Systems Science approach to organisational integrity. Case: Services Small and Medium Enterprises

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Systemic approach to organisational integrity. Case: Services Small and Medium Enterprises

This study developed a model oriented to organisational integrity in service in small and medium-sized enterprises (SMEs). A systemic approach was adopted to articulate methodologies as follows: A) the soft systems methodology was used to frame the problem and formulate a conceptual model (supported by 140 participants). B) Partial least squares path modelling was applied statistically to validate the construct. C) Through the viable system model, interactions within SMEs were realigned to foster organisational integrity. Results suggest that the relationships proposed in the construct may promote organisational integrity. The ideas developed are restricted to the organisational domain, and although the results apply to the Mexican context, this possible constraint was overcome through the adopted multi-methodological perspective. This study provides an opportunity to discuss methods for improving and viewpoints for rethinking viability in these organisations and provides tools to support academics and managers for addressing the issues identified.

Keywords: Systems science, Soft Systems Methodology, Partial Least Squares, Viable System Model, SMEs, Integrity

Introduction

According to Valdez-Juárez et al. (2018) small and medium-sized enterprises (SMEs) are important in most countries, especially in those regions considered to be emerging because they represent about 91% of economically active organs (WTTC 2018). In the Mexican context, SMEs are preponderant because they generate 70% of formal jobs, contribute 75% of gross domestic product (GDP), and amalgamate products and services, encouraging relationships between various economic sectors.

Kozielski (2019) reported that SMEs face different problems that affect their adaptive ability to a complex environment as well as to respond to the demands of internal and external customers. Ahrholdt et al. (2019) estimate that some of the most notable challenges are: consistency between operational units, absence of coordination and control mechanisms, low capabilities to retrieve information from the environment and transforming it into data at will, which contribute to the transformation or

equilibrium in SMEs, and little coherence between the management model and organisational objectives.

Additionally, SMEs regularly face difficulties related to their organisational structure, and they often lack a clear ethos or organisational integrity, which impacts the effectiveness of operative units, weakens their work framework as well as commitment and loyalty from operative unit to the company (Deakins and Bensemann 2019). According to Cui and Jiao (2019), organisational integrity is the integration of organisational factors and human qualities to shape a company's behaviour towards improving internal confidence without falling into contradictions. To this end, heterogeneous perspectives and strengthening procedures should be considered, toxic working contexts should be reduced, and ethical operations and leadership should be fostered to generate self-sustaining and profitable companies. Following previous studies, Koo Moon and Kwon Choi (2014) and Vasconcelos (2018) highlighted the relevance of addressing organisational integrity problems in SMEs, as such problems can lead to their closure. For instance, decrease in turnover, staff wear, and deterioration of relationships can damage a company's image by generating low confidence for investing or preventing the formation of new strategic linkages.

It is pertinent to mention that the application context in this article is the Mexican tourism sector. For Mexico, tourism is one of the most significant activities as it is estimated to generate around 6,000,000 direct jobs (CNET 2019). Accordingly, tourism SMEs are taken as the application framework for developing the ideas in this study. Similar to other companies, tourism SMEs depend heavily on their organisational structure and employees to be competitive. However, they are weak at the individual, organisational, and normative levels, reducing the possibilities of operating under a scheme that allows acquisition of the benefits of an integrity framework (Valdez-Juárez et al. 2018).

Numerous perspectives have been presented to address the problematic situations mentioned above as well as to conceptualise them and define their components (Bera and Poels 2019). However, according to Cui and Jiao (2019), seeking internal improvement or fostering organisational integrity may constitute a differentiator that generates sustained competitive advantages for an SME by strengthening its primary operations (Palazzo 2007), planning processes, resource bargaining between operational units and their management, and means of coordination and control (Harun et al., 2019), without neglecting interactions with other companies (Bakhsh Magsi et al.,

2018). In this manner, the organisational structure in charge of management can be enriched. This creates an opportunity to apply comprehensive models or perspectives that promote balance and viability in organisational terms (Trondal 2015).

Considering these findings, this study developed a conceptual model that proposes interactions conducive to the achievement of organisational integrity, considering operational units, control mechanisms, and management without avoiding adaptation to changes in the current context in which they operate. The model and its validation were carried out with the participation of 140 actors. In this regard, the following objectives were set: 1) apply Checkland's soft systems methodology (SSM) (2001) to identify conflicting components and relationships, structure the problem, and outline a conceptual model (construct) serving as a starting point for change; 2) estimate consistency from construct relationships using partial least squares path modelling (PLS-PM); 3) with the obtained results, propose an organisational configuration by applying the principles of Beer's (1985) viable system model (VSM) to build a bridge between the conceptual and application areas. VSM inherently considers integrity through the deployment of a function that considers the ethos of the whole organisation (Cardoso Castro 2019). This function does not depend on individual components of the model; this precept favours integrity using the recursion principle (Bera and Poels 2019).

It is pertinent to emphasize that the novelty of this study lies in the SSM-PLS-PM-VSM integration, indicating how to deploy them and proposing a systemic tool set applicable in other areas. This study finds its significance because it addresses the need for applying the system science knowledge to studying organisational integrity in management and organisations. Additionally, it extends the scope beyond statistical validation of constructs to identifying systemic applications.

Literature review

According to Philbeck et al. (2008) from the World Economic Forum (WEF), ethics and integrity are major factors for the success of any company because, in the current context, it is no longer enough to increase performance, ensure proper functioning of the supply chain, or focus on financial aspects, but consideration of and working in soft dimensions are required, particularly at the organisational level. This requires organisations to seek and sustain balanced relationships with the context in which they operate (Paradissopoulos 1991). However, although management efforts should be

sustainable, internal integrity should not be neglected in order to positively impact the human component that realises sustainability and is critical to the link between growth and the environment (Umpleby, Medvedeva, and Lepskiy 2019).

Vasconcelos (2018) reported that topics such as organisational integrity have been studied from various perspectives, such as administration, organisational science, sociology, political science, international relations, philosophy, and even economics. Some contributions focus on conceptual analysis (Jackson et al., 2013), theoretical principles (Rodriguez-Rad and Ramos-Hidalgo 2018), cost assessment (Deakins and Bensemann 2019), the mediating effects of variables (El-Kassar et al., 2017) or effects on management (Koo Moon and Kwon Choi 2014; Servajean-Hilst and Calvi 2018). Other studies focus purely on quantitative testing or qualitative approaches (Agrawal 2017; Gibson et al., 2015; Harun et al., 2019) to define models and standards applicable to any company regardless of their core activity or the sector to which they belong.

Ali, Sun, and Ali (2017) and Harun, Wekke, and Saeka (2019) agree on the importance of organisational integrity for the success of any socio-technical system, and they established three dimensions that theoretical or empirical efforts should address: organisational culture, leadership, and training. More authors support this idea; El-Kassar et al. (2017) stated that the employment-organisation relationship is fundamental for the organisation's integrity and executing ethical strategies. Gorondutse and Hilman (2016) reported that the perception of integrity affects the operations of SMEs, and the organisational culture must be restored if they are to operate in a manner that cares about the human capital and the operational environment. Additionally, every organisation must incorporate and implement values at work as this positively affects the organisational climate, and increases cooperation and performance (Ahmed et al. 2019; Shukla 2019). Nevertheless, integrity should not be separated from viability because it is linked to the reinforcement of principles that allow a system to be responsible in each dimension (Doe and Puplampu 2019). This goes beyond the mere adoption of tenets and proposes staff education as a vehicle for transformation (Faldetta 2016).

An approach frequently used to study issues related to the abovementioned concepts is the partial least squares structural equation modelling (PLS-SEM) or path modelling (PLS-PM). For example, Gorondutse and Hilman (2016) studied the association between the perception of ethical actions in SMEs and organisational performance; they also assessed the mediating effect of organisational culture on the

relationship and found that the perceived ethics indeed positively influence organisational performance. They also established that in order to maintain symbiosis in such a binomial, the organisational culture must be continuously reviewed and strengthened to influence the results adequately. The authors also suggest some practical implications, such as supporting policymakers, to include the social or corporate responsibility concept.

