

## **A systems based interpretative framework for approaching exaptation and bricolage in decision making and value co-creation**

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### **Abstract**

**Purpose** – The increasing variety and variability of social and economic dynamics is pushing both researchers and practitioners in developing approaches, models, and tools for supporting decision makers in observing, interpreting, understanding and managing emergent dynamics. For contributing to the ongoing debate, the paper aims at discussing possible paths for facing the challenges of the increasing complexity through flexible decisional and behavioral approaches.

**Methodology/approach** – The paper adopts a qualitative approach for systematizing and refreshing the interpretative role of existing literature within managerial and organizational fields. Through the interpretative contributions provided by the systems thinking, a multi-disciplinary literature review is conducted for identifying possible constructs through which addressing the development of flexible managerial and organizational models.

**Findings** – Managerial and organizational fields are enriched through the concepts of exaptation and bricolage as explicative domains able to provide useful indications to decision makers interested in building more flexible decisional and behavioral approaches. A possible path for managing the increasing social and economic complexity is depicting in the light of systems perspective, and a system based interpretative framework is defined for explaining actors' reciprocal adaptation as a way for supporting value co-creation.

**Research implications** – The paper provides possible pillars on which acting to build managerial and organizational approaches able to enhance actors' contributions through the definition of shared processes. The concepts of exaptation and bricolage enrich previous managerial and organizational literature promoting research on value co-creation as a driver for ensuring systems' viability in dynamic ecosystems.

**Practical implications** – The paper calls the attention of decision makers on the need for the systems' flexibility through the enhancement of actors' contributions for facing the challenges of increasing social and economic complexity. Acting on exaptation and bricolage, a possible model is provided for clarifying managerial and organizational paths for increasing the systems' flexibility and for supporting practitioners in defining approaches able to support actors' collaboration as a required condition for value co-creation.

**Originality/value** – Adopting a multi-disciplinary perspective the paper enriches previous managerial and organizational literature through the definition of concepts, processes, and approaches able to support both researchers and practitioners for better understanding and managing increasing social and economic complexity by acting on exaptation and bricolage. Thanks to the interpretative lens provided by the systems studies, a conceptual model for addressing systems' decisions and behaviors in the light of value co-creation is proposed.

**Keywords** – Exaptation; Bricolage; Value co-creation; Systems studies; Complexity; Flexibility; Ecosystems

**Paper type** – Conceptual

## Introduction

Since long time, social and economic dynamics have been analyzed adopting predictive models with the aim to anticipate future evolutions as consequences of past events and dynamics, according to a sort of cause-effect approach (Greiner, 1989; David, 2007; Short *et al.*, 2009). Nowadays, the increasing numbers of actors involved in social and economic dynamics (Gibbons, 1994; Dicken, 2007), the multiple aims of each actors (Kemp *et al.*, 2007; Roloff, 2008), and the rapidity through which social and economic balances change, as a consequence of innovation practices (Nooteboom, 2000; Smith *et al.*, 2010), are dramatically reducing the opportunity for anticipating future evolutions of configurations (Held *et al.*, 2000; Holling, 2001; Rosa, 2003).

Recognizing the state of the art, several researchers and practitioners have tried to overcome the previous managerial and governmental approaches, based on the ‘anticipation’, with new methods, based on the incremental use of available resources (Casari & Plott, 2003; Sirmon & Hitt, 2003) and on the constriction of environmental variety through alliances and barriers (Cook, 1977; Harrison & St. John, 1996; Koka *et al.*, 2006).

Despite the relevant advancements in knowledge provided in this direction, it is evident that increasing market variety cannot be reduced through the definition of rules and regulations (Spulber & Spulber, 1989; Aguiari, & Di Nauta, 2012; Vogel, 2018). Organizations’ survival is even more related to organizations’ ability to develop capacities for the adaptation to environmental changes (Folke *et al.*, 2002; Barile *et al.*, 2016a; Heckmann *et al.*, 2016). In line to the point, Liang and Jones (1987) stated that “the system must adapt to predictable evolution automatically and leave the unpredictable evolution to system designers and users” (p. 61). Thanks to this statement, it is possible to highlight the need for building conditions of ‘automatic adaptation’, through which any organized entity can face the challenges of market turbulence ensuring its survival over the time.

