

INTERACTION OF SCHEMATA AND ROUTINES – THE MISSING LINK BETWEEN THEORY AND PRACTICE OF ORGANIZATIONAL DYNAMICS

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Purpose: identification of effective mechanisms of organizational adaptation under high uncertainty in light of the assumptions of the complexity theory.

Design/methodology/approach: The approach adopted involves literature review, including an interdisciplinary ground of complexity theory.

Findings: The content of the article includes the conceptualization of patterns as schemata at the level of an organization, recognition of the relationship between schemata and organizational routines as an area subject to shaping, and identification of the dynamics of routines depending on the degrees of uncertainty.

Research limitations/implications: The results of the study are presented in the form of theoretical framework enabling further testing.

Originality/value: Conceptualization of the contextual nature of routines depending on the degree of uncertainty as a mechanism of change and stability in the organization.

Keywords: uncertainty, schema, routines, complexity.

Category of the paper: Conceptual paper.

1. Introduction

The contemporary business environment characterized by uncertainty requires an organization to respond adaptively to threats and opportunities arising from extreme, discontinuous and thus unique phenomena. In such circumstances, strategies based on accurate foresight that consist in selecting the right position in a sector or even configuring the right resources fail. The reasons for meeting the necessary conditions for the strategies previously regarded as good are related precisely to the limitations in predicting the future. Foresight is not possible if the future is of undetermined, or open-ended, nature, that is when causes (actions) may lead to the infinite number of effects (results) (Stacey, 1996). Effective foresight is possible when events are in some sense a repetition of those from the past, rather than with regard to

completely new events. The purpose of foresight is to lay the groundwork for reigning over (controlling) the organization's development paths. Foreseeing events makes it possible to competently prepare for them, and even shape what is to happen. In the face of open-ended change (in case of indeterminate future), it is only possible to participate in emerging events and accept their results. Unpredictability, and therefore the lack of possibility of control, reaches intellectual aspects as well, limiting the possibility of rational behavior. Open-endedness naturally leads to anxiety, it touches emotional aspects and, in this sense, causes a lack of rationality (Bratnicki, 2020).

The crises experienced and the resulting uncertainty leads us to reflect on the possibilities of effective organizational adaptation, both in terms of management theory (in particular, strategic management) and business practice. In own studies, whose purpose was to identify effective mechanisms of organization's adaptation under high uncertainty, a relatively new approach in management was used, that is complexity theories.

One of the cognitively attractive aspects of the approach adopted in the author's own study is that it does not make existing knowledge outdated, but rather makes its boundaries explicit (Rokita, Dziubińska 2017; Morin, 2007). These boundaries concern also the carried-out considerations of adaptive mechanisms with regard to organizational dynamics in order and unordered situations. The former ones are based on the body of management literature in its mainstream, whereas the conceptualization of the latter uses the theoretical basis within complex adaptive systems (CAS). These ontologically different states require a fundamentally different approach towards diagnosing phenomena and interventions in the organization.

A significant term within CAS are so-called schemata that have also been used in own considerations of generative mechanisms responsible for organizational adaptation under high uncertainty. Schemas are knowledge structures that organize past and future experience needed to act in the present. It can be said "schemata act as data reduction devices enabling individuals to negotiate a complex and confusing world" (Balogun, Johnson, 2004, p. 525). The term "schemata" refers to the level of individual people, however, it is justified to talk about organizational schemas created when people forming an organization share individual schemata with one another (Bartunek, 1984). Organizational schemas can affect organizations' behavior since they are shared mental representations of what organizations mean in terms of beliefs, values, and attitudes (Harris, 1994; Wood, Stoltz, Van Ness, Taylor, 2018). Routines, which constitute part of the resource theory in management science (Orlikowski, 2000, Feldman, 2004), have been adopted as the manifestation of schemata in the organizational context. Organizational routines are understood here as repetitive, recognizable patterns of interdependent actions carried out by multiple actors (Feldman, Petland, 2003). Schemas and routines are related though not unambiguous concepts (Rerup, Feldman, 2011). Considering both categories makes it possible to obtain better theoretical coherence in the concept of the organization's response to the conditions of uncertainty, and to combine considerations at the theoretical level with specific empirical context.

