What are Management Systems? The Effect of Management Style According to System Dynamics

Guido Angello Castro-Ríos
Assistant Professor, Universidad de La Sabana, International School of Economics and Administrative Sciences – EICEA, Chía (Cundinamarca) Colombia, guido.castro@unisabana.edu.co

Lorena Silvana Reyes-Rubiano
Auxiliar Professor, Universidad de La Sabana, International School of Economics and Administrative Sciences – EICEA, Chía (Cundinamarca) Colombia, lorenareru@unisabana.edu.co

Ángela Lucía Noguera-Hidalgo
Professor, Universidad del Rosario, Political Science, Government, and International Relations Faculty, Bogotá (Cundinamarca), Colombia, angela.noguera@urosario.edu.co

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Abstract
Organizational management models involve various perspectives, such as management style, cultural dimensions, business models, organizational models, behavioural models and organizational learning. Each of these perspectives has an effect and thus a bearing on management. Accordingly, it becomes difficult to determine which of these perspectives is the most significant for a management model. For example, management style can be held to be a variable with a major impact on the organization because it affects the definition of organizational objectives while coordinating and controlling resources. Therefore, this study presents a proposal for the characterization of management models and presents in the form of a causal chart what could be considered a matrix framework for an organizational management model. To construct this matrix, possible relationships were established between each of the previously proposed systems considered to constitute organizations.

Key words: Business dynamics, leadership styles, management models, management styles

1. INTRODUCTION

As a social system that consists of individual members who permanently interact [1], the organization has long been a focus of study for scholars from different fields interested in understanding organizational behaviour as well as control and management methods. In this regard, the application of systems theory to organizations is not an exception. For example, Katz and Kahn [2] propose that this theory in organizational terms is related to the importance of accounting for problems that arise from the relationships, structure and interdependence of parties. For these researchers, such postulates differ from classical organization models, which consider an organization as a machine that responds to the design of the proposals provided by a leader [2].

In addition to the concept of organization, management processes are important aspects in the study of management. From this perspective, the strategic management of an organization could be understood in terms of conceptual approaches and the tools or means available for development. Among conceptual approaches in the literature, one strategy adopts the classical fundamentals, which consider the need to establish a planned, deliberate management process when reflecting on an organization’s future. In this field, traditional approaches are represented by the studies by Ansoff [3] [4] and David [5]. Regarding the tools or means to support strategic thinking, studies that address management processes include the approaches of the Boston Consulting Group matrix, the analysis of market forces [6] [7], strategy maps [8] and the Balance Scorecard [9].

However, one could argue that organizational management models are more useful. These models could be said to possess greater relevance for business management because they combine elements from the classical approach and with other significant methodological aspects in managing organizational resources. That is, an organizational model could be regarded as the interaction of multiple variables that form each of the aspects that define the model [10]. In addition, managing a business is a complex task because of the rapid and constant changes of the market. Therefore, organizational management models
are associated with complex dynamics with a high degree of uncertainty caused by unexpected changes. In the literature, organizational management models have been analysed with the aim of understanding organizational dynamics. However, these studies adopt a static perspective, in which the organizational model is defined as a set of guidelines that does not change over time. Therefore, this study aims to develop a new concept of organizational model based on the hypothesis that a model includes management style, cultural dimensions, a business model, an organizational model, models of behaviour and organizational learning. This proposal is based on the fact that models are volatile and affected by external factors to which the organization must constantly adjust. Thus, ongoing knowledge production occurs that is based on the experience, perceptions, modifications and other responses of the organization’s members. Such knowledge might be considered an important resource for organizational decision making and for regular feedback between the different perspectives included in the management model. Therefore, the proposal presented here is based on the variables and relationships that are included in a management model and aims to analyse cause-and-effect relationships and their influence on system dynamics. An additional variable to be analysed is management style, including its role in organizational management and behaviour, although this variable is subject to how well accepted the management is within the organization. In sum, system dynamics is adopted as a tool with which to construct relationships and consider the most important variables among management models. This study is organized as follows. First, a brief description of management models is provided. Second, the study presents the constructed model and explains its implications. Finally, conclusions and future research perspectives are offered.

