchmarking	
	Self-assessment	
Strategy Alignment	Systems thinking	Jaeger et al. (2014), Lin and Tseng (2016), Shingo Institute (2016).
	Focus on Organizational excellence	
	Organizational strategy alignment	
Strategy Development	Strategic objectives definition	Lu et al. (2011); Jaeger et al. (2014); (Carvalho et al., 2019)
	Strategy development	
	Process Orientation	
Strategy planning and deployment	Deployment action plan	Brown (2013); Jaeger et al. (2014); (Shingo Institute, 2016); Luo et al. (2018).
	Contingency planning	
	Resource Allocation	
Organizational Communication	Strategy Communication	Brown (2013); (Shingo Institute, 2016); Luo et al. (2018).
	Communication processes	

allowed to collect critical information to understand these organizational phenomena. Table 2 lists the sources of evidence considered in this study and the different data collection methods used, outlining their strengths, weaknesses, and previous usage in similar research. The collection of data was based on the identification of the different enablers or cultural elements and their success factors. Once a success factor was referred in a conversation or survey response, or identified through the analysis of any documentation, we promoted its verification and further study. Based on these data collection methods, we identified any other mentions of the existence of the different success factors, promoting triangulation in order to collect multiple perspective and mounting evidence to understand its true implementation. For example, if a certain success factor was mentioned in the interviews with a manager or leader, we would follow in further interviews or in focus groups and surveys. In order to understand how well sustained a certain success factor was, we also relied on evidence collected through the observation of practices and behaviours, and through the analysis of documents. Based on this evidence, we promoted the assessment of each success factor, rating their implementation in accordance with the evidence found.

Documents and archives considered in this project include, amongst others, financial and strategic reports; work instructions; Quality, Operational Excellence and Agility standards, models, and assessment reports; projects deliverables and reports; training programmes; and newsletters or other artefacts of internal media.

Direct engagement was done through interviews, focus groups or questionnaires. For direct engagement with the workforce, three different staff groups were defined: leadership, middle management, and associates. While the number of participants varied across each organization – as their dimension and workforce size varied –, the research team guaranteed that, through the use of interviews, questionnaires, and focus groups, a minimum of 20% of an organization's workforce was engaged in the study. For organizations A to F, 20–30% of the workforce participated in the study. For organizations G, H, I and J that grew to between 60% and 80%.

Table 4. Organizational agility enablers and success factors.

Enablers	Success Factors	References
Orientation and Work Environment	Agile mindset	Vázquez-Bustelo et al. (2007), Bottani (2009), Conforto et al. (2014), Dikert et al. (2016).
	Agile-style work environment	
	Collaborative work	
	Adequate reward for the use of agile tools and methods	
Agile Resources and Capabilities	Development and deployment of new capabilities	Vázquez-Bustelo et al. (2007), Doz and Kosonen (2008), Bottani (2009), Gligor and Holcomb (2012).
	Talent to support agility	
	Knowledge Management	
	Job rotation systems	
Process and Project Team	Team dedication	Vázquez-Bustelo et al. (2007), Doz and Kosonen (2010), Conforto et al. (2014), Dikert et al. (2016).
	Autonomy and empowerment	
	Integration and Cross-functional teams and projects	
	Team Experience	
Organizational structure	Promoting a horizontal structure	Van Hoek et al. (2001), Lin et al. (2006), Vázquez-Bustelo et al. (2007), Conforto et al. (2014).
	Decentralized decision-making	
	Interdepartmental collaboration	
Manufacturing (development) flexibility	Automation	Gunasekaran (1999), Gligor and Holcomb (2012), Conforto et al. (2014).
	Speed	
	Flexibility and Reconfiguration	
Process flexibility	Process concurrency	Van Hoek et al. (2001), Lin et al. (2006), Bottani (2009), Gligor and Holcomb (2012), Conforto et al. (2014).
	Process integration	
	Frequent revision cycles	
New Product and Process Development	Newness	Bottani (2009), Conforto et al. (2014).
	Complexity	
	Balance of project management methods	
Technology and Information Systems	Use of technology	Gunasekaran (1999), Vázquez-Bustelo et al. (2007), Bottani (2009).
	Virtual enterprise	
	Readiness for Connectivity and Digitalization	
Agile strategic planning	Leadership Unity	Doz and Kosonen (2008), Conforto et al. (2014), Dikert et al. (2016).

(*Continued*)

Table 4. Continued.

Enablers	Success Factors	References
	Fact-based decision making	
	Product succession planning	
Change Management	Strategic Sensitivity	Van Hoek et al. (2001), Lin et al. (2006), Doz and Kosonen (2008), Dikert et al. (2016).
	Effective initiation and prioritization of change efforts	
	Resource fluidity	
Agile information and communication strategy	Intensified Communication	Lin et al. (2006), Bottani (2009), Conforto et al. (2014).
	Easy access to information	
	Open information sharing	

2.3.1. *Interviews and focus groups*

Interviews were mostly used at leadership and middle management levels, while focus groups were used mostly with the associates and middle managers. Occasionally, 'group interviews' at the leadership level were promoted, normally with two to three people involved. Focus groups were designed to have 10 people, although smaller groups were common. Interviews took between 25–40 min, focus groups about one hour. Questionnaires were distributed across the entire organization, but the distinct groups were tracked separately.

Interviews (and in a similar way, questionnaires and focus groups) were conducted more often towards the middle of the case study and thereafter, once an initial assessment of the organizations had been made. In order to avoid an ad hoc approach, leading to poorly articulated questions or to difficulties in the treatment of the collected data, a semi-structured approach was used. Semi-structured interviews allow the researcher to have some degree of definition around the matters to be asked, but still allows some flexibility in the issues to be addressed by the interviewee (Longhurst, 2010). Accordingly, a series of themes and a few core questions were defined from the beginning, but room was left to explore other issues, both by the researcher and by the initiative of the interviewee.