With the aim to contribute to the challenges debate about the definition of conditions for ‘automatic adaptation’, the paper adopts the Systems Thinking interpretative lens (Von Bertalanffy, 1968; Weinberg, 1975; Beer, 1984; Emery, 1981; Gharajedaghi, 2011) for depicting, in the perspective of the Viable Systems Approach (VSA) (Golinelli, 2010; Barile, 2013; Barile & Saviano, 2010, 2018; Calabrese *et al.*, 2018), a possible interpretative framework with the aim to support decision makers and organizations in re-acting to environmental changes. In such a direction, a brief multi-disciplinary literature review is conducted with the aim to identify possible key concepts able to address managerial and organizational interpretative frameworks toward more flexible and adaptation-based approaches. The concepts of bricolage (Lévi-Strauss, 1962) and exaptation (Gould & Vrba, 1982) have been firstly discussed in paleontology and anthropology studies as potential multi-disciplinary domains, able to support a better understanding of possible evolutions paths. Later, these concepts offered interpretative suggestions also for social and economic systems, which can adapt to the environmental changes, with the aim to support both researchers and practitioners in organizing and managing the available resources in the light of more flexible and adaptive-based approaches (Di Nauta *et al.*, 2019). Thanks to the introduction of these two concepts in managerial and organizational studies, several reflections are presented with reference to the ways in which social organizations could face the increasing challenges of market turbulence in a more efficient, effectiveness, and sustainable ways, and a concise interpretative framework is proposed for guiding both researchers and practioners in developing renovate managerial and governmental approaches (Saviano *et al.*, 2018).

Following the traced line of reflections, the contribution of the paper is twofold. Firstly, it underlines and recalls the attention of researchers and practitioners on the need for developing managerial and organizational models and tools, able to support organizations in facing the increasing challenges of market turbulence. Secondly, it proposes an extension of the domain of managerial and organizational studies, thanks to the introduction of multi-disciplinary concepts able to emphasize the need for extending sharing reflections beyond the boundaries of firm representation (Barile et al. 2012; Caputo *et al.*, 2016; Espejo, 2017).

The paper is structured as follows. The theoretical background is presented for explaining the interpretative contribution provided by the systems thinking and VSA, introducing the concepts of bricolage and exaptation. After this, a concise interpretative framework for addressing researchers' and practitioners' behaviors and decisions is presented with the aim to support a better understanding and management of market turbulence. Finally, implications of the research are discussed and some preliminary conclusions and possible future directions for the research are drawn.

## **Theoretical background**

### *The interpretative contributions of Systems Thinking*

The concept of system is not new, it has been widely discussed in managerial and organizational studies for describing several kinds of organized entity (e.g. production system, public system, policy system among the others) (Barile *et al.*, 2016). Preliminary contributions about this concept can be easily identified in biological and natural studies (Von Bertalanffy, 1968), where the concept of system has been used for describing functioning mechanisms through which plants, animals, and different kinds of viable entities adapt themselves as a consequence of constant interactions and resources exchanges with external environment.

In managerial and organizational studies, the concept of system has progressively attracted the interest of both researchers and practitioners in the last half century (Berkes et al., 2000; Alavi & Leidner, 2001; Ng *et al.*, 2012; Haines, 2016; Espejo, 2017). Initially used for describing components of social and organization configurations (Nadler and Tushman, 1980), the concept of system has rapidly widespread its boundaries in social sciences becoming one of the more powerful interpretative domains (Bruni *et al.*, 2018).

As a consequence of the increasing attention of managerial and organizational researchers on the domain of system, an increasing number of contributions have been progressively produced, and several new concepts have been introduced in the managerial and organizational background, such as autopoiesis (Maturana & Varela, 1991), homeostasis (Thompson & Hirschman, 1995), and viability (Beer, 1984), among the others.

All these concepts have enriched managerial and organizational studies, offering the possibility for better understanding the functioning dynamics of socio-economic world. Unfortunately, they have been usually proposed in different research streams, and they have contributed to build a fragmented scenario, in which it was hard to identify a common interpretive framework (Flood, 2010).