2. Determinants of order and unordered systems as a context for decision-making

A relatively new and cognitively interesting perspective, especially for the study of phenomena associated with uncertainty, is a relatively new approach in management based on complexity science (Rokita, Dziubińska, 2016). The analysis of the phenomena in this perspective requires distinguishing three different ontologies, i.e., order, complex and chaotic (Axelrod, Cohen 1999; Gell-Mann, 2022). The state of the system referred to as order, refers to a situation in which the relationships between causes and effects are discoverable and empirically verifiable. Consequently, it is possible to create prescriptive and predictive models and to design interventions leading to the assumed purposes. Hence, it follows that understanding the causal relationships that existed in the past behavior of the system makes it possible to define so-called best practice for future behavior. Therefore, it is possible to identify the right or even perfect courses of action. It may also be that due to certain epistemological limitations, the relationships between causes and effects may not be obvious or self-evident. Thus, discovering them may require a more complicated procedure – collecting relevant data, subjecting them to expert analysis and, based on that, selecting measures in line with good practice with well-established experience.

The complex and chaotic state of the system can be referred to as unordered. However, it should be noted here that this does not mean a complete lack of order but rather order of a different nature (Morin 2007). Each attempt to learn about the system simultaneously means its change – each diagnosis is an intervention in which we shape or create patterns (Gell-Mann, 2002). To put it in a more precise way, complex adaptive systems are created by agents that remain in constant interaction. The nature of agents and the amount of interaction mean that the relationships between causes and effects, although they exist, cannot be clearly identified *ex ante* (consistent patterns can be identified retrospectively). The states of the system are not subject to prediction, but their anticipation is possible (McKelvey, Boisot, 2009). Learning about the system consists in sensing current and potential patterns. Intervention is necessary for orientation which patterns may lead to desired results (and which may not). It is an attempt to figure out which patterns are possible in the first place, and, among them, which will be sustainable in a certain time frame.

Even different conditions are created by the situation of chaos in which cause and effect relationships do not exist (in none of the conventional meanings of the notion). It should be noted that due to the natural proclivity towards self-organization, in social systems it is always a transitional period. There is always the potential for order in chaos, although it can be difficult to notice, and even if this potential is recognized, taking action to realize it most frequently entails a great deal of mental strain. However, under conditions of chaos, even a small intervention holds the potential to trigger commensurately large results. The transformation of

a system from a state of chaos to other states can occur in two ways, that is on the basis of an imposed order (a single-point attractor transfers the system into the order domain) or on the basis of conditions that make it possible for patterns to emerge (various possibilities emerge that coevolve to shift the system into a complex state).

With regard to systems created by humans, the basis for operation in the three ontologically different states is summarized by Snowden with the following heuristics (Kurtz, Snowden, 2003):

- order (visible/hidden): sense – categorize/analyze – respond,
- complex: probe – sense – respond,
- chaotic: act – sense – respond.

In order domain, the key issue is appropriate categorization/analysis, which makes it possible to select a proper (grounded in experience) scheme for the current situation – in this sense it can be said that “the model precedes the action” (Boist, McKelvey, 2009; Snowden, Rancati, 2021). In unorder (complex and chaotic) domains the acquisition of valid (in accordance with the adopted criterion) data precedes trial activities, or even taking action with no basis – the action serves as the basis for modification or even creation of new frameworks of reference. A significant boundary runs between the domains of order and unorder, making it possible to distinguish sense-making frameworks and categorization frameworks as a basis for decision-making under uncertainty (Kurtz, Snowden). The difference lies in the nature of the created representations of the system (Plotkin, 1993), or “schemata” understood as descriptions of perceived “regularities” that result in an “effectively complex,” adaptive response of “viable living entities” (Gell-Mann, p. 13).