2. MANAGEMENT MODELS

Ideally, a model not only represents a paradigm or example of something real but also should be considered an example to follow or imitate [11]. “A model that attempts to describe a social phenomenon represents a set of assumptions about what is happening and why. By giving us a general way of seeing and thinking about that phenomenon, the model provides us with a particular perspective about a more complex reality” [12]. In this way, a management model corresponds to different systems of organizational rules, to different reasoning or rationalization structures. Therefore, such systems constitute the deep logic that guides the effort represented by organizational activity. One view that is frequently examined in the research proposes that the management model originates in the organizational executives. “A management model is the choices made by a company’s top executives regarding how they define objectives, motivate effort, coordinate activities and allocate resources; in other words, how they define the work of management” [14]. Although this approach restricts itself to the organizational design established by the top management, an organization operates through not only the motivation of its top leadership but also the interaction of formal and informal structures as well as according to internal and external interests that define the way an organization typically responds to challenges and adaptation needs. Accordingly, the traditional perspective proposes that “management is about how we get work done through others – it is concerned with the day-to-day work of setting objectives, motivating efforts, coordinating activities and shaping decisions” [14]. However, one should also examine perspectives that consider the structural complexity of organizations and the environment in which organizations are managed. Thus, different concepts must be adopted, for example, considering organizations as complex systems, that is, systems formed by interconnected agents represented in terms of rules, which constantly adapt and modify such rules based on experience [15]. However, these agents are individuals endowed with cognition and who become regular rule makers, rule users [16] and change makers, i.e., centres of variability that challenge management models.

In this approach, organizations of any type, whether private, public, managerial or governmental, change constantly with respect not only to their structure but also the way in which they perform activities, their behaviour toward change processes, their culture and other elements that form the organizational system. Thus, as proposed by Quinn et al. [12], models and definitions of management are incomplete systems that constantly change. Therefore, along with changes in factors related to the environment (e.g., societal values, customs) and to internal features (e.g., organizational principles, the rules of the organization, the social needs of the involved agents), perspectives change, new situations emerge, and consequently, new management models appear.

“These models emerge from a complex interaction among all these factors” [12]. Therefore, to believe that a management model only derives unidirectionally from organizational guidelines is to ignore the bidirectional influences that occur between the different agents within an organization regardless of their position in the hierarchy or the business structure. However, if we conceive of management models as a set of relationships, we should consider developing a tool capable of a good understanding of this phenomenon.
This aim could be achieved through system dynamics, as discussed in the following section.

3. SYSTEM DYNAMICS AS A TOOL FOR THE STUDY OF MANAGEMENT MODELS

The available tools for understanding the complexity of organizations are limited. However, as stated by Repenning (2003), “organizations are dynamic places, and scholars who have studied them often recognize this fact. Unfortunately, they do not often have the right tools for this dynamism and are left with few options, beyond requesting to pay more attention to these characteristics in future works; these kinds of comments are open invitations for the application of system dynamics to scholarly communities” [10]. Consequently, this view leads to the interest in investigating management models using the tools available in system dynamics.

As previously suggested, organizational management models represent a system of increasing complexity due to the number of relevant variables and the relationships between them. Therefore, system dynamics can be regarded an appropriate means to study and analyze the impact of each variable on the system because it is possible to define processes and the intervention of specific situations through dynamic systems models [17]. That is, the variables can be defined as continuous, linear or nonlinear equations. Such variables could also be outcome variables that reflect the behaviour of a set of variables. However, an advantage of models based on system dynamics is that the number of variables and relationships are not limited. Such models can represent complex situations. However, why should one resort to system dynamics for the construction of management models? The answer is that the interaction of multiple variables and the relationships between the business model, the behaviour model, the learning model, the organizational model, cultural dimensions and management style prevents the use of conventional methods of simulation. System dynamics facilitates a linkage between variables and the representation of hypothetical relationships that result from abstract management models [18]. Here, an abstract model of a dynamic system, such as a management model, is a relatively durable and accessible but limited conceptual representation, an internal conceptual representation of an external system whose structure maintains the perceived structure of that system [19].