The literature also discuss the effect of variables, such as the sense of meaning, sense of community, and wisdom (Ahmed et al. 2019; Rodriguez-Rad and Ramos-Hidalgo 2018) on employee behaviour. Although such constructs may be considered "spiritual", using PLS-PM, it was concluded that fostering these values at the organisational level promotes the sense of belonging as well as the willingness to support other colleagues to meet their goals. In that frame of ideas, Strobl et al. (2019) and El-Kassar et al. (2017) studied the relationship between corporate social responsibility and corporate ethics. Authors proposed a conceptual model that considers variables such as corporate ethics, employee-organization identification, corporate social responsibility, and citizenship organizational behaviour, and the results suggest that social responsibility positively affects employee performance as well as generation of a sense of loyalty and belonging to the company. Regarding these ideas, Bakhsh Magsi et al. (2018) also suggest organisational culture as a leading latent variable to foster equilibrium between operations and the immediate environment.

The contributions mentioned present as an opportunity to propose relationships or organisational structures and their deployment from a systemic conception. In this context, the usefulness of other contributions is mentioned. For example, the acceptance of principles or recommendations related to integrity could be increased and friction from working groups involved could be decreased by applying professional ethics codes in education and even in training contexts (Kafi et al., 2018). In contrast, Mussner et al. (2017) and Strobl et al. (2019) state that some values are not disrupted or affected by organisational configuration. Subsequently, the authors focused on analysing the unproven effect of integrity and work ethics on individual behaviour as factors that foster innovation. Through PLS-PM, they demonstrated that being self-reliant and time-efficient are factors positively correlated with employees' innovation behaviour, while an attitude towards hard work and leisure has a negative impact. Unlike some of the abovementioned studies (Rodriguez-Rad and Ramos-Hidalgo 2018, Simionescu and Dumitrescu 2018; Valdez-Juárez et al., 2018); Mussner (2017) states that a fair wage

promotes commitment to innovation, inviting managers to reflect on the importance of considering the link of personal differences and identify crucial inherent values related to work to foster a sustained innovation process.

Among contributions that have attempted to comply with the suggestion of Awan and Sroufe (2019), Harun et al., (2019) used PLS and proposed a model integrating variables, such as organisational culture, leadership, and training. The authors agreed with Awan and Sroufe (2019) as well as Deakins and Bensemann (2019), suggesting that a better implementation and operationalising of integrity contributes to organisational performance, especially in the supply chain. Rodriguez-Rad and Ramos-Hidalgo (2018) proposed the solidification of organisational integrity by evaluating the role of moral identity and integrating the consumers' perspective into the study. This work demonstrated that consumer preferences for business products or services is are mainly affected by organisational commitment to sustainability, organisational compliance to ethical standards, and incorporation of beliefs, such as those of honesty, kindness, generosity, and compassion. On this basis, each organisation must face the challenge of responding with actions that are congruent with the market requirements that demand integrity from the corresponding companies. Several studies (Al Hammadi and Hussain 2019, Koo Moon and Kwon Choi 2014; Zinko et al., 2016; Ahrholdt et al., 2019) also postulate the idea of endeavouring and consolidating an organisational integrity climate that can benefit both employees and organisations. However, most empirical research efforts on this subject have been developed at the individual level, circumventing the organisational level and the operational environment. Considering this issue, Cui and Jiao (2019) studied how organisational integrity positively impacts customer satisfaction, financial performance and the way in which these factors foster organisational innovation. Their results suggest that a positive relationship definitely exists between the components of their model and that actors with decision-making power should support engagement as this regulates the degree of innovation.

Although relevant, the revised proposals are considered to have limitations in that they focus on statistically validating constructs or providing a condensed version of requirements, without identifying systemic applications. Toro, Seif, and Akhtar (2020) highlighted the need for and relevance of applying the knowledge of system science to issues such as organisational integrity in socio-technical systems. They mainly suggest adopting cybernetics as an approach because, through its control mechanisms, it offers

an alternative to design systems that are geared toward organisational integrity at all levels. In this context, Gonçalves (2019) suggested one area of opportunity—the adoption of a holistic research approach that integrates the world view and knowledge of managers with the human factor. However, this is considered a disadvantage because it hinders the development of a repeatable process to build systems that seek organisational integrity. Addressing this issue, Midgley and Pinzón (2013) recommend adopting mediation mechanisms that integrate reasoning, experiences, and workers' beliefs that people are more important than payment or financial participation. In this manner, rejection or demeriting of other approaches can be avoided, the need of a company for support can be expressed, and the organisation can adapt to changes in the environment. In contrast to other approaches, and according to the authors, a framework based on systems thinking encourages participants to explore and be critical about their interests in the organisational context. Through systemic mediation, endeavours can be made to generate both personal knowledge and improvements in mutual understanding by seeking coexistence and synergy in a social system.

Based on the above, organisational integrity and its implications can be handled from the domain of systems science, specifically organisational cybernetics (OC) (Rezaee et al. 2019; Núñez-Ríos et al., 2019). In this regard, the systemic point of view of the mentioned aspects can be shaped through two components: 1) The good regulator theorem, which imposes regulatory mechanisms for a given system to be responsible (Conant and Ashby 1970); and 2) the law of requisite variety, which establishes that for a regulator to respond effectively, its capabilities or resources must equal or exceed those of the system to be regulated (Ashby 1956). However, this is difficult when the organisational integrity concept is applied (Umpleby, Medvedeva, and Lepskiy 2019). von Foerster (2003) sought to tackle these issues from the domain of OC and one of the imperatives he proposed was, "Act always trying to increase the number of options". However, this fosters an infinite loop that does not indicate when to stop generating new options, thus propitiating imbalances and risking an organisation.

Facing the problem of designing sustainable systems that strive for organisational integrity, Schwaninger (2006) suggested adopting OC and proposed the application of VSM as a meta-language to regulate the process. According to Schwaninger (2018), the VSM states that if organisational structures are clearly defined and the order and relationship of key functions are considered, it is possible to achieve equilibrium and viability in any socio-technical system. To this end, VSM uses a

recursive logic enabling adaptive structural design. In this manner, it is possible to adopt organisational integrity from the individual to the general level without neglecting the relationship with the operational context.

The viable system model has proven its effectiveness in various problems, such as evaluation for adopting and using technology for learning (Hart and Paucar-Caceres 2017), establishment of and guidance for organisational complementarity between SMEs as an alternative to the cluster mode (Sánchez-García et al., 2018; Sánchez-García et al. 2020), support for regulation and sustainable performance in natural protected areas (Sánchez-García et al. 2019), acceleration and improvement of organisational processes (Kirikova et al. 2018), study of staff management in the service sector and suggestion of means for self-organization (Núñez-Ríos et al. 2015; Núñez-Ríos et al. 2018), suggestions for improving human capital management in tourism companies (Núñez-Ríos et al., 2019); and structuring response mechanisms in disaster situations (Preece et al., 2015).

The VSM has been also used as a diagnosis tool for identifying organisational pathologies (Rezaee et al. 2019), designing organisations aimed towards equilibrium (Schwaninger 2006), and even to propose a pattern geared towards sustainability that articulates all sectors of the society (Schwaninger 2018). It has helped to identify components related to corporate social responsibility. In this sense, Romero Juárez et al. (2018) combined OC and international responsibility criteria to provide SMEs with tools that allow them to independently generate and operationalise social corporate responsibility principles.

Based on the above, and taking into account the idea that implementing more alternatives than necessary is not decisive for a system to fulfil its purpose, this was aimed at proposing a model that reduces the gap between the operationalisation and deployment of organisational integrity in SMEs (Núñez-Ríos et al. 2018). This contribution is proposed through the VSM (Beer 1985), a metamodel suitable for organisational problems of hierarchically structured systems. As mentioned earlier, VSM inherently considers ethical components through the deployment of a function that considers the ethos of the whole organisation.