Focus groups and group interviews were also an important source of data that allows the collection of new information, with relative depth, to a research project. Although not allowing the same in-depth perspective as individual interviews, focus groups have other advantages: promoting a discussion within a group of people can lead to release of inhibition and allow insights that would not arise from individual interviews; at the same time, they offer a method that involves relatively low cost and little time investment. However, they require the ability to lead and facilitate a group and interpreting the group discussions can be challenging (Campbell et al., 2013). Interviews were Held with the CEO and COO of every organization, and either interviews or focus groups being promoted to inquire the remainder of top and middle management levels. While the number of people varied depending on the size and structure of each organization, the people responsible for the following functions were subject to either single or group interviews: Quality Management and/or Continuous Improvement, Innovation Management, Research & Development and/or Innovation Management, Design and Development, Logistics and/or Supply Chain Management, Human Resource Management; Production Management/Control; and Customer Success/Relationship Management.

2.3.2. *Questionnaires*

Questionnaires are powerful tools to collect a large quantity of data from human subjects in a non-invasive way (Campbell et al., 2013), being a low cost, efficient and fast methods for data collection (Sue & Ritter, 2011). Questionnaires allow a direct focus on topics under study and provide insights into an organization (Campbell et al., 2013; Yin, 2003). On the other hand, some of these advantages have a downside: questionnaires have become very frequent in organizations, leading to saturation (Yin, 2003). Furthermore, they are exposed to different kinds of bias, derived from poorly articulated questions, rationalized and self-reported answers, and inconsistently applied ding criteria (Campbell et al., 2013; Skaaning, 2018).

Questionnaires were deployed both physically and online, and used primarily amongst associates and managers. Although the same (or very similar) questionnaires were distributed to these groups, data were treated separately in certain conditions, to help understand different perspectives between these groups. Questionnaires were distributed both physically and online.

The questionnaire was structured into four sections, targeting both the experience of the workforce within the organization and larger organizational phenomena, mainly regarding the relationships between Operational Excellence and both Organizational Culture and Organizational Agility. The first section focused on the social climate of the organization, gathering the perspective of the workforce regarding the work environment and the experience of working in the organization. The second and third sections focused on uncovering the level of engagement and participation of the workforce in organizational improvement activities, and their perceptions and understanding of strategic initiatives and results. Finally, the fourth section presented a Cultural Relation Matrix, aiming at quickly assessing the level of cultural alignment with the ideas, tools, and methods related Operational Excellence and Organizational Agility.

2.3.3. *Documentation and archival review*

The review of documentation – either contemporary or historical – is a valuable way to collect stable, exact and precise information, no matter how frequently it is accessed. Furthermore, it is unobtrusive, requiring little engagement of the organization and its people. Furthermore, and in the case of historical and archival records, they allow access to events occurring in a long period (Yin, 2003). Documentation, by not being the products of observations and notes created by the research team, guarantees some freedom from researcher bias and helps with triangulation. The challenge in analysing documents and archives is that documental information may not always be easily accessible (or made accessible) by the organizations.

Documents considered in this project included both production and operations records – such as register of production performance, product defects, complaints, downtimes, amongst others, financial; operational processes and procedures – work instructions, integrated management systems documented information, standards, frameworks, and assessment reports, projects deliverables and reports, training programmes; and strategic reports on Quality, Operational Excellence and Agility. Other documents analysed include newsletters or other artefacts of internal media.

2.3.4. *Observation*

Direct observation is an insightful approach to collect data and gather information on how a group, strategy or tool works. However, there are a few challenges associated with it: it is

time-consuming, requires good and consistent observations, and a clear definition of the elements to observe (Campbell et al., 2013; Viller & Sommerville, 2003).

Together with observation, ethnography gains special relevance in this work due to the importance of the concept of Organizational Culture to the project. Ethnography in the workplace has been used by authors to promote the description of the customs of individuals and cultures within an organization (Freeman et al., 2003; Watson, 2011). Ethnography is essential to describe the experience of the people in the workforce, separately from the organizational dynamics, until the culture of the organization is well understood. From there, it may finally be compared and integrated with further evidence collected by other methods (Watson, 2011).

Observation focused on the general work environment in different sections and departments of the organization, and included meetings at several organizational levels – from work activities in the shop floor to larger corporate events. Elements observed included behaviours, language, and physical artefacts. Grounds for observation included meetings at several organizational levels, from work activities in the shop floor to corporate events; and the general work environment in different sections and departments of the organization. Elements to be observed include behaviours, rituals, language, and physical artefacts regarding beliefs and values.

2.4. *Analysis*

Following the use of a structured case approach, all data analysis efforts considered a review and comparison of the evidence against the proposed conceptual framework. The conceptual framework thus guides the analysis, but does not limit it – as new relationships or concepts may be incorporate as the research (and the conceptual framework) evolves (Carroll & Swatman, 2000). While the concepts in the original conceptual framework guide the initial analysis, further codes, and new details regarding those same codes, are expected to result from the evolution of the theory. It is expected that the evidence collected through the use of the structured-case approach can open the door for new interpretations., and the research team must be open to an exploratory approach (Carroll & Swatman, 2000). This approach endorses open-mindedness and triangulation, and may be used to complement traditional confirmatory data analysis, Bayesian statistics or revisiting the data collected so far and its interpretations (Carroll & Swatman, 2000; Yu, 1977). In this sense, data analysis is an ongoing and iterative task that may involve reading and rereading transcripts repeatedly to gain a deep understanding of the data and the underlying themes and its patterns (Carroll et al., 1998). The management and analysis of the data collected were done using NVivo qualitative data analysis software. Data analysis included the following tasks: (i) identification of patterns in corporate documents, interview transcripts, and focus groups and meeting notes; (ii) treatment and comparison of questionnaire results; (iii) triangulation and data consistency; (iv) results from observation. In order to assess practices and behaviours demonstrating Operational Excellence, Organizational Agility, and an Excellence-oriented Culture, we had previously identified the enablers and success factors that allow the identification of each concept (Tables 2–4).

