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A note on defining organisational systems for contingency theory in OM

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ABSTRACT

This paper aims to improve the applicability and relevance of contingency theory research in the field of Operations Management. Based on the results of previous studies, we have identified a systems-based single definition of organisation types that could describe the fit between organisational environment and organisational structure. This definition of organisation type, which we call an 'organisational system', regards the organisation as an integrated whole instead of as a sum of its parts and can help to better classify organisations in order to identify fits between organisation types and emerging practices in Operations Management.

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Contextual factors; organisational structures; organisational environments; contingency theory; fit

1. Introduction

Contingency theory suggests that contextual factors affect the way a business unit is organised, and that the way a business unit is organised affects the performance of a company (Weill and Olson 1989). Thus, certain ways of organising a business unit will produce better performance results when dealing with certain contextual factors, producing what is called a 'good fit'.

The field of operations management (OM) has developed a significant body of research using contingency theory (Walker et al. 2015). The work by Sousa and Voss (2008) shows the extent of OM practice contingency research (OM PCR) and provides a critique of the current state of research and future directions. They state that the main focus of studies in OM PCR is to understand the usefulness of certain 'best practices' when applied to different contextual factors.

OM PCR has resulted in a number of useful conclusions regarding the fits between certain OM practices (processes and policies) and single contextual factors, but few studies have actually suggested a fit between different types of organisations and emerging OM practices. Additionally, these studies (see, for example, Lloréns-Montes, García-Morales, and Verdú-Jover 2004; McCarthy, Silvestre, and Kietzmann 2013; Plugge and Bouwman 2013; Taylor and Taylor 2014; Salimian, Rashidirad, and Soltani 2017) and their conclusions are limited by the fact that they view an organisation as the sum of its parts and focus on the interaction between individual contextual factors and organisational structure. But we believe that more useful conclusions from OM PCR could be gained by moving to a holistic approach in which an organisation's context and

structure are viewed as a single integrated entity, which could be termed an 'organisational system'.

The objective of this paper is to provide such a definition in order to help researchers to develop research designs that are specifically focused on discovering good fits between organisation types (rather than individual organisational characteristics) and emerging OM practices. In addition, practitioners could benefit from the results of OM PCR studies by quickly identifying the applicability of certain emerging OM practices to their organisation type.

The rest of this paper is organised as follows. Section 2 provides a literature review of theoretical issues in OM PCR through different conceptualisations of fit. Section 3 presents a description of what constitutes an organisation as a single integrated entity and defines an organisational system. Section 4 discusses the advantages to be gained by using this approach, as well as the challenges that OM PCR may face in implementing this definition. Section 5 presents some final conclusions.

2. Literature review regarding the notion of fits

The notion of fit is central in the field of Contingency Theory, as it suggests that there are certain organisational structures and practices, i.e. business processes and policies, which are more suited to particular organisational environments, i.e. contextual or contingency factors. On one hand, there is the organisational environment, which is comprised of contextual factors that are exogenous to the company; on the other hand, there are the organisational structure and practices, which are managerial decisions that have been

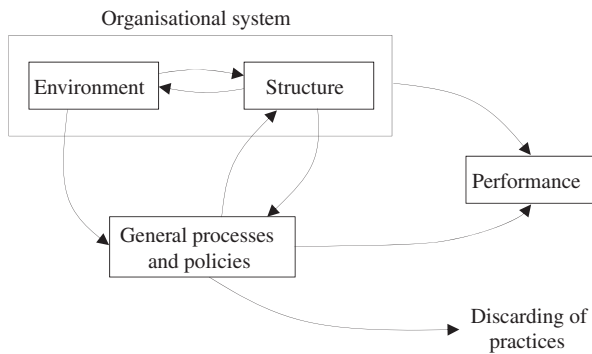


Figure 1. Dynamic process of defining an organisational system in contingency theory. Adopted from Jonsson and Mattsson (2003) and Sousa and Voss (2008).

made in order to cope with the environment to attain certain performance levels (Child 1972).

