

**BRITISH ACADEMY  
OF MANAGEMENT**

---

**BAM**  
CONFERENCE

---

**3RD-5TH SEPTEMBER**

**ASTON UNIVERSITY BIRMINGHAM UNITED KINGDOM**

This paper is from the BAM2019 Conference Proceedings

**About BAM**

The British Academy of Management (BAM) is the leading authority on the academic field of management in the UK, supporting and representing the community of scholars and engaging with international peers.

<http://www.bam.ac.uk/>

# An Analysis of Tensions in Corporate Sustainability in Uncertain Times: A Complex View

Domenico Ceglia<sup>1</sup>, Eugênio Ávila Pedrozo<sup>2</sup>, Márcia Dutra de Barcellos<sup>3</sup>, Mônica Cavalcanti Sá de Abreu<sup>4</sup>, Tiberio Daddi<sup>5</sup>

<sup>1</sup>Federal University of Rio Grande do Sul, School of Management, 855 Washington Luiz Street, Porto Alegre (RS) Brazil, [ceglia@gmail.com](mailto:ceglia@gmail.com)

<sup>2</sup>Federal University of Rio Grande do Sul, School of Management, 855 Washington Luiz Street, Porto Alegre (RS) Brazil, [eapedrozo@ea.ufrgs.br](mailto:eapedrozo@ea.ufrgs.br)

<sup>3</sup>Federal University of Rio Grande do Sul, School of Management, 855, Washington Luiz Street, Porto Alegre (RS) Brazil, [marcia.barcellos@ufrgs.br](mailto:marcia.barcellos@ufrgs.br)

<sup>4</sup>Federal University of Ceará, Faculty of Economics, Administration, Actuarial and Accounting, Avenida da Universidade, 2470, Fortaleza (CE) Brazil, [mabreu@ufc.br](mailto:mabreu@ufc.br)

<sup>5</sup>Sant'Anna School of Advanced Studies, Institute of Management, 33 Martiri Della Libertà Square, 56127 Pisa, Italy, [tiberio.daddi@santannapisa.it](mailto:tiberio.daddi@santannapisa.it)

## INTRODUCTION

Hahn, Pinkse, Preuss and Figge (2015) have claimed that the tensions can paradoxically reside in each multi-level dimension, sustainability issues, and temporal and spatial frame. However, they have overlooked the interrelationship between them that could be source of multiple tensions or inhibition of them. Haffar and Searcy (2017) have reviewed the literature about trade-off and win-win thinking on corporate sustainability showing a top-down framework to analysis the tensions. However, the source of tensions should be examined under a ontological and epistemological discussion instead of the claim that constraint and competition as source of tensions under a Natural Resource Based View lens (Haffar and Searcy, 2017). The two frameworks proposed neither address the complex tensions emerge in uncertain times as climate change (Van der Byl and Slawinski, 2015), environmental disaster (Redclift, 1987), and regulatory uncertainty (Marcus, Aragon-Correa and Pinkse, 2011) nor they have proposed a complex view of the interrelationships between uncertainty and certainty in corporate sustainability.

We propose a ontological discussion based on a triological relationship or trinity thinking of sustainability issues claimed by Schad, Lewis, Raish and Smith (2016). The complex thinking by Morin French philosopher offers an epistemology to work with “uncertainty” and “unpredictability” because it deals with the irreducibility of disorder and random; the union of singularity with universality; the incalculability of interactions and inter-retroactions; the relations of complementarity, antagonism and concurrent between disorder, order and organization notion; the dependence of closed system with the environment (Morin, 2005, 2008b). Therefore, the complexity analyses the integrations of relationships between the corporate sustainability issues at multi-level dimensions according to recursive loop. We aim to reformulate the analysis of tensions on corporate sustainability based on three complexity principles: the dialogic, recursive and hologramatic according to tetragram logic. The dialogic principle helps us to understand the duality logic in the unity of things; the recursive principle breaks with the cause and effect logic introducing the auto-organization logic and the hologramatic principle deals with the parts and whole paradox (Morin, 2001). We use the tetragram logic because it contributes to understand the interactions between

order/disorder/organization inherent to the interactions between the sustainability dimensions and the organizational levels.

Primarily, we open a pathway based on complex thinking beginning with an ontological and epistemological discussion for corporate sustainability. Secondly, we depict a complex thinking framework for corporate sustainability to introduce new insights for sustainability, and finally, we open a pathway for understanding the challenges and opportunities for business research based on three complexity principles.

## INTRODUCING THE COMPLEX THINKING FOR THE ANALYSIS OF TENSIONS IN CORPORATE SUSTAINABILITY: ONTOLOGY AND EPISTEMOLOGY

As the sustainability contains many contradictions and complexities, there is an opportunity for researchers to unfold these contradictions and to begin to develop a deeper understanding of the complexities (Van der Byl and Slawinski, 2015). The sustainability tensions, at an individual level, should amplify, mitigate and trigger others at higher levels and the complexity could increase when economic, social and environmental performance enable ambiguity to adopt the strategies (Whiteman, Walker and Perego, 2013; Hahn *et al.*, 2015). However, the mainstream literature is very still blurred about what complexity is although it is cited in the most papers on sustainability tensions (Hahn *et al.*, 2010, 2015; Whiteman, Walker and Perego, 2013; Van der Byl and Slawinski, 2015).