The study of organizational problems through system dynamics is not new. Several authors have adopted the approach to study the dynamics of strategic decision making [20], the relationship between strategic thinking and system dynamics [21], and questions that concern the control of business processes [22]. The aim is to guide organizational management toward a complete understanding of the behaviour of the relationships within the organizational model, relationships that result in the continuous change that causes difficulties that challenge decision making. Thus, systems dynamics represents a problem-management approach that could improve organizational performance.

4. ORGANIZATIONAL MANAGEMENT MODELS FROM A DYNAMIC PERSPECTIVE

This study proposes a management model based on the relationships, interactions and bifurcations present in the organizational environment. Therefore, a management model (MM) is the construct that arises from dynamic relationships among a range of organizational, social and cultural elements. These relationships might be expressed through a network diagram (Figure 1), in which the different variable sets contribute to the MM’s configuration. Such sets would be models of behaviour (MB), business models (BM), models of organization (MO), cultural dimensions (CD), management styles (MS) and organizational learning (OL). Any MM would be influenced by the complexity stemming from the relationships between the variables and the organization as well as between the organization and its environment.

This abstraction uses elements that define the organization. However, these elements are also variables that form a network of interconnected influences, with nodes and linkages that energize information flow and decision making though a process that adapts to internal and external circumstances. According to Holland [15], in adaptive complex systems, such as organizations, flows vary over time: “nodes and links may appear and disappear, depending on whether the agents are successful or not in their efforts to adapt. Therefore, neither the flows nor the networks can remain unchangeable over time: these are patterns that show the changes caused by the adaptation process as time goes by and experiences accumulate” [15]. Therefore, these management models do not exhibit characteristics of stability. On the contrary, they are dynamic.

Therefore, the elements that constitute this proposal can be described as follows:

- MBs are the result of actions or emotions derived from workplace diversity. Organizational cultural diversity implies the existence of more than one perception and attitude affecting organizational performance. Organizational behaviour can change according to the organizational culture as a consequence of agent behaviour. Therefore, this
model changes over time according to the influence of the organization's internal models. To summarize, influences cause the organization to be a system of complex relationships.

- The BM is the way in which the organization determines how to align and operate its resources to serve its customers/users and generate income. The model refers to the activities that form organizational actions and that provide guidelines for performing actions necessary to achieving organizational goals.

- The MO is organizational structure, which is determined by the organization’s business model.

- CDs are the principles and values that form the basis of the MO and the sociability of employees between organizational levels.

- MS is the formal and informal methods used by organizational leaders to influence other members within the organization to change their behaviour to achieve organizational goals (or even to ignore the other members).

- OL is the dynamic behaviour caused by feedback between the MB, BM, MO, CDs and MS, which combine to create a process that accumulates experience and generates new guidelines.

Like any restricted representation of reality, this abstraction has its limitations. One should also note that how the variables relate to one another it is not evident. Therefore, this study briefly adopts graphic representation to analyse the possible intersections between the elements believed to shape the MM. Figure 2 shows several of the multiple relationships within an organization, which we must understand if we are to measure MM performance. To understand the dynamics represented in the chart, it is necessary to describe a number of the variables that were considered (Table 1).

