Identifying key elements for evaluating organizations’ complex adaptive leadership readiness (CAL-R framework): paving the way for a measurement tool development

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Abstract

Purpose – Traditional management models are no longer viable in this complex era, with fast-pacing markets and various emergent properties affecting organizational success. The present study acknowledges the need for developing a coherent framework that leaders may use to evaluate their organizational adaptive ability.

Design/methodology/approach – This paper uses theoretical analysis.

Findings – This paper proposes the CAL-R framework, which identifies key characteristics of complex adaptive systems (CAS). These actionable elements, manifested in respective behaviors, will increase organizational adaptability. Adaptability is then suggested to be the mediating factor between complex adaptive leadership practice and organizational performance.

Research limitations/implications – The suggested actionable elements are developed based on a theoretical, non-measurable approach; however, the need for statistical rigorousness is also acknowledged. Further research and a quantitative approach are also suggested for the development of a sound measurement scale.

Practical implications – Applying effective complex adaptive leadership will potentially provide organizations with a competitive advantage by making them more innovative, able to transform and adapt to environmental needs and changes and eventually meet their goals and reach their vision. Leaders may use the identified actionable elements as benchmarks against which they can evaluate their organizations’ complex adaptive leadership readiness (CAL-R).

Originality/value – The CAL-R framework may be used by leaders in order to evaluate their organization’s current adaptive maturity level (ability) and identify the elements they need to focus on more and develop in order to become more adaptive and competitive.

Keywords Complexity theory, Leadership development, Organizational development

Paper type Research paper

1. Introduction

Organizations are operating in constantly increasing complexity, where the unknown prevails and traditional business models cannot be viable anymore (Turner and Baker, 2019). Organizations need to reinvent themselves, develop adaptable and sustainable business models and become innovative and reliable in context and time (Lichtenstein and Plowman, 2009; Bäcklander, 2019; Cantu et al., 2021; He and Ortiz, 2021). They have to be sensitive to environmental changes and move away from the old-mindset objective of maximizing their profits but rather are able to adapt to stakeholders’ needs (He and Ortiz, 2021).

Undoubtedly, modern business calls for new leadership paradigms, which foster the right environment for high performance, enabling complex dynamic interactions between the agents of the system (people) and balancing between freely emergent action in the individual and/or team level and coordination on common organizational goals (Uhl-Bien et al., 2007; Bäcklander, 2019; Uhl-Bien and Arena, 2018). We live in the era of “complexity awareness”,...
recognizing the existence of nonlinearity, where any causality can be identified in a retrospective instead of a predictive manner (Leitão et al., 2017; Turner and Baker, 2019). Organizations need to adapt to changes and change themselves accordingly; however, this change cannot be ultimately controlled nor predicted. It emanates from adaptive interactions between the members of the system, without been neither initiated nor controlled by central management (Lichtenstein and Plowman, 2009; Wilson et al., 2023).

Many researchers have been using concepts from the realm of complexity theory in their effort to delineate organizational frameworks, markets, internal and external interrelationships (Angelis et al., 2012; Brantnell and Baraldi, 2020). There is a growing literature pinpointing the need for adaptability and leadership behaviors facilitating emergence, due to the complex and chaotic business environment (Clarke, 2013; Bäcklander, 2019). Most managers/leaders seem to be aware of it; however, there is no much discussion about the level of understanding of the concept and whether organizations are actually applying the principles of complex systems. This makes some sense if we consider the fact that the application of an emergent leadership approach is not easily manageable, thus not easy to comprehend and apply (Hernes, 2014). Indicative of this is the fact that authors analyzing complexity theory as a leadership practice do not converge into a single point of view, as suggested by Rosenhead et al. (2019) in their review paper. Literature needs to be enriched with conceptual frameworks and testable tools that will further explain and hopefully measure complexity and become more specific in identifying the characteristics of complexity theory that apply to leadership practice (Rosenhead et al., 2019).