We further paradoxical approach for sustainability tensions with complexity thinking because the tensions provoke disequilibrium in corporate sustainability, thus far from framing competing yet interrelated tensions in a paradoxical perspective in an equilibrium form (Smith and Lewis, 2011). When a system moves from one equilibrium state to other states, the social science theorists implicitly admits a disequilibrium state (Burrell and Morgan, 1979). In the Morin thinking, a system is never completely closed and never wholly open, a disequilibrium state is necessary to search for a new equilibrium state (Morin, 2001). Furthermore, what the science forget is the "organizing," it is the bigger engine and the bigger absent in our science because from one equilibrium state to another equilibrium state, the "organizing" plays the leading role (Morin, 2001).

According to Elkington (1998) the sustainability supports three elements concurrently widespread at multiple levels (Starik and Rands, 1995; Hahn *et al.*, 2015). In detail, we advance our understanding of tensions in corporate sustainability adding the complex thinking by Morin, yet few clear in this field (Smith *et al.*, 2017).

### Ontological Debate

Encountering in an ontological debate according to Tsoukas and Chia (2011) means understanding the key categories to define the nature of its subject matter and frame its inquiries. To search an ontological debate on sustainability means ask you the question: what is sustainability? Although sustainability is an elusive concept (White, 2013), according to an ontological complex view by Morcol (2001), the sustainability could be a reality as an emergent whole where determinist and indeterminism co-exist, the relationships between economic, social and environmental dimension are not linear without predictability between events (Morcol, 2001). The sustainability is a complex and dynamic equilibrium among economic, environmental and social aspects, and the short-, long- and longer-term perspectives (Lozano, 2008).

Unfortunately the organizational studies have neglected the relationships between the three sustainability dimensions, indeed according to Figelj and Biloslavo (2015) the organizational studies are too focused on the duality between exploration and explanation due to the interests by corporate on efficiency and growth issue. The duality (A or B) is the base of the paradoxical discussions (Smith and Lewis, 2011), but we need to embrace on ontological debate when tensions related to sustainability are challenged by corporate because not only two forces are competing, although for practical purposes the idea of *duality* is accepted (Ramirez, 2012). The modern science has based its fundamentals on a mechanistic paradigm where his linear logic had to explicate the interrelated economic, social and environmental issue. Farjoun (2002) have criticized the mechanistic paradigm because of its profit-maximization objective, as it does not help the corporate to pursue several and at times contradictory goals and objectives as sustainability for example.

Starik and Rands (1995) have argued that corporate has interactions with other levels (corporate, business and functional) and systems (individual, organizational, political-economic, social-cultural and ecological) integrated into a web of relationships planned and recognized. Indeed, the ecology is mutilated if it is related only to natural science because it integrates the ecosystem and human society (Morin, 2001). The anthropological development in the industrial era has allowed not only human development but the anthropological complexity (Morin, 2001). The human development has subjugated the environment misunderstand that it is both inside and depend on the environment (Morin, 2001). This lead to a duple complex inscription, the anthroposophy organization in the natural eco-organization and vice versa allowing to understand two vague, multidimensional and mix polarity: it recalls to an eco-(bio-socio)-logy complex reality (Morin, 2001). This complex reality is formed by interrelation between eco-bio-socio systems. These systems create disorder or confusion when it takes together, but they guarantee an order giving life to an organization (Morin, 2001).

A complex unit or system emerge from a tetragram loop between order, disorder, organization and interactions of systems simultaneously complementary, competing and antagonistic (Morin, 2001). These complementary, competing and antagonist forces trigger tensions among economic-biologic-social system (Holling, 2001). The systems compete for resources like time, space, human, financial and so on; they complement the shortage of these resources when needed, and they antagonize when the rights are required, or demands emerge. Therefore, we can affirm that the sustainability represents not only the response to these tensions, but it feeds them through a recursive loop (Morin, 2005, 2008a), so the sustainability integrates the tensions (Allen, Marshall and Easterby-Smith, 2015). It means that sustainability tensions are inherently needed to maintain the eco-bio-socio systems live. In this regard, we are moving from paradox *duality* to complex *trinity* whereas three systems have the same nature, it is the instinct of survival, but they moved separately and interrelated at the same time.

According to the above discussion, we should further academic research on corporate sustainability adding the *trinity*'s genesis to our argument. The instrumental view is most studied in academic research to understand the corporate sustainability according to win-win and trade-off strategies for sustainability dimensions, although an integrative view goes a step forward because it rebalances these dimensions (Van der Byl and Slawinski, 2015). Paradox approach deals with different yet interrelated elements (dualities) that exist simultaneously and persist over time logically in isolation, but irrational and inconsistent when juxtaposed (Lewis, 2000). However, this definition should not be suitable for sustainability in the

corporate because they have their genesis delving in a complex *trinity* and tetragram loop. Moreover, the interrelated systems never are logically in isolation but integrate as a recursive loop. For example, the corporate response to climate change allows social gain and at meantime less institutional pressure on corporate actions.