OL is an element that occurs throughout the flow depicted in Figure 2. OL is understood as the ability of the work team to retain and apply organizational knowledge (i.e., lessons learned through experiencing external and internal changes in the organization), thus facilitating strategic, tacit and operational changes that enable the organization to improve its response to dynamic changes in its environment. Therefore, each link of the causal chart can be said to continuously create organizational knowledge, which is then adopted as a basis for future decisions or when developing competitive strategies for the organization.

That is, organizational knowledge is the means to transfer knowledge from generation to generation while facilitating the transmission of experience through retention.
For a better understanding of the model, one should note that the type of leadership in the organization might contribute to the construction or elimination of organizational knowledge. Thus, the influence that a leader might exert is said to depend on the level of acceptance of the MS. Figure 3 shows the relationship between the variables that affect organizational behaviour. The loop represented in the models of organizational behaviour is a balance loop, that is, a loop for self-correcting the model to restore balance to the system. The chart assumes a direct relationship between the acceptance and the influence of the MS. That is, without prior acceptance of the MS, influence on or change in the work team cannot occur. Additionally, the model describes an inverse relationship between change in team behaviour and the need to change the MS. That is, if the influence of the MS does not generate a change in the work team, one should assume the existence of organizational dissatisfaction, which implies a need to change the MS. In contrast, if the influence of the MS acts as an incentive for a change in behaviour, the need to change the MS will be little or null. The pattern is similar with respect to the relationship between the need to change the MS and the recognition of the management. The model assumes that the greater that the need to change the MS is, the lower the recognition of the management. The MB is defined by not only the MS but also the variables that define the organization’s cultural dimensions. The upper loop (green lines) is a positive feedback loop. That is, such variables reinforce or amplify what occurs in the system. The chart shows that interpersonal sensitivity and building relationships into the organization have a direct relationship, which amplifies the variable related to the acceptance of the MS.

The organizational model shown in Figure 4 is represented as a balance loop to express the interaction between the model and a number of the variables that belong to the BM, CDs and MS. The model assumes direct relationships between the following variables: recognition of management; acceptance of MS; influence of MS; effectiveness in controlling the team; alignment of the organization’s mission, vision and strategy; retention of principles, policies, values and guidelines; organizational knowledge; organizational effectiveness; customer/user satisfaction; customer/user expectations; and need for innovation. These direct relationships reflect an amplification of the behaviour of the preceding variables, whereas the variables with an inverse relationship (i.e., alignment of the organization’s mission, vision and strategy; changes in organizational structure; retention of principles, policies, values and guidelines; need to change MS; recognition of management) indicate correction or reduction regarding the behaviour of the preceding variables.

Re-examining the model, we can define it based on the relationship between other organizational models that have variables with direct and inverse relationships. However, global loops indicate that relationships generate positive feedback. Thus, the BM (Figure 5) reinforces and amplifies the behaviour of the other models in the organization. As previously mentioned, the BM can be defined as the way in which the organization generates income. Therefore, negative behaviours in any organizational model have a negative impact on the BM, which results in a decrease in income and organization growth.

To conclude, the analysed model demonstrates a holistic view of organizational MMs. Therefore, this model could be considered a useful tool to evaluate the MS that responds to the needs of the environment and the organization. Thus, this model could represent an important approach to the design and implementation of short- and long-term strategies in an organization.

In addition, the study of organizational management models from a dynamic viewpoint represents a novel approach because it analyses organizational dynamics from changing perspectives. Therefore, the systemic approach to organizational MMs could offer a framework for more detailed analysis.