In this premise, the purpose of this study is to investigate organizations’ readiness (ability) to become adaptive to change, based on complexity theory related principles. More specifically, it aspires to raise awareness of the complexity leadership approach and theory in general (Uhl-Bien and Arena, 2017) and to identify the key elements against which leaders could benchmark their organizations and evaluate whether they are functioning as complex adaptive systems (CAS). By analyzing literature related to complexity leadership, approached from different perspectives, i.e. CAS, complexity leadership theory (CLT), organizational culture and complexity (OCC) and sustainability and reliability (SR), this paper proposes the complex adaptive leadership readiness (CAL-R) framework. This framework attempts to bring more clarity to the study and application of complex systems, by integrating theory and identifying key organizational elements that may affect the level of adaptability (readiness to respond to complexity) and, hence, the performance of any organization operating in complex environments. The current study’s approach focuses on closing the gap of evaluation, starting from a grounded narrative perspective for evaluating organizations’ ability to manifest adaptive behaviors, by acknowledging the role of emergence and human agency (Poulis, 2021). Eventually, it aspires to become the basis for the future development of a measurement tool, in order to prepare organizations for the new era; however, it is believed that complexity related frameworks should be first operationalized before being tested (Caws, 2015). The proposed framework will encourage leaders to identify and develop the CAL-R elements in their organizations and further investigate (evaluate) how they contribute to organizational adaptiveness and performance.

2. Complex adaptive systems (CAS)

Organizations are now tending to be seen more like unified entities, shifting away from reductionistic perspectives which view systems based on the analyses of causal relationships (Holte, 1993; Rosenhead et al., 2019). Collective and participative leadership, as well as empowerment are elements of such a new approach to leadership practice (Avolio et al., 2009; Dionne et al., 2014). Increasing complexity can be better understood and managed under the
principles of holism, a state that differentiates from just the summation of individual behaviors (Richardson, 2008; Turner and Baker, 2019).

One of the key traits of a complex system is the self-organization of its agents (i.e. people), the interacting parts of the system. Such a system is considered dynamic and open (Caws, 2015). This means that the constituents of the system are in direct contact and exchange with the external environment. Thus, in order to characterize an organization as being CAS ready, people need to have a certain level of freedom to interact and co-adapt and also be able to make decisions (empowerment) informed by the external environment. Information which openly runs from the environment and through the organization is the energy the system needs to replenish and become viable (Hazy and Uhl-Bien, 2014). Another key property of a CAS is emergence which again emanates from interaction and co-adaptation and which eventually results in differentiating one system from another, by developing distinct emergent properties and organizational identity (Roberts, 2000; Turner and Baker, 2019).

Emergence is the “force” that generates the system’s behavior which cannot be explained nor predicted by the individual behaviors of its agents and can be generated or found at all organizational levels (Lichtenstein and Plowman, 2009).

Researchers have further proposed CAS key properties which can be considered as actionable strategies for a system to demonstrate adaptive and emergent behaviors. Modularity is a characteristic which acknowledges the existence of subsystems within the whole and which retain separate identity (Albert et al., 2015). It is important to understand that the parts of the system, its agents, are its building blocks and that it is their interaction that will render the system adaptable. Therefore, an adaptive system has to first value its diversity and what each component has to contribute to the whole organization (deMattos et al., 2012). These components need to retain some level of autonomy and freely interact in order to coevolve and demonstrate emergent and adaptive behaviors (deMattos et al., 2012). Therefore, communication and interactions (openness) are rather important for the subsystems (individuals, teams, departments) to be able to exchange information (feedback), within the system and with the external environment (Aritua et al., 2009; Albert et al., 2015). A diverse and modular system, however, needs to also demonstrate integration (e.g. shared vision, values) (Aagaard, 2012) and create a strong cultural identity which will offer direction and purpose. A system that meets the respective characteristics or elements will eventually demonstrate adaptive behaviors, which means that the system remains open to informational exchange with its environment and is able to respond to any environmental changes (Hunt et al., 2009). Accordingly, Wilson et al. (2023) provide a set of criteria under which systems may be classified as complex and adaptive, such as the existence of “a large network of autonomous agents (autonomy), dynamic and non-linear interactions, a high rate of change, emergent high-order effects, ability to learn and adapt, self-organization, coevolution, temporality, and system history” (Wilson et al., 2023, p. 169).

Eventually, creating an adaptive space in organizations is what leads to adaptability. The adaptive space is actually one that enables interconnectivity, and this is exactly the role of the leader for the new era, to generate the conditions (context) that will nurture CAS characteristics, such as communication, interpersonal relationships, experimentation etc (Uhl-Bien and Arena, 2017). Enabling leadership itself is considered as a valuable CAS element to design a system that will promote the implementation of CAS characteristics and lead to emergence and adaptive behaviors (Borzillo and Kaminska-Labbe, 2011). Therefore, the current analysis will further build on complexity leadership theory and the connection between OCC.