The revised literature suggests a gap concerning the application of holistic models that support the deployment of organisational integrity and principles that enable such status to be achieved in service SMEs. Therefore, and given that few interventions were identified based on methodological complementarity, the validation

and possible implementation of a proposal that considers the relationship between operational units and their control and management mechanisms are issues of interest.

Research method and methodology

The systemic method is considered useful when adopting a multi-methodological perspective to assess unstructured problems, in which the "what, how, or who" in a problem are difficult to define, and it also considers the worldview of those involved (Nunez Rios et al. 2020). It is noteworthy that the systemic method is considered appropriate because it promotes dialectical synthesis among naturalist, criticist, and positivist research methods by seeking, in addition to understanding a problem, to generate positive actions to influence reality (Schwaninger and Scheef 2016) and attempting to solve problems with multiple interrelationships and variables. In this context, SSM was used as a leading methodology to articulate the study and structure components within the problem.

The inner flexibility of SSM allows the combination of other methodological tools and improvement of the robustness of the study. In this regard, the integration of PLS-PM and VSM is justified, which were applied as follows: the first tool was used to statistically validate the proposed construct, and the second to suggest organizational relations to strive for organisational integrity. This work adopts the deployment suggested by Checkland (2000); Sánchez-García et al. (2020), as shown in Figure 1.
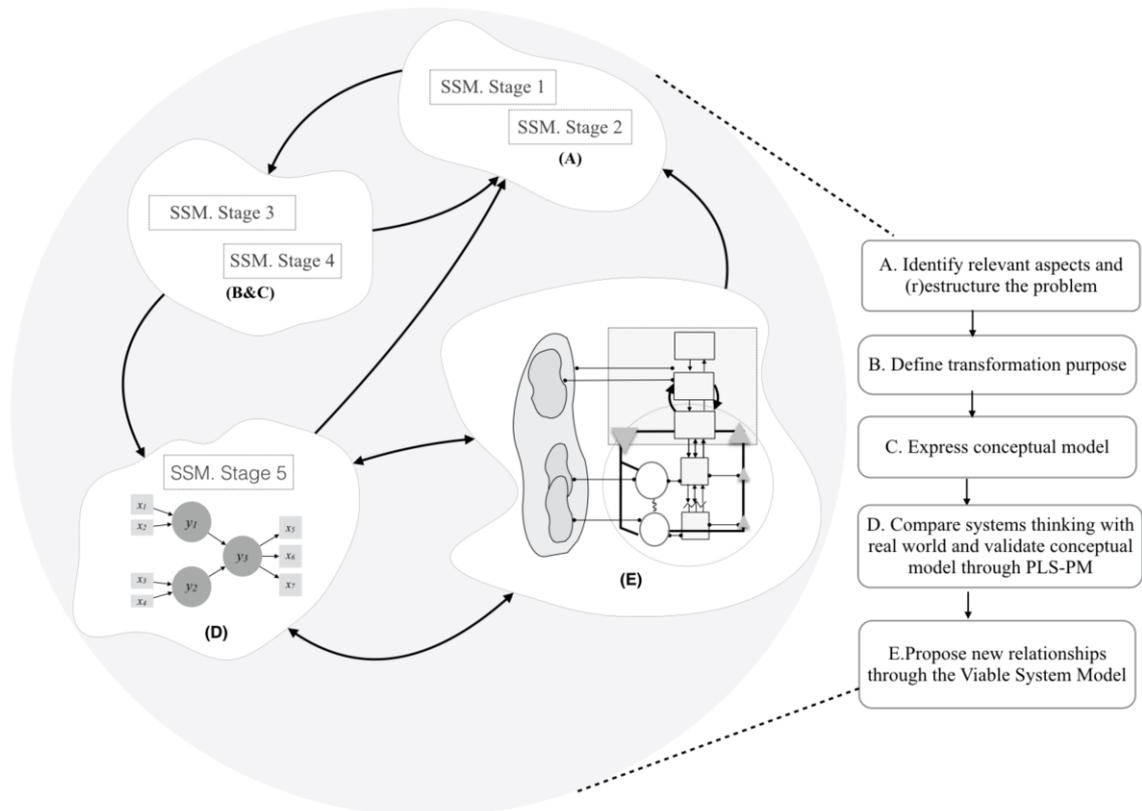
Figure 1. Methodological deployment

Source: Adapted from Checkland (2000); Sánchez-García et al. (2020)

The SSM is composed of two large blocks: the real world (block 1), which comprises stages 1, 2, 5, 6, and 7, and systems thinking (block 2), which comprises stages 3 and 4 (Checkland 2000). To better understand this methodology, a concise description of the stages is provided:

- *Stages 1 and 2. Problem situation (unstructured and expressed):* Here, the purpose is to detect organisational and contextual components that may have direct/intermediate impact on the problem, and their interaction affects organisational integrity. These first two stages helped in developing the concept of this study. Participants answered questions about the perceived problem situation, and the information was used to formulate a construct that was reviewed by the participants until a consensual model was reached.

- *Stage 3. Root definition of relevant systems:* The mnemonic CATWOE (Customers, Actors, Transformation, *Weltanschauung*, Owner, Environment) was applied to identify the required elements to express the relevant systems (or variables) that compose the construct as a basis for a viable solution.

- *Stage 4. Conceptual model of relevant systems:* Along with actors' participation, relevant systems or latent variables are integrated into a construct to establish the "ideal" state for a system to achieve its purpose.

- *Stage 5. Comparison between 4 and 2:* The objective here is to check the congruity of the proposal from systems thinking for possible implementation in the real world. According to Wilson (2010), there are four ways of comparison: (1) general discussion; (2) question definition; (3) (historical) reconstruction; and (4) model overlay. Option 4 was selected because it allows integration of quantitative tools. Thus, PLS-PM was used to fulfil the objective in this stage.

- *Stage 6. Desired and feasible changes:* The participants declare the optimal state or changes to the problem (changes must be shared). In this regard, adding the VSM into the SSM structure is feasible to express courses of actions and restate relationships between organisational components.

The methodology of this study can be summarised as follows:

(1) Identify components and relations in conflict.

(2) Propose a conceptual model shared by all participants as a basis for an alternative improvement.

(3) Express the hypotheses derived from the conceptual model.

(4) Design and apply a questionnaire considering the variables of the conceptual model.

(5) Analyse the data to validate the construct using Rstudio and the *plspm* package.

(6) Apply the VSM considering the obtained results.

Information collection

The questionnaire inquiries about aspects related to organizational and contextual aspects that may impact on achieving organizational integrity, and it was based in previous research such as Cui and Jiao (2019) and especially from Sánchez-García et al. (2020) because, in addition to considering the variables of the conceptual model, it allows to structure the questions following the viable system model. As for the measurement scale, the five-points Likert scale was used, where 1= completely disagree and 5= completely agree (Table 1). Data were collected through email with the support of Mexican service SMEs.

The samples comprised 140 actors and all questionnaires were 100% filled. Therefore, the sample size consisted of 140 observations. The participants were required to have at least three years of managerial experience. Accordingly, forty SME owners, seventy managers, and thirty staff employees participated in the survey, and no distinction was made in the gender of the respondents. Regarding sample size and composition, Avkiran (2018) states that there are no rigid guidelines to determine the minimum of observations when using PLS-PM. The sample in this study was *a priori* using the pwr package in Rstudio to perform an F-test (Champely 2018) considering a statistical power value of 0.90 with a significance level of 0.05 (Kaufmann and Gaeckler 2015). The result in this regard conforms to the recommended minimum of 100 to 200 observations to obtain meaningful results using PLS-PM (Kock 2018).