### Epistemological Pathway

The organization theorists are interested in the science of complexity because of nonlinear and network feedback systems of organizations (Stacey, 1995). This nonlinear feedback behaviour by organizational members occurred because the agents' perceptions could be non-proportional over- and under-reaction or many outcomes for any action (Stacey, 1995). The group behaviour is more than the sum of single ones because of new emergent quality, or propriety emerged in the whole group that retracts on the parts themselves creating the micro emergence (the part is more than the part) (Morin, 2001). The science of complexity promotes that for the corporate to be innovative, creative, and changeable it must be driven far from equilibrium to internalize essential elements as disorder and irregularity (Stacey, 1995).

The complex is well systemic, and the last term was preconized by Ludwig von Bertalanffy (1950). Since past centuries, science has explained the investigated phenomenon reducing it to interplay of units studying them independently of each other, although Bertalanffy (1950) pointed out that in modern science, there is vaguely the “wholeness” terminology. In social science, Bertalanffy (1950) said the society was considered as a sum of human behaviours, but now as a whole greater to its parts implying the significant problems of a planned economy (Bertalanffy, 1950). Morin (1992) alleged that whole is insufficient to apply the open system at social science evocated by Bertalanffy General System Theory because it needs to deepen their roots in their system/organization dimension and connections with critical concepts and to think about dynamic feedback loop among elements simultaneously and complementary, competitive and antagonistic.

### Introducing the Comprehension Dialogic among Sustainability Dimensions

Since the introduction of “triple bottom line” depicted by Elkington (1998), the corporate environmental and social management studies have conceived sustainability as an outcome to accomplish to attend inside and outside public expectations, a stakeholder view (Steurer *et al.*, 2005; Lozano, Carpenter and Huisingh, 2015). In fact, the Corporate Social Responsibility, Corporate Social Performance and Corporate Sustainability have been considered pure management tools to contribute at sustainable development of the planet, although the critics emerge due to the big disconnection between the sustainable development and sustainability, the misunderstand of sustainability dimensions, and the inconsistency with neo-classic theory and practices for sustainability issues (Lélé, 1991; Diesendorf, 2000; White, 2013). Indeed, the social and environmental issues are conceived as means to achieve superior economic performance called “business case” model (Springett, 2003; Kleine and von Hauff, 2009). Another problem is how the management studies look to the environment (surrounding the corporate) and to ecology (the relationship between corporate and natural environment) (Costanza and Daly, 1992; Mebratu, 1998). There is, therefore, an anthropocentric vision of corporate sustainability without understanding the complex relationships with time and dynamic equilibrium between sustainability dimensions (Lozano, 2008).

Although the complex relationships between sustainability dimensions are discussed in various academic works (Hahn *et al.*, 2015; Sasse-Werhahn, Bachmann and Habisch, 2018), the big vacuum is to understand what is the complexity. The logical core of complexity is the dialogue between the separability-inseparability, whole-parts, effect-cause, product-producer, life-death and so on (Morin, 2007b). The principle of dialogic complements two antagonistic processes or concepts that should refuse each other, but which are indispensable and inseparable from understanding reality. There are antagonistic notions of thinking about the organizing, productive and creative processes in the complex world (Morin, 2003). It is dialogical because it deals with the complementarity, antagonism and simultaneity (Morin, 2007b). This principle works at a physical, biological and human world where the dialogic between order, disorder, and organization, through innumerable interrelation, is continuously at work and it takes up the two terms that tend to be excluded (Morin, 2003). The thought needs to set borders and overcome them, opening and closing the concepts, but in the meantime, it needs to assume and feed them (Morin, 2008a). The dialogic help us to see the nature with its relations including a kind of harmonious dance between order and disorder, patterns and unpredictability; uncertainty and chance are constituent elements of a natural organization (Morin, 2002).

According to the complexity view, the sustainability dimensions are complementary, antagonist and concurrent at the same time. For example, when a corporate reduce its environmental pressure concerning resource extractions and waste emissions, human knowledge of planetary boundaries provides a set of regenerative and absorptive capacity to support the Earth's life (Fang, Heijungs and De Snoo, 2015). The complementarity is confirmed when higher environmental performance enables higher economic performance (Hart, 1995; Michael and Paul, 1997). The corporate sustainability competes for resources to allocate to obtain higher sustainability performance (Aragón-Correa and Sharma, 2003; Branco and Rodrigues, 2006). The corporate sustainability looks each dimension only separately and antagonistically according a trade-off paradigm (Hahn *et al.*, 2010), forgetting the qualities that could emerge if it looked at the whole system of relationships between them. A business case model orients the weak corporate sustainability has neglected the co-evolutionary stage, it is a developing a mutually enhancing and beneficial relationship of balance, harmony, and synergy (Landrum, 2017). However, being the corporate a set of physical, biological and human elements, the organization is the engine to move these elements towards corporate sustainability (Morin, 2001; Rasche, de Bakker and Moon, 2013). Morin has done the organization role within a physical, biological and social world obscured by simplification paradigm because the organizing role reveals the complexity among the constituents to reach whole sustainability performance (Morin, 2001; Málovics, Csigéné and Kraus, 2008). The “organization is the arrangement of relationships between components or individuals that produce complex unity or system, endowed with qualities unknown to the level of the components or individuals” (Morin, 2001, p. 117).