At this point, it has to be noted that some traits which can be considered as difficult to comprehend, such as path dependency and history, nonlinearity, chaos and irreducibility, were intentionally excluded from the current analysis and/or subsequent propositions. These terms are mainly informed by non-managerial disciplines, hence more difficult for managers
to identify and comprehend for practical application. More specifically the CAL-R framework, based on this theoretical analysis, provides some key elements that may be translated into actionable strategies based on which managers and leaders may evaluate organizational adaptability (readiness to respond to complexity).

Proposition 1. Organizations integrating CAS elements and manifesting respective behaviors, will demonstrate increased ability and readiness to respond to complexity and adapt to environmental changes.

3. Complexity leadership theory (CLT)
The theory of complexity leadership mainly posits the development of the right conditions to create what is called as the “adaptive space” within which emergent behaviors will arise (Bäcklander, 2019). This adds up to what was called by Lichtenstein and his colleagues as “relational space” which enables agents’ (people’s) interactions and emergent behaviors (Lichtenstein and Plowman, 2009). The elements of this space are identified as mutual trust, interdependency, shared goals and responsibility, coordination and commitment (Uhl-Bien et al., 2007; Lichtenstein, 2014; McLean et al., 2021). Bäcklander (2019) also suggests quality interactions and constructive, open and honest, non-judging dialog. Organizational outcomes should emerge, rather than being imposed and enabling leaders must be aware of the situation and whether they should provide more detailed guidance or more freedom, balancing between control and adaptation. Furthermore, constructive dialog promotes learning feedback, experimentation and reflection (Edmondson, 1999; Schippers et al., 2015; Koeslag-Kreunen et al., 2018). These characteristics align with a design thinking philosophy where collaborative experimentation and divergent thinking are built based on trust, open communication, empowerment and self-discovery (autonomy), as well as human-centeredness and learning from errors (Cousins, 2018; Bason and Austin, 2019; Nakata, 2020).

Enabling leadership is the function that brings balance between alignment and control and the creation of a flexible environment, allowing emergent adaptive behaviors through communication (Uhl-Bien et al., 2007; Livingston and Lusin, 2009; Uhl-Bien and Marion, 2009). It is a key function of CLT along with the administrative and adaptive ones, allowing for both control and experimentation, that enables the organization to adapt to environmental changes, through creating shared identity, information gathering and information using (Leitão et al., 2017; Hazy and Uhl-Bien, 2014; McLean et al., 2021). It leaves enough space and freedom for emergent team properties which enable functional procedures and block the way to dysfunctional decision-making processes (Uhl-Bien et al., 2007; Livingston and Lusin, 2009; Leitão et al., 2017). Interactions and communication have to be emergent at all levels and information exchange is an opportunity for mutual influence between the members of the organization (Lichtenstein and Plowman, 2009; Hazy and Uhl-Bien, 2014). Open and trusted communication, along with alignment to goals, enables team cohesion, which in turn significantly contributes to team/organizational viability, through shared purpose and commitment (Leitão et al., 2017). Embracing uncertainty, allowing for conflict to emerge, encouraging experimentation, interactions and collective activities are also considered key properties (elements) of leadership which enables emergence as identified by Lichtenstein and his colleagues (Lichtenstein and Plowman, 2009).

Another leadership style related to complex business environments is paradoxical leadership, which deals with environmental tensions, trying to retain a balance between stability and flexibility (Smith and Lewis, 2011; Zhang et al., 2015; Waldman and Bowen, 2016). Paradoxical leaders face competing demands in their effort to secure both business sustainability and change (Waldman and Bowen, 2016). Informed by this approach, we would...
expect that within a complex adaptive organization, leaders would express adaptive behaviors as well, such as control and autonomy, structure and flexibility, centralized decision-making and delegation, focusing both on the collective and the individual (Zhang et al., 2015; Shao et al., 2019). Complexity leadership should even allow for emergent leadership to replace formal hierarchical authorities in the context of environmental disturbances that lead the system far from an equilibrium state (Lichtenstein, 2009; Acton et al., 2019). In such contexts, leaders emerge, as well as emergent behaviors and experimentation that tend to bring the system back to balance (Lichtenstein and Plowman, 2009; Wolfram Cox et al., 2022).