Table 1. Variables definition and items

Variable	Definition	Item	Id
Environment (**Env**)	The context in which an organisation operates and demands adaptation (Awan and Sroufe 2019)	The organisations filter information and focus on what it does well	Env_1
		To achieve organisational objectives, we work cooperatively	Env_2
HRM & Hiring practices (**HrmM**)	Courses of action that amplify human resource capabilities, handling socio-cultural and ethical characteristics of employees (Cui and Jiao 2019)	Human resources managers own and transmit clear and precise objectives	$Hrm.H_1$
		HrmM ensure the linking guidelines informing the whole company	$Hrm.H_2$
		Plans and decision making are based on human resource capabilities to amplify good results	$Hrm.H_3$
Operative unites (**Opu**)	Activities responding to a particular environment; processing inputs is vital to fulfil organisational objectives (Cardoso Castro 2019)	Each operative unit has precise tasks to tackle a specific function and environment	Opu_1
		Operative units self-organise because they possess a framework for it	Opu_2
Coordination (**Crd**)	Actions that seek cohesion and regulation of primary activities (Schwaninger 2018)	Coordination and feedback mechanisms are effective	Crd_1
		Internal and external communication processes are effective	Crd_2
		All organisational components are interconnected and strive for synergy	Crd_3
Operational & managerial regulation (**OpMr**)	Exert control and management to maintain daily activities regarding the "here and now" of the organisation. It frequently assesses the effectiveness of the Pac in strengthening the essence of the organisation (Cardoso Castro 2019)	Operational and managerial relations are often marked with conflicts	$Op.Mr_1$
		The organisation owns and communicates clear and precise courses of actions	$Op.Mr_2$
		Operations related to strategic processes consider the organisation's overall environment	$Op.Mr_3$
Corporate governance (**Cog**)	Definition of purpose and policy for the entire organisation. It proposes courses of action based on **Int** (Schwaninger 2018)	Operations at each organisational level are comprehensive and inclusive, promoting integrity and equilibrium	Cog_1
		Global units are supported and able to fulfil their mission independently and respond accurately to changes considering information for integrity and equilibrium	Cog_2
Strategic Planning (**StP**)	Continuous monitoring of the organisation's context to generate forecasts and relevant information to support adaptation and integrity (Schwaninger 2018)	Analysis of the environment and planning is made to improve capabilities and integrity in the company	$St.P_1$
		New plans are based on analysis of the environment and translated for the whole organisation to understand	$St.P_2$
		The **StP** function influences the organisation and is considered a key factor for the course and integrity in the company	$St.P_3$
Organisational integrity (**OrIn**)	Integration of organisational and human factor capabilities that reduce toxic working contexts and improve operations in order to realise self-sustainable organisations (Cui	Diversity in knowledge and resources foster integrity and equilibrium in response to changes in the environment	$Or.In_1$
		The organisation identifies its distinctive	$Or.In_2$

	and Jiao 2019)	capabilities to enrich and strengthen work interrelationships	

The PLS-PM analysis was performed using Rstudio (Sanchez 2013):

- Translate the conceptual model into a path model diagram.

- Evaluate the unidimensionality of latent variables (LV) that correspond to the measurement model through Cronbach's alpha coefficients and Dillon–Goldstein's rho, which must exceed 0.7. Additionally, the first eigenvalue must be above 1, and the second less than 1.

- The factorial loading for each indicator must be greater than 0.7 for it to explain at least 50% variability of the LV.

- Verify cross-loadings to ensure all indicators are a good proxy of its LV. That is, the widest factorial loading corresponds to the indicator to which it belongs.

- Assess the structural model, review R^2 determination coefficients, and report the amount of variance in the dependent variables explained by their independent variables ($R^2 < 0.2$ low, $0.2 < R^2 < 0.5$ moderate, $R^2 > 0.5$ high). Redundancy is also checked as it informs about the predictive capability of the dependent variables by the independent variables, i.e., the higher the value the greater the capability.

- Perform bootstrapping analysis to validate meaningful relationships. This produces a confidence interval for each path coefficient in the model. If this value is not 0, the hypothesis is significant with 95% reliability.

Results of SSM and PLS-PM

Considering the ideas in previous sections, the SSM application is briefly described:

Stages 1 and 2: According to Checkland (2000), the components of a problem and their interactions are identified at this stage. It is necessary to clarify that these stages rely on the dialogic process to initiate the interaction of participants. Therefore, the participants highlighted the elements that integrate the internal or immediate contexts as well as the operational context of the studied SMEs (Figure 2).
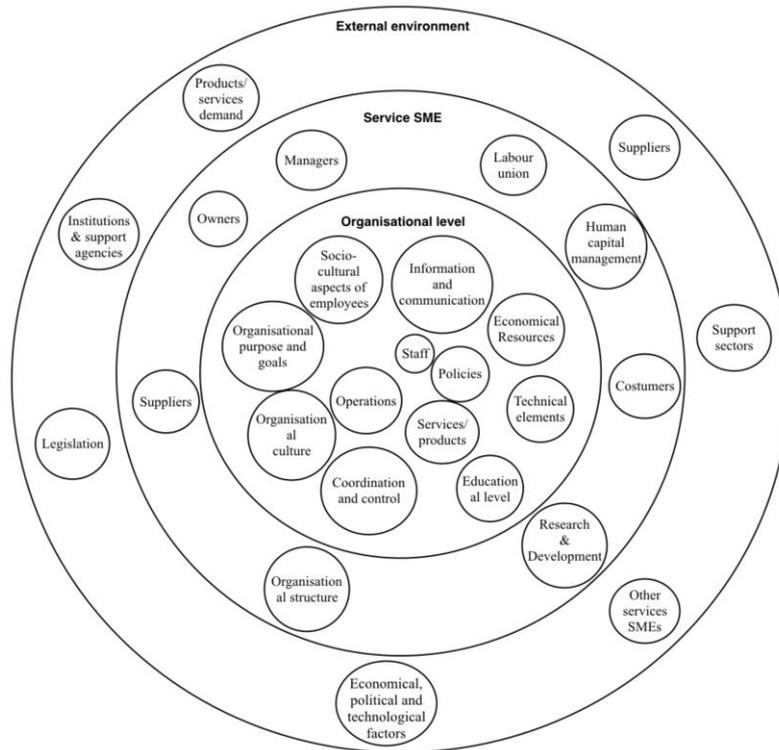
Figure 2. Elements of the problem situation

Source: Based on Checkland (2000)

Considering the mentioned stages, some conflicts are identified at each level and described:

- Organisational level: Managers consider that organisational culture, employees' sociocultural aspects, technical resources, company's purpose and policies, and action spectrum of the coordination and control mechanisms weaken and affect the structure and efficiency of operational units.

- Service SME or intermediate level: Participants recognise that a problematic factor in service SMEs is that their management model continues to be based on functionalist and reductionist precepts. This generates, among other situations, overlapping among the requirements of owners, suppliers, and customers at the organisational level because management does not incorporate mechanisms that regulate and order the interaction between operating units, management, and the context in which they act. Moreover, the lack of a systemic conception in planning affects the staff integration, i.e., it focuses people on tasks, but ignores socio-cultural aspects that contribute to the integrity.

- External environment: Managers indicated that they do not have the instruments to react to the demands and constraints of the environment adequately. They also

consider SMEs to have insufficient capabilities to retrieve relevant information from the environment and translate it into strategies that improve both operations and staff conditions and strengthen the organisational structure.

Stages 3 and 4: According to the above stages, it is crucial to define relevant variables and their interaction to suggest a possible improvement to the problem. In this regard, the *CATWOE* mnemonic (Table 2) was applied to consider the minimum but sufficient components to lead to change. Following the SSM framework, the root definition or nature of the transformation was expressed as follows: "*A viable structure that fosters articulated relationships among operational units and their control and managerial mechanisms to propitiate organisational integrity*". The following step is to design a construct (conceptual model) that expresses what links can be created in order to achieve the root definition (Figure 3). Descriptive statistics of the essential variables of the conceptual model are presented in Table 3.