2.5. Reflection

The reflection stage considers the revision of the theory in light of the newly collected evidence, analysis, and overall results of each case study. Reflection is essential for theory building, promoting its further development and evolution, permitting to raise new

questions, suggesting alternative explanations, and allowing the addition of new concepts and the inclusion of contradictory evidence (Plummer, 2001). It is based on the reflection that there is progress in the conceptual framework, ensuring that the accumulated knowledge is incorporated into the theory, and leading to a more accurate representation of the reality of the phenomena (Carroll & Swatman, 2000). After each case, the theoretical framework was compared to the results of each case study, and updated accordingly. Accordingly, the theoretical framework underwent an ever-evolving progress, with a review being made after each case. This review took into consideration the findings from the previous case and the accumulated findings from former cases and form the literature, leading to an updated theoretical framework that was used in the following case. Using this methodology ensured the continuous inclusion of the findings into the theory development.

3. Results and reflection

The structured case approach was valuable in achieving a broader understanding of the dynamics between Excellence, Culture, and Agility. Table 5 presents the key findings of each case study.

Each case study offered important standalone insights. However, and in a perspective of building theory, these insights gain further relevance when adding to the cumulative knowledge. Following a cross-case perspective, the highlights of the reflection stage are shared below.

Case study B added evidence of how a mature Operational Excellence system, sustained in well-developed capabilities and a cultural orientation to Excellence, can lead to the development of Organizational Agility capabilities. This case study showed a reality that closely matched the relationships considered in the conceptual framework in Figure 2 as a whole. While this case was quite particular in that sense, the remaining organizations added contributions that helped not only to validate, but to further develop the theoretical framework. In some case the validation of parts of the framework was achieved; in other, new links and dynamics were uncovered. Cases in organizations A, D, and F, for example, showed how a limited perspective on Operational Excellence limits the ability of organizations to develop their Culture and constrains the pursuit of Agility. These organizations, having in one way or another developed a focus on Operational Excellence that was mostly task-or compliance-oriented and performed in an isolated manner (at local level, and with poor or no integration between them). As a result, they showed only an intermediate cultural orientation to Excellence, and a limited development of Organizational Agility. Furthermore, and in the particular case of Organization F, it was possible to see how the pursuit of sustainable Operational Excellence demands both technical and cultural development efforts. At Organization F, an initial excessive focus on cultural aspects did not deliver the practical results that the organization expected. In a response, it shifted to promote an unbalanced attention to tools and processes that did not guarantee a strong engagement from the workforce.

These case studies also added evidence that, even in the presence of highly unstable business environments, limited levels of development of Operational Excellence are not enough for organizations to actively seek the development of Organizational Agility capabilities. Although from a different standpoint, these findings were reinforced by the results from C and E. While both organizations emphasized Agility over Excellence, their development of Organizational Agility was still constrained by issues that fell within the scope of Operational Excellence. Silos, limited integration between improvement initiatives, broken communication lines, and no active management, control, and optimization of

Table 5. Individual case study key insights.

#	Key insights
A	In case study A, an active plan was identified with the goal of developing an organization-wide approach to Operational Excellence (OpEx). OpEx enablers such as Leadership and Management Commitment, and Workforce Engagement and Empowerment were present but moderate. While there was an active workforce commitment, varying levels of understanding and engagement with Quality and Excellence were observed, and practices and behaviours were far from uniform. Quality systems were in place but strategy alignment, development, and deployed say sere constraints and limitations. Cultural elements were present but their scope and intensity varied across the organization. Organizational Agility (OA) enablers were limited. There was clear evidence of constraints in the engagement with OA due to constrains not yet tackled by Operational Excellence (e.g. silos, poor communication channels and processes, undeveloped process integration and cross-functionality).
B	In case study B, several enablers of Operational Excellence were identified, with strong implementation and practice across the organization. A clear Operational Excellence-oriented culture was also observed, with practices and behaviours being well rooted and followed frequently. Strategic aspects were deeply aligned with the pursuit of Excellence, and the organization showed strong practices regarding Quality and Excellence. Case study B added evidence of how a mature Operational Excellence system, sustained in well-developed enablers and a cultural orientation to Excellence, can lead to the development of Organizational Agility capabilities. The organization started to invest in Organizational Agility and pursuing adaptability as a means to create more value for its customers, a strategy that led to the creation, and then expansion, of a Research and Development unit that has been gaining importance and resources within the organization. Furthermore, the work environment and organizational structure were update to allow more adaptability from the workforce.
C	Most Organizational Agility enablers were well developed, with high flexibility, focus on and the promotion of an agile work environment, and in managing change. However, the evolution of several enablers showed to have stagnated. Evidence showed that despite significant maturity in terms of process integration and strong team cross-functionality, sharing Agile knowledge and capabilities was a difficult task. While within the environment of development teams the use of Agile methods and the development of Organizational Agility capabilities are well advanced, their development has been made in a somewhat isolated manner. A number of Operational Excellence enablers and related practices (and success factors) were identified. The company showed to excel in terms of Quality Systems management, and in the control and optimization of processes, but there was a lack of strategic alignment with Operational Excellence. A culture of Excellence was observed in certain areas of the organization, but it was not transversal to its entirety. Case study C provided insights on how the pursuit of Organizational Agility can be constrained by the limited development of Organizational Excellence. This organization puts clear emphasis on Agility capabilities, but the lack of Operational Excellence practices and an organization-wide cultural alignment limit their further development.
D	Organization D demonstrated well developed enablers of Operational Excellence, many related to a heavily regulated market in which the company operates. Clear evidence was collected on enablers such as compliance and quality control systems; management, control and optimization of processes, process assessment and data validity, and organizational learning. Nevertheless, engagement with Quality initiatives varied from area to area, as did the engagement and commitment of the workforce. Furthermore, Organization D presented limited cultural alignment with Excellence, and a very limited development of Organizational Agility capabilities. The intense focus on the stability of processes, and the strategic importance of Quality and Excellence have so far left little room for efforts focused on improving the Agility of the organization. Although a number of initiatives have been considered, especially at the

(*Continued*)

Table 5. Continued.