3. Individual and organizational schemata

Definition of schemata

Schemata are an interdisciplinary category, addressed and studied by researchers from various disciplines. At the individual level, the issue was referred to as behavioral scripts, evaluative rules, decision-making or operating rules, or mental models (Baddeley, 1990). Schemata are also sometimes called (especially interchangeably with mental models) paradigms and cognitive maps (Kuhn, 2009; Huff, 1990). Schemata are, at their essence, complex structures of mental representations (Goldberg, 2011), either innate or acquired through experience and socialization (Zerubavel, 1997). Individuals’ world experiences are understood through them (DiMaggio, 1997; Hunzaker, Valentino, 2019), since they organize the knowledge about the world (Strauss, Quinn, 1997). Schemata (or mental models, evaluative rules, action theory, operational rules) can take a conscious form or be outside the level of

consciousness and be used automatically (either as a result of trained high competences or as highly defensive behavior). Most of these rules are outside the realm of consciousness, therefore conclusions about them are made on the basis of the behaviors observed by the observer.

The importance assigned to events, things and experiences refers to how an agent interprets them, attributing quality, and significance to experiencing them. The perceived sense in the form of patterns is always incomplete to a certain extent, specific examples of the same phenomena may differ from one another, but the agent reads into them sufficient similarity to consider them consistent with recognizable categories (Wittgenstein, 1958). By experiencing patterns, the agents “decide” themselves what they take into account and what they do not (Drew, Vo, Wolfe, 2013). The pattern is a result of own expectations and judgements about what is important (Gell-Mann, 2002) as well as motivation or intent (Dennett, 1996). To put it differently, “it seems that whatever we perceive is organized into patterns for which we the perceivers are largely responsible (...). As perceivers we select from all the stimuli falling on our senses only those which interest us, and our interests are governed by a pattern-making tendency, sometimes called schema. In a chaos of shifting impressions each of us constructs a stable world in which objects have recognizable shapes, are located in depth and have permanence (...). As time goes on and the experience builds up, we make greater investments in our systems of labels. So, a conservative bias is built in. It gives us confidence” (Douglas, 1966, as cited in Snowden, 2005, p. 6). In the broadest terms, schemata are the ways in which we make sense of the world that surrounds us, by interpreting and assigning sense to events and by selecting and evaluating information.

Schemata (behavioral scripts) are expressed in the form of decision making or operational rules, which in turn transform the sense extracted from information into actions. Therefore, agents’ schemas are composed of structures of rules that individuals refer to when making a choice. An agent can make two types of choice: evaluation, i.e., choice and information interpretation, and operation, i.e., acting on the basis of the sense of this information. Within the framework of the agent’s structure Stacey enumerates occurring simultaneously, although in opposition to each other (paradoxes), key features, such as inspiration and anxiety; conformity and individualism, leadership and followership; participating and observing (Stacey, 1996, pp. 34-35)¹. Agents’ schemas contain rules referring not only to what has already happened but also to what could have happened – formulation of expectations and making forecasts (Stacey, 1996, p. 32). Schemas responsible for operation include rules that are shared with other agents.

Schemata are embedded in individual cognitive structures, however, inside the organization collective processes of socialization and information exchange take place in which the sense is shared. Therefore, it is justified to talk about shared meaning schemas, since they

¹ Schemas can be individual (change through learning) and shared (evolve through interaction and dialogue); reactive and anticipatory (Stacey, 1996, p. 33).

simultaneously reside in individuals as a cognitive trait and the collective as reference frames (Wood et al., 2018). Collectively, the process of interaction between agents inevitably leads to interpretation to be shared, fostering the creation of systems of meaning. Each action undertaken by the agent impacts on other agents inducing them to respond and thus causing feedback effect on the agent. This process is both social, because it operates in groups, and cognitive and affective, occurring reflexively from the sense-making reality. Schemas can be shared in the form of bureaucracy rules or expressed as shared culture of the entire organization or a group being part of it. Valid and timely schemas economize on agent and organization scarce resources.

