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Allostasis and organizational excellence

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ABSTRACT

Organizational excellence is critical towards the development of organizations and, considering organizations' role in the modern world, for societies' economic and social development. The ability of organizations to adapt and adjust to the contingencies of the change and recover the stability of organizational systems through organizations' own dynamic process is known as allostasis. This research focuses on the relationship between allostasis and organizational excellence. Based on a sample of 205 firms from Portugal and Spain, and resorting to fuzzy-set QCA (fsQCA), this research reveals that there are different combinations (equifinality) of conditions inherent to allostasis (adaptive capacity, feedback capacity, stigmergy capacity and integration intensity) leading to sustainable high outcomes (employee satisfaction, stakeholder satisfaction and organizational performance, jointly selected as proxies for organizational excellence). The analysis also shows that organizations that match those combinations simultaneously achieve high employee satisfaction, stakeholder satisfaction and organizational performance (multifinality), which is aligned with the premises of organizational excellence. Finally, the results reveal that in the different contexts (countries) analyzed, the combinations leading to high outcomes differ, thus supporting the idea that the ability to adapt and adjust that characterizes allostasis is critical towards organizational excellence.

1. Introduction

Organizations are complex entities that play a central role in the economic and social development of societies. Organizational excellence and managerial excellence are the most requested attributes that simultaneously ensure the highest long-term organizational performance and the satisfaction of employees and stakeholders. Excellence is a state of quality or a condition of sustained superiority (Arussy, 2008). Given the scarcity of research, the central point is to understand the conditions that enable excellence. According to Sutton and Rao (2014), these conditions include the organizational routines and other capabilities of the organizational system, the personal interrelationships, and the characteristics of managers for decision making.

This research is supported on allostasis theory (Schulkin, 2003; Sterling, 1988, 2004, 2012), feedback theory (London, 2003), stigmergy theory (Grassé, 1959; Marsh & Onof, 2008), and adaptative capacity theory (Ates, Assarlind, Maguire, Bititci, & MacBryde, 2011; Karimi & Walter, 2015; Wang & Ahmed, 2007). Allostasis theory suggests that homeostatic and allostatic endogenous organic attributes promote the adjustment conditions and the efficient regulation of the system by anticipating needs before they arise. Feedback theory refers to the action and anticipation mechanisms for the self-regulation or adjustment of organizational components. Stigmergy theory refers to the intrinsic capacity of organic systems to ensure their survival and development through the combined action of their components and processes to self-orientate, coordinate, and adjust, according to a higher purpose, without needing that each sub-system obeys a common decision-maker. Adaptive capacity theory refers to the ability to react to changes that induces continuous adaptability, involving organizational routines that allow the rapid identification of transformational factors, which benefit from resilience, operational agility, and strategies to respond to recession situations or new environmental conditions.

The focus of this research is the concept of allostasis and its relationship with organizational excellence. The aim is to understand the relationship between allostatic mechanisms and sustained organizational development, expressed in employee satisfaction, stakeholder satisfaction and organizational performance. The first objective is to confirm the attributes that identify organizational allostasis, the second

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is to identify the configurations of allostasis attributes leading to organizational excellence, and the third is to analyze the context's implications on the configurations of allostasis conditions leading to organizational excellence. Considering these research objectives and data characteristics, we use fsQCA to analyze the sample comprising Spanish and Portuguese organizations.

The results show that the concept of organizational allostasis is explained by the factors (or allostatic mechanisms) of adaptive capacity, feedback capacity, and integration intensity. The results regarding the stigmergy capacity are not conclusive. Another important result is that there are alternative configurations of allostatic mechanisms associated with organizational excellence. Finally, the results show that the context influences the configurations of conditions leading to organizational excellence. As organizational excellence refers to a state of sustained superiority, it is recognized that the organic systems have the ability to dynamically adjust factors, which, for example, relates to the findings regarding multifinality.

This research makes an important contribution to the literature analyzing the concept of organizational allostasis. One of the main contributions of allostasis theory is demonstrating that the activation of allostatic mechanisms occurs not only during challenging situations but that allostatic mechanisms can be activated before changes in one of the organic systems to better adapt to situations of confrontation or competitive challenge, predictable or unexpected. This adjustment mechanism results from the adaptive capacity and the stigmergy capacity. Another positive contribution of using the concept of allostasis is that the homeostatic self-regulation mechanisms that ensure the conditions of system stability are used based on negative feedback capacity (Heylighen & Joslyn, 2003) in reaction and positive feedback capacity (Heylighen, 2001) in anticipation.