In this premise, emergence occurs through dynamic interactions at all organizational levels, starting from the individual level. It is a continuous process, after emergence has occurred, being variable and constantly changing (dynamic and non-stable) across contexts and through time (Kozlowski, 2015; Acton et al., 2019). Emergence is a process that entails information sharing and takes time for emergent behaviors, as well as leadership, to occur at higher levels (Kozlowski and Klein, 2000; Kozlowski et al., 2013).

**Proposition 2.** Organizations integrating complex leadership theory (CLT) elements and manifesting respective behaviors, will demonstrate increased ability and readiness to respond to complexity and adapt to environmental changes.

### 4. Organizational culture and complexity (OCC)

Elements such as human-centeredness, trust, collaboration, experimentation, open communication, etc. clearly reflect cultural elements of organizational life. By definition, organizational culture is what will dictate the emergence of shared meaning between the agents of the system and will distinguish the system from other external organizations (Robbins and Judge, 2017). Therefore, in the need for developing an adaptive culture, Bäcklander (2019) provides an interesting framework where teams and organizations have to cultivate friendly and low-stress environments, build strong values, promote open communication and sense of ownership and accountability and be action oriented, as well as sensitive to environmental stimuli. Adaptive organizations value diversity and interdependency between agents who are free to adapt to each other’s behaviors, also through manageable conflicts (Uhl-Bien et al., 2007). For emergence to occur, organizations need to develop an environment which cultivates quality relationships and collaboration, based on mutual trust, shared context and shared understanding/alignment and psychological safety (Bradbury and Lichtenstein, 2000; Marion and Uhl-Bien, 2001; Lichtenstein and Plowman, 2009). Putting all these concepts together, transformation happens beyond mere individual contributions and is affected by contextual factors (Osborn and Hunt, 2007).

Emergence, as Lichtenstein and Plowman (2009) identify can be enabled by four contextual factors, namely the dis-equilibrium state, the amplifying actions, the recombination or self-organization state and the stabilization of feedback. What these four pillars actually suggest, is that we need to create an environment, a culture, that encourages a state of flux, allowing for disruption and nonrules-based behaviors to occur (McKelvey, 2004). A context with clear objectives, less and simpler rules, as well as clear and rational boundaries, combined with certain levels of autonomy and flexibility, will set a less stressful and more creative environment (Lafferty and Alford, 2010; Shao et al., 2019). *This brings balance between stability and disorder, leaves space for individual differences to co-adapt* and enables people to focus on values and targets, as well as to better evaluate situations and make effective decisions, through cognitive functions and learning processes (Platt and Huettel, 2008; Cushman and Morris, 2015; Liljeholm et al., 2015). Organizations must develop
structures and cultures that allow for experimenting behaviors and leadership to emerge in the context of exogenous disturbances, based on diverse environments away from discriminations and stereotypes (Wolfram Cox et al., 2022). An adaptive system needs a culture that supports porous boundaries, in that they are not rigid, hence they let the agents (people) interact in continuous and unpredictable ways, coevolve and express emergent collective behaviors (Wilson et al., 2023).

Such an environment sustains a dynamic context and also allows for a certain level of variability which is prerequisite for innovation and change to happen, leading to new paradigms of behavior (Goldstein, 2007). Developing a supportive and learning culture will create people willing and capable of working independently and interdependently within teams, without the need of strict supervision (Obolensky, 2007). In this regard, a value-based decision-making process, as well as continuous learning and improvement would also contribute to an environment which promotes adaptation (Bäcklander, 2019). Adaptation to this new regime is what is called self-organization and eventually the new state has to be institutionalized and bring a certain level of stability, until the next time the system will need to adapt (Lichtenstein, 2007).

**Proposition 3.** Organizations integrating OCC elements and manifesting respective behaviors, will demonstrate increased ability and readiness to respond to complexity and adapt to environmental changes.

5. **Sustainability and reliability (SR)**

Sustainability has been identified as an important property and proposed as a new research paradigm to be integrated with CAS research, as it contributes to systems’ viability (Porter and Reischer, 2018; Turner and Baker, 2019). A sustainable organization needs to be sensitive to context (Bäcklander, 2019). This means that people are aware of their actions, what they should be paying attention to (focus) and what is the impact of their actions on internal and external stakeholders. Building reliable organizations needs a holistic perspective, considering how the whole organization, the internal processes and relationships can sustain business by adapting to and recovering from any external disturbances and by learning from both failures and successes (Haavik et al., 2019; Paries et al., 2019).