Organizational schemas: espoused and enacted

Organizational schemas have been mainly studied as cognitive ideas created to define reality and thus set a common ground for organization members to operate on. When studying the relationship between organizational schemas and routines, Rerup and Feldman (2011, p. 578) defined organizational schemata as shared assumptions (Balogun, Johnson, 2004), values (Gioia, Thomas, Clark, Chittipeddi, 1994), and frames of reference (Bartunek, 1984) that give meaning to everyday activities and guide how organization members think and act (Elsbach, Barr, Hargadon, 2005). As can be seen from this definition, two dimensions of schemata are distinguished, i.e., espoused and enacted. Although the dimensions remain in inseparable interaction the enacted schemata may coincide to varying degrees with the intents embedded in the espoused schemata (Mintzberg, Watres, 1985), what is more, changes in one do not have to translate into changes in the other. Other terms for espoused interpretative schema are “in-progress frame of reference (Isabella, 1990, p. 17), “initial schema” (Labianca, Grey, Barss, 2000, p. 240) and “new (expected)” schemata (Balogun, Johnson, 2004, p. 544). Schemata are articulated (revealed) by managers especially in problematic situations or in the face of challenges. Enacted schemas are expressed through observable actions and this “enacting” of events or structures (Weick, 2001) is their “bringing into existence and setting in motion” (Rerup, Feldman, 2011, p. 579). They constitute the transformation of intents into patterns of enacted cognition and actions. Enactment of schemas leads to their adaptation (Maitlis, Sonenshein, 2010), actions can also be conditioned by schemas and can lead to their revision. Hence, to date, the relationship between espoused and enacted schemata has been studied from two distinct perspectives. The first emerged from the problem of actions (Bartunek, 1984; Labianca et al., 2000), and the other from so-called sense-giving, i.e., “the process of attempting to influence the sensemaking and meaning construction of others toward a preferred redefinition of organizational reality” (Gioia, Chittipeddi, 1991, p. 442, as cited in Rerup, Feldman, 2011, p. 579).

4. Routines as observable manifestation of schemas in an organization

In the research on organizational dynamics organizational schemata were linked to routines (Balogun, Johnson, 2005; Rerup, Feldman, 2011). The introduction of the term organizational routines to the literature is attributed to Stene who regarded them as basic mechanisms for achieving organizational intents (Stene, 1940, p. 1129). Since then, the research on routines have resulted in various metaphors, such as individual habits; programs, heuristics or scripts, or genes of the organization (Feldman, Pentland, 2003). Cognitive effectiveness and complexity reduction were attributed to organizational routines (March, Simon, 1958; Simon, 1981; Cohen, Bacdayan, 1994). Routines were also defined as a result of organizational learning in the adaptation process of the organization and environment (Argote, 2013). Flexible use of routines is the core of improving organizational task execution (Canales, 2011; Howard-Grenville, 2005; Turner, Rindova, 2012), and their use is inherently grounded on action, surprise and creativity. Routines account for both organizational change and stability (Feldman, Pentland, 2003). They are recognizable patterns, but at the same time they constitute part of messy, unpredictable situated actions “for an established routine, the natural fluctuation of its surrounding environment guarantees that each performance is different, and yet, ... it is ‘the same’ (Cohen, 2007, p. 782).

Complex dynamics of routines results from a generative mechanism that consists in the interaction of two of their aspects, i.e., the ostensive and the performative (Feldman, Pentland, 2003; Pentland, Feldman 2005). The ostensive aspect is an abstract, generalized idea of routine. The ostensive aspect may take a codified form of standard procedure or exist as an unquestioned, taken for granted standard. The ostensive aspect may also contain a significant tacit component embedded in the procedural knowledge (Cohen, Bacdayan, 1994). However, it is worth noting that it also contains subjective understanding of various participants, which, as each social resource, is unequally available (Berger, Luckmann, 1996). Feldman and Pentland conceptualize it on the basis of the “ostensive definition,” according to which the said ostensive is constituted of specific instantiations that observers or participants experience as belonging together (Latour, 1984; Wittgenstein, 1958). The sense embedded in ostensive patterns is of emergent nature and depends on the point of view of those who experience/participate in action. Therefore, there are many ostensive aspects, they are diverse and none of the routines is a single entity (Pentland, Feldman, 2005, p. 797). The performative aspect consists of actions in the particular context of the people undertaking them, at a specific time and place. To describe the ways in which participants construct routines of potential opportunities, Pentland and Reuter (1994) use the term “effortful accomplishments”. Even in the case of thoughtless, habitual actions under highly constrictive conditions, participants perform self-evaluative reflection (Giddens, 1984). Then an interpretation of actions to make sense of what people are doing takes place and although choices about how to proceed may

seem automatic or thoughtless, there is always the possibility of resisting expectations and acting differently (Giddens, 1984; Orlikowski, 2000).