Studies concerned with investigating fits between organisational context and OM practices have considered three different conceptualisations of fit: selection, interaction and system approaches. The most commonly used approaches regarding OM PCR are the selection and interaction approaches (Sousa and Voss 2008).

The selection approach investigates the presence of certain contextual factors along with specific organisational practices without considering performance. This approach assumes that if management has decided to adopt certain practices it is because those practices have a logical fit with certain contextual factors. An example of the selection approach to fit can be seen in the paper by Romero-Silva, Hurtado, and Santos (2016), where the presence of certain contextual factors in manufacturing plants is analysed in relation to the presence of certain OM practices and policies without considering performance.

On the other hand, the interaction approach incorporates the aspect of performance in the notion of fit. In this approach, a good fit is found whenever good performance is attained when using an organisational practice in the presence of certain contextual factors. Devaraj, Hollingworth, and Schroeder (2001) adopted the interaction approach by studying whether the companies that are located in the 'fitting' diagonal of the Hayes and Wheelwright (1979) matrix perform better than the companies that are outside this diagonal.

The selection and interaction approaches consider only one possible fit between one contextual factor and one organisational practice. However, the performance of a business unit can be affected by a series of fits relative to different contextual factors and practices (Drazin and Van de Ven 1985) because the combination of a number of contextual factors can make a practice a better fit for a company compared to its usefulness when regarding only a single contextual factor. Thus, studies addressing 'good fits' should consider this more holistic approach, which is commonly called the systems approach (Van de Ven and Drazin 1984), since the performance results of a business unit depend on its set of contextual variables and practices interacting in conjunction instead of interacting in isolation. The study by Helkiö and Tenhiälä (2013) is an example of the systems

approach to fit, in which they analyse how each of the components of a product and a manufacturing process and their interactions is related to performance. They also add another dimension called Dynamism, which tries to model the periodicity and magnitude of changes in the environment.

As Sousa and Voss (2008) specify, the majority of the studies in OM PCR have been concerned with the selection approach, i.e. analysing the extent to which an OM practice is applied to certain contextual factors, e.g. the use of JIT practices in different firm sizes; yet other studies have, to a lesser degree, been concerned with taking an interaction approach that investigates how performance is affected by the use of a practice in the presence of a contextual factor, e.g. the performance of companies using JIT practices relative to firm size. The systems approach, however, has seldom been considered in the field of OM, and Sousa and Voss suggest that researchers should increase their use of this approach in their studies on fit.

The main difficulty in using the systems approach is the requirement for a great deal of effort be put into gathering large amounts of data, as the various contingency factors and the different operational practices of the business unit should be included in the study in order to measure their impact on performance. This large data requirement is well suited for the case study research methodology (Yin 2008), but for studies that aim to gather information from a significant number of companies, i.e. survey studies, it can be an enormous hurdle.

In order to facilitate a systems approach and generate a broader range of studies, we believe that a mechanism is needed for defining an organisation and its characteristics as a whole. Having holistic, concise definitions of organisation types will be very helpful in designing studies that investigate fits between organisation types and emerging OM practices. Such a definition is presented in the next section.

3. Defining organisational systems for OM PCR

The two factors that constitute an organisation are the organisational environment and the organisational structure. The organisational environment is comprised of a number of contextual factors that are exogenous to the company. The organisational structure, or the way the organisation operates, is the result of the management team coping with and adapting to the organisational environment in which the organisation carries out its operations in order to attain certain performance levels. The organisational structure is comprised of a series of business processes and policies that the organisation adopts over a long period of time, effectively embedding these processes as constituent parts of the organisation.

However, if one were to try to define any particular organisation using the above factors, it would be difficult to describe it by listing all its environmental and structural characteristics. Therefore, a more concise definition of what constitutes an organisation type is needed, one where both the organisational environment and the organisational structure are included. This definition is what we call 'organisational

system'. The 'organisational system' will define an organisation as a single integrated entity, since the organisational structure has no relevance without its context and the organisational environment is what drives the adoption of the processes and policies that comprise the structure of a company.