The next section is devoted to the literature review and the definition of the research propositions. Section 3 focuses on the research methods and is followed by Section 4, devoted to presenting the results and analysis. The discussion of the results is presented in Section 5. Finally, Section 6 presents conclusions and contributions.

2. Literature review and propositions

Organizational excellence (OE) is expressed when organizations are able to overcome high expectations (Arussy, 2008). OE is achieved through excellent people, excellent partnerships, excellent processes, and excellent products (Dahlgaard & Dahlgaard, 1999). According to Sasmita and Nayantara (2003), an organization that seeks excellence must transmit the vision to employees, empower those employees, link excellence to activities and processes, assess excellence, foster technology-related skills, and encourage learning. McGregor (1994) considers that employee involvement, empowerment, leadership, and commitment to quality are critical success factors for the organization's overall quality. According to Hui and Chuan (2002), the critical aspects of OE are to establish a consistent vision and mission and commitment to excellence at all levels. To achieve excellence, McNamara (1997) argues that the organization must be aware of its market participation and customer credibility, along with profitability, financial structure, technology position, and other key competencies.

In the organizational system, in a state of high sustained performance, the necessary condition (NC) establishes having the best resources, capabilities and routines, and the sufficiency condition (SC) establishes having the best people, good interpersonal relationships, an open mind and high mental predisposition to knowledge and innovation. Both contribute to the excellence of the organizational system.

The way in which the system is structured, and the resources are organized to respond to organizational mission and objectives, and how rules, principles and values are established to ensure organic functionality support the dynamic capacity (Hess & Rothaermel, 2008), the stock of experiences (Cohen & Levinthal, 1990) and adaptative capacity (Wang & Ahmed, 2007) are challenges, among others, placed on the organizational system. The existence of a stock or the memory of experiences, according to Sterling (2012), provides aptitudes to the organizational system. The mechanisms of stigmergic coordination (Heylighen, 2016) respond to the stimuli that destabilize the system to restore organizational equilibrium through change, following a process of great difficulty, to ensure a new state of dynamic equilibrium (allostasis). Dynamic capacity refers to systematic and continuous organizational processes that use resources to respond to changes or new environments and promote the renewal of competencies or changes in the market (Eisenhardt & Martin, 2000; Mills, Platts, Bourne, & Richards, 2002). Adaptative capacity is a component of dynamic capacities, aiming at effectively adapting to changing environments or new environments (Zhou & Li, 2007). The adaptative capacity theory (Ates et al., 2011; Karimi & Walter, 2015; Zhou & Li, 2007) focuses on the aptitude to react to changes that lead to continuous adaptability, involving the organizational routines that allow the rapid identification of transformation factors, benefiting from resilience, operational agility, and strategies to respond to situations of recession or new environmental challenges.

When observing the organizational system, the culture and internal environment of the organization are important, reflected in the efficiency of the system, the processes and quality of the decision, the quality of the resources, and the human aptitudes. The automatic implicit adjustment and coordination of tasks and functions, without the intervention of a central decision, ensures the conditions for sustained stability to achieve high performance and organic efficiency levels. This stigmergy phenomenon is intrinsic to excellent organizational systems and results from the systematic effort made to ensure the dynamic balance of the system (allostasis) that is observed in the perspectives of the homeostatic mechanism and allostatic mechanism and responds to the internal challenges of efficiency of resources and aptitudes and external competition challenges. Stigmergy theory (Marsh & Onof, 2008) refers to an indirect coordination and cooperation mechanism, informally established without centralized control of information between multiple independent agents, with the ability to organize the behavior of those agents persistently and continuously, ensuring the functionality and development of a complex system.

Employee, stakeholder, consumer, and supplier welfare are observed from the organizational system, in fulfilling its purpose and intrinsic challenges that result from its mission and objectives and the resources and capacities held to respond to internal and external challenges and to satisfy the various actors. The technological resources and their evolutionary dynamics are factors that bring pressure to the organizational system and force it to have a greater capacity for adjustment.