Taking into consideration these two dimensions of routines is not by its nature new and is, for example, analogous to the division between “know how” (ostensive part) and “know that” (performative part) (Ryle, 2000). The ostensive aspect in the language of the theory of practice (Giddens, 1984; Bourdieu, 1995) is the structure of routine, whereas agency lies in the performative dimension. Their interaction is a necessary internal condition for routine to exist, although routines are open systems and are also influenced by external tensions (MacIntyre, 2007), including crises (Gersick, Hackman, 1990). Taking into consideration both aspects of routines simultaneously (as opposed to obscuring one of them) helps to better understand the nature of dynamics - the transition of organizations between various states (ordered - complex - chaotic) - the play between stability and change.

5. Interaction between schemas and routines

Interactions Both organizational schemata and routines are referred to as abstract patterns of an emergent nature that arise through actions. There is constitutive feedback between the espoused and enacted aspects of a schema. As in the case of routines, the performative aspects create and recreate the ostensive aspects which then constrain and enable the performative aspects. These primary, generative mechanisms are open, which makes their (co)evolution possible. This openness also provides a link between schemas and routines. Rerup and Feldman set schemata and routines in the “realm of action” (Barley, 1986) and indicate how observable actions associate the ostensive aspects of routine with enacted organizational schemata (Rerup, Feldman, 2011) - figure 1. At the same time, the authors point out two basic differences between schemata and routines, which they locate at different levels of analysis. Ostensive patterns of routines are constituted by actions aimed at specific tasks, in relation to which the routine (or part of it) was constructed. On the other hand, enacted patterns of organizational schemas are formed by many different types of actions that take place in the organization, including those that form a pattern of routines (Rerup, Feldman, 2011, p. 580).

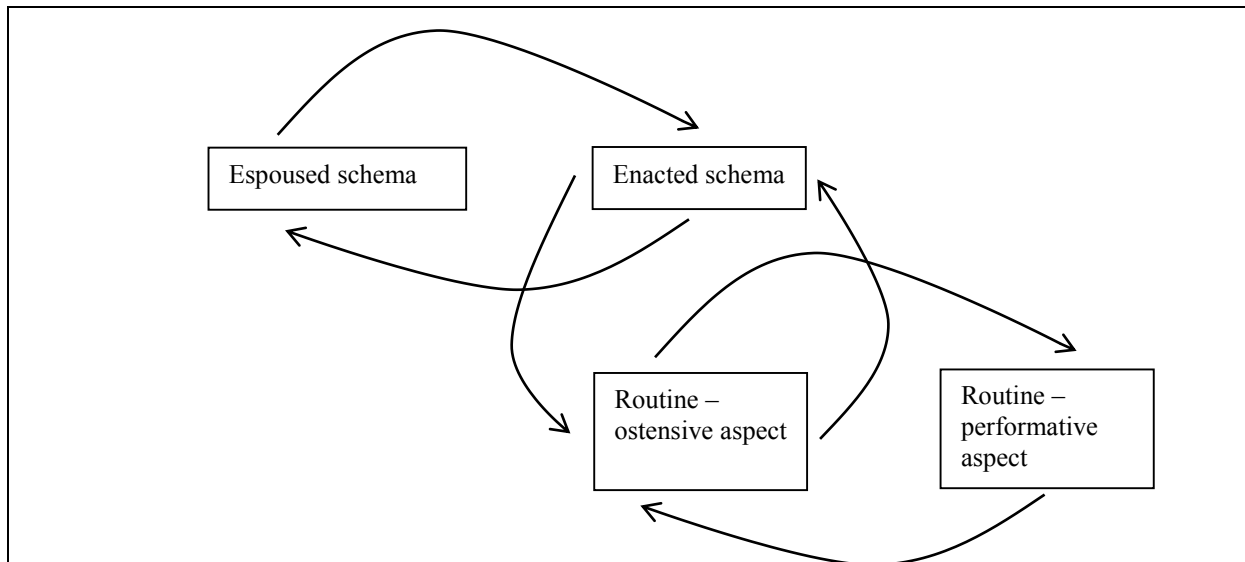


Figure 1. Relationship between endogenous generative mechanisms of organizational schemata and organizational routines.