Table 2. CATWOE elements

Element	
Client	Managers, other services SMEs, customers, inputs and suppliers
Actor	Managers, staff, SMEs owner(s), and medium-sized service companies
Transformation	Coherent linkage among operations, management, and control mechanisms propitiate synergy for adapting to the complex environment without neglecting integrity
Weltanschauung	Organisational integrity is an unstructured and complex issue, and the interrelationships for operating coherently and reaching that state are not clear; therefore, it is necessary to improve organisational structure.
Owner	SME owners and human resource managers
Environment	Institutions and support agencies, other service SMEs, and regulation organisations

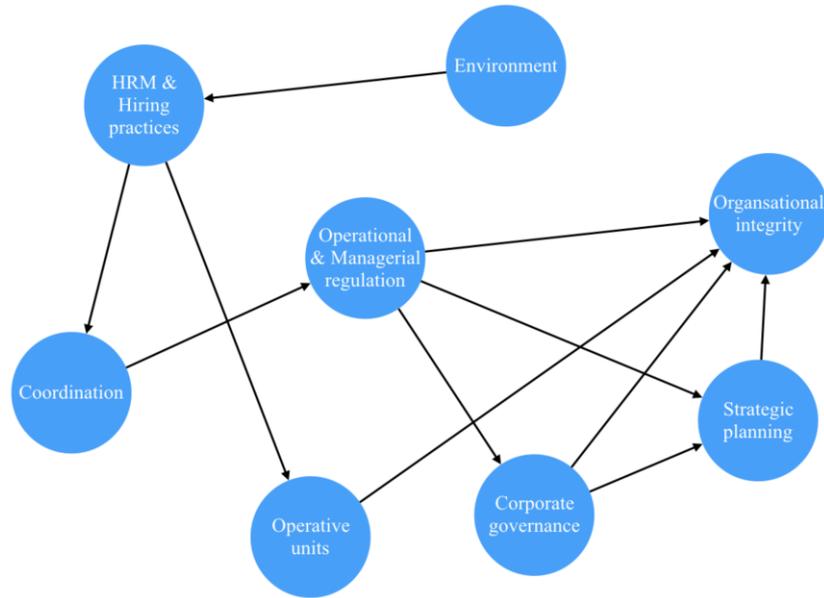Source: Adapted from Checkland (2000)

Figure 3. Conceptual model

Source: Based on stages 3 and 4 of the SMM (Checkland 2000)

In SSM terms, one of the outcomes of stages 3 and 4 is the definition of a hypothesis. In this regard, the following general hypothesis is stated: "Organisational integrity of service SMEs depends on the integration of variables such as *Environment, HRM & Hiring practices, Operative units, Coordination, Operational & managerial regulation, and Corporate governance and Strategic Planning*".

Table 3. Variables and items for the conceptual with corresponding values of mean (μ) and standard deviation (σ)

Variable	Id	μ	σ
Environment	Env_1	3.65	1.12
(Env)	Env_2	3.22	1.21
Human Resource Management & Hiring practices	$Hrm.H_1$	2.64	1.22
(Hr.H)	$Hrm.H_2$	3.18	1.19
	$Hrm.H_3$	3.25	1.14
Operative unites	Opu_1	3.73	1.19
(Opu)	Opu_2	3.22	1.19
Coordination	Crd_1	2.73	1.09
(Crd)	Crd_2	3.22	1.19
	Crd_3	3.19	1.06
Operational & managerial regulation	$Op.Mr_1$	4.48	0.57
(Op.Mr)	$Op.Mr_2$	4.52	0.53
Corporate governance	Cog_1	4.40	0.62
(Cog)	Cog_2	4.47	0.56
Strategic Planning	$St.P_1$	4.54	0.50
(Stp)	$St.P_2$	4.50	0.52
	$St.P_3$	4.51	0.52
Organisational integrity	$Or.In_1$	4.47	0.56

Accordingly, the working hypotheses fitting the conceptual model are:

- H_1: Environment significantly influences HRM & Hiring practices.
- H_2: HRM & Hiring practices positively impact Coordination.

- H_3: HRM & Hiring practices exerts a positive effect on Operative units.
- H_4: Coordination has a positive effect on Operational & Managerial regulation.
- H_5: Operative units are positively related to Organisational integrity
- H_6: Operational & Managerial regulation positively influences Corporate governance.
- H_7: Operational & Managerial regulation is positively related to Strategic planning.
- H_8: Operational & Managerial regulation exerts a positive effect on Organisational integrity
- H_9: Corporate governance is significantly related to Strategic planning.
- H_{10}: Corporate governance has a positive effect on Organisational integrity.
- H_{11}: Strategic planning is positively and significantly related to Organisational integrity

Application of PLS-PM to conceptual model assessment

According to Wilson (2010), PLS-PM is a multivariate technique useful for validation in the soft modelling context. Its application is pertinent as the construct resulting from steps 3 and 4 can be treated as a composite of variables. PLS-PM can handle the complexity of unstructured situations by reducing their dimensions and focusing on estimating multiple and relevant relationships to provide systemic conclusions (Ringle et al. 2018). Therefore, this technique has been used to determine, through the significance index, whether relationships expressed in the construct are consistent and approximate or adjust to the actual context of the problem situation. Therefore, it is crucial to evaluate the internal unidimensionality of the conceptual model components. To this end, Marin-Garcia and Alfalla-Luque (2019) suggest jointly reviewing Cronbach's alpha and Dillon-Goldstein's rho as indicators of consistency (Cepeda-Carrion et al., 2019). Table 4 provides information about these measures. Values of Cronbach's alpha were above 0.70 in most cases, and those of Dillon-Goldstein's rho were above 0.80. Additionally, the first eigenvalue was above 1 and the second eigenvalue below 1. These statistics confirm the unidimensionality of the items as each contributes to acceptably explaining the relevant system or latent variable to which it is related. It should be added that factor loadings above 0.75 were obtained in most cases, confirming reliability in the measurement of LVs (Table 5). According to Kock (2019),

values above 0.70 ensure that the item explains at least 50% of the LV variability.

Table 4. Cronbach's alpha (α), DG rho (ρ), and first and second eigenvalues for measuring the internal consistency of each latent variable

	α	ρ	eig.1	eig.2
Environment **(Env)**	0.80	0.90	1.68	0.32
Human Resource Management & Hiring practices **(Hrm.H)**	0.80	0.88	2.14	0.62
Coordination **(Crd)**	0.73	0.85	1.96	0.65
Operative units **(Opu)**	0.47	0.80	1.28	0.72
Operational & managerial regulation **(Op.Mr)**	0.70	0.87	1.53	0.47
Corporate governance **(CoG)**	0.77	0.90	1.63	0.37
Strategic Planning **(St.P)**	0.95	0.97	2.71	0.20
Organisational integrity **(OrIn)**	0.70	0.87	1.54	0.46