#### A Comprehension of Organizational Recursion between Order-Disorder-Organization

According to Morin (2001), an organization is “active” when it generates actions and/, or these actions generate it. However, this (retro) active loop not only regulates, but it transforms the disorders, antagonists, turbulent processes into an active organization. Therefore it called a recursion loop (Morin, 2001). This is a generator by which the production’s outcome feeds the production itself. For example, the individuals produce the society in - and through - their interactions, but society, while all emergent, produces the humanity of these individuals by bringing the language and culture (Morin, 2003). There, the

active organization produces the elements and the effects that are necessary for its existence and generation (Morin, 2001). The organizational recursion is self-organization, a process of disorganization and permanent reorganization, in which the presence of a disorder is accepted, impelling a new order, and a new organization (Morin, 2002). An active organization is produced-by-itself because it produces without end; permanent regenerated because the system is subject to entropic process and permanent reorganized because the system tends to be disorganized (Morin, 2001).

In positive science, the disorder is not accepted because of closed system logic. Thus it is both excluded our reduced to insignificance small part to be managed. The disorder, it is no equilibrium, the flow of matter and energy may be a source of order in the social evolution system (Prigogine and Stengers, 2017). The disorder is a linear, completely irrational and unpredictable and the progress for the human and natural dimension is not possible due to lack of order (Geyer, 2003). The order is established again when much energy is dispensed to return to an equilibrium state (Derry, 1999). Although this process of adaptability emerges at any level, from individual organizations to societies between an interplay of dynamics of the social and ecological system (Boons, 2013), this process needs to be organized (Morin, 2001). Boons (2013) has defined this interaction as causal complexity. Morin (2001) has evoked that this complexity originates from the interaction between order-disorder-organization because they are at the same time interrelated and separate in the social world. According to Morin (2001), the social system is not separate from biosphere, biologic, and human system, in fact Gladwin et al. (1995) have recognized that the organizational science has dissociated the biosphere with the full community searching the critical order of the nature and the society tacitly encouraging the destruction of both natural and social life-support systems, thus it is necessary to reintegrate, include, connect these systems for human development.

### Understanding the Hologram between Corporate and Systems

The system or systemic approach does not exclude the parts to understand the whole (Morin, 2001), we do not intend to follow the "holism" notion because it neglects the parts and interactions among them. The system is an "organizational global unit of interrelations between elements, actions, and people" (Morin, 2001, p. 115). The organization is the "accommodation of relations between things which produce a complex or system unit" (Morin, 2001, p. 117). The organization connects, transforms, produces and conserves the system elements (Morin, 2001). In this respect, the system according to Morin (2001) is an interrelation between whole and parts, emergencies, pressures, inhibitions and antagonism. According to Morin (2001), the system is more complex compared to that defined by Bertalanffy because the pressure from whole to parts and vice versa creates inhibitions/antagonisms to whole and parts. The idea of the system is necessary to understand as the organization gives stability for the interrelations between parts and these with the whole (Morin, 2001). The organization necessity of order and vice versa and as Morin (2001) advocated there is a tetralogy loop between interactions necessary to feed order, disorder, and organization. Morin (2001, p. 53) said: "in order for there to be an organization, there must be interactions: there are interactions, there must be encounters. Thus, it is necessary that there be a disorder (agitation, turbulence)." This is the first principle of complexity called systemic or organizational.

The hologram is defined when not only a part is inside a whole, but also the whole is inside the part (Morin, 2007b). For example, the staminal cells are the parts, and they are in whole

the body, but they contain the information of the whole body. Each cell is part of the whole - global organism - but the whole itself is in part: the totality of the genetic patrimony is present in each cell; the society as a whole, appears in each, through language, culture, norms (Morin, 2003). Lozano et al. (2015) have evoked an integrative and holistic theory for corporate sustainability, but we move away from holist lens because it excludes the parts to study the whole pulling out the emergences/inhibitions from the relationship between the parts (Morin, 2001). These emergencies and inhibitions are a hidden story of relationship web by Starik and Rands (1995).

Starik and Rands (1995) have shown as a relationship web between individual, organizational, political-economic, social-cultural, and ecological levels are interconnected according to an environmentally sustainable organization. Individuals as members of organizations influence and are influenced by daily practices shaping the eco-socio-environmental system of them. They participate in organizational profit of the organizations, they jointly create functional departments as a social group, and they should take care of the natural environment because they feed on it, but at the same time they use part of this profit to life-support, they require a no pollution air, and social condition to empowerment their life. The organizations influence to and are influenced by politic-system through the regulation law, but at the same time, the organization is taxpayers to support the public service for individuals as school, hospital among others. The political-economic system is embedded in the social-cultural system because the last shapes the form through the values that own build over time. These values are shaped but individuals when they are embedded in a social group, for example, if an organization does not have acquired the environmental values, it is not secure that it can create an environmental department. This web of relationships is intended as a hologram when we move away from a reductionist logic because according to Morin (2001) this logic separates/excludes/mutilates the knowledge of the reality.