3.1. The dynamic process of defining an organisational system

The process for defining an organisational system is a dynamic one that recognises constant changes in the business context and constraints. A diagram of the dynamic process of defining an organisational system is presented in Figure 1.

In this dynamic process, the environment influences the decision about which process or policy the business unit should adopt given the objective of attaining good performance levels. After adopting a particular practice or process, either constraints or a constant good fit can turn that process or policy, over an extended period of time, into an embedded practice which will be part of the organisational structure. Moreover, the organisational structure can also have an effect on the organisational environment. At this stage, both the environment and the structure are intertwined, effectively constituting an organisational system.

An example of an embedding process due to a constant good fit comes from the adoption of a make-to-order policy in a company that produces customised products. As there are no major technological constraints that limit when and how production orders are expedited, this policy could change quickly and constantly over time. But changing from a make-to-order policy to a make-to-stock policy could significantly reduce performance since it would be difficult for such a company to forecast demand. Another example comes from the implementation and use of ERP systems in large companies. Nowadays we cannot conceive of a large corporation not having an ERP system. Both the capital capacities and information needs of large corporations constitute the environment that creates a good fit between such corporations and ERP implementation (Romero-Silva, Hurtado, and Santos 2016). This practice is further embedded by technical and financial constraints, as returning to a previous means of enterprise data management or changing to another ERP system could prove costly and difficult.

It is worth noting that a practice that becomes embedded in the organisation is not necessarily permanent, as a change in the conditions of the main environmental factors could make the original fit unsuitable for future conditions. Thus, after a period of time, the processes or practices that result in a lack of performance may be discarded by the company. In addition, a constraint that initially limited the ability of the business unit to change the organisational practice could be overcome, thus giving the business unit the ability to modify such practices at will.

Summarising the dynamic process in Figure 1, the organisational environment creates a perceived need for the implementation of a process or policy. That general process

or policy could become part of the structure if it becomes part of the company's normal operations owing to its good fit with the environment. Both the environment and the structure of an organisation constitute what we have defined as organisational systems.

Along with the processes that are already part of the organisational structure, the management team could decide to incorporate new processes and policies that will improve performance and that could work hand in hand with the structural processes and policies. Due to changes in the environment, which Helkiö and Tenhiälä (2013) would call Dynamism, or due to the discovery of better practices, a structural practice could cease being structural and become a general practice that is not integrated into the organisational system. Furthermore, if that practice is deemed a non-fitting practice, the management team could decide to discard it.

An organisational system, then, is comprised of a series of contextual factors that have a significant impact on a company's operations, i.e. organisational environment, and of a number of organisational processes and practices that are embedded in the company's operations, i.e. organisational structure. Defining an organisational system can be a straightforward process since the fits between environment and structures happen naturally, as the examples from the next subsection will show. This concept of organisational system can then be used to classify organisations.

3.2. Examples of studies that have used the organisational system concept

An example of the definition of an organisational system comes from adopting decentralised decision practices in manufacturing plants, i.e. shop-floor autonomy, where scheduling decisions are taken at each station independently instead of by a single scheduler. The logic behind that change is that human operators in each station are often faster and better able to react to disturbances than a single, global scheduler because of their close relation to the production process and because they are more motivated in their job (Van der Schaaf 1995). Nevertheless, the adoption of different levels of shop-floor autonomy could have an effect on how the decision maker deals with relevant changes in the state of the system depending on the uncertainty of product demand (Wiers and Van der Schaaf 1997).

Thus, a company that has low levels of uncertainty in demand and a high proportion of sequence-dependent setup times and that adopts autonomous, decentralised decision-making as a policy will, after a period of evaluation, come to the conclusion that this policy is not suited for its current organisational environment. In this case, a policy that has been used in the organisation will not be good enough to remain for a long period of time in the company's practices; in that event, the policy will be discarded rather than become part of the organisational structure and organisational system.