Because organizations are endowed with dynamic capacity, they constantly confront antagonistic forces at different scales and at different levels. The forces of creation seek organic efficiency by introducing energy into the system, while the forces of destruction lead to inefficiency and organic degeneration, increasing the system's entropy. This intrinsic and permanent confrontation has repercussions on the functionality and performance of the system in the search for dynamic equilibrium supported in capacities and in the homeostatic dynamics (Damásio, 2018, adapt.). Homeostasis is related to the fundamental set of self-regulation operations within the organizational system that guarantee its survival, development and future prevalence as powerful innate, implicit, and intrinsic imperatives of the organic system (Damásio, 2018). The systems of homeostatic regulation aiming to restore the balance of the organizational system resort to negative feedback mechanisms (McEwen & Wingfield, 2003) to maintain the stability of the organizational system in the face of situations that change temporarily. Feedback theory (Baker, 2010; London, 2003) is related to the mechanisms for action and anticipation towards the self-regulation or adjustment of the components or factors. When disruptive challenges occur (which can be continuous, exceeding limits of intensity, predictability, and duration), the regulatory systems of homeostasis are activated and lead to higher levels of challenge to ensure the dynamic

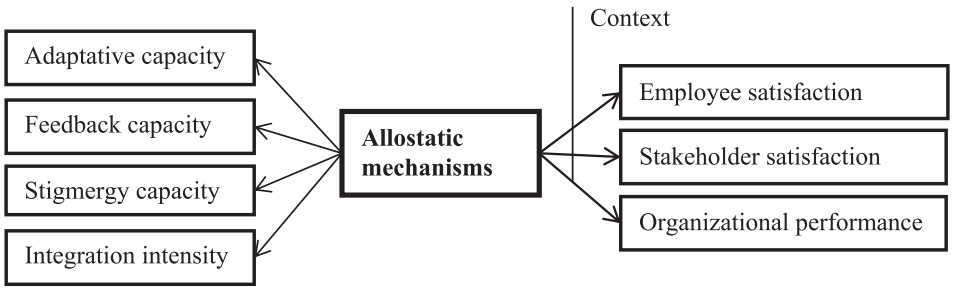

Fig. 1. Research model.

balance of the system, which is called allostasis (Sterling & Eyer, 1988). Allostasis is triggered by internal adjustment processes or alteration of mechanisms or by competing external agents, either predictable or unpredictable (McEwen, 1998).

Allostasis theory (Sterling, 1988, 2004, 2012) states that processes can operate under different adjustment conditions if they allow a better adaptation of the organizational system to the adverse internal or external conditions. When there is an inability to adapt, the entropy and inefficiency of the system accelerate, leading to performance degradation (McEwen & Wingfield, 2003). Allostatic mechanisms predict, integrate, adjust, and mobilize routines, resources, and mechanisms and store dysfunctional information to minimize energy in adverse situations and avoid excessive use at other times (McEwen, 2016; Sterling, 2012). It is recognized that adaptive capacity theory and feedback theory contribute to the necessary condition and that stigmergy theory, homeostasis theory, and allostasis theory contribute to the sufficiency condition of the organizational system. An organizational system with sustained conditions of high performance needs the best resources, capabilities, and routines (structural capital), identified with the necessary condition. When the organizational system has the best human capital (good people), social capital (good interpersonal relationships) and relational capital (openness of mind and high disposition for knowledge and innovation), it is identified with the sufficiency condition. Based on the literature review, we formulate the following proposition:

P1: Adaptative capacity, feedback capacity, stigmergy capacity, and integration intensity integrate the allostatic mechanism.

In times of emergency and serious difficulties caused by internal imbalances or external factors, the organization must have answers that guarantee survival and stability, with active adaptation processes (Wang & Ahmed, 2007). Employee satisfaction affects attitudes and behaviors at work, such as organizational commitment (Meyer, Stanley, Herscovitch, & Topolnytsky, 2002), organizational performance (Schneider, Hanges, Smith, & Salvaggio, 2003), absenteeism and stress at work (Shaikh, Bhutto, & Maitlo, 2012).