#	Key insights
	leadership level, the organization fears that these large-scale changes will have a destabilizing impact its products an operation. Accordingly, Agility is still regarded both as an opportunity and a risk.
E	At Organization E the driving focus of the strategy is more clearly related to Organizational Agility than to Operational Excellence. Organization E's engagement with Excellence showed to be essentially focused on process control and efficient distribution. Most of the focus on Quality and Excellence observed in the organization is linked to the development and distribution processes and their metrics. A clear limitation was the inability of the organization in the creation of an organization-wide alignment, which also relates to the lack of an orientation to Operational Excellence. At Organization E, Organizational Agility enablers were also centred on development activities, and agile initiatives are essentially found in technical areas. Despite having a majority of tech-oriented employees and working continuously to become more agile, Organization E has been unable to create a stable organizational alignment, and has even seen some resistance and mistrust on the use Agility-oriented methods and strategies. Organization E faces severe constraints to the expansion of Agility capabilities across the organization due to the lack of Operational Excellence capabilities, systems and cultural alignment.
F	Organization F showed evidence of a strong commitment to Operational Excellence (OpEx). OpEx initiatives were initiated as a response to the heavy regulated environment in which the organization operates, but quickly expanded beyond that scope. The organization invested in creating a robust organizational alignment with Quality Systems. It also promoted a Learning Organization, creating a small group to prepare a comprehensive training and development programmes to help increase awareness on Quality and continuous improvement tools, and create an organization-wide commitment to OpEx. However, challenges to recruit and retain talent have been growing. Organization F's workforce, with good levels of experience and expertise, and additionally trained in organizational improvement and OpEx, became highly valued in the market, and competitors have been attracting them. As a result, it has been experiencing high levels of employee turnover, with a considerable number of associates – and even some middle managers – having left. This reality jeopardizes the existing OpEx enablers and the maintenance of the cultural orientation to excellence in place at the moment of study. As for Organizational Agility, any evidence in the presence of enablers was very limited. This case demonstrated that highly unstable business environments, by themselves, are not enough for organizations to actively and efficiently seek the development of Organizational Agility capabilities.
G	Organization G made the development of Agility enablers a core aspect of its strategy, focusing on being able to grow by learning from the market and adapting to its needs and expectations. The organization showed a clear orientation towards Agility and promoted an agile work environment, heavily investing in resources and capabilities. During the initial years, it was mostly focused on the development of its products services, and ensuring funding and sales. The organization's structure transmitted a flexible and adaptable structure that prioritized project teams and capabilities to develop new products and services. In this process, and despite some emphasis on strategy, the organization invested little in the definition of processes and systems to guide its activities. These were typically developed on a 'need-to' basis. As the organization started to stabilize and grow, it found the need to focus on Operational Excellence, with a few enablers being identified. It was clear that the need to further develop capabilities and advance the maturity of Organizational Agility efforts had an influence in the development a process orientation and in setting the organization in pursuit of Operational Excellence. Organization G worked to design its operations and to define processes. The organization also put more emphasis on communication and organizational learning. However, at the time of study, the development of a cultural orientation to excellence was still minimal.
H	Organization H showed several enablers of Organizational Agility: it showed proficiency with several agile project methods, using them consistently. Project development processes and methods were well-developed, with clear metrics to promote balanced, cross-functional, and autonomous teams. The organization made good use of the existing knowledge and expertise to promote the development of its workforce. It also focused on the development and deployment of agile strategies. The creation of an agile-oriented work environment. The organization puts a strong emphasis on retaining the talent and knowledge it has acquired and developed. This case also provided evidence that an organization can develop Operational Excellence capabilities even when

it is more actively engaged in the expansion of Organizational Agility (OA) capabilities. Although with less intensity when compared to OA, quality of products and services was promoted as a central value of the organization. The importance of ensuring stable processes for delivering projects to their customers was well understood. The organization was able to define several of its core processes, supporting its operations and strategy, with active systems to manage resources and balance capabilities, ensuring timely delivery. and active feedback loops. Processes showed to be stable, and the organization managed them actively. However, the cultural orientation to excellence is still limited, being seen with variations across the organization.

I Organization I, at the time of this study, operating mostly on a project approach., and there was still a considerable level of variability in its products and processes. While the definition of processes is essential, their flexibility is at this point more critical for its ability to adapt to the market and find the best way to connect with its customer's expectations. As a consequence, the organization has been more active in the deployment of agile enablers, especially focusing strategies and methods. There is a strong focus on the use of technology to maintain flexibility and an attention in maintaining agile management and strategy. Leaders, despite their espoused commitment to Operational Excellence, are more actively focused on prioritizing change management and maintaining a balance between the needs and requirements of its projects and the available resources, expanding the organization's workforce as a result of those needs. Efforts to ensure this balance includes the acquisition of talent to support agile strategies and the development of Agility-related capabilities – from project management methods to technical skills to deal with increased complexity and disruption of the level technology supported by its products. The culture of the organization was deeply influenced by its leaders. It showed to have some degree of orientation to Excellence, but a more active concern with Organizational Agility.

J In its activity, Organization J has two main technical challenges. The first deals with product development; the second with the operations to deploy their solutions. With a product aimed for areas with difficult access, quality is a major concern, with the need to ensure its endurance and reliability in the long term. Accordingly, there was an effort to develop Operational Excellence capabilities. To deal with these challenges, Organization J has focused on the quality of products and the development of operations and organizational learning. Central process are well defined and stable. Nevertheless, the variability in the characteristics of the products and possible deployment scenarios puts pressure on the organization to operate under the principles such as speed and flexibility. The focus on acquiring talent and retaining is obvious, but the organization has been more actively engaged in reinforcing the technical capabilities of the workforce. There are clear efforts to involve customers and stakeholders in the description of products and delivery operations, but each case is approached in a project scope. Furthermore, the emphasis and cultural orientation to Operational Excellence have been less evident than the one to promote Organizational Agility, and the development of the workforces is more clearly centred on helping the organization maintain high levels of adaptability.

processes are examples. Accordingly, it was observed that these organizations were, at the time of study, trying to tackle these issues by implementing new actions and tasks – most of which clearly aligned with the development of Operational Excellence enablers (Table 3).