Researchers have suggested communication of vision (Shabot et al., 2013; Brass et al., 2018), identification of reliability gaps (Tolk and Hartley, 2011; Schaffer et al., 2012), transformation of culture (Stringfield et al., 2016) and strategic approach to resilience (Shabot et al., 2013) as key attributes of high reliability organization which sustain the long-term operation of the system. Cantu et al. (2021) assessed the implementation of Weick and Sutcliffe’s (2001) hallmarks and suggested that it could be used as a tool to assess the maturity of a system in retaining reliable operations. These hallmarks are, pre-occupation with failure (analyzed below), reluctance to simplify interpretations (this relates to a holistic/systemic perspective, e.g. not seeing problems as isolated departmental issues), sensitivity to operations (which retains the system vigilant to operational adjustments and error prevention), commitment to resilience (a mindset of detecting failures and restoring balance) and deference to expertise (delegation for front line decisions, rank free) (Weick and Sutcliffe, 2001).

Building a resilient and adaptable learning organization appears to be a core characteristic of a complex adaptive system, which can restore a dynamic balance and avoid chaos. Resilience, more specifically, is a quality of a system that needs to deal with perturbation and unpredictability (Dekker and Woods, 2010; Siemieniuch and Sinclair, 2014). In this regard pre-occupation with failure was found by Cantu et al. (2021) to be the most commonly implemented hallmark by organizations in their effort to be resilient and adaptable. This
means that they focus on identifying errors, even minor ones and treat them as opportunities to redesign processes, change the culture of the organization and train people in becoming more resilient (Soriano et al., 2016; Brass et al., 2018).

Following this analysis, we may see the similarities of the traits that complex systems have with reliable (resilient) organizations. Furthermore, CAS have been linked in literature with concepts such as agility, sustainability and resilience management (Riaz et al., 2023). Therefore, this paper supports the fourth proposition that literature in SR may also add to our understanding of complex systems and to the identification of critical elements that could be operationalized by leaders to the systems’ benefit.

**Proposition 4.** Organizations integrating SR elements, and manifesting respective behaviors, will demonstrate increased ability and readiness to respond to complexity and adapt to environmental changes.

6. **An approach to organizational complex adaptive leadership readiness (CAL-R)**

Measuring the maturity level of organizations in being CAS is quite challenging. As Cantu et al. (2021) have found in their research for the implementation of high reliability attributes, organizations are not measuring high reliability itself, they rather use them as measurable system’s traits which lead to quality outcomes. The present study follows a similar assumption aiming to understand the CAS characteristics/elements and how they can be applied to practice. Organizations may not even be aware of CAS traits; however, many of them may be implemented by organizations in their development efforts to deal with the complex markets. Furthermore, trying to measure complexity may be problematic, as it is an effort to predict something unpredictable, which is contradictory in nature and oversimplistic, not being able to incorporate the multifaceted and untamable nature of complexity (Tsoukas, 2017; Poulis, 2021). As Poulis (2021) suggests, a measurement-driven approach may be epistemologically unorthodox in understanding complexity, hindering us from developing and implementing our knowledge. The current analysis is building on that perspective by suggesting a narrative approach for leaders to analyze their organization’s CAS related traits and evaluate the extent of their application.

Therefore, this study focused on four theoretical fields of study and on identifying the key characteristics, here called actionable elements, that would make an organization adaptable and, hence, ready to respond to complexity and environmental changes. Following on from the present analysis, and by observing the proposed actionable elements in each section, it is made clear how these four fields of study, i.e. CAS, CLT, OCC and SR overlap and complement each other. They all have to add to our understanding of which elements (properties) will help organizations develop adaptive behaviors and better respond to environmental changes. More specifically, CAS literature focuses mainly on the study of the systemic characteristics and how the system interacts with the environment, the CLT literature mainly focuses on how to create and lead the right environment for emergent properties and adaptability to take effect, OCC literature adds to our contextual understanding and the mindset that organizations need to develop, further dictating the appropriate structure and interpersonal relationships, and SR literature focuses on the continuous improvement efforts, also learning from mistakes, making an organization viable in complex environments.

The proposed elements are called actionable because managers/leaders may focus on these areas and apply a Complex Adaptive Leadership approach, rendering their organizations ready for complexity. The CAL-R framework is presented in Figure 1, showing how the fields overlap and may lead to adaptability. It is a simple representation, avoiding further complex interrelationships, because the main purpose of this study is to help leaders identify and
translate the proposed areas and respective elements into actionable strategies for their organizations, aiming at improving the performance of the system in terms of meeting market needs.