Teams can respond quickly to problems, and organizations depend on success in most of the work teams (Wuchty, Jones, & Uzzi, 2007). When team members trust in team effectiveness, they make effort to work toward and achieve common goals rather than personal goals, with a positive influence on results ensuring the valuable contributions of skilled workers to the organization (Gil, Rico, & Sanchez-Manzanares, 2008; Gully, Incalcaterra, Joshi, & Beaubien, 2002). Organizations inevitably face adversities that threaten performance (Whiteman & Cooper, 2011). Previous research attempts to explain how organizations respond to preserve performance and avoid decline (Perrow, 1994; Roux-Dufort, 2007; Wan & Yiu, 2009). Efficiency and productivity are very important factors. Another very important factor conditions both factors: motivation. This is defined by Dessler (1993) as the desire of a person to satisfy certain needs. We formulate the following proposition:

P2: Allostatic mechanisms contribute to different configurations that ensure conditions for sustained organizational excellence.

To consolidate business models in dynamic environments, it is necessary to modify the work structure traditionally configured around individuals and to manage team-oriented organizational entities (West, Markiewicz, & Dawson, 2004). The organization's context plays a critical role in the effectiveness of these entities (Hackman, 2002). We formulate the following proposition:

P3: There are cross country differences in the model solutions for high satisfaction and performance.

3. Methods

3.1. Research model

The research model is based on the literature review and relates the allostatic mechanisms observed by the adaptative capacity, feedback capacity, stigmergy capacity and integration intensity to employee satisfaction, stakeholder satisfaction, and organizational performance. The influence of the context is also considered (Fig. 1).

3.2. Factors and variables

The four factors that constitute the allostatic mechanisms integrate 18 variables; Adaptative capacity integrates five variables; Feedback capacity integrates five variables; Stigmergy capacity integrates four variables; Intensity integration integrates four variables. The attributes of sustained organizational excellence integrate ten variables reflected in the employee satisfaction with three variables, stakeholder satisfaction with three variables, and organizational performance with four variables (Table 1). All refer to the self-assessment made by the respondents.

3.3. Data collection and sample

The research was supported by a questionnaire sent out to top managers between July and November 2016. The sample, from a total of 7,000 firms (gathered from multiple sources, including Amadeus and SABI) that were contacted through e-mail, comprises 205 valid responses, 163 from Spain and 42 from Portugal, which are two neighboring countries that share several similarities, but also have significant differences, including the size of the domestic market. 38.5% of the responses came from family firms, and 54.6% came from firms with less than 50 employees.

3.4. Measures and analysis method

The factors were calculated as averages of the original variables, allowing for multiple representations in just one measure which reduces the measurement error (Hair, Black, Babin, & Anderson, 2010). This

Table 1
Factors and variables.

Factors	Variables	References
Adaptative Capacity	CA1 – Encouragement and support to teams that cooperate to make changes CA2 – Appreciation of efforts when changes must be made CA3 – Adoption of measures that encourage entrepreneurship and new challenges CA4 – Appreciation of teams that respond quickly to the need to make a change CA5 – Stimuli to consider failure as an opportunity to learn and improve	(Bonavia, Prado Gasco, & Barberá Tomás, 2009; Denison & Neale, 1994; Tseng & Lee, 2014; Wang & Ahmed, 2007)
Feedback Capacity	F1 – Encouragement and satisfaction with team performance F2 – The internal environment stimulates the well-being of the people working in the organization F3 – There are conditions and incentives for the follow-up of the improvement actions F4 – There are conditions to anticipate the behavior that needs reinforcement F5 – There are means to carry out improvement actions	(Baker, 2010; García Álvarez & Ovejero Bernal, 1998; Herold & Parsons, 1985; Morgeson & Humphrey, 2006)
Stigmergy Capacity	S1 – There is a coordination of its members toward a common perspective S2 – Values perseverance and consistency S3 – Ensures coordination conditions so that the tasks are carried out in a systematic way S4 – There is an environment that encourages the natural emergence of information useful to guide the activity	(Heylighen, 2016; Holland & Melhuish, 1999; Susi, 2016)
Integration Intensity	II1 – Fosters conditions for cohesion and teamwork II2 – There is a culture that supports the ability to listen and be alert to other people II3 – Promotes conditions for trust between its members II4 – Values people who bring different perspectives and experiences to work	(Bonavia et al., 2009; Salanova, Llorens, Cifre, & Martínez, 2012
Employee Satisfaction	EE1 – Facilitates the creation of teams EE2 – Promotes conditions for respect, trust, and collaboration EE3 – Stimulates lifelong learning	(Bonavia, Prado, & García, 2010; Schneider et al., 2003; Wageman, Hackman, & Lehman, 2005)
Stakeholder Satisfaction	SS1 – Encourages clear, conflict-free, and appropriate relations SS2 – Has high–quality attention and customer service SS3 – Has an environment conducive to continuous improvement	(Acosta, Dominguez, & Ligero, 2007; Van Der Raadt, Schouten, & Van Vliet, 2008)
Organizational Performance	EF1 – Has the ability to change customary operating procedures in response to changes EF2 – Has mechanisms to maintain the structure and resources over time EF3 – Has adequate internal communication mechanisms EF4 – Adopts appropriate mechanisms to ensure optimal use of resources	(Kaptein, 2008; Quirke, 2000)