5. DISCUSSION
Because of the multiple factors involved in management that are subject to changes in variables external to the organization, an organizational MM cannot be a static or deterministic concept. Therefore, this study suggests that organizational models are abstractions that respond to organizational behaviour as complex dynamic systems. They are systems that should be analysed from a holistic perspective.
### Table 1. Variables in the causal representation of a management model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influence of MS</td>
<td>The influence can be positive or negative for the organization depending on the growth the organization has achieved, the possibility the team has of establishing relationships within the organization and the management’s recognition within the organization.</td>
</tr>
<tr>
<td>Acceptance</td>
<td>The effectiveness of the work team in adopting, understanding and sharing the philosophy of the management. Therefore, the greater that the influence of the MS is, the greater the number of team members who will adopt its philosophy.</td>
</tr>
<tr>
<td>Change in behavior</td>
<td>Each type of top manager has a different management style. Therefore, each leader must adjust the organization to the new philosophy. This change only occurs if the members exhibit high acceptance of the top manager and/or MS.</td>
</tr>
<tr>
<td>Need to change MS</td>
<td>When a top manager is able to generate changes in the organization due to his or her influence, he or she demonstrates achievement of a high level of acceptance. Therefore, there would be little or no need to change the MS and/or the organization’s leader. However, the need to change the MS is related not only to the organization’s internal factors but also to external factors.</td>
</tr>
<tr>
<td>Retention of principles, policies, values and guidelines</td>
<td>This variable is related to the implementation of principles, policies, values and guidelines imposed by the top management on the organization. Therefore, the greater that the need to change the MS is, the lower the retention of principles, policies, values and guidelines by the organization’s members.</td>
</tr>
<tr>
<td>Acceptance of leadership style</td>
<td>The higher that the acceptance of the MS is, the greater the change it can generate in the organization and the greater retention of principles, policies, values and guidelines. Therefore, the type of recognition that the leader has can be analyzed.</td>
</tr>
<tr>
<td>Organizational knowledge</td>
<td>The greater that the retention of principles, policies, values and guidelines is, the greater the organizational knowledge possessed by the organization’s members.</td>
</tr>
<tr>
<td>Interpersonal sensitivity</td>
<td>This variable directly depends on the MS and the types of relationship the top management enables to be established. Therefore, interpersonal sensitivity is defined as the communication skills of the members of the work team, considering changes in the levels of hierarchy.</td>
</tr>
<tr>
<td>Building relationships into the organization</td>
<td>As the members of the team demonstrate communication skills, they build new relationships into the organization.</td>
</tr>
<tr>
<td>Teamwork effectiveness</td>
<td>The ability to control the team is directly related to the acceptance of the management. Therefore, the higher that the acceptance of the management is, the greater its control over the team, and vice versa.</td>
</tr>
<tr>
<td>Alignment of the mission, vision and strategy of the organization</td>
<td>Alignment depends on the management’s control over the work team because control guidelines are directly related to needs and the procedure required to comply with the organization’s mission, vision and strategy.</td>
</tr>
<tr>
<td>Changes in organizational structure</td>
<td>The better that the organization’s alignment is, the lower the need to make changes in the organizational structure.</td>
</tr>
<tr>
<td>Effectiveness in the organization</td>
<td>The organization’s ability to provide the customers/users with what they need, when and where they need it is directly related to the strategies and the organizational model defined to respond to a defined customer/user.</td>
</tr>
<tr>
<td>Customer/user satisfaction</td>
<td>This variable is defined based on the effectiveness of the organization in satisfying a specific need.</td>
</tr>
<tr>
<td>Customer/user expectations</td>
<td>According to the historical satisfaction of the customer/user, customers/users can modify their expected level of satisfaction (higher or lower). However, customer/user expectations can be modified through changes in the market/environment.</td>
</tr>
<tr>
<td>Need for innovation</td>
<td>This response variable is used to represent the changes that the organization must perform to satisfy new expectations, those generated within the organization and those produced by the market or the environment.</td>
</tr>
<tr>
<td>Customer loyalty/user confidence</td>
<td>The initial premise is that customers/users will be loyal to the organization as long as the organization can meet their needs. This variable affects the customer/user confidence in the organization.</td>
</tr>
<tr>
<td>Number of customers/users</td>
<td>The higher that the number of loyal customers/users is, the greater the expected increase in the number of customers/users.</td>
</tr>
<tr>
<td>Income</td>
<td>The amount of money the organization receives, which is directly related to the number of customers/users. In the case of public non-business organizations, the amount of money received can be related to the operating budget an organization is assigned.</td>
</tr>
<tr>
<td>Profit</td>
<td>Profit depends on the income and costs incurred by the organization to operate.</td>
</tr>
<tr>
<td>Operating costs</td>
<td>The costs to be incurred by the organization to be operational.</td>
</tr>
<tr>
<td>Resources</td>
<td>The amount of money to invest in the organization.</td>
</tr>
<tr>
<td>Investment</td>
<td>The amount of money invested in research, team incentives and/or process improvements.</td>
</tr>
<tr>
<td>Productivity</td>
<td>Productivity is understood as the ratio between the output of products and the input of resources into the process. It is assumed that productivity improves with greater investment in the organization. That is, the organization is able to produce more with less.</td>
</tr>
<tr>
<td>Organization growth</td>
<td>The ability to increase production levels/coverage levels to achieve the desired organization growth.</td>
</tr>
</tbody>
</table>
Figure 4. Organizational model