Source: Own elaboration based on Rerup, Feldman, 2011.

To put it another way, ostensive patterns are formed through actions aimed at achieving specific tasks, therefore they operate at the level of routines. On the other hand, patterns of schemata are formed by all the actions undertaken by members of the organization (some actions are part of routines while others are not) - schemata operate at the level of the organization. It can be said that routines and schemata belong to orders of different degrees. It is worth noting that this is a different view from the concept of “metaroutines”, which served as the theoretical basis for the description of dynamic competences (Teece, Pisano, 1994). Schemas are of universal nature and can form relationships with diverse specialized routines.

Grasping the relationship between schemata and routines sets a theoretical bridge between the mechanisms of organizational learning from practical execution of day-to-day tasks and how strategic directions for organizational development are established. Understanding this relationship provides greater insight into how practical actions co-evolve with strategic intents, conditioning the trajectory of organizational development. It appears that the relationship should be “appropriately complex”. Too much independence of schemata and routines can lead to fantasies and, consequently, create unrealistic expectations. Too close relationship between schemas and routines can constrain abstract thinking, link too tightly to the current context and, consequently, lead to a lack of adaptive vision.

6. Plasticity of routines – the importance of context

There is always an element of uncertainty in routines. Schemata (rules) constitute resources for actions, but they never fully determine them (Giddens, 1984). Even with highly bureaucratic

generalized routines (Merton, 1940; Webber, 1947) an “open area” always remains to some extent so that the routine can be implemented. There are not enough rules to fully determine the behavior pattern, since interpretation of any rules (or any part of rules) requires further rules (Wittgenstein, 1958, as cited in Feldman, Pentland, 2003, p. 101). In this sense, the meaning attributed to routine, the ostensive aspect of routine, becomes definitive only when it is implemented in practical action. The performative dimension also always remains open to a certain extent. Practice by its very nature contains a component of improvisation (Bourdieu, 1977, 1990). Although practice is undertaken on the basis of a set of rules (schemas) and expectations, the specific course of action undertaken is always different to a certain extent. Some variation can be expected even if the procedures implemented are described in detail in the form of expected sequences of steps (Victor, Boynton, Stephens-Jahng, 2000; Nelson, Winter, 1982).

Referring to the posed objective of considerations, it should be noted that concentrating attention on the interaction mechanisms of the abstract and contextual dimensions of patterns (mutually constituting thinking and action processes) is crucial under high uncertainty, and this is where the key resources for organizational dynamics are found. When referring to routine derived from the theory of practice of a metaphor of co-creating structure and agency (Giddens, 1984; Bourdieu, 1995), Feldman and Pentland identify the abstract idea of routine with the structure, and their second part containing specific action in a specific context with agency (Feldman, Pentland, 2003, pp. 95, 98-99). Depending on the level of uncertainty, these dimensions play distinct roles. Ordinary conditions for the operation of organizations (ordered systems) justify reliance on past experience - it is possible to transfer patterns from the past to future situations (as opposed to complex systems when patterns become coherent only ex-post). Then the abstract dimension of routines (structural) has a stabilizing potential, whereas the performative (agentive) one is a source of potential differentiation, and thus is responsible for change (it drives evolution). This is the image of routines that is most frequently seen in the literature. Even if they were described as a component of organizational learning (Levitt, March, 1988; March, 1991), they served mainly as a repository of knowledge - organizational memory (Huber, 1991). Possible changes were rather caused by external pressure to improve performance (e.g., pressure from other units to improve quality), whilst more attention was paid to their structural dimension. In this view, routines were conceptualized as a source of stability, or even organizational rigidity (as responsible for inertia, mindlessness, demotivation, deskilling or competence traps), mainly due to parts of unconscious routine behavior (e.g., Hannan, Freeman, 1983; March, 1991). This stabilizing role of routines contributed to the development of an evolutionary metaphor where they were compared to genes or the DNA of an organization (e.g., Baum, Singh, 1994; Aldich, 1999; Durand, 2006).