procedure is complemented with the computation of Cronbach's alpha (George & Mallery, 2003). The variables were measured through a seven-point Likert-type rating scale ranging from 1 = totally disagree to 7 = totally agree. Bagozzi and Baumgartner (1994) consider these scales approximately continuous.

The study uses fsQCA 2.5 software (Ragin & Davey, 2014) to calibrate the original variables and compute the necessary conditions and the fuzzy truth table algorithm outputs. Following Crilly, Zollo, and Hansen (2012) and Ragin and Fiss (2008), the analysis of the fuzzy truth table algorithm outputs builds on the parsimonious and intermediate solutions. During the calibration procedure, the study uses 0.499 to replace the point of maximum ambiguity of 0.5 (Crilly et al., 2012). The descriptive statistics and calibration thresholds are presented in Table 2.

Table 2
Descriptive statistics and calibration thresholds.

Factors	Mean	Standard Deviation	Fully In	Maximum Ambiguity	Fully Out
Adaptative Capacity	5.43	1.20	6.88	5.60	2.56
Feedback Capacity	5.16	1.21	6.77	5.36	2.43
Stigmergy Capacity	5.48	1.10	6.87	5.67	3.00
Integration Intensity	5.66	1.18	7.00	6.00	3.02
Employee Satisfaction	5.57	1.14	7.00	5.80	3.20
Stakeholder Satisfaction	5.77	1.06	7.00	6.00	3.43
Organizational Performance	5.53	1.10	7.00	5.75	3.25

4. Results and analysis

The research model links the causal conditions (adaptative capacity, feedback capacity, stigmergy capacity and intensity integration) to the presence of the outcome measured by employee satisfaction, stakeholder satisfaction, organizational performance.

In the first stage of the analysis, which focuses on the necessary conditions, the results reveal that adaptative capacity and feedback capacity are necessary for better employee satisfaction, stakeholder satisfaction, and organizational performance.

The results obtained from the truth table algorithm (Table 3) reveal that configurations leading to high employee satisfaction, stakeholder satisfaction and organizational performance are similar (multifinality), which means that high performing firms may perform simultaneously well in the three perspectives, which is consistent with the concept of organizational excellence. However, several configurations lead to high outcomes (equifinality). One of these assumes the absence of certain conditions, which is interesting to analyze based on the relevance of organizational allostasis towards organizational excellence.

Firms obtain high outcomes in the presence of adaptative capacity (core condition) combined with the presence of feedback capacity and integration intensity as peripheral conditions (C1a), the presence of feedback capacity and stigmergy condition as peripheral conditions (C1b) or the absence of feedback capacity, stigmergy condition and integration intensity as peripheral conditions (C1c). The lower importance of the sufficient condition is confirmed, which allows understanding of the lowest commitment of valuing interpersonal

Table 3
Configurations of causal conditions, Spain and Portugal.