In a contrasting case, a shop-floor with high levels of demand uncertainty and with no particular constraints that link resource assignment among the different stations in the manufacturing process could discover that an autonomous

shop-floor is a good fit with their current organisational environment, and so that practice will be adopted. After a certain period of time, this policy will be embedded in the organisation's normal operations. In fact, a practice can be embedded so deeply that it can cause other policies to be rejected by both management and operators even in the face of new constraints, such as minimum lot sizes.

Taking into account the work by Wiers and Van der Schaaf (1997), the two fictional companies depicted above could be described just by their organisational system rather than by each of their constituent parts. Following this idea, rather than describing one of those companies as a company with an organisational environment of high demand uncertainty and with an organisational structure of no shop-floor autonomy, we could talk about a 'Smooth shop'. Moreover, instead of describing the second company as a combination of an uncertain environment and an autonomous decision structure, we could refer to the company as a 'Sociotechnical shop'. The concepts of 'Smooth' and 'Sociotechnical' shops describe organisational systems, i.e. the organisation as a whole, while the levels of uncertainty in the demand only describe a particular contextual factor and the degree of decision autonomy only describes a particular organisational structure. Then, as we incorporate the concept of organisational system, we could further explore the fit between a 'Smooth shop' and an additional OM practice. For instance, we could determine the effect of adopting a Drum-Buffer-Rope policy (Schragenheim and Ronen 1990) in a 'Smooth' or 'Sociotechnical' shop.

Another example comes from the paper by Tenhiälä (2011), where the concept of an organisational system is depicted in a study where the fit between capacity planning levels and process types is investigated. In that study, instead of investigating the type of production process that each company has and describing its demand requirements, as many studies concerned with the product-process matrix do (Jonsson and Mattsson 2003; Ahmad and Schroeder 2002; Ariss and Zhang 2002; Kotha and Orne 1989), Tenhiälä considers the company's process type to be a natural fit with demand and only describes process types as 'job shop', 'batch process', 'bottleneck-controlled batch process' and 'production line'.

The demand factor and manufacturing process factor are so intertwined that a single concept (the process type) describes both. The study from Tenhiälä assumes that there is already a working fit between environment and structure, and it uses that assumption as a basis to investigate the relation between the organisational system (including its environment and structure) and the level of capacity planning. In the case of the relation between product and process, a good fit generates the adoption of manufacturing processes as structural practices, and the difficulty of changing to another manufacturing process creates a deeper embedding of that organisational practice.

4. Discussion

Adopting the notion of organisational system in order to design studies concerned with fits between OM practices and types of organisations generates a series of advantages

for OM PCR, while also presenting a few challenges. This section discusses both.

4.1. Advantages of the organisational system concept

As we have stated, we believe that the main advantage of using the organisational system concept is the progression of knowledge regarding fits among emerging OM practices and organisation system types. This approach can be used in industrial sectors with a certain level of maturity in their operations since organisational structures are more established. As new OM practices emerge or new applications for traditional practices are discovered, practitioners will need to determine whether those practices will be helpful for a range of organisation system types or whether their use is only limited to certain types. Using previous OM PCR results that investigated and proposed organisational taxonomies describing organisational system types, practitioners will be able to investigate whether or not the emerging OM practice fits with certain organisational system types.

Apart from the fact that this concept could create more focused research regarding fits, the suggested approach can also help to develop research without embarking on intensive data gathering methodologies. One particular example that shows this advantage is the aforementioned paper by Tenhiälä, where a survey was designed to collect information about the product-process combination that the companies had, rather than collecting detailed information about the various characteristics of their demand and manufacturing process. In this case, instead of including many questions that would help the researcher to model the type of organisational system, e.g. the questionnaire designed by Kemppainen, Vepsäläinen, and Tinnilä (2008) for parametrising a production environment into different measurable variables, Tenhiälä only included one question.