More dynamic conditions make stable rules more unreliable in controlling (predicting behavior) the system and may even be counterproductive (intended actions result in unintended outcomes). Under complex conditions, the emphasis is shifted from the structural dimension to

agency (and subjectivity and power associated with it). Human as an agent is embedded simultaneously in three time dimensions - acting in the present remembers the past and can imagine the future (Emirbayers, Mische, 1998, p. 963). Acting within the framework of organizational routines is grounded on “reenacting the past, [but] the performance of routines can also involve adapting to context that require either idiosyncratic or ongoing changes and reflecting on the meaning of actions for future realities. Whole organizational routines are commonly portrayed as promoting cognitive efficiency, they also entail self-reflective and other-reflective behavior” (Feldman, Petland, 2003, p. 95). Under conditions of complexity (and therefore higher uncertainty) the abstract and performative dimensions of routines (structure and agency) enter a more dynamic and coevolutionary interaction.

In the situation of deep crisis (chaos) cause and effect relationships are invisible, hence there is no basis for relying on past experiences (coherent patterns are not discernible either ante or ex post). The way to discover sense is to act and only on that basis attempt to understand reality - act-sense-respond (as opposed to sense-analyze/categorize-respond and probe-sense-respond) - each action in search of a diagnosis is an intervention and each intervention is a diagnosis (Kurtz, Snowden 2003). The new order that emerges may require a major reconstruction of the structure (changing patterns). Therefore, it seems reasonable to believe that in an extraordinary situation (in relation to ordinary conditions) the role of the dimensions becomes reversed. Now it is in the performative dimension that the continuity potential lies. Changing the structural dimension (routine) makes it possible to preserve identity. It can be said that the change goes deeper and encompasses a second-order level, and thus organizational schemata.

Summing up, when under lower uncertainty, in which it is possible to base actions on accumulated experience, the ostensive dimension of routine acts as a source of organizational stability. Deviations from existing (best or good) practices lie in practice – in the performative dimension. Under uncertainty, basing on the accumulated experience in the above-mentioned manner is not possible. The greater the uncertainty, the more novelty the system’s response requires. The stabilizing role of dimensions of routine - ostensive and performative - is reversed. The above can be summed up in the following way:

Proposal: Under high uncertainty, maintaining the organization’s identity requires searching for new schemata that can provide an effective basis for action, hence the ostensive aspect of routine requires change, whereas the potential for continuity lies in the performative aspect of routine.

Survival of an organization under high uncertainty, most frequently associated with a crisis, requires searching for different, creative ways of executing activities. The preservation of continuity (the organization’s identity) lies in symbols, rituals adapted to the new conditions of action practice.

7. Summary

The article addresses the issue of adaptation mechanisms of organizations. In the subject literature, the issue has mainly been addressed in relation to organization operating under relatively stable conditions, because they make it possible to “transfer” patterns established on the basis of past experience into the future. The challenges arising from high uncertainty that have currently dominated the organization’s practice also lead to a critical reflection on the existing strategic management theory. A cognitively attractive perspective in this regard is provided by complexity theories. This is because one of principle properties of CAS is their unpredictability in the sense assumed on the grounds of classical science (Rokita, Dziubińska, 2017). This does not mean that these systems do not subject themselves to cognition, but that it requires a different approach. Referring to the key concept in the field of studies of CAS, i.e., patterns, made it possible to translate the interdisciplinary theory of CAS into the level of organizational management theory. In particular:

- conceptualization of patterns as schemata at the level of an organization,
- recognition of the (cause-and-effect) relationships between organizational schemata and routines as areas subject to shaping; and
- identification of paradoxical dynamics of routines depending on degrees of uncertainty formed a conception through which an attempt was made to successfully address the dilemma of searching for speculative ways to improve organizational performance and adherence to rigorous standards of scholarship (March, Sutton, 1997, p. 698). This postulate does not only apply to the domain of theory, since a better understanding of the mechanisms of organizational adaptation under high uncertainty is currently an equally urgent challenge for researchers and management practitioners.

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