#### CRAFTING A FRAMEWORK FOR THE ANALYSIS OF TENSIONS IN CORPORATE SUSTAINABILITY IN UNCERTAINT TIMES: DEALING WITH COMPLEX TENSIONS

Although the definition of sustainability remains an elusive concept as it means different things according to different research fields (White, 2013), Lozano (2008) argued that sustainability represents three dimensions with complex and dynamic equilibrium among economic, environmental and social aspects under short-, long- and longer-term perspective. Therefore, we follow Morin thinking to frame our epistemology for corporate sustainability. Morin (2007a, p. 39) has conceived a fundamental principle of "ecologized thinking", that is "not possible to split an independent being (*Autos*) from its *habitat* physical and biological (*Oikos*) cosmos, but we need to think that the *Oikos* is within *Autos* without however that the *Autos* stops being independent.

Following this thinking, we understand the corporate sustainability an auto-eco-organization whereas the "eco" represents the corporate dependence from its economic-social-environmental system and "auto" represents the corporate independence from its economic-social-environmental system. These dependence and independence are established through its inter-retroactions to and from the systems by which the corporate reorganizes to address new sustainability challenges. In fact, sustainability has required a human thinking change from linear to cyclical, objective to subjective, exterior nuts and bolts to interior hearts and mind, analytic to synthetic, reductive to integrative approach (Gladwin, Kennelly and Krause, 1995). The tensions are imposed not only from biosphere (Meadows, Randers and Meadows,



2004), but from the social and economic systems ever more interconnected between them causing disorder/chaos when a limit is overpassed. Therefore, a new order/equilibrium is required for corporate sustainability, and new theoretical lens (Hahn *et al.*, 2015) to tackle the tensions in the corporate sustainability (Hahn *et al.*, 2014). Related to the above discussion, we introduce a framework under complex thinking for analyse the tensions in corporate sustainability, as seen on Figure 1.