Consequently, the proposed framework is meant to become a tool that could potentially assess the system’s readiness to adapt to complexity. Managers find it difficult or are reluctant to deal with uncertainty and there is an overall resistance to applying emergent frameworks which lead to nonlinear transformation and innovation (Braukmann, 2022; Santos et al., 2023). The proposed CAL-R approach provides a clear path to developing adaptive behaviors, in the realm of constant change which cannot be predicted, also providing a way to close the gap of “quantum” change based on a systemic approach informed by CAS related literature (Riaz et al., 2023).

Finally, it is also proposed, and added to this framework, that managing the suggested CAL-R elements and applying respective interventions to make the system more adaptable, it will also lead to increased organizational performance (i.e. better serving the market needs). Performance is a multifaceted construct, defining the ability of an organization to meet its main goals and reach its key objectives and including various aspects of organizational practice, such as financial growth, productivity, customers’, employees’ or other stakeholders’ satisfaction etc (AlMulhim, 2023). By definition, performance cannot be objectively defined, and it is context dependent, based on organizational and market characteristics (Pavlov and Micheli, 2023). In the context of the present framework, performance is mainly defined as the ability of an organization to effectively and efficiently respond and adapt to market changes and needs. This, in turn, it is believed that it will lead to viability and growth, as well as to stakeholders’ satisfaction.

Meeting stakeholders’ needs and/or outperforming competition is a primary goal for any organization. Many researchers have been using complexity theory as a framework to explain how change occurs and how relates to organizational performance (MacLean and MacIntosh, 2011; Gerpott et al., 2019). However, speaking of complexity, this is not easy to measure, as we cannot predict and readily measure how and when each intervention will take effect, as dictated by sensitivity to initial conditions and nonlinearity. It is strongly
recommended, though, to evaluate the results from a holistic, multilevel perspective and not in an isolated form (Walton, 2014). This leads to the final proposition that adaptability will mediate the relationship between CAL-R elements and overall organizational performance. From the complexity perspective, performance is also considered as an emergent phenomenon, emanating from the interactions that take place within the system, as behaviors and beliefs change and co-adapt (Pavlov and Micheli, 2023). Overall, general CAS principles may lead to quality improvements of the system, if those principles are properly applied (Wilson et al., 2023). Hence, it is assumed that what will make the system highly perform is its ability or readiness to adapt to environmental challenges.

**Proposition 5.** Adaptability will act as a mediating factor between integration of CAL-R actionable elements and manifestation of respective behaviors and organizational performance (Figure 1).

7. **Conclusion: practical application, limitations and further research**

Many researchers are trying to decipher how complexity theory may be applied to managerial practice and how it affects organizational efforts to change and adapt, yet it is still difficult to find a well-grounded method to evaluate respective interventions in the realm of leadership practice (Rosenhead et al., 2019). Only few studies seem to have made a clear link between complexity theory and actual application (e.g. Colbert and Kurucz, 2011; Zimmerman, 2011). This difficulty could be due to the lack of a unified framework against which managers/leaders may evaluate the behavior of their system. This gap is addressed here with the CAL-R framework which could be further developed into a measurement tool, evaluating more specific behaviors in each discussed/proposed realm (element). This could potentially close the gap in empirical research, which is still needed to reveal further cause and effect relationships in the fields of complexity theory and actual leadership practice (Uhl-Bien and Marion, 2011; Podsakoff and Podsakoff, 2019). Embracing complexity thinking and practice provides organizations with an evolutionary advantage. Operating at the edge of chaos provides organizations with a good balance between experimentation, which enhances adaptability and structure, which keeps the system away from disorder. It is believed that this state of existence, where behaviors are free to emerge, is beneficial to any organization, increasing adaptability, efficiency and performance (McMillan, 2004; Lichtenstein, 2014; Bäcklander, 2019).