Source: self-elaboration

Figure 4 shows λ for each indicator in its corresponding block, providing information on the behaviour and relative importance of each component that integrates each LV (Ringle et al. 2018). For this model, all items report λ above 0.7, exceeding the minimum 0.5 threshold and indicating commonality. Sanchez (2013) confirmed that each item above this threshold explains at least 50% variance of each LV.
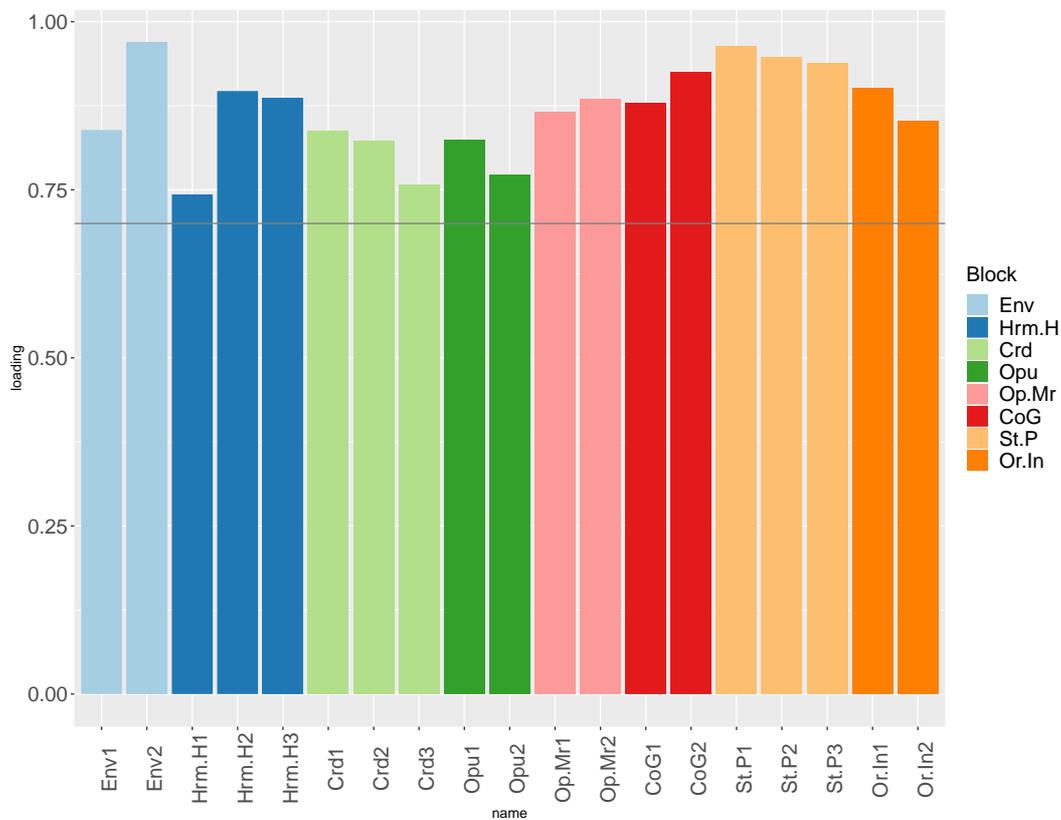

Figure 4. Bar-chart loadings for each indicator

In a complementary sense, Table 5 reports discriminant validity between variables as factorial loadings [λ] do not overlap with cross-loading ranges [C-λ]. This ruled out the possibility that the indicators are not an appropriate proxy of their LVs as λ > C-λ (Bentler and Huang 2014). The resulting SSM model fits discriminatory validity requirements as each variable reports a more significant λ towards the corresponding variable (Hair et al. 2019). It is worth mentioning that this validity exists between two variables if R^2 < AVE, that is, if the shared variance is lower than the extracted variance. Table 6 rectifies this condition by checking the corresponding columns. Additionally, convergent validity is assumed if λ is narrow and the value of the lower limit of the loading for each variable is significant (Sanchez 2013).

Table 5. Factor loadings (λ), cross-loadings (C-λ), and AVE values for each variable

	[λ]	[C-λ]	AVE
Environment (Env)	0.84 - 0.97	0.06 - 0.72	0.83
Human Resource Management & Hiring practices (Hrm.H)	0.74 - 0.90	0.12 - 0.70	0.71
Coordination (Crd)	0.76 - 0.84	0.15 - 0.74	0.65
Operative units (Opu)	0.77 - 0.82	0.11 - 073	0.64
Operational & managerial regulation (Op.Mr)	0.85 - 0.88	0.06 - 0.74	0.77
Corporate governance (CoG)	0.88 - 0.92	0.08 - 0.87	0.81
Strategic Planning (St.P)	0.86 - 0.94	0.12 - 0.84	0.90
Organisational integrity (OrIn)	0.85 - 0.90	0.08 - 0.83	0.78

The determination coefficients (R^2) in Table 6 also report that exogenous variables explain the variance level of each endogenous variable, providing an overview of the overall model quality. Based on this, and the ranges stablished by Hair et al. (2019), the variables Strategic Planning and Organisational Integrity exhibit a high or substantial R^2 level, whereas Coordination, Operative units, Operational & managerial regulation, and Corporate Governance variables exhibit a moderate variance level. In addition, this table exhibits redundancy results; it should be noted that for all endogenous variables, the value of redundancy is above 0, which supports the predictive quality of the construct proposed using SSM.

Table 6. Type of variable, and values of R^2, redundancy, and average variance extracted for latent variables

	Type	R^2	Redundancy	AVE
Environment (Env)	Exogenous	0.00	0.00	0.83
Human Resource Management & Hiring practices (Hrm.H)	Endogenous	0.57	0.41	0.71
Coordination (Crd)	Endogenous	0.57	0.37	0.65
Operative units (Opu)	Endogenous	0.58	0.37	0.64
Operational & managerial regulation (Op.Mr)	Endogenous	0.55	0.64	0.77
Corporate governance (CoG)	Endogenous	0.57	0.46	0.81

Strategic Planning (**St.P**)	Endogenous	0.79	0.71	0.90
Organisational integrity (**OrIn**)	Endogenous	0.66	0.70	0.77

Figure 5 represents the translation of the conceptual model into a path coefficients diagram and shows the effects on the proposed relationships. For example, components such as **Env**, **Hrm.H**, **Crd**, and even **Opu** do not constitute elements that themselves directly and significantly influence **Or.In**. However, from a systemic perspective, they are elements whose interrelationship with other variables amplifies their effect on Organisational Integrity. From the obtained coefficients, it can be inferred that Organisational integrity is attainable for the companies under study. This requires monitoring, filtering, and processing information from **Env** in order to positively affect the recruitment, management, and training practices of the human component as they are relevant factors to promote Organisational integrity without neglecting the context in which SMEs operate. Considering the bootstrapping results in Table 6, it is necessary to mention that Organisational Integrity is not attributable to the effect of a single variable, but it should be understood as an resultant property of the interaction of contextual and organisational features, that is, components related to operation, management, strategic planning, and governance. This suggests consistent integration of organisational elements that generate rearrangements required to support and conduct clear indications and move towards Or.In.
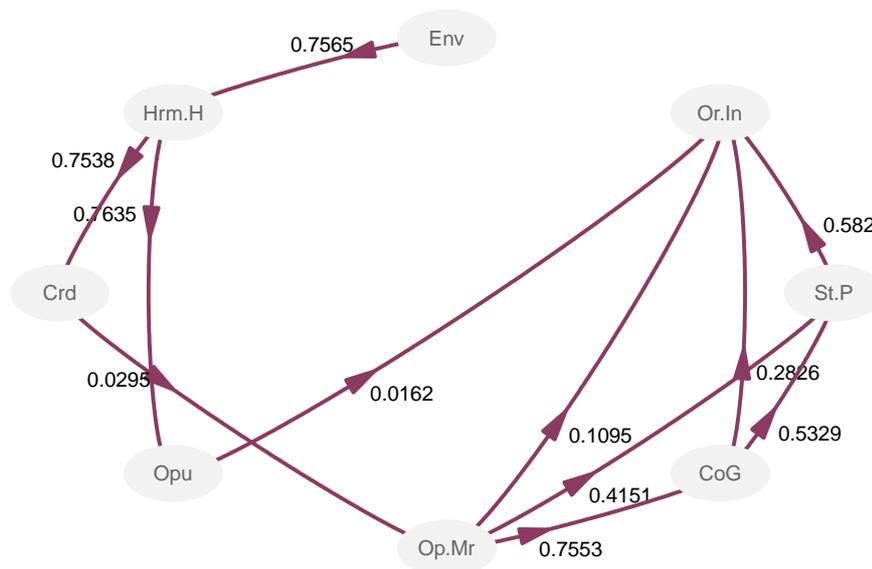

Figure 5. Path coefficients for the proposed relationships in the model

In a confirmatory manner, bootstrapping analysis validates the significance of the proposed relationships in the model (Table 7). Along with the confidence interval,

from the results of the bootstrapping analysis, the stability or degree of acceptability of the sample statistics can be inferred as an estimate of the population parameter (Bentler and Huang 2014). If the *perc.025* to *perc.975* confidence intervals do not contain 0, the proposed relationship is significant and 95% reliable. Accordingly, eight of the eleven hypotheses expressed are supported, suggesting that the probability of SMEs to achieve Organisational Integrity is high. However, this presents the challenge of re-arranging the organisational structure in order to achieve the purpose expressed in the variables raised.