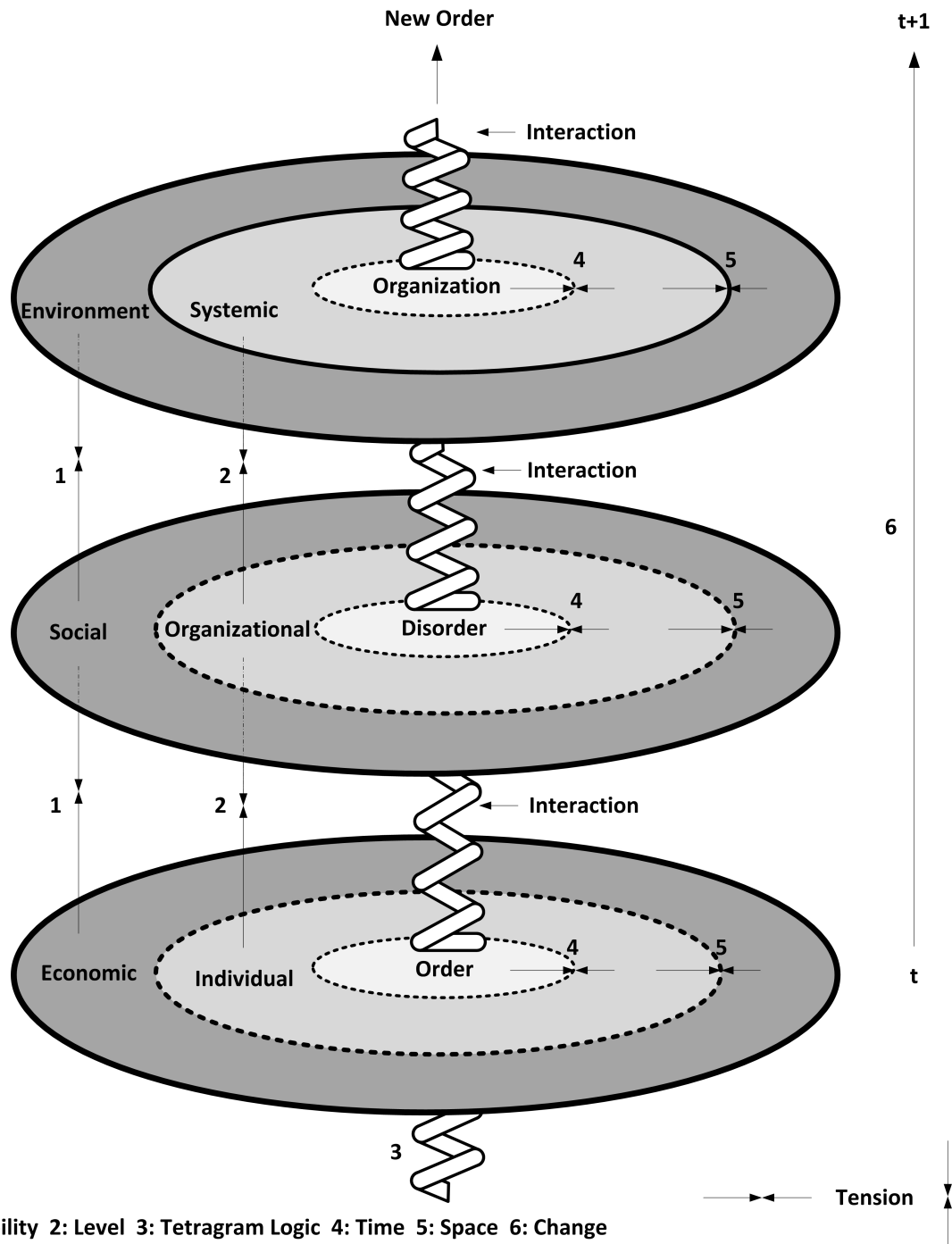


Figure 1 - Framework for the analysis of complex tensions in corporate sustainability

The framework in Figure 1 does not replace the current organizational and management thinking, but it aims to complement these through the Morin complexity thinking. The complexity is in everything, but we do not see it. The core of complexity is the tetragram

logic because it shows that the interactions cannot be conceived without disorder, that is without inequalities, turbulences, and agitations causing the meetings; and order and organization are inconceivable without interactions (Morin, 2001).

### Tetragram Logic

The Tetragram logic proposed by Morin (2005) is not the key for the knowledge, but it formulates the conditions and the incomprehensible limits of the knowledge, therefore the complexity is not the solution for the world problems, but it is the world problem. In the real corporate world, the complexity is perceptible only when we move away from alienation that there is only the order of things. The need of thinking for order/disorder/organization/interactions in isolation and jointly at the same time considering its antagonism, complementary and concurrent relationship, it is the core of complexity (Morin, 2001). The supposed order has reigned with its contradictions, for example, the corporation has engaged with the sustainability problems according to business logic, that is social and environmental issues as a servant of business issues, but the corporate continues to pollute the environment (Whiteman, Walker and Perego, 2013). The pollution of the ecosystem is the disorder of the relationships between corporate and nature, whereas the corporate depends on it (Winn and Pogutz, 2013). Therefore, the disorder is already present in the notion of order because of this interaction. The corporate is not able to control the natural resources because there is a complex relationship between them. The corporate opposes with its biosphere where it extracts the natural resources, with its biophysical mass because the corporate needs to transform it and with the inherently entropic law (Georgescu-Roegen, 1986; Sharpe and Agarwal, 2014). At the meantime, the corporate competes with its rivals for environmental, economic and social resources, as a natural, market, and skills, the corporate complements these resources adding qualities that before they do not have. For example, the corporate needs of biosphere nutrient to transform the raw material into a product with energy prevenient from the biosphere. As said Morin (2005) the organization moulds the elements together within a system causing emergencies and inhibitions on the parts against the whole. The corporate aggregates economic and social value when it employs, sells, invests but at meantime the corporate limits its role to specific function, for example, the worker has his role in the corporate limiting him to particular function; if the corporation wants to change the market, the products or any services the corporate losses the expertise gained over time.

In Figure 1 (3), the Tetragram is represented by a helical spring to show an order/disorder/organization/interaction jointly and separately work at any level (individual/organizational/systemic). These interactions work at the individual level when new sustainability practices are implemented, and a new sustainability cognitive frame needs to be acquired (Hahn *et al.*, 2014) creating workplace stress (Putnam, Fairhurst and Banghart, 2016). At the organizational level, the interactions work for example when a new environmental regulation inhibits corporate activities, or the corporate takes a fine or the corporate losses the "license to operate" to explore natural resource for example. New sustainability business models need to be implemented to manage the stakeholder for example (Matos and Silvestre, 2013). Thus, the corporate changes the old practice, and it enters in the new one. At the systemic level, the interactions are contextual because implies national, international and inter-organizational organizations when new international agreements are set up to reduce carbon emission to change the current extraction model of fossil fuel (Muttitt, 2016) for example.

## Complex Sustainability Tension

The play of interactions between order/disorder/organization that happen in and out the corporate links and separates the economic-environment-social (e-e-s) issues among them at any level as Figure 1 (1) shows. The corporate activities are inherently social because individuals perform them, they are economical because impacts on revenues and costs; and they are environmental because it transforms raw material with energy from biosphere at the same time. However, still, now sustainability is considered an elusive concept because both individuals and organizations “know it when they see it” (White, 2013, p. 217). This generates tensions in the corporate because the business logic imposes a separation of objectives to reach them (Van der Byl and Slawinski, 2015). When the disorder happens at an environmental disaster, as new strict environmental regulations, or something that change the normal pathway or corporate activities, this influences the social and economic dimension at the same time and when a new form of “organization” is encountered to deal with it, the social and economic dimension return to new form of order in and out the corporate. The three dimensions are dynamically complex as Lozano (2008) has affirmed because they are interdependent among them according to an antagonist, complementary and concurrent relationship. They are concurrent because the unique corporate resources need to be deployed to attend different requests according to time and space range (Slawinski *et al.*, 2017). They are complementary because the corporate activities are at the same time e-e-s as below argued and they are the antagonist because of a shortage of corporate resources to attend them.

