Second-Order Management
How Second-Order Concepts Contribute to Solutions within Complex Environments

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ABSTRACT[1]

In our daily practice as management consultants we observe disorientation, misconceptions, and open questions about the suitability, limitations, and/or benefits of novel management approaches. Certainly, there is a strong demand for up-to-date management practices, though at the same time there exist the dangers of misuse and misleading expectations, not necessarily from malice but rather, according to our experience, from lack of self-observation. In this context, second-order concepts are revealed to be useful and solution-oriented.

Even though in literature we can find approaches to distinguish first-order cybernetics (FOC) from second-order cybernetics (SOC), none of those focus on organizations as social living systems or the organization's basic operation: decision making.

Consequently, in this paper we discuss the essential ideas of SOC-based management methods and tools, focusing on the dissimilarities of posture and potential performance of these concepts. To contrast them, we compare Design Thinking with Comparative Systemic (CS) Management, two concepts that use SOC ideas, with two well-known FOC management approaches: the Plan-Do-Check-Act-Cycle (PDCA Cycle) and Systems Dynamics.

Finally, we present the fundamental differences between FOC and SOC based decision making in management. Basically, we differentiate between concepts based on FOC or SOC by means of three modes of action: how they propose to coordinate (temporal dimension), structure (factual dimension), or legitimate (social dimension) decisions.

Keywords: Second-Order Management, Social System Theory, Solution-Focused, Resource-Based Management, Comparative-Systemic Consulting

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1. INTRODUCTION

Ironically, in a world with plenty of access to almost any kind of data, most key organizational decisions are based on a statistical shortage. As a result of the latest developments, e.g. the ascension of the Internet, smartphones, and their applications, as well the rising pace of environmental change, tried-and-true strategies no longer have the expected effects. Changes are taking place so fast that it's almost impossible to forecast what will happen next. Managers have to make decisions for unprecedented situations. Thus, organizations now demand novel management methods in order to survive in a variety-rich environment. Agile, the current buzzword in the organizational world, is a good example of a concept comprising tactics aimed at assuring faster, more flexible, and effective ways to manage complex tasks [1].

The work of W. Ross Ashby (1903-1972), a British cybernetician, contributed much to the understanding of how systems with high levels of variety operate in changing environments. Homeostasis, the phenomenon of maintaining critical variables within tightly defined limits, is one of the mechanisms Ashby used to describe how best to achieve stability. "Only variety can absorb variety," he said [2]. Until recently, organizations have often coped with environmental challenges by reducing the variety of production conditions they were required to manage. Process standardization and mass production are examples of efforts to reduce variety. For decades, together with similar strategies, organizational analysis, modeling, and planning have been integrated into management practices and worked well for organizations [3]. Organizations are built to coordinate communication, decisions, and processes. In their essence, they seek stability, schedules, and structures [4]. As such, organizations have always required reliable and accessible data for planning. Variety is also a measure of how distinct different views are. "An element's [e.g. a collaborator's] perspective tells us what the system looks like from its point of view" [5].

Therefore, distinct points of view with regard to complexity and variety within an organization are helpful

in order to successfully respond to complexities outside of the organization. Organizations and their networks inevitably shift from controllable entities to social systems—a concept that also includes the constructivist idea that observers change an object simply by observing it differently. Thus, SOC (observe observation—or "investigation which is based on self-referentiality"[6]) has become more relevant for management as leaders have employed more systemic and agile management tools in their decision making.

On the other hand, FOC-based ideas are strongly connected to organizational practice; they seem to make complex situations simpler.

We usually call successful simplifications "technology." [7] In fact, our society is so successful in this area that we are constantly tempted to perceive problems as "technical" and to look for simplifications that work. However, the prerequisite for that is for causal factors to be isolated. Whenever it is possible to connect supposed causes in such a way that only certain effects are achieved and neither disturbances nor unwanted side effects come into play, organizations tend to try technical solutions [8]. In cases where such connections are not possible, this kind of simplification tends to become less useful. In practice, when a technical standard process fails in social systems such as organizations, the failure is then usually labeled an "exception" and the stated reason for its failure is often "lack of data security." Specialists working with complex living systems call such events "real life" or "autopoiesis," where the unpredictable happens and individuals enjoy free will.