Table 7. Bootstrapping analysis results of latent variables, with confidence interval at 95% and their significance level

	Original	Mean.Boot	Std.Error	perc.025	perc.975	Signf.
Env -> Hrm.H	0.7565	0.7582	0.0409	0.6684	0.8303	***
Hrm.H -> Crd	0.7538	0.7614	0.0344	0.6861	0.8226	***
Hrm.H -> Opu	0.7635	0.7641	0.0401	0.6784	0.8345	***
Crd -> Op.Mr	0.0295	0.0113	0.1134	-0.2021	0.2051	- - -
Opu -> Or.In	0.0162	0.0154	0.0218	-0.0270	0.0586	- - -
Op.Mr -> CoG	0.7553	0.7627	0.0470	0.6633	0.8470	***
Op.Mr -> St.P	0.4151	0.4153	0.1121	0.1994	0.6373	***
Op.Mr -> Or.In	0.1095	0.1054	0.1108	-0.1055	0.3295	- - -
CoG -> St.P	0.5329	0.5348	0.1101	0.3137	0.7466	***
CoG -> Or.In	0.2826	0.2771	0.0912	0.0709	0.4370	***
St.P -> Or.In	0.5820	0.5923	0.1245	0.3468	0.8428	***

To support and complement the information obtained through bootstrapping analysis, Table 8 shows *p*-value estimations. The values must be below 0.001 to confirm the significance of the relationships suggested in this study.

Table 8. T test values and their significance: *** with 0.001, ** with 0.01 and * with 0.05 confidence level

|	Estimate	Std. Error	t value	Pr(>|t|)	Signf.
Env -> Hrm.H	0.7565	0.0580	13.0347	0.0000	***
Hrm.H -> Crd	0.7538	0.0583	12.9259	0.0000	***
Hrm.H -> Opu	0.7635	0.0573	13.3241	0.0000	***
Crd -> Op.Mr	0.0295	0.0887	0.3326	0.7400	- - -
Opu -> Or.In	0.0162	0.0342	0.4746	0.6359	- - -
Op.Mr -> CoG	0.7553	0.0582	12.9887	0.0000	***
Op.Mr -> St.P	0.4151	0.0622	6.6686	0.0000	***
Op.Mr -> Or.In	0.1095	0.0603	1.8167	0.0717	*
CoG -> St.P	0.5329	0.0622	8.5618	0.0000	***
CoG -> Or.In	0.2826	0.0651	4.3418	0.0000	***
St.P -> Or.In	0.5820	0.0745	7.8168	0.0000	***

Proposing changes through VSM

The results have implications for SMEs and facilitate the development of desirable organisational changes to achieve the expressed objectives in the construct, as indicated by SSM stage six. For example, considering the paths in Figure 5, one of the challenges is to integrate the operational units (**Opu**) such that they properly process inputs from **Hrm.H** and, in addition to fulfilling their assignments, affect the organisation positively. In this manner, the organisation can operate on an organisational integrity scheme. Additionally, it is essential to integrate into the internal SME dynamic a function that activates and promotes the Corporate Governance (**CoG**) activity and serves as a scaffolding for the interaction between management and the mechanisms responsible for monitoring the environment and regulating operations. For this purpose, it is necessary to set up an organisational scheme that complies with the intended objectives. According to Cardoso Castro and Espinosa (2019), VSM has potential in enabling practical application of the results derived from the integration of SSM and PLS-PM and in guiding changes.

VSM consists of five systemic functions whose interaction seeks regulation, control, and continuous equilibrium (van Caspel 2011). According to Schwaninger (2018), this model is relevant for organisational domain issues and crystallising solutions to soft problems. Based on this, the meta-functions are described and then applied to the context of the study:

- S1: It consists of organizational elements such as tasks, processes or competences that are directly related to the organisation's operations, i.e. the production and delivery of goods or services to the environment.
- S2: It is responsible for the coordination or harmonic functioning of S1 units such that their activities do not overlap; for this purpose, resources such as manuals, policies, and rules are used.
- S3: It is responsible for managing S1 units and bargaining their requirements, that is, focus on the company's day-by-day activities or "here and now".
- S3*: It is a support mechanism to recover information that escapes S3, auditing and ensuring that both S2 and S3 objectives are met.
- S4: Its essential function is to monitor the context in which the organisation operates to obtain relevant information, translate it for S3, and strengthen management and decision-making processes.

- S5: This is the highest authority in the system; it ensures congruency in the ethos and cohesion across the organisation and balances the here and now with the company's future, considering external and internal aspects and generating courses of action or policies based on S3 and S4 information for S3 to implement at S1.

Subsequently, a VSM design is presented as an alternative configuration to respond to contextual changes and seeking organizational integrity (Figure 6).
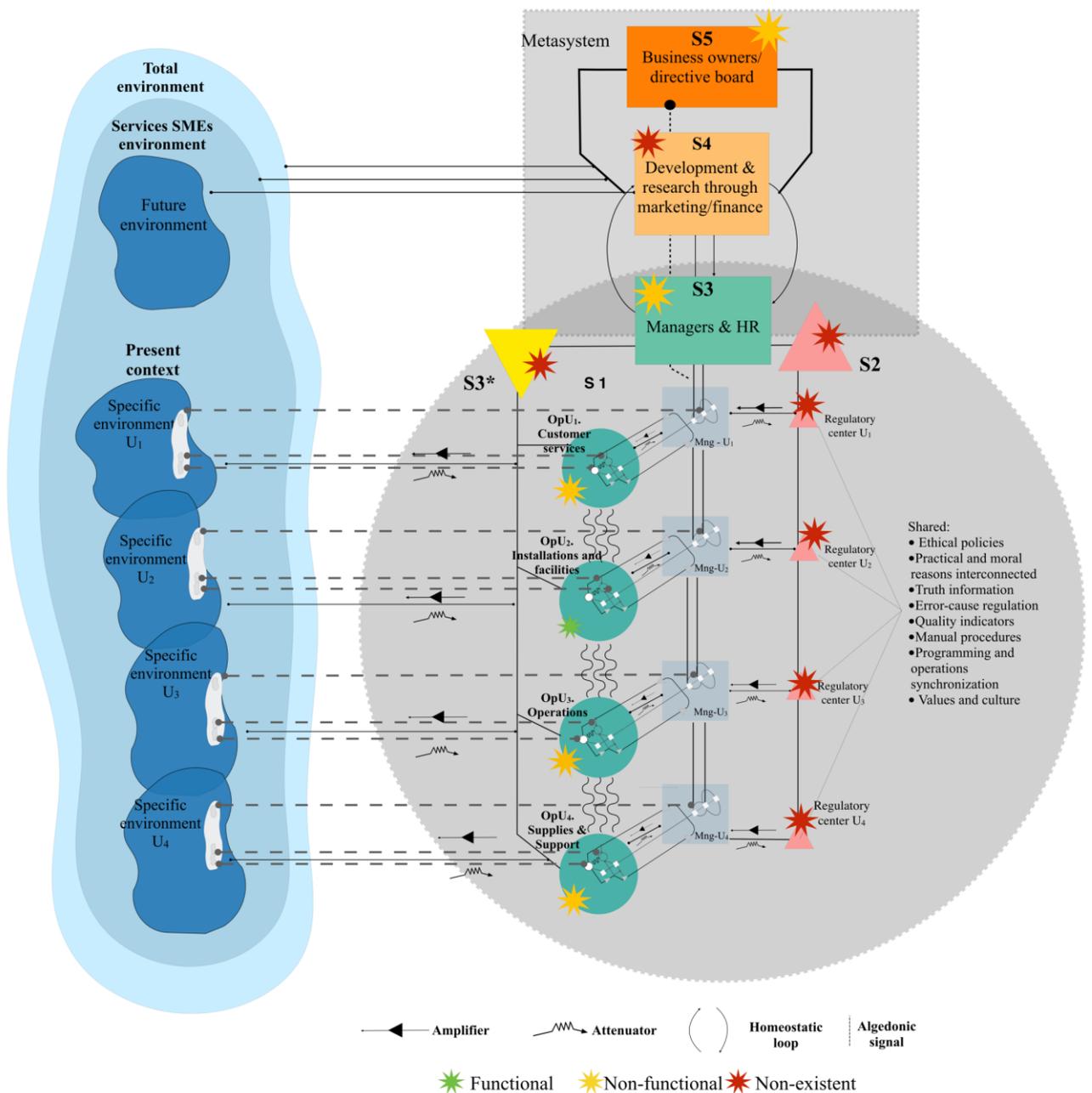
The green, red, and yellow colours in Figure 6 indicate the current state of the components of participating organisations from the perspective of VSM, and the proposed design for service SMEs should be interpreted in terms of the functions described below:

- S1: Elements related to S1 were mostly marked yellow because although the SMEs have identified essential operations, they are not configured to meet the requirements of their immediate contexts; they also overlap its actions. In this regard, S1 requires integrating mechanisms that order and structure communication with other operational units and suitable reports that help dialogue with S3. In this manner, needs can be continuously updated and a better supply chain can be achieved.