	Employee Satisfaction			Stakeholder Satisfaction			Organizational Performance		
	C1a	C1b	C1c	C2a	C2b	C2c	C3a	C3b	C3c
fs_adaptative	●	●	●	●	●	●	●	●	●
fs_feedback	•	•	○	•	•	○	•	•	○
fs_stigmergy		•	○		•	○		•	○
fs_intensity	•		○	•		○	•		○
Consistency	0.92	0.91	0.87	0.92	0.91	0.86	0.90	0.91	0.85
Raw Coverage	0.78	0.75	0.42	0.76	0.73	0.40	0.77	0.76	0.41
Unique Coverage	0.02	0.01	0.03	0.02	0.01	0.03	0.02	0.02	0.03
Overall solution consistency	0.87			0.87			0.86		
Overall solution coverage	0.83			0.81			0.83		

Note. ● = core causal condition present; • = peripheral causal condition present; ○ = core causal condition absent, ○ = peripheral causal condition absent.

Table 4
Configurations of causal conditions, Spain.

	Employee Satisfaction				Stakeholder Satisfaction				Organizational Performance			
	C1a	C1b	C2a	C2b	C1a	C1b	C2a	C2b	C1a	C1b	C2a	C2b
fs_adaptative	●	●			●	●			●	●		
fs_feedback		•	○	•		•	○	•		•	○	•
fs_stigmergy	○		○	•	○		○	•	○		○	•
fs_intensity			●	●			●	●			●	●
Consistency	0.86	0.87	0.91	0.93	0.85	0.87	0.90	0.93	0.82	0.86	0.87	0.92
Raw Coverage	0.54	0.82	0.47	0.75	0.52	0.79	0.45	0.74	0.51	0.81	0.45	0.75
Unique Coverage	0.02	0.03	0.03	0.01	0.02	0.03	0.03	0.02	0.02	0.04	0.03	0.02
Overall solut. consistency	0.83				0.84				0.83			
Overall solution coverage	0.89				0.88				0.89			

Note. ● = core causal condition present; • = peripheral causal condition present; ○ = core causal condition absent, ○ = peripheral causal condition absent.

Table 5
Configurations of causal conditions, Portugal.

	Employee Satisfaction			Stakeholder Satisfaction			Organizational Performance		
	C1a	C1b	C2	C1a	C1b	C2	C1a	C1b	C2
fs_adaptative	●	●	○	●	●	○	●	●	○
fs_feedback	○	•	●	○	•	●	○	•	●
fs_stigmergy	○		○	○		○	○		○
fs_intensity		•	○		•	○		•	○
Consistency	0.89	0.93	0.86	0.90	0.93	0.90	0.87	0.92	0.86
Raw Coverage	0.50	0.77	0.39	0.50	0.74	0.40	0.51	0.79	0.40
Unique Coverage	0.04	0.31	0.03	0.04	0.29	0.04	0.04	0.32	0.04
Overall solution consistency	0.87			0.88			0.87		
Overall solution coverage	0.85			0.83			0.87		

Note. ● = core causal condition present; • = peripheral causal condition present; ○ = core causal condition absent, ○ = peripheral causal condition absent.

relationships and team in sustainable terms.

When the context is introduced in the analysis, the results reveal that firms established in Spain (Table 4) reveal similar configurations for the presence of all of the outcomes under analysis. However, those configurations are distinct from those identified for the global sample, which reveals the importance of context towards the configurations for organizational excellence. The solutions imply first order and second order equifinality.

The first configuration is based on the presence of adaptative capacity as a core condition with the absence of stigmergy condition (C1a) or the presence of feedback capacity (C1b) as peripheral conditions. Configuration 2 is based on the presence of integration intensity as a core condition with the absence of feedback capacity and stigmergy condition (C2a) or presence of feedback capacity and stigmergy condition (C2b) as peripheral conditions. The importance of the necessary condition and the sufficiency condition is confirmed, which allows us to understand the role of sustainability in ensuring the organic system of excellence with evidence for the enhancement of interpersonal and team relationships.

The results for firms established in Portugal (Table 5) reinforce the argument regarding the importance of context in the analysis of the necessary conditions and reinforce that the configurations for a high outcome are stable across the different outcomes. As in the Spanish context, the solutions reveal first order and second order equifinality. These solutions are supported by the necessary condition identified with the resources, capacities, routines, and processes and by the sufficiency condition that sustains excellence anchored in human, social and relational capital.