Cases G, H, I, and J showed that even if there is some focus on process definition and improvement, the pressure from the market to promote Operational Excellence does not become evident until later. Each of these organizations showed to face evident pressure to be highly flexible and to quickly adapt to new or changing demands from its (potential) customers. As a result, their efforts have been mostly centred on the development of Organizational Agility enablers and success factors (Table 4). While smaller and younger, these organizations already showed gaps in their cross-departmental integration, indicating that they may face the same challenges to expand Organizational Agility enablers as their counterparts C and E. Accordingly, it is expected that, as in cases C and E, organization G to J will see similar need of well-defined processes and systems and a reinforced emphasis on Operational Excellence as they grow.

In organizations that operate in these contexts, and which are focused on Organizational Agility, a culture of Agility was identified. Traits of an agility-oriented culture were identified., with teaming and improvisation marking team activities, as well as more frequent use of project and programme approaches (organizations G, H, I and J). Such a culture was also recognized in organizations C and E as a past orientation, which now has slowly shifted towards Operational Excellence.

The combined results of the case studies and the individual, iterative reflections promote along the research process provided insights that allow a deeper understanding of the relationships between Operational Excellence, Organizational Culture, and Agility. These insights are summarized in Table 6.

4. Findings and discussion

By exploring the relationships between Operational Excellence, Organizational Culture, and Agility in different organizations, significant insights and perspectives were collected. Based on these findings, there are four clear theoretical contributions from our study: (i) the creation of a cultural orientation to Excellence is tied to the development of Operational Excellence practices; (ii) Operational Excellence enablers support the development and expansion off Organizational Agility enablers and success factors; (iii) a balance between Operational Excellence and Agility may be achieved independently from where an organization started its journey, and (iv) organizations in highly volatile contexts tend to first develop and Agility-oriented culture, which will not jeopardize a future move towards Operational Excellence.

The first contribution refers to the creation of a cultural orientation to Excellence. The results of the case studies support that the creation of a cultural orientation to Excellence is tied to the development of Operational Excellence capabilities. Across the ten organizations studied, higher maturities in terms of Operational Excellence capabilities consistently corresponded to higher cultural orientations to Excellence. It was also found that, in a two-way direction, culture does drive practice, but it also becomes dependent on such practice to further evolve across time. This is, by itself, an important finding for the generality of continuous improvement efforts – that the sustainability of such efforts is only possible when they are built both on technical and cultural aspects. Based on the observations made in all 10 organizations, we can state that there the continued pursuit of operational excellence fosters a transformation of the organizational culture, leading

Table 6. Summary of the findings of this study in the different relationships between the concepts of Operational Excellence, Organizational Culture, and Organizational Agility.

Operational Excellence and Organizational Culture	The creation of a cultural orientation to Excellence showed to be tied to the development of Operational Excellence capabilities: the higher the maturity in terms of Operational Excellence capabilities, the higher the cultural orientation to Excellence. Operational Excellence sustainability and the unlocking of its potential benefits are only achieved when there is an active development of both the culture and the capabilities of OpEx. Evidence on this relationship was observed in the case study at B, and complemented by observations in organizations A, D and F.
Operational Excellence and Organizational Agility	The proposed path leading organizations that have mature Operational Excellence capabilities towards Organizational Agility was proved, with these organizations developing OA capabilities because of their search for continuous improvement and their goal of creating value in increasingly unstable business environments (see case study *B*). However, evidence was collected showing that the relationship between these concepts is not a single-way dynamic. Instead, organizations may approach Organizational Agility, as a strategic choice, regardless of their engagement with Operational Excellence. Normally, such organizations so in order to better support or expand their OA capabilities, normally after identifying constraints to their development (already observed at organizations *C* and *E*, and potentially similar behaviours identified in *G*, *H*, *I* and *J*).
Organizational Agility and Organizational Culture	Traits of an agile-oriented culture were identified. Organizations with an agile-oriented culture showed higher emphasis on individual talent, with teaming and improvisation marking team activities, as well as a more frequent use of project and programme approaches (organizations E, G, H, I and J). These cultural orientation and traits are seen even in efforts focused on the development of Operational Excellence capabilities.
Operational Excellence, Organizational Agility and Organizational Culture	There is a mutual influence between the three concepts, as observed across the entire pool of case studies. Strategic prioritizations and different levels of maturity affect the way Operational Excellence and Organizational Agility interact and how their capabilities are developed. It has been established that Operational Excellence programmes can change the behaviours in an organization – first by integrating with the Organizational Culture and allowing the development of an Excellence-oriented Culture, and second by using the established OpEx capabilities and cultural orientation to support the development of Organizational Agility capabilities. In the opposite direction, organization in volatile context favour the development of their Organizational Agility enablers and success factors, but increasingly incorporate principles of Operational Excellence and their operations stabilize, or they scale up.

to the development of values and beliefs that support the daily practice of operational excellence, and the creation of an excellence-oriented culture. These findings support the cyclical pattern proposed in the original theoretical framework and respective model (Figure 2).

The second relevant finding is that this cultural orientation towards excellence does not immediately result in higher levels of organizational agility – but that it does so only if maintained in the medium – to long-term. Two different scenarios were observed along this cultural transformation journey. Organizations which had already a well-developed excellence-oriented culture found an easier path for the further development of organizational agility. In contrast, organizations with an initial focus on excellence and a limited orientation to the culture find it more difficult to support the development of organizational agility capabilities. In short, high scores of Operational Excellence support the further development of organizational agility capabilities, while lower scores of Operational Excellence represent a siloed and unconnected reality that may constraint or clash with the development of organizational agility practices.