This study provided a theoretical analysis of relevant literature related to CAS, in order to identify key elements that could be applied to complex adaptive leadership efforts. Two key points that the current analysis stresses out are the importance of enabling ideas and decisions to emerge through people’s actions and interactions (agency). People have the agency, the ability to act upon the system and influence it in a positive way (Kok et al., 2021). However, leaders’ responsibility is to provide support and create an enabling environment, in which people will not only have the ability to act, but also the willingness to bring a positive change (De Haan and Rotmans, 2018). The analysis is not exhaustive in the respective fields, as the scope of the current study is not to provide a thorough literature review, but rather to identify and provide key CAS elements which can be operationalized and promote organizational adaptability. The CAL-R approach aims at helping organizations become adaptive and able to transform in order to stay competitive and viable overall, in complex markets, within complex societies. Linear and deterministic change processes seem not to be suitable. Rather, a more flexible approach to transformation is needed – one that will integrate and consider complex organizational characteristics, interactional dynamics and constant change needs (Riaz et al., 2023). Operating as an adaptive system does not only mean to respond to environmental changes, but goes one step further, proactively leading the change...
itself. Leaders should encourage a mindset that allows for innovative ideas to emerge, and these ideas will lead to sustainable competitive advantage. It has to be noted that the main focus of this analysis is on identifying key complexity elements against which practitioners/leaders could evaluate their organization’s adaptive readiness or maturity level. The suggested framework provides a better view of the general areas of interest in organizational operations for which leaders should be more alert. Leaders may then design and apply interventions to develop any weak areas of organizational operations (e.g. develop interactions, trust, empowerment etc.), in order to render the system more adaptable and let adaptive behaviors emerge accordingly. In alignment with the definition of performance, which is meeting organizational vision and goals (AlMulhim, 2023), it has to be clarified here that the present framework is also meant to be applied to broader organizational contexts, e.g. for- or not-for-profit organizations, various types of institutions, etc. Complexity is inherent in all kinds of social structures, and the need is always to successfully meet an organizational purpose and contribute to the broader societal growth.

Although a more qualitative/narrative approach of analysis and evaluation is encouraged for managerial practice in the complexity field (Poulis, 2021), and also proposed here, we also need to acknowledge the need for orderliness and stability, to put something in a specific context so we can illustrate, communicate and compare against standards for organizational success (Schneider et al., 2017). Therefore, the CAL-R framework has yet to be tested and standardized across sectors and cultures around the world in order to also develop a statistically valid instrument for further and rigorous measurement. Hence, a quantitative approach should also be offered by future research in order to provide a validated tool that measures adaptability and emergent behaviors in various contexts (Poutanen et al., 2016). However, overreliance on linear statistical representations should be used with caution as it is difficult to generalize nonlinear complexity effects and capture the actors’ (agents) role and understanding (or experience) of complexity (Díaz-Fernandez et al., 2019; Poulis, 2021). So, even if this approach is used to quantify organizations’ adaptability, leaders should always consider a discourse approach, in order to deeply understand the meaning of each item, the importance to their organization, how they emerge and how they may contribute to organizational transformation and growth. Therefore, as mentioned before, it is vital to take a first step to operationalizing this framework, by integrating it into strategic efforts (Caws, 2015). It has to be first well-comprehended and applied within context before it is further supported by a statistical measurement tool.

The CAL-R approach could potentially provide a good basis for integrating aspects of CAS into a single evaluation tool. Further investigation and validation would provide the missing solid theoretical substantiation and methodological coherence in applying complexity theory principles to real contexts, in order to build innovative organizations (Poutanen et al., 2016). Furthermore, developing a measurement tool could also be related to performance levels, as is the case with other shared and transformational leadership measurements, but one that is validly evaluating team or organizational performance in complex environments (Kozlowski et al., 2016; Spedding et al., 2023). Many researchers argue that contextual factors always apply, rendering a best practice approach as not suitable in all situations. For example, not all organizations operate in complex environments; hence, an evaluation tool that is based on complexity theory would not be that useful to organizations operating under more stable and predictable variables (Jansson, 2013). However, we cannot rule out the fact that the world is inherently complex even in apparently more stable environments. Every organization is a complex entity consisting of people with also complex and non-predictable behavioral patterns (Gavalas, 2022; Pavlov and Micheli, 2023). As a living organism, sooner or later, an organization will have to adapt to emergent market trends and societal needs and undergo some kind of change or transformation, in order to improve its performance, in a realm that traditional managerial approaches have become obsolete.
Pavlov and Micheli, 2023; Riaz et al., 2023. Therefore, the proposed framework, if carefully applied, could be valuable to organizations’ development needs and performance improvement.

References


Identifying key elements for CAL-R framework


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**About the author**

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