We can see that the utilisation of this concept needs a very mature field of knowledge so that every survey respondent has a clear notion of what the different organisational system types are. In particular, as a field of knowledge becomes mature enough to have clearly defined types of organisational systems, e.g. the product-process matrix, we believe that information that explicitly describes every characteristic of an organisational system will be information that will not produce additional support for conclusions resulting from studies investigating fits between types of organisations, as whole entities, and emerging OM practices. However, even in a mature field, a self-assessment questionnaire can always be prepared so that survey respondents can identify their own organisational system.

For instance, studies concerned with the fit between supply network configurations and supply chain strategies can be developed using the supply network configuration factor as a global organisational system by searching for a fit between the four types of supply network configurations proposed by Harland and others (2001, Dynamic/Low Degree of Focal Firm Influence, Dynamic/High Degree of Focal Firm Influence, Routinised/Low Degree of Focal Firm Influence, Routinised/High Degree of Focal Firm Influence) and four strategic pipelines suggested by Christopher, Peck, and Towill (2006, Lean-Continuous

Replenishment, Agile-Quick Response, Lean-Planning Execution and Leagile Logistics Postponement).

Another topic that can be studied with this concept is the issue of how different integration practices throughout the supply chain could fit the different structural dimensions of a network (Lambert and Cooper 2000), i.e. horizontal structure (number of tiers) and vertical structure (number of business units on each tier). Note that the issue of supply chain design (Meixell and Gargeya 2005) is considered here using the organisational system concept, as the configuration of the supply chain is regarded as a decision that has already been taken and implemented and is currently a constitutional part of the supply chain system.

4.2. Challenges of the organisational system concept

The concept of organisational system could present some challenges for the field of OM. The first challenge is the one related to the maturity of knowledge regarding the classification of organisational system types. In order to consider this concept, research that adds to the description of known classifications is needed. Thus, this approach is constrained by previous research. Nevertheless, this challenge could motivate researchers and practitioners alike to discover new classifications.

An additional challenge could result from overcoming the first challenge, since studies investigating the characteristics of an organisational system could identify new and different fits and, consequently, new and different classifications of organisational systems. This issue has appeared previously in studies (Ahmad and Schroeder 2002; Safizadeh, Ritzman, and Mallick 2000; Romero-Silva, Hurtado, and Santos 2016) where different sets of factors are taken into consideration in order to discover organisational systems and to propose new taxonomies. With these results, researchers could be faced with the question of deciding which taxonomy to use or whether they should propose their own taxonomy.

The main issue with proposing new taxonomies resides in the fact that the proposal will completely depend on the set of variables that is used to form the groups, as can be seen in the paper by Romero-Silva, Santos, and Hurtado (2015), which shows that different taxonomies could be proposed by using different sets of variables, despite the fact that data is taken from the same sample of manufacturing plants. Interestingly, when both classifications from that study were compared with the traditional production environment classification of Hayes and Wheelwright (1979), there was a tendency for each new taxonomy to be described by the original product-process matrix. Thus, we suggest that researchers consider previously proposed and proven classifications for the organisational systems and build upon such classifications.

5. Conclusions

This paper was concerned with providing a definition of organisation types in order to help researchers to design focused studies on fits between organisation types and current OM practices. Based on previous papers, we propose

that OM PCR can gain momentum by considering the notion of an organisational system, which is a description of an organisation as a single integrated entity that takes into account its organisational environment and structure.

Use of this concept could lead to the development of more relevant research into the applicability of certain emerging OM practices in certain types of organisations by providing more clarity and focus to the research design and reducing time-consuming information gathering requirements. Moreover, results from such studies could help practitioners to more easily identify the most applicable OM practices given their specific type of organisation. Finally, the need to correctly define organisational systems could motivate researchers and practitioners alike to propose new classifications, effectively contributing to develop a more mature field for contingency research.

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