With the aim to bridge this gap in knowledge, in the last few decades the research stream rooted in the Viable Systems Approach (VSA) has been proposed and has progressively been accepted in social science as a way for systematizing and refreshing previous contributions related to the domain of system (Golinelli, 2010; Barile, 2013; Barile & Polese, 2010; Barile & Saviano, 2010, 2018; Barile *et al.*, 2012, 2014, 2015, 2016b).

Over the time several concepts and models have been provided by the studies rooted in the VSA, such as the structure-system dichotomy (Barile & Saviano, 2011), the curve of complexity (Barile, 2009), and the consonance and resonance (Barile & Saviano, 2013), among the others. All these contributions have offered the opportunity for understanding that social systems are viable system because they aim to survive over the time and, for this reason, they cannot avoid to interact with the environment exchanging resources and knowledge (Caputo & Evangelista, 2018; Armenia *et al.*, 2018; Tronvoll *et al.*, 2018).

Thanks to the introduction of viability in social science, the VSA has recalled the attention of both researchers and practitioners on the necessity for identifying paths and tools able to support socio-economic organizations in understanding the dynamics of environmental changes and in quickly adapting themselves (Polese *et al.*, 2009; Polese & Di Nauta, 2013; Di Nauta, 2017; Saviano *et al.*, 2018). In such a direction, a renovate view of function and role for systems' components have been introduced, and the relevant role of modularity for social systems have been underlined. With the aim to better clarify these latter concepts, in the following subsections they will be briefly explored in the light of contributions provided by different research domains and disciplines.

### *Responding to the future through bricolage*

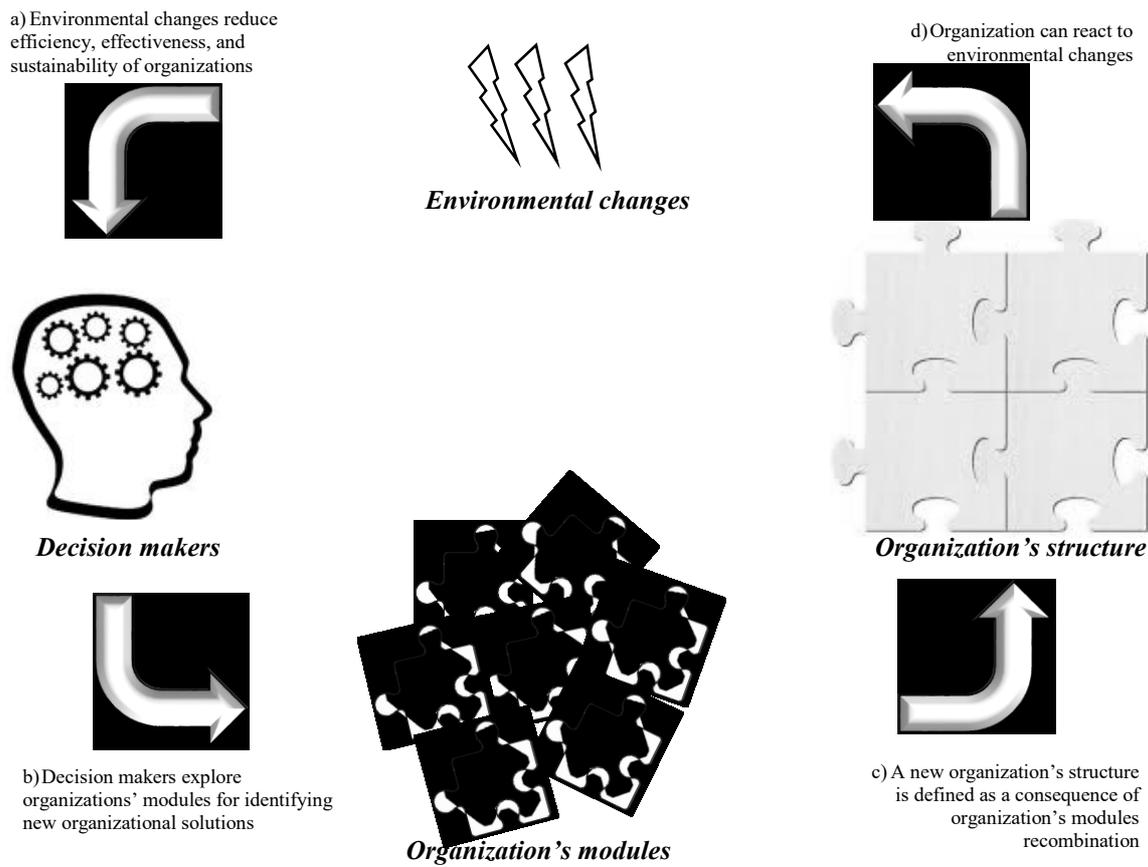
Recent changes in social and economic dynamics have been affected by the appearance of new actors, by the increasing fluctuation in relationships, and by the emergence of new opportunities and risks related to the so-called digital revolution among the others (Stacey, 2002; Napoletano & Carrubbo, 2011; Caputo & Wallezky, 2017; Caputo *et al.*, 2018). All these elements have dramatically reduced the possibility for forecasting future dynamics in social and economic flows, with the consequent impossibility to build managerial and governmental models able to support researchers and practitioners in facing the challenges of increasing market turbulence (Martinez *et al.*, 2017).