For this reason, we move away from *duality* when we talk about sustainability, and we have introduced the *trinity* terminology. The complexity thinking evoked by Morin goes beyond the systemic thinking of research in sustainability management as Williams et al. (2017) have evidenced because holistic thinking as required by the authors for future research will induce us towards a misunderstand of sustainability. Morin (2001) has criticized the system and holistic thinking because they forget the parts to study the whole. Being the corporate sustainability the desired objective for various motives, the corporate activities are separate but interdependent between them, therefore not only the cause-and-effect logic is necessary, but it is insufficient to reach the sustainability if we do not look the recursive effect on the corporate activities. Therefore, if each level e-e-s is transformed, generated and inhibited the cascade of cause and effect links could seem linear, but this blurs a complex view because the new values established according to recursive principle are the source of new learning processes (Wals and Jickling, 2002). Therefore, the whole sustainability reached creates new conditions, new micro-emergences and new inhibitions on individuals, corporate and external relationship with customers, suppliers, and governments.

## Complex Level Tension

The paradoxical organizational tensions disguise a complex logic because the interrelated interactions between learning, belonging, organizing and performing go beyond a simplistic duality of contradictions as depicted (Smith and Lewis, 2011). According to tetragram logic, an organization efforts to create a stability of complex unit or system steam from disorder interactions between elements to create order between them (Morin, 2001). In Figure 1 (2), the interactions are necessary to whatever levels and although they appear separate, they are inseparable because it is unconceived to think learning tension without organizing, belonging and performing together. Top leaders act in a learning process when gathering information from integrating multiple stakeholder demands (complexity) to improve corporate social

performance, structure and values are changed (Wong, Ormiston and Tetlock, 2011). Integrate the demands between the multi-stakeholder and society seem to create disorder for corporate, but they act separately at the same time because each stakeholder have a different needs (Freeman, 1984), and this entails a series of interconnections with structure and identity inside corporate. These series of interconnections under complex thinking are antagonistic, complementary and competing among them at the same time (Morin, 2001).

### Complex Time Tension

Bansal et al. (2014) have recognized the “time” as a tension in the corporate decision to align business with society for sustainability issue due to the uncertainty of the future, but they have claimed that it is acceptable when a system is resilient. The time becomes tension when is compared between the short and long run in the corporate decision for sustainability (Slawinski and Bansal, 2015; Mathias, Mckenny and Crook, 2017). Morin (2001) has defined the time as one and multiple, and it is simultaneously continuous and discontinuous, it is in the same movement, the time of derivations and dispersions, the time of morphogens and developments. The sustainability at each level (individual/organizational/systemic) is addressed at different time with different corporate practices as seen in Figure 1 (4), but a short-time decision at individual level does not impede any decisions at organizational level and vice versa, for example, a corporate board member would call for short-term decision about the recycling of chrome for tanning use, and an organizational level the corporate board would call this investment in a long-term for economic reason. The two times aspect represents a tension, but they are complementary because a long-term decision needs to series of short-term decisions. At the same time, both member and board need of the same information to act their decisions, therefore they are concurrent to collect strategic information, for example.

### Complex Space Tension

Schoenberger (2000) has argued that spatial and temporal processes are intimately connected, due to an economic context in continuous change. Therefore, the corporate spatial form is an indeterminate result of some processes that may be in considerable tension. Bansal (2002) have discussed the corporate role within a society ever more environmentally, socially and economically conscious whereas the globalization of production could bring out new tensions. Bansal and Knox-Hayes (2013) have pointed out that space is immutable in the physical world, but it is more plastic in an organizational world, thus ignoring physical materiality is problematic because the corporate relies on the physical world. Figelj and Biloslavo (2015) have shown 21 organizational dualities in the organization, and the spatial tensions emerge in the 8 of them as centralization versus decentralization, global standardization versus local customization, and internal versus external resource among them. Landrum (2017) has argued that the current economic model is that the entire focus inward on the business case confining corporate actions and behaviours to achieve weak sustainability. Dyllick and Muff (2016) have pointed out that the macro-level model originates from ecology science should be introduced at micro-level as well to achieve strong sustainability. Morin (2004) has claimed that the reality polarized between natural eco-organizational and human socio-organizational is vague, the real reality is a complex eco-(bio-socio)-logy constitutes of biological and social eco-organization where the urban, rural, and selvedge interact according to complementary, concurrent and antagonist. Following the Morin thinking, in Figure 1 (5), the corporate works on three interrelated dimensions or spatial domain whereas the tensions emerge due to blur boundaries between them. For

example, when the corporate adopts a decentralization strategy to closer deal with sustainability issue, the closer centralized sustainability issue depends on the other because the corporate is not an isolated "organization", but an eco-organization, that depends from outside input to survive, it is biological eco-organization because it needs to feed its life. In other words, the corporate members depend from outside events closer or not from the physical location of the company. Too often, the corporate sustainability deals with this paradox because polarize these two antagonist poles without too deep the complementary issues. Further, both corporate strategies share the same economic, social and environmental resources to accomplish the results desired. Therefore, decentralization and centralization are concurrent as well.