Thus, in situations with high levels of complexity and a shortage of data, appropriate SOC concepts may help organizations to progress. Nowadays, organizations act sometimes as if they are "lost in translation" when it comes to choosing a method for handling their challenges. Management still often fails to understand which style is best suited to deliver high security for common results in living systems.

This paper aims to make it possible for observers to distinguish the respective forms of FOC- and SOC-based management concepts and thereby clarify which can help in which context.

2. IMAGES OF ORGANIZATION FROM FOC AND SOC VIEWPOINTS

In his book "Images of Organization," Gareth Morgan describes the different perspectives we can adopt when dealing with organizations. He explains some of the consequences of our assumptions. For example, organizations, among other possible interpretations, can be considered as living systems with their own dynamics, constantly subject to change. Following this, we tend to focus on understanding the logic of change and dynamic processes in organizations as well as their environments. Therefore, the autopoietic, biological system and the cybernetic model of thinking open different ways for exploring organizations [9].

Morgan proceeds on the assumption that, according to a cybernetic model, organizations can be understood as multicausal and networked systems with diverse positive and negative feedback loops [10]. Based on this view, it is possible to replace "linear-causal" thinking with networked and circular contexts in order to be able to comprehend the dynamics of change in complex systems.

Systems Thinking and System Dynamics (SD) shall be considered here as superordinate concepts that comprise a range of methodologies and approaches endeavoring to analyze, understand and solve problems of complex self-regulating feedback systems. As a discipline, SD "emerged in the late 1950s, as an attempt to address such transitional, long-term policy issues, both in the public and corporate domain. The first application area of the methodology was the strategic management of industrial problems" [11].

The zenith of the popularity and importance of systems thinking/dynamics for work with organizations was the 1990 publication of Peter Senges' book, "The Fifth Discipline."[12] There, Senge described several types of "system archetypes" (feedback models or systems. Cf. Figure 2 for an example) that could help organizations to learn more efficiently.

Even before World War II, however, methods for more effective management, also based on feedback loops, such as the PDCA Cycle (Plan, Do, Check, Act), were successfully implemented in organizations.

Behind those concepts, there was an implicit assumption that the world we observe could be fully understood and mastered through the right rules and policies. For this paper, that assumption is one of the characteristics we want to use to draw the line between the FOC- and SOC-based concepts.

Yet, the complexity of economic and social development had evolved to such a point that traditional predictive tools gradually failed. Hence, more flexible ways of working and forms of organization were sought and developed, and which have proved capable of providing stability to organizations despite their—or the market's—greater complexity.

Organization, says the German systems theorist Dirk Baecker in his book "Organisation als System," is only possible if the organization is free to deal with knowledge in a highly selective way, without taking note of data or drawing conclusions from information. Only then can the

organization decide which knowledge to refer to, which data to process, and from which information to draw its conclusions. Those decisions are the ones that make the organization an *organization* [13]. The communication of decisions, according to social Systems Theory, is the basic operation that defines a system as an organization [14].

As a response to the threat of complexity and the necessity of organizations to have their own freedom to process knowledge, novel management tools have been developed. For those developments, the image of organizations as biological or autopoietic systems offers a way of thinking that can provide better insight into the processes of shaping an organization's life. Because notions of causality are often insufficient to explain the dynamics of a complex system, observing the capacity of systems to create and maintain themselves can lead to useful perceptions. For that reason, we call the coordinated process leading to joint results in living systems "co-creation."

To illustrate the differences and similarities between management tools, and to offer a contrast to the aforementioned systems dynamics and PDCA Cycle, we chose to introduce the following two methodologies based on SOC ideas: (a) Design Thinking, as a currently popular project management tool, and (b) the CS Work, also called Distinction-Based Systemic Work, developed and emerging as a promising management tool in the German-speaking world.

The next two sections address the brief description of the aforementioned four management tools. Subsequently we will propose a possible approach to contextualizing and differentiating them in order to be able to decide which is the most useful, depending on the actual needs of an organization.