Nowadays, managerial and organizational researchers are strongly invited in developing possible new tools and instruments for supporting social and economic organizations in reacting to the environmental changes (Saviano *et al.*, 2017; Reynoso *et al.*, 2018). Among the contributions provided in this direction, an increasing attention has emerged around the so-called modularity as domain interested in defining the conditions trough which it is possible select and combine in different ways available resources, competences, and knowledge for reacting to different scenario (Fodor, 1983).

This domain has been introduced in cognitive sciences by Fodor Jerry Alan for providing a new representation of mind architecture and functioning. Basically, Fodor's view of modularity refers to the possibility for managing modules that are: 1] domain specific, 2] innately specified, 3] informationally encapsulated, 4] fast, 5] hardwired, 6] autonomous, and 7] not assembled.

Contextualizing the concept of modularity proposed by Fodor to social and economic organizations, it is possible to image an organizational model trough which decision maker has the possibility for selecting inside the organizations' structure the components required for reacting to environmental changes and to quickly combining them for ensuring organizations' survival as represented in the following Figure 1.

**Figure 1.** *A modular flow for organization's reaction to environmental changes*



Source. Authors' elaboration

Discussing the representation proposed in Figure 1, organization is considered a closed system in which decision maker uses the available resources for re-acting to the environmental changes. This representation is not new, it has been preliminary presented by Lévi-Strauss (1962) under the name of *bricolage*. According to the author, the bricolage refers to the ability of the bricoleur to use available resources in different ways for reacting to multiple scenario through the definition of several organization flows (Johnson, 2012).

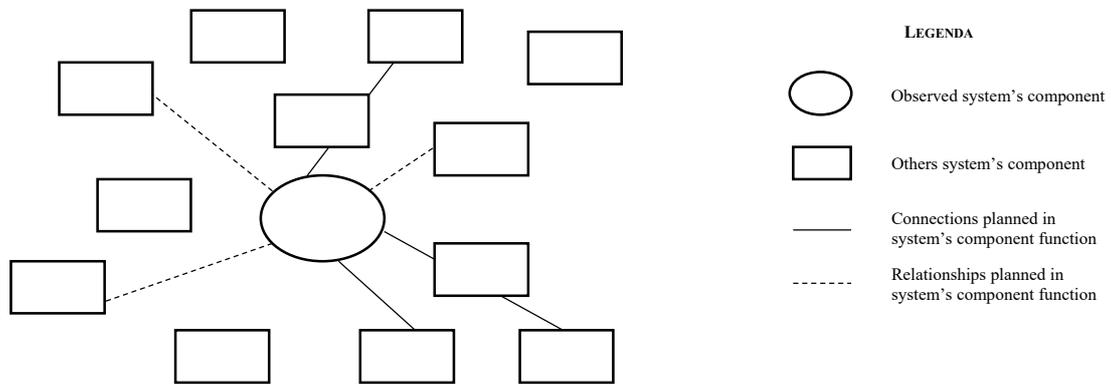
Thanks to the concepts of bricolage it is possible to introduce, in managerial and organizational studies, a renovate view of decision maker as a bricoleur, able to combine - de-combine - re-combine organizations' components for re-acting to environmental changes (Barile et al., 2016a). This representation of the decision maker role is useful for underling the opportunity related to a high level of flexibility in managerial models. Unfortunately, it is not enough for supporting organizations in reacting to environmental changes that require the use of resources that are not available inside the organizations' structure. In this latter case a different approach is required as discussed in the next subsection.