Figure 5. Business model
A proper conceptual means to understand and represent the complexity of these models would be system dynamics, which can represent the relationships between the different organizational factors and through simulation quantify the influence of each variable on the organizational MM. Thus, system dynamics represents a robust conceptual framework that provides tools to design models, experiment with such models and implement strategies that reflect the best combination of elements in an organization’s MM. However, although MS strongly influences the complete dynamic of such a model, MS is not the only factor that affects MM behaviour. The relationship of MS with other elements in the organization and with the environment that surrounds it results in adaptive processes that change the entire functioning of the organization. In sum, continuous feedback on organizational components from internal and external sources produces permanent changes in an organization’s response to emerging situations and consequently changes the manner of setting goals, motivating effort, coordinating activities or allocating resources. The latter is related to the need of organizations to focus on improving their output and performing activities better, whereby the MM plays a structural role. Therefore, the consideration of multiple relationships and processes of change highlights the need for better mechanisms of formulation, design, implementation and improvement with respect to MMs, for example, as in this case, to consider models as tools that facilitate the incorporation of new practices, knowledge and experience.

Future studies should analyse in detail the behaviour of different variables and their relationships in the terms adopted in this research: simulated processes for specific organizational cases, with the aim of evaluating the impact of each of our variables on the MM and their effect on organizational design and its improvement. Thus, this study could be considered a basis for systematically evaluating and determining the best alternative for managing a particular organization and using models that recognize organizational diversity as a social system.

6. REFERENCES


Šta su sistemi menadžmenta? Uticaj stila upravljanja prema sistemskoj dinamici

Guido Angello Castro-Ríos, Lorena Silvana Reyes-Rubiano, Ángela Lucía Noguera-Hidalgo

Apstrakt

Modeli organizacionog upravljanja uključuju različite perspektive, kao što su stil upravljanja, kulturne dimenzije, poslovni modeli, organizacioni modeli, modeli ponašanja i organizaciona učenja. Svaka od ovih perspektiva ima efekat i time ima uticaja na menadžment. Shodno tome, postaje teško odrediti koja od ovih perspektiva je najznačajnija za model upravljanja. Na primer, stil upravljanja se može smatrati varijablom koja ima veliki uticaj na organizaciju, jer utiče na definisanje organizacionih ciljeva dok koordiniše i kontrolis~e resurse. Stoga ova studija predstavlja predlog za karakterizaciju upravljačkih modela predstavljenih u obliku uzročne karte što se može smatrati matričnim okvirom za model organizacionog upravljanja. Da bi se izgradila ova matrica, uspostavljeni su mogući odnosi između svakog od prethodno predloženih sistema za koje se smatra da predstavljaju organizacije.

Ključne reči: Dinamika poslovanja, stilovi liderstva, modeli upravljanja, stilovi upravljanja