3. PDCA CYCLE AND SYSTEM DYNAMICS

The work of Frederick Winslow Taylor, consolidated in his 1911 treatise, "The Principles of Scientific Management," still influences business economists. In the course of efforts to make business more productive using scientific methods, many models have been developed. Taylor attempted to optimize productivity by introducing the strict separation of planning, decision making and execution of the production process. Four decades later, W. Edwards Deming's work in Quality Management offered a tested and proven model that enabled systematic work in management, the Deming PDCA Cycle—for Plan, Do, Check, Act (1951). The basic idea of the cycle model was to build a sense of continuous improvement instead of a linear notion of progress with the goal at the finish line [15].

Deming's model inspired Masaaki Imai and Kaoru Ishikawa, Japanese Quality Management experts, to elaborate on the PDCA Cycle. They redefined the PDCA Cycle to include some instructions for each phase of the model. Today, in daily management practice, the model is used basically as it is pictured in Figure 1 (beginning with "Plan").

Systems dynamics (SD), on the other hand, is understood as an important tool for comprehending complexity [16]. "You can only understand the system of a rainstorm by contemplating the whole, not any individual part of the pattern" (P. Senge) [17]

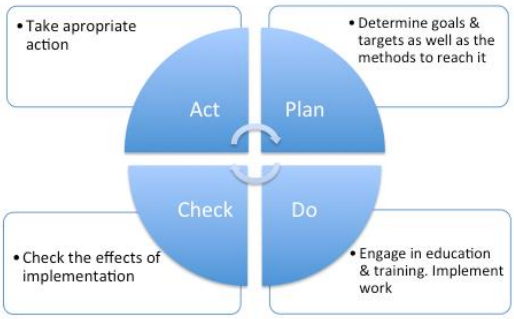

***Figure 1**: PDCA Cycle. Source: own diagram based on R. Moen, 2009[18]*

As Peter Senge entered graduate school at MIT, he was already interested in the work of Jay Forrester's SD research group. Later on, Senge joined the group. His work with business leaders and organizations was a further motivation for him to devise a managerial concept that could be useful for companies [19].

Senge's model assumes that systemic feedback structures can influence behavior. Those structures exist regardless of personalities or events. They create the conditions whereby some events become likely. "But it is very important to understand that when we use the term 'systemic structure,'" he says, "we do not just mean structure outside the individual. The nature of structure in human systems is subtle because we are part of the structure" [20]. Therefore, according to Senge, we also have the power to change them, by employing feedback structures.

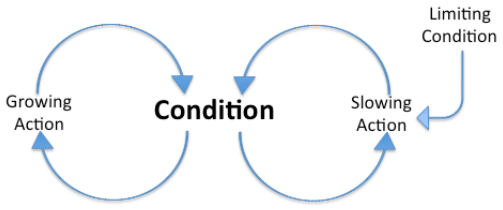

***Figure 2**: Limits to Growth. Example of a feedback process representing a common structure in real life situations. Source: own diagram based on P. Senge 2006 [21]*

Senge describes some of the structures or "patterns that

control events" [22] in several system archetypes, aiming to make the recognition of such structures in real life easier and faster. There one can find the structures "Balancing Process with Delay," "Limits to Growth," "Shifting the Burden," and so on. The picture above (Fig. 2) shows an example of such a structure.

4. DESIGN THINKING AND CS WORK

Agile management methods and frameworks such as Design Thinking are in vogue. Their enthusiasts claim that agile methods provide quicker feedback from the market to the producers, and that they enable faster prototyping in order to obtain the most useful result in the shortest time [23]. Those are management method virtues that companies are currently looking for, probably hoping that they can provide the support that organizations need in order to be able to cope with modern challenges, such as the increasing variety.

Basically, Design Thinking is a methodology, which includes a five-stage process with several feedback loops providing the potential for a team to be flexible, customer-oriented, and creative. The five stages are as follows: (1) Empathize, (2) Define, (3) Ideate, (4) Prototype, and (5) Test [24].