### *Re-acting to the future through the exaptation*

Studies and contributions interested in describing socio-economic organizations are full of references about the possibility for planning and managing organized entities through the definition of rules able to address individual behaviors and decisions (Choo, 1996; Beach & Mitchell, 1978; Rahim, 2017).

This possibility is introduced by the basic assumption that each system's component has a specific function and, as a consequence, it can develop a defined range of connections and interactions inside and outside the system as shown in the following Figure 2.

**Figure 2.** *A function-based representation of a system's component connections and relationships*

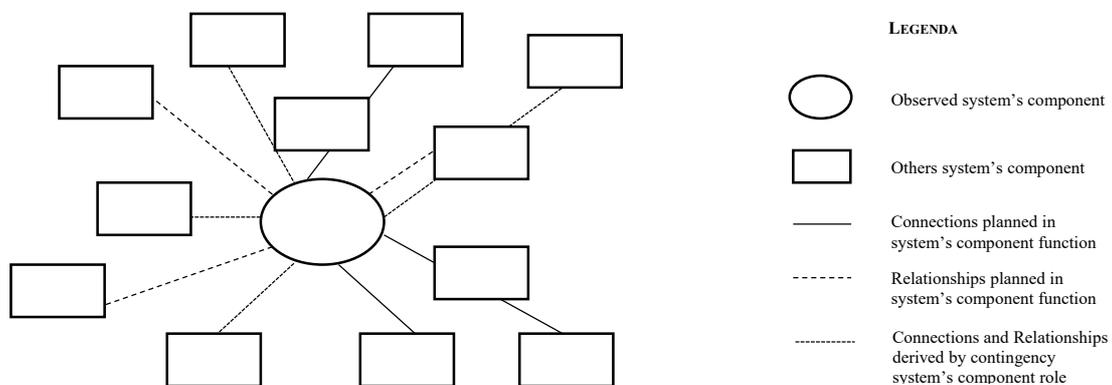


**Source.** *Authors' elaboration*

Despite the general validity of this representation in stable domains, recent advancements in knowledge have underlined the possibility that each systems' components could act following paths that are not directly linked to their functions as a consequence of the need for reacting to unpredictable dynamics (Badinelli *et al.*, 2012). In such a scenario, the concept of *role* has been introduced for explaining that a component with a defined function can build connections and interconnections that are not part of the scheme planned in its function but that could be required by a specific contingency.

As a consequence of this extension in perspective, it is possible to state that the management and understanding of system's component behaviors is affected by an increasing variety and variability as shown in the following Figure 3.

**Figure 3.** *A role-based representation of a system's component connections and relationships*



**Source.** *Authors' elaboration*

The function-role dichotomy has a relevant role in ensuring an effective understanding and management of potential paths through which a system can react to environmental changes (Barile *et al.*, 2013). This dichotomy offers the opportunity for understanding that an organized entity has a structured and static dimension (in which functions are defined) and a systems and emerging dimension (in which roles are incipient).

Focusing the attention of the concepts of function and role it is possible to state that they can be considered as the ‘practical’ application in social science of a more general concepts developed by Gould and Vrba (1982) within the domain of paleontology: the exaptation. According to the authors, exaptation refers to the case in which system’s components “are fit for their current role, hence aptus, but they were not designed for it, and are therefore not ad aptus, or pushed towards fitness. They owe their fitness to features present for other reasons and are therefore fit (aptus) by reason of (ex) their form, or ex aptus” (Gould & Vrba, 1982: 6).

Recognizing the validity of this definition and contextualizing it to the domain of social sciences, it is possible to state that systems’ components can perform activities that are not typically of their function and that are possible as a consequence of their specific features. These features could be not known by decision makers but they are needed for ensuring system’s adaptation to environmental change and systems’ survival over the time (Polese *et al.*, 2018). According to this, exaptation represents in social science a way through which socio-economic configurations can react to the future modifying their structures and dynamics along paths that were not previously imaged (Polese, *et al.*, 2017).