- S2: No coordination mechanisms supporting operations or strengthening S1 efforts or operating under an organisational integrity framework were identified. In this regard, some mechanisms that can be shared and integrated are error-cause resolution, inspection charts, event synchronisation matrices, modal failure and effect analysis, ethical policies and values strengthening. Additionally, it is necessary to standardise and simplify the generation of agreements between the components of SMEs in order to promote organisational integrity.

- S3 - S3*: Although these elements exist in SMEs, their status is non-functional. It is necessary to increase the capacity to generate agreements with S1 components. Support for human capital management is vital in order to promote collaborative work without neglecting the resources allocation for proper fulfilment of objectives. Additionally, S3 should promote commitment, and collaborative work—to influence organisational integrity by constantly monitoring production parameters—should be audited by S3* without interfering with the management of S1 elements.

- S4: No element for monitoring or supervising the environment and providing information that contributes to equilibrium or adaptation was identified. Therefore, S1 tasks and efforts are detached from the overall context. Research must be implemented to facilitate the translation of exogenous data that enable

forecasting of changes in the environment and generation of appropriate courses of action. To comply with this, S4 must use internal data, government databases, or statistics generated using support business cameras.

- S5: It is mainly exercised by the SME owners or managers. Despite being present, it may not be functional, negatively affecting governance and the congruency of all functions within the ethos system. Multi-criteria quantitative techniques need to be integrated at this level to strengthen decision-making, and it is also necessary to implement methodologies that consider qualitative aspects and allow for better problem structuring. In addition, a communication plan should be consolidated to intervene across the organization when situations require it.

Discussion and conclusion

Considering the ideas developed in this study, the results are briefly discussed.

The evidence for the **Env** variable agrees with the contributions of Cui and Jiao (2019), Harun et al. (2019), and Rodriguez-Rad and Ramos-Hidalgo (2018) who emphasised that the environment affects the internal dynamics of an organisation or how companies achieve their purposes. Although SMEs have organisational characteristics that restrict their structure and responsiveness, this study proposes the consideration of the organisational arrangements or configurations of VSM. The results also suggest that the **Hrm.H** component should exploit the inputs of the environment. Moreover, the estimates for this variable indicate its importance in generating organizational complementarity and its positive impact on shaping organizational integrity. However, while implementing it, the beneficial relationship with **Crd** and **Op.Mr** should not be neglected.

Although Agrawal (2017); Bakhsh Magsi et al. (2018); Awan and Sroufe (2019) considered coordination processes, they were observed as an isolated and low-level function for the fulfilment of management priorities. In contrast, through SSM, the proposed model presents coordination as a meta-function that amalgamates, from a systemic perspective, control and regulation mechanisms to enhance actions of the human component by seeking equilibrium. Although service companies identify organisational integrity as a competitive advantage, the ideas presented by El-Kassar et al. (2017) and Koo Moon and Kwon Choi (2014) suggest that, in terms of practical development, integrity in all company dimensions is a major factor determining the

interrelationship of key variables. If SMEs focus on some variable in an isolated manner, they are unlikely to make efforts that lead to learning and adaptation.

Ali et al. (2017), Gorondutse and Hilman (2016) considered the role of **St.P**, stating that strategy alignment must consider contextual, human capital management, and operational factors, which are fundamental to building symbiotic associations that can foster an integrity framework. However, the estimates obtained for this variable show that it does not provide an adequate framework for regulating interactions of operative units if taken individually. Therefore, its coupling is essential considering the inputs from **Op.Mr** to generate system-wide action courses. Some works (Palazzo 2007; Nicolăescu et al., 2015; Faldetta 2016) addressed corporate governance (**CoG**), but it has not yet been identified to have a predominant role in complementing management-related tasks. In contrast, the model proposed in this article suggests integrating coordination, corporate governance, operational management, and strategic planning as regulatory mechanisms that mitigate internal changes made by interacting with the environment and allow SMEs to be consistent with their current context. This is also true for **Or.In**, which, in turn, enables the determination of interrelationships between these factors, and promotes efforts towards achieving organizational integrity.

In summary, the arguments developed in this article agree with the findings of Doe and Puplampu (2019), Kafi et al. (2018), Simionescu and Dumitrescu (2018), and Strobl et al. (2019) because they reveal the suitability of system thinking for identifying critical factors that positively affect the dynamics of organisations by ensuring that improvement actions are attributable to their elemental composition. Furthermore, the need to address organisational domain situations from a multi-methodological approach is also highlighted. Although the contributions cited have focused on the causal relationship between variables and model reliability, it is possible to contribute to the field of study by suggesting the deployment of the proposal. In this study, the knowledge and experience of actors involved in the problem were taken into account to propose and validate the construct, and relationships between components of service SMEs were determined to improve their responsiveness. In this framework of ideas, the SSM-PLS-PM-VSM integration is considered pertinent to the proposal of organisational models that differ from the usual models employed by SMEs.

Through the literature review, the inadequate use of the holistic perspective on management domain issues could be identified. Although several studies have addressed complex problems, within the SME framework, reductionist criteria have

generally been used, emphasising on proposals for improvements in basic or particular features while ignoring the impact of context. From the systemic method perspective, this study sought to interweave methodological tools adequately. To this end, the general objective was achieved by applying the SSM to structure the problem situation as well as generate a construct focused on identifying and evaluating the components that can foster organisational integrity in SMEs without neglecting the challenge of responding to changes posed by the environment. Following this idea, using the proposed methodology, a root definition could be expressed, which, in addition to considering the knowledge and worldview of those involved, provides meaning to the transformation process and the conceptual model.

The second objective of this work was to estimate and validate the relevance of the relations of the construct through PLS-PM. Interrelationships between the relevant variables were found to be congruent and consistent. Therefore, they constitute an adequate approximation of the context in which SMEs operate. The statistical validation of the construct and the results obtained for each hypothesis reinforce the idea that the model can be extended to other types of organizations and even from other sectors.

The third objective was met by concatenating VSM after validation with PLS-PM. VSM served as a bridge between the conceptual and operational deployment, providing an alternative tool for improving internal interrelationships to provide a framework of organisational integrity. Additionally, the reconfiguration through VSM involves structuring processes, respecting the principle of autonomy, and integrating ethical tenets through an appropriate relationship in S5. It is noteworthy that VSM facilitates the understanding of internal pathologies in SMEs, which affect viability in companies, and also serves as a guide to identify the efforts required to generate changes. Addressing issues related to organizational integrity is essential as it allows SMEs to retain and develop their staff as well as stay in the market and increase their ability to generate profits or strategic relationships.

Finally, this study aims to contribute to the methodological arena by combining systemic tools. For this purpose, a model that promotes organisational integrity in service SMEs was articulated and validated. The proposal contributes to the methodological arena by expanding the outputs of both soft systems and viable systems. It can be used in other fields of management and even in other sectors. In conceptual terms, the proposal attempts to contribute to the study of SMEs using the systemic approach as an alternative to handle fuzzy problems. Finally, in practical terms, to the

proposal encourages actors with management functions to consider moving from reductionist models to a holistic perspective.

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