Ad (1): The first stage of the process is to obtain an empathic understanding of the problem. In this phase, the Design Thinker will immerse them in the physical environment with the problem that they are trying to solve, in order gain a deeper understanding of the issues involved.

Ad (2): By this time all the information collected in Stage 1 will be analyzed in order to define the core problems identified by the team up to that point. However, the definition of the problem should occur in a human-centered manner, from the point of view of the product users.

Ad (3): Designers are now ready to start generating ideas.

Ad (4): The aim at this stage is to produce several inexpensive versions of the product, so that the team can investigate the solutions they generated in the previous stage. At this point it is still possible to return to Stage 3.

Ad (5): The results generated during this final stage "are often used to *redefine* one or more problems and expand the *understanding* of the users, the conditions of use, how people think, behave, and feel, and to empathize" [25]. This stage also provides feedback loops to Stage 2.

Aside from Design Thinking as a project management tool, the Comparative Systemic (CS) tools for management are more wide-ranging [26]. This approach offers a distinction-based, solution-focused method to deal with complex situations, especially if one has to cope with a lack of data, information, or knowledge. These methods/tools focus on resources, useful differences, and results,[27] instead of problems and outdated analyses, in order to find sustainable solutions for living systems. Most of the CS-tools work based on questions that develop useful differences. They support a person or a system in order to bolster their skills for self-organization and autonomy and generate individual solutions that consider the whole context [28]. The methods work mostly by shifting the attention of a person and/or system from

…analyzing the past to creating a state full of resources to serve as a basis for fresh solutions;
…spending energy for acquiring new resources to recognizing and using existing resources;
…utopian targets to realistic, concrete next steps;
…data based content/knowledge to finding relevant differences;
…personal attributions or judgments to considering and including the whole context;
…plans to actually advancing toward the desired goal(s) step-by-step, while able and flexible enough to include context alterations.

There are numerous tools to improve the ability to work with complex systems in a way that embraces all of their complexity, instead of forcibly mapping this complexity onto a simplified model that fails as soon as reality approaches circumstances deviating from the assumed normality (exceptions). They may range from questions that build useful differences all the way to communication techniques, task clearing techniques, structural constellation work, et al.

In organizations, these methods and tools can be put into practice by teams, or any single manager willing to do so, independent of the organizational culture or the education of the coworkers. Other than with methods such as Design Thinking, CS tools do not require a whole trained team in order to obtain results. Using CS tools, managers can make decisions easier and more securely, because they are based on significant differences between data instead of being dependent on individual content or data security (second instead of first-order approach). The fact that CS tools can be used independently but still have the potential to change a whole system offers leaders new possibilities in their capacity to act.

5. DIFFERENCES

Karl H. Müller performed a highly detailed analysis differentiating between first- and second-order science. In his book "Second-order Science: The Revolution of Scientific Structures," he presented a wide range of perspectives on the classification and differentiation of both concepts.[29] The exercise of reflecting on significant differences helps us to recognize situations

where one or the other science could be useful.

Müller distinguished between the two sciences as follows: "First-order science: the science of exploring the world. Second-order science: the science of reflecting on these [sic] explorations" [30]

In this respect, methods like the PDCA Cycle and Systems Thinking can be placed in the frame of first-order methods, because they either assume that the events under study are predictable/projectable (and therefore explorable) or aim to understand the world better (exploring rules and/or feedback structures).

On the other hand, methods like Design Thinking are more geared toward reflection on the reality of others—one of its core activities is to *empathize* with the user rather than necessarily understand them—which rather corresponds to second-order thinking. CS tools do not need to work with any particular analysis in order to lead to useful results. Based on the available resources, their approach is to observe relevant differences by using syntactic patterns. Thus, by using CS tools the moderator does not even need to understand the content of a situation in order to be relevant. It is sufficient to understand what the key differences are in order to advance the client's situation.

Having decisions as the fundamental operation of an organizational system [31], we will now focus on differences in how the aforementioned management methods arrive at decisions in organizations. Figure 3 shows differences between the FOC and SOC approaches in terms of the continuous decision-making processes of organizations. It compares the two in three dimensions: temporal (red), factual (blue), and social (green) [32].