### **Combining bricolage and exaptation in a systems based interpretative framework**

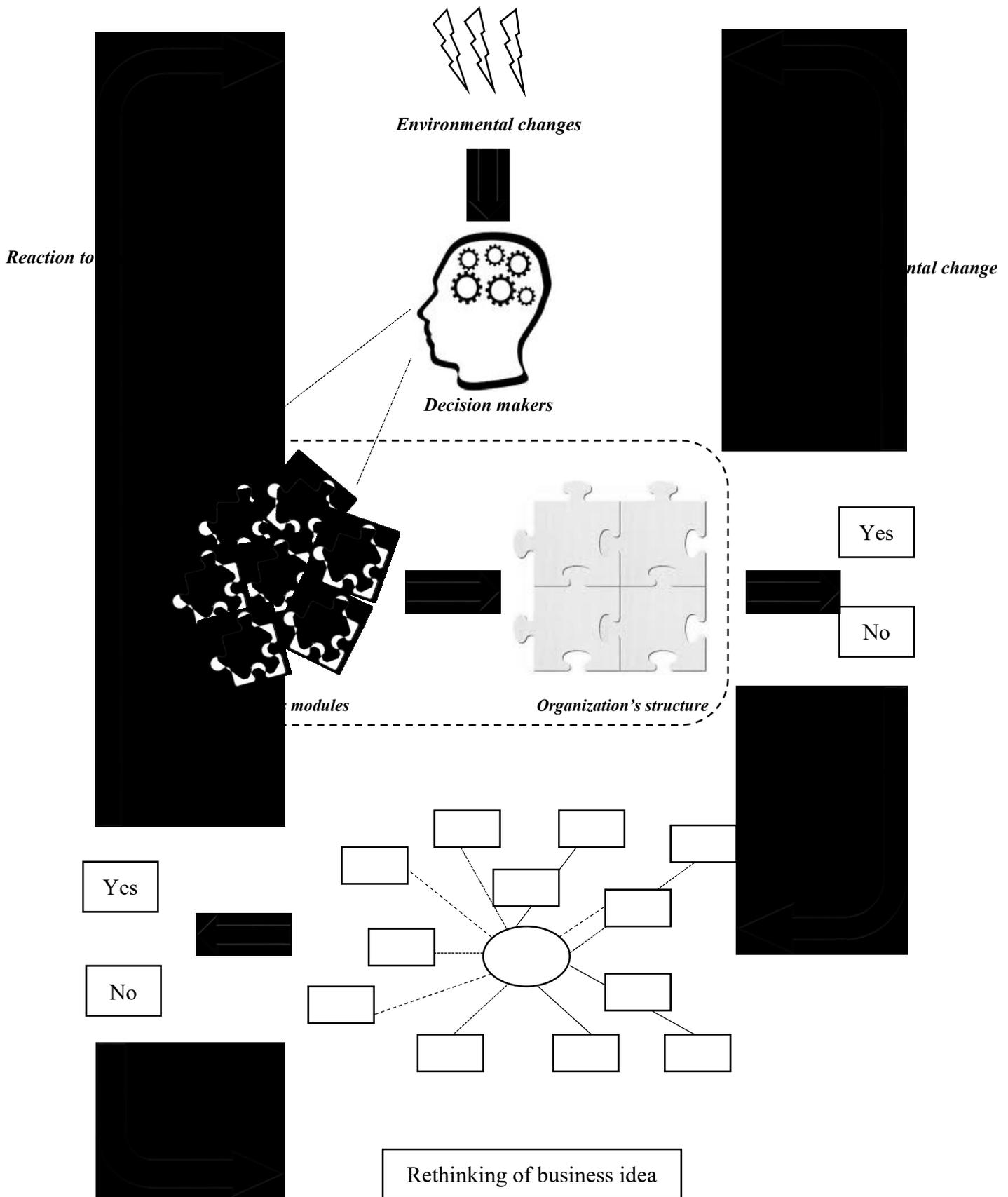
As a result of increasing turbulence in social and market dynamics, the need for developing new interpretative frameworks able to support both researchers and practitioners in reacting to environmental changes is becoming strongly perceived both in managerial and organizational studies. ‘Internal’ and ‘external’ organizations’ flows should be in depth investigated for understanding in which ways decision makers can build efficient, effectiveness, and sustainable paths.