A third contribution comes from the understanding that the relationship between Operational Excellence and Agility could be initiated at any of the two concepts, and that in the long term, a balance between Operational Excellence and Agility may be achieved. Contrary to the relationship between Operational Excellence and Organization Culture, the dynamics between Operational Excellence and Organizational Agility do not follow a cyclical pattern. They usually occur in one way or the other, depending on the needs and market context of an organization. While they may happen with high frequency (for example, in organizations prioritizing the development of Organizational Agility capabilities but needing to improve their Operational Excellence systems to do so), they were, in each case, observed in a single direction. The direction, frequency, and intensity of the relationship between OpEx and OA are thus heavily dependent on the business environment and the strategic choices of each organization. The move from Excellence to Agility was observed in cases where the organizations were mainly focused on Quality and Operational Excellence, but saw Organizational Agility enablers develop as a result of their pursuit of continuous improvement and customer-centric value creation. In the opposite direction, the observed context was marked by the need to stabilize, sustain and expand Organizational Agility enablers across the organization. These dynamics were observed mostly in organizations that were primarily focused on ensuring their adaptability to very unstable and volatile market requirements, but that found sustained growth in their new market activities and need to ensure a company-wide effort (organization E and G).

Finally, it was observed that some organizations, having a clear focus on Organizational Agility, end up developing and Agility-oriented culture. Importantly, it was found that the existence of such a culture, although not immediately aligning with Operational Excellence practices, does not hamper its future pursuit and integration with Organizational Agility practices. In fact, and as discussed in the previous point, a balance between Agility and OpEx is possible independently from which of the two concepts was first under development in the organization. Some traits of this Agility-oriented Culture were identified. Organizations with an agile-oriented culture showed higher emphasis on individual talent, with teaming and improvisation marking team activities, as well as a more frequent use of project and programme approaches (very clear in cases E, G, H, I and J). This cultural orientation and traits were even observed where there were already ongoing efforts focused on the development of Operational Excellence enablers and succeed factors (H and I).

5. Theory and conceptual model update

The evidence collected across the ten case studies shows that the links initially proposed in Figure 2 were only able to capture part of the organizational dynamics between Operational Excellence, Organizational Culture, and Organizational Agility. On the one hand, this evidence validated the link between Operational Excellence and Organizational Culture, sustaining the developed process of an excellence-oriented culture that we had previously proposed. On the other, it showed that the relationships between Operational Excellence and Agility, and between the later and Organizational Culture, were not sufficiently represented.

Accordingly, it is necessary to add to the theoretical framework (and consequently, to the conceptual model) the insights resulting from the empirical validation efforts. The dynamics between Organizational Agility and both Operational Excellence and Organizational Culture were at first understood to flow in a single direction, with the development of Operational Excellence enablers and success factors leading to the creation of a cultural orientation to excellence, and, as a result, to the development of Organizational (Figure 2). While such behaviour was confirmed in the field, the evidence collected across the ten case studies showed that we had previously not consider the full extent of the dynamics between these concepts. While it was observed that the organizations that have well-developed Operational Excellence capabilities start pursuing Organizational Agility as part of their search for continuous improvement and value creation in increasingly unstable environments, the proposed relationship did not consider all possible origins for the development of a focus on Organizational Agility. In fact, it was observed that some organizations approach Organizational Agility as a strategic choice, regardless of their level of maturity in terms of Operational Excellence. In such cases, the relationship between Operational Excellence (OpEx) and Organizational Agility is not one where the latter is an outcome of the development of OpEx and an Excellence-oriented culture, as initially proposed in the theoretical framework (Figure 2). Instead, this relationship is shaped by need to sustain, integrate or expand the Organizational Agility capabilities across the organization. In fact, the case studies in organizations C, E, G, H, I, and J added evidence that, in contexts where Organizational Agility is the main focus, the continued development of OA capabilities is contingent on the existence of stable organizational systems to support them. Such systems, which are favoured by Operational Excellence enablers and success factors (Table 3), help to ensure defined and repeatable processes and operations, the integration between different programmes and methods, and the commitment and engagement of the workforce. Improving Operational Excellence capabilities thus showed to be a common strategy to sustain and expand Operational Agility. In this sense, it was observed that as organizations prioritizing Agility wish to develop their OA capabilities further, they find the need to push for the improvement of their Operational Excellence systems.

According to these findings, it became clear that a balance between OpEx and Agility may be achieved from a starting point in any of the two concepts – a reality from which the existence of a cultural orientation to Agility was also uncovered. Initially, the conceptual framework considered only the creation of a cultural orientation to Excellence as connecting the three blocks. While this relationship was sustained by the practical evidence collected during the fieldwork, another one was uncovered, in line with the two-way dynamic between Operational Excellence and Organizational Agility explained above: the creation of an Agility-oriented culture and its influence in the pursuit of Operational Excellence. This link is important not only because it helps understand the development

of Operational Excellence capabilities sparked by Organizational Agility expansion needs, but also because of the way it shapes how OpEx is pursued, and the characteristics of Organizational Culture itself. As an organization with an Agility-oriented Culture starts to focus on the development of Excellence capabilities, it also initiates the development of a cultural orientation to Excellence. However, the Organizational Culture, being more influenced by Agility principles, profoundly affects the way the organizational structure and the people arrange and approach this development.

In the light of these findings, new perspectives on the relationships between Operational Excellence, Organizational Agility, and Organizational Culture are added to the theory. Figure 3 presents these interactions provide an updated representation of the theory, with the new links are added to the theoretical framework.

Looking at Figure 3 and comparing it with the original model (Figure 1), a few key takeaways emerge. The links between the first two blocs of the conceptual framework see no changes. The evidence collected in the case studies proved that the relationship between Operational Excellence and Organizational Culture is under constant development from the first moment there is an organizational focus on OpEx. The cyclical nature of this relationship was also proved, as it was confirmed that it is the constant search for fit between these two concepts that fosters the creation of an Excellence-oriented Culture and allows the pursuit of higher levels of engagement and practices of Operational Excellence.