The first configuration is based on the presence of adaptative capacity as a core condition combined with the absence of feedback capacity and stigmergy condition (C1a) or the presence of feedback capacity and integration intensity (C1b) as peripheral conditions. Configuration 2 is based on the presence of feedback capacity as a core condition and the absence of adaptative capacity, stigmergy condition and integration intensity as peripheral conditions.

5. Discussion

The results reveal that there are different solutions, based on the presence or absence of adaptative capacity (Wang & Ahmed, 2007; Zhou & Li, 2007), feedback capacity (McEwen & Wingfield, 2003, adapt.), stigmergy capacity (Grassé, 1959), and integration intensity that are sufficient for the high-performance outcome to occur. This finding is aligned with proposition 1, which is confirmed. Allostasis implies a systematic effort to ensure the system's dynamic balance (Sterling & Eyer, 1988), but there may be different conditions of adjustment. The existence of different solutions for high outcomes supports this argument based on the theory of allostasis (Sterling, 1988, 2004).

This research is focused on three outcomes of organizational excellence (Kandula & Caimi, 2002): employee satisfaction, stakeholder satisfaction and organizational performance. The results reveal that the solutions are characterized by multifinality, which means that a configuration of conditions that is associated with the presence of one of the outcomes is associated with the presence of the other outcomes. This finding is aligned with proposition 2, which is confirmed. This finding is consistent with Hui and Chuan (2002) who highlight the importance of commitments to excellence at all levels.

Finally, we addressed the influence of context in the research model. Using data from two distinct countries, we obtained different and specific configurations of conditions when the high outcomes occur. According to proposition 3, the context influences the solutions, thus supporting the proposition, which is confirmed. These results are consistent with Hackman (2002) who considers the importance of context towards the effectiveness of organizations.

6. Conclusions and contributions

This research reveals the importance of adaptative capacity, feedback capacity, stigmergy condition, and integration intensity, all these conditions are associated with the perspective of allostasis theory, towards achieving high levels of outcomes, employee satisfaction, stakeholder satisfaction, and organizational performance, which are analyzed from the perspective of organizational excellence. Furthermore, the results also highlight the existence of different configurations of conditions conducive to high outcomes, which reveals the different arrangements towards excellence within the organizations. Excellence, in turn, implies exceeding expectations and what we observe from the results is that organizations exceeding expectations in one of the outcomes under analysis also do it for the other outcomes based on the same configurations of conditions. The specific arrangements of these configurations and the role of the allostatic mechanisms support the sustainability of the outcomes.

The context influences the conditions of sustainable excellence of organizational systems based on excellent resources, capabilities, routines, and processes that identify the necessary condition and based on the broader sustainable excellence involving human, social and relational capital, which is identified with the sufficiency condition. In a particular context, organizations may focus on developing the adaptative capacity as a reaction to changes based on routines and on the feedback capacity as an anticipation mechanism to self-regulate and achieve organizational excellence. Organizations in other contexts may focus on developing the integration intensity and the intrinsic organic system stigmergy capacity as a self-regulation mechanism that ensures the orientation, coordination, and adjustment processes.

These findings constitute important contributions to literature because the concepts of allostasis and excellence are simultaneously important and difficult to operationalize. The necessary condition and sufficiency condition are relevant contributions to understanding the conditions for sustainable organizational excellence. This study uses an innovative approach based on fsQCA and, therefore, provides novel insights on both concepts and, considering the multifinality and equifinality of configurations, opens new perspectives for practitioners (aiming to reach organizational excellence) and researchers interested in understanding organizational excellence.

Our research presents several limitations that can be considered avenues for future research, including the limited sample size, the limited diversity of the context under analysis, the importance of additional variables as the activity sector, and studying the specific interaction between those variables and adaptative capacity, feedback capacity, stigmergy condition, and integration intensity. Another avenue for future research is focusing on the impact of extreme events in the life of the organizations, such as the sudden loss of the CEO.

CRediT authorship contribution statement

J. Augusto Felício: Investigation, Methodology, Project administration, Supervision, Validation, Writing – original draft, Writing – review & editing, Conceptualization. **Ricardo Rodrigues:** Writing – review & editing, Writing – original draft, Validation, Software, Investigation, Formal analysis. **Carmen Patino-Alonso:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Writing – original draft. **Teresa Felício:** Writing – review & editing, Software, Investigation.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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