In such a direction, the concepts of bricolage and exaptation, as introduced in the previous section, and discussed in the light of the interpretative contributions provided by the systems thinking, could represent possible building points on which reflect for the definition of innovative managerial models.

Systematizing the concepts above mentioned, it is possible to underline than bricolage and exaptation traces two different paths for reacting to the environmental changes. Specifically, while bricolage refers to the possibility for recombining the components of an organized entity for reacting to environmental changes, the exaptation extends the perspective to the components that are potentially available for an organization also outside its structure.

According to this sequence, it is possible to define an order of actions for decision makers that must react to environmental changes as depicted in the following Figure 4.

**Figure 4.** A systems based interpretative framework for approaching exaptation and bricolage



Source. Authors' elaboration

The framework reported in Figure 4 briefly depicts a possible path through which decision makers can react to the challenges of environmental changes. Specifically, as a consequence of environmental changes the decision makers should initially evaluate the possibility for recombining available resources, knowledge, and competences with the aim to build a more efficient, effective, and sustainable organizations. This first step requires the adoption of a bricolage-based approach, in which evaluations about the combination of available modules should be conducted in the light of compatibilities. If decision maker adopts a bricolage-based approach, he should pay attention to the willingness of modules to interact, and to the possibility for combining modules in shared paths oriented by value co-creation logic (Caputo, 2017; Del Giudice *et al.*, 2016; Di Nauta *et al.*, 2018).

In the case in which the bricolage-based approach is not enough for responding to the pressures of environmental changes, the decision maker has the opportunity for redefining organizations' structure, acquiring or involving resources and components that are extern to organization's boundaries, but that are potentially compatible to organization's aims. In this case, the decision maker can adopt an exaptation-based approach for extending the total amount of resources available for reacting to environmental changes. Also in the case, in which decision makers decide to adopt an exaptation-based approach, as well as for bricolage based-approach, it is necessary to evaluate if the new identified components are aligned to the internal organization's components for ensuring the emergence of collaborative paths inspired by value co-creation logic (Caputo *et al.*, 2016; Del Giudice *et al.*, 2017; Polese and Di Nauta, 2013; Scuotto *et al.*, 2018).

Finally, in the case in which both bricolage-based approach and exaptation-based approach result to be not enough for providing valuable responses to environmental changes, decision makers should evaluate the radical change of its business idea and/or the possibility for changing its market.

## **Conclusions, implications, and future directions for the research**

The increasing rapidity of market and social changes represents one the most discussed topic both in managerial and organizational studies (Archer, 2013; Giddens, 2013). Consolidated managerial approaches and interpretative frameworks seem to be unable to support researchers and practitioners in defining and developing paths through which ensure fast reactions to environmental changes in order to ensure organizations' survival.

With the aim to contribute to the ongoing debate about the ways through which enforce decision makers' ability in efficiently react to environmental changes, the paper adopts the interoperative lens provided by the systems thinking for introducing and contextualize in social sciences the concepts of exaptation and bricolage. Thanks to these two concepts a systems based interpretative framework is developed for guiding decision makers in defining paths and strategies for reacting to environmental changes. This framework underlines the multidimensional nature of decision makers and it underlines the need for analyzing and managing organizations' components in the light of their effective and potential contributions to organizations' survival.

Specifically, proposed interpretative framework emphasizes the ability of decision makers in combining available components and in selecting potential new components for organization's structure. At the same time, the framework recalls the attention of decision makers on the need for evaluating 'conditions for integration and compatibilities' each time than a new organizational form is defined and/or new elements are introduced in a consolidated organizational model. Accordingly, the paper also contributes to the ongoing debate about value co-creation logic because it shows than efficient organizations' reactions to environmental changes are possible only in the case in which

internal components are combined and/or external components are selected ensuring their integrability and compatibility in shared path direct to enhance individual contributions for the achievement of a common aim (Gummeson & Mele, 2010).

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