As for the dynamics between the blocs of Operational Excellence and Organizational Agility, further detail and new links were added to the conceptual framework in order to better represent the reality observed in the organizations studied. The move from Operational Excellence to Organizational Agility became better understood. As seen in the cross-case analysis, organizations that have been able to ensure sustainability in their efforts to the pursuit of Operational Excellence also showed to have developed increased levels of maturity in Organizational Agility capabilities. These findings are in line with the original model, which proposed that organizations pursuing Operational Excellence across time will eventually seek Organizational Agility as a means to answer their customer's

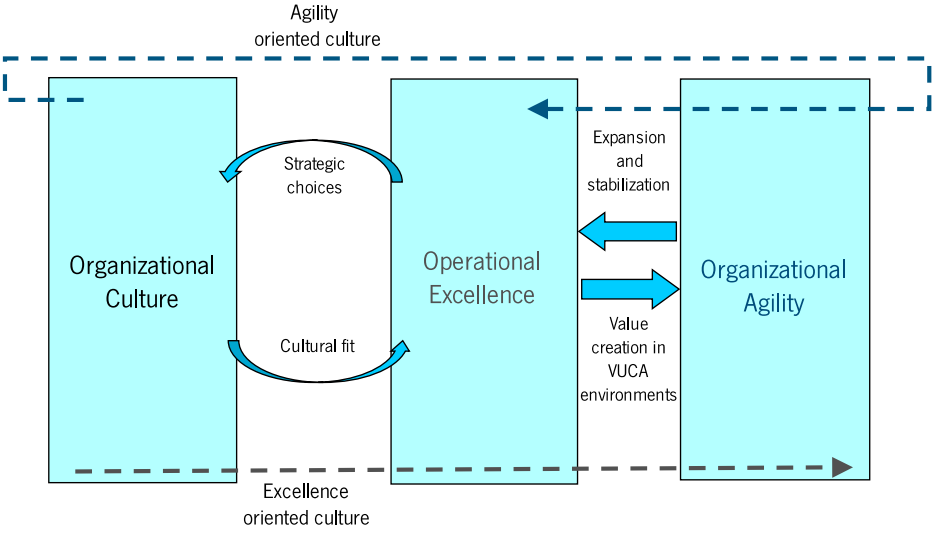

Figure 3. The updated representation of the conceptual framework.

need in a changing environment. However, and contrary to what was originally considered, the case studies showed that a move in the opposed direction may also be possible, i.e. the development of Operational Excellence capabilities may also spawn from evolving Organizational Agility practices. This happens when organizations prioritize agile strategies and adaptability in their strategic choices, but understand that they need the support of Operational Excellence capabilities to expand or stabilize their Organizational Agility approaches. Often, this move from OA to OpEx was observed to occur as organizations experience increased stabilization in their markets and need to define their processes and activities better to ensure reliable quality and operational performance. Another motive observed for this move was the need to expand a change programme across the organization, creating better integration and alignment between different functional areas and their teams.

Finally, there are important findings regarding the role of Organizational Culture in these relationships. The initial model considered the creation of a cultural orientation to Excellence as the link between Operational Excellence and Organizational Agility. While this study has validated Organizational Culture as the link between these concepts, it also uncovered how the creation of an Agility-oriented culture may influence the pursuit of Operational Excellence. This link is important not only because it helps understand the development of Operational Excellence capabilities sparked by Organizational Agility expansion needs, but also because of the way it shapes how OpEx is pursued, and the characteristics of Organizational Culture itself. As an organization with an Agility-oriented Culture starts to focus on the development of Excellence capabilities, it also initiates the development of a cultural orientation to Excellence. However, the Organizational Culture, being more influenced by Agility principles, profoundly affects the way the organizational structure and the people arrange and approach this development. The characteristics of this culture thus shape the early steps of most organizations in pursuit of Operational Excellence.

6. Implications

6.1. *Theoretical implications*

At the theoretical level, the major contribution of this work is the development of a more complete and evidence-based understanding of the relationship between Operational Excellence, Organizational Agility, and Organizational Culture. This three-way relationship can now be better understood, as can the dynamics between each of these concepts.

In regards to the research questions (‘do companies incurring in sustainable operational excellence initiatives have more capacity to be agile, through the transformation of their organisational culture?’), this study confirmed that Operational Excellence initiatives, if sustainable, can influence the Culture of an organization and support Organizational Agility. At the same time, our results provide important implications regarding the Organizational Culture transformation process. It had been observed that although an Organizational Culture cannot be fully managed (Barney, 1986), it may be changed to a certain extent through the creation of a cultural orientation (Gebhardt et al., 2006; Homburg & Pflesser, 2000b). Our results show that this transformation occurs in an iterative way, based on the idea of a cyclical relationship of influence between Operational Excellence (OpEx) and Organizational Culture. This iterative evolution finds matching perspectives in the literature, most notably in the theory proposed by Edgar H. Schein (Schein, 1995) that an Organizational Culture is shaped by the strategies and initiatives that, over time, prove to be successful in responding to the needs of the market.

The relationship between Operational Excellence and Organizational Agility was also clarified, countering existing perspectives of trade-off or discontinuity between the two (Benner & Tushman, 2003; Bertels & Buthmann, 2013). In the same way that a cultural support was found to be needed for the sustainable development of both Excellence and Agility, we found evidence that these two concepts support each other. This means further clarification of the relationship between Organizational Agility and Operational Excellence. In the literature, the perspective that agility and excellence are opposites is common(da Silveira, 2005; Lee et al., 2010; Vinekar & Huntley, 2010). Nevertheless, a few works support the idea of a positive relationship between the two. For some authors, Excellence is seen as an indicator of success in a globally competitive environment where organizations deal with highly volatile and unstable marketplaces (Ahmed et al., 2003; Vinodh et al., 2010). For others, Operational Excellence is a key to develop the organizational capabilities and resources of Organizational Agility (Gleich & Sauter, 2008; Vokurka & Fliedner, 1998). This happens as Organizational Agility needs to be built on previously developed capabilities, many of which fall within the scope of Quality and Excellence (Carvalho et al., 2019; Zhang & Sharifi, 2000). These two views align with the findings of this project, with the evidence collected across the ten case studies supporting both these perspectives. On the one hand, organizations with higher levels of maturity for Operational Excellence showed superior market sensitivity and awareness, allowing them to comprehend their business environments better and find new ways to offer value, thus becoming better able to develop Organizational Agility capabilities. On the other, organizations prioritizing Organizational Agility have shown to have also invested in process optimization and integration, operational flexibility, and a series of other Operational Excellence capabilities that proved to be essential for the further development of OA capabilities.