Temporal Dimension: In this dimension, FOC-based concepts concentrate on planning; decisions are made with a given, defined target. By contrast, SOC-based decision-making processes schedule their tasks during a co-creation process, which stays attentive to the permanently evolving context throughout the process in which the decisions take place.

Social Dimension: In order to build trust and legitimate their decisions, organizations using FOC-based concepts usually rely on analysis, data and explicit knowledge, whereas SOC-based concepts generate trust via relationship security and enabling genuine encounters between people.

F**actual dimension:** Here FOC-based concepts rely on the systematic execution of documented tasks and processes. SOC-based management concepts obtain their structural security from syntactic patterns and their relationship structures. Syntax here is the relationship structure between communication elements.

Figure 3 may be considered as an orientation aid for decision makers. It should enable:

- a quick differentiation between FOC- and SOC-based methods;
- recognition of which method is appropriate to use in what context; and
- increased awareness of managers for the spectrum of opportunities within this scope of approaches.

Due to the focus of FOC-based management methods on exploring (analyzing, explaining, understanding) situations before taking action, useful data and information are crucial assets for them to function. Without proper data those models could fail in their aim to provide reliable solutions for organizations.

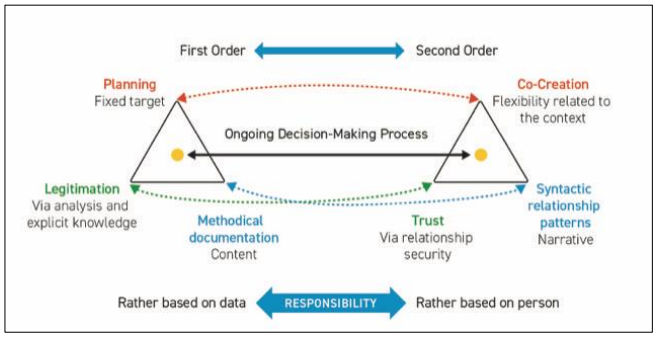

***Figure 3**: The different backgrounds of decision-making processes viewed from first-order and second-order management perspectives.*

In contrast, SOC-based models generally need to shift attention to the decision maker's own responsibility. Useful differences have a greater impact on future solutions than does content knowledge from the past. On this basis, CS methods are effective even without any previous knowledge of data or facts. ("One can know what is better without knowing what is good" (S. de Shazer) [33]). Hence, decisions can take place based on useful differences.

Additionally, second-order methods have other characteristics in common. They all base their models and conceptions upon the three elements of the "minimal configuration for observing systems": "first, the observers; second, the language they use; and third, the society [the context] they form by the use of their language." [34]

6. CONCLUSION

According to Systems Theory, organizations have all they need to organize complexity. They can unite and organize people around tasks. They can communicate with other systems (according to Luhmann, they are the only type of

social system which can directly communicate with other social systems [35]). They can produce variety (also because they consist of different people with various viewpoints). They can explain and reduce complexity.

Today, we have plenty of tools and methods to act within complex situations. Complex systems can be steered toward common targets. The contemporary successful toolkit used by most of today's organizations differs from the one that used to work in a less complex environment. It is a toolkit based also on second-order science understanding.

Most of the time we are focused on mastering the world in the logic of big data and algorithms. But when it comes to living, complex systems like organizations struggle with the limitations of that approach. In the best cases, organizations are finding ways to work within that exploding complexity. The world of living systems can be mastered, but the interventions leading a team to its targets in the context of today's complexity are different from what works for a trivial system (analysis and understanding the cause). The relevant result of a useful intervention in a living system comes from finding the difference between moving on and achieving a state of "*better*." Therefore, it demands an entirely different approach, logic and understanding of the working process, compared to solution-finding in technical, trivial systems. If we focus on useful differences, we take an enormous shortcut (because we do not need analysis), gain security for results, and include the whole context of the complexity. The deeper understanding of the fundamental differences of FOC and SOC concepts shall help organizations with the production of variety as a means of improving their performance in complex situations.

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