6.2. *Managerial implications*

Together with the theoretical implications, our findings offer important practical contributions and implications for managers. First, this study reinforces the importance of Organizational Culture as an inseparable aspect of operational management, especially in times of change. The creation of a cultural orientation to Excellence proved to be essential in sustainable developing Operational Excellence capabilities in the long run. Among the organizations studied, those that had evidence of a cultural awareness and focused on the cultural side of Operational Excellence were those that had the most success in implemented principles and practices over the years. In opposition, organizations that focused mostly on the implementation of procedures and tools, with limited regards to the 'soft' factors of OpEx beyond communication, showed to have stagnated in their development of true organization-wide excellence. The same proved to be true in regards to Agility. Organizations that pursued Organizational Agility showed to be the most successful when there was an alignment between the espoused culture and the tools, methods, and practices at use in each organization. Only organizations that had promoted awareness and integration on Agility across the board were able to successfully work with it in the long run.

Second, it showed that there is no need to compromise when organizations feel the need to pursue both Operational Excellence and Organizational Agility. While some organizations trusted Operational Excellence and Agility to be able to coexist, others offered a different opinion, one where a trade-off between Excellence and Agility. For most organizations, the concepts of Operational Excellence and Organizational Agility

were often referred, in practice, as Quality and Adaptability. It was in reference to the view that Operational Excellence was often related to process definition, standardization and compliance; and seen as a challenge towards Agility or Adaptability. With this study, we were able to counter such perspective, and to prove the importance of Organizational Culture for it to happen. As such, the order of priority given to Operational Excellence and Organizational Agility varied from organization to organization, the benefits of pursuing both Excellence and Agility were clear. On the one hand, organizations that had their primary focus on Excellence but embraced Agility showed to be able to more efficiently navigate the changing markets, while gaining flexibility in their value creation processes. On the other, it was observed that organizations were only able to truly excel in implementing Operational Agility when they had used Operational Excellence capabilities to tear down siles and functional barriers, created involvement across the organization, and promote internal benchmark and organizational learning.

These results show Organizational Culture is a key factor for managers to consider as they pursue the successful implementation of both Excellence and Agility. Organizational Culture is crucial not only in helping the workforce cope with change itself, but also supporting in the development of practices that support the development of Operational Excellence Organizational Agility capabilities. When Culture is disregarded, both Excellence and Agility will stagnate and the full potential of change and improvement programmes will not be attained.

7. Conclusions

This article addresses our research efforts to explain the dynamics between the concepts of Operational Excellence, Organizational Culture, and Organizational Agility, thus addressing the perceived tensions between quality and adaptability. It builds on a theoretical framework previously published by our research team, built on a broad review of the literature but without empirical validation (Carvalho et al., 2019). This theory, depicted in Figure 2, was tested, reflected upon, and further developed considering the results of ten 10 studies in highly technical and technological industries.

In the end and considering the findings on the relationships between these three concepts, it is possible to identify the advantages of the fieldwork for this project. Not only the proposed links between were proved, finding support in the evidence collected in the ten participating organizations, but new dynamics were uncovered, helping to better understand the relationships between Operational Excellence, Organizational Culture, and Organizational Agility. Different elements in these relationships will be observed in different organizations, depending on their goals and on the strategies, they develop and implement to achieve them. As organizations that prioritize and sustainably pursue Operational Excellence develop an Excellence-oriented Culture, they tend to move towards a more market sensitive and adaptable state that favours the development of Organizational Agility capabilities. In the opposite direction, organizations prioritizing Organizational Agility will develop an Agility-oriented culture. However, when they see it necessary to scale up or expand their Operational Agility enablers across the organizations, they demonstrate a move towards practices and behaviours related to Operational Excellence, lead to the creation of OpEx enablers and to a shared (and growing) cultural orientation to Excellence.

By identifying and understanding these dynamics, this article helps guide researchers and practitioners in dealing with perceived tensions between the implementation of Operational Excellence and Organizational Agility. The results obtained in this project counter

the perceived trade-off between these two strategies, and help bridging the gap between quality and adaptability – a bridge ever more critical in today's highly unstable business environments.

Naturally, some limitations must be highlighted. Given the need to study the cultural side of organizations, researchers needed to be present in the field in order to observe, identify and uncover the dynamics and reasons that lead to it. Accordingly, a case study approach was selected. However, such methodology is time – demanding and limits the number of cases that it is possible to do in the lifecycle of a research project. While ten case studies represent a sizeable number given these circumstances, we are aware that further studies would probably allow even broader and deeper insights. However, and while this sample cannot lead to solid statistical conclusions, such results in an exploratory data analysis context allow a significant level of confidence in building this theory.

One other aspect that we wish to highly as a limitation – and possibly as future work – is that of the Agility-oriented Culture. While this cultural orientation was identified and some of its traits were uncovered, the fact is that it was visible in only a few of the case studies, and halfway through the project. Accordingly, we did not set to fully review the enablers sand success factors of a culture of agility – a work that has clear future perspectives.

All in all, we believe that the core aspects of the dynamics between Operational Excellence, Organizational Culture, and Agility have now been identified – at least to the extent where they become manageable and allow the pursuit of a functional balance between Quality and adaptability.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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