### Complex Change Tension

Doppelt (2010) has argued that organizational change toward sustainability is not linear because it is messy and usually involves movement backward, forward, up and down. Linnenluecke and Griffiths (2010) have discussed the culture change for corporate sustainability showing that different subcultures could prevent an oriented sustainability mind-set although a surface level changing as the sustainability reporting, employee training, and evaluation measure integrated with sustainability could mitigate employee values and beliefs. Lozano (2014) has suggested to insert institutionalized creativity and learning to foster an organizational change for corporate sustainability advocating that they will fall into the knowledge abyss if they cannot be transferred from individuals to groups, organizations, and finally to society. Figelj and Biloslavo (2015) have observed that organizational stability versus change is the third most discussed issue. Panayiotou, Putnam and Kassinis (2017) have discussed how the organizational change across three different organizational levels (micro/meso/macro) through tensions, unintended consequences and responses produce stability (order) and change (disorder/chaos).

Morin (2001) has claimed that the action can only stabilize an active system. The change guarantees the constancy and vice versa renewing it. The antinomy between activism/invariance, on the one hand, stationary/constant, on the other, not only compete with each other but also co-produce each other. Morin gives an example of a water vortex whereas the meeting and clash of water flux create a stable form. Further, as Farjoun (2010) has brilliantly exposed, there is a part of the change in the stability and vice versa abounding the idea of paradox. This relaunch the idea of hologram conceptualized by Morin, although Morin has said that the information within the parts is present in the whole and vice versa giving as an example the language against the society. In Figure 1 (6), the corporate enters in flux the interactions with the environment carrying perturbation/inhibition/disorder as Panayiotou et al. (2017) have said as well. However, the Morin thinking moves away from Panayiotou et al. (2017) because he has introduced the "organization" an element of the transition to the new order.

Although these notions are isolated between them, they act concurrently because the disorder carries order and vice versa. For example, a new environmental regulation could cause confusion and anxiety within the corporate, but at the same time, the norms contend in this regulation carries the order to new corporate practices. Therefore, the two notions are complementary. The tetragram in Figure 1 (3) knots along the spring within and across the organizational and sustainability level to represent separation and jointly understanding of the tensions between them. The tetragram helps us to comprehend a recursive loop to create new learning during the "organization" filling the vacuum probably left if we mutilate the

creativity institutionalizing. For example, the new norms introduced inhibit some corporate practices, but at the same time, it releases new ones creating a new understanding of sustainability among the organizational level.

## CONCLUSION

We contribute to organization and management studies with the framework represented in Figure 1 because as Schad et al. (2016) have pointed out there are limited studies that use the complex and changing systems to explore paradoxical tensions in the organizations. Our framework shows as the forces in play can be concurrent and complementary at the same time. Putnam, Fairhurst and Banghart (2016) have said that the scholars are now addressing organizational complexity through embracing both poles simultaneously, not necessarily viewed in an antagonistic way. However, as above discussed a complex thinking is when the tensions in corporate sustainability are analysed in a concurrent, antagonistic and complementary way. Smith, Erez, Jarvenpaa, Lewis and Tracey (2017) have pointed out that interdependent contradictions pose complex, irrational, and circular phenomena of study against the current related concepts conceived as simple, rational, and linear. However, we posit according to a recursive circle, as above discussed, the tetragram logic works uninterrupted within multi-level dimensions and sustainability issues. Therefore, the complex thinking posits to fill this theoretical vacuum introducing three pathways according to complex principles.

### The Pathway towards a Trialogical Relationship between Sustainability Dimensions

The *trinity* conceived in this manuscript is not a milestone for organization and management studies, but a provocation for scholars too focus to the business case (Dyllick and Muff, 2016) for sustainability, although Dyllick and Hockerts (2002) have begun this discussion a long time ago introducing natural and societal case for sustainability. The big challenges have undertaken a journey outside the realm of his own familiar domain, for example as Burrell and Morgan (1979) has argued open systems theory as the dominant framework for organizational analysis. Since social science was contaminated by natural science with its scientific methods to discover the “truth” of things, the organizational theorists have endeavoured to polarized the social paradigms to organizational analysis, for example see Burrell and Morgan (1979) the four paradigms divided in two major intellectual traditions “sociological positivism” and “German idealism”. We believe in a third intellectual strand that complements the last two traditions, the complexity thinking of Morin French philosopher, because his thought unites what is divisive, dialogues with its opposites and compliments them, relates the parts with the whole and vice versa, enhances disorder in the order, introduces the subject into the object of study and relates the disorder with the order through the organization. Organizational theorists, therefore, could enrich their understanding and questioning if the sustainability under a complex thinking could be dichotomized between a “social construct” or “given reality” and if the “human nature”, this is the relationship between the “human beings” and the “environment” could be antagonist, complementary and concurrent.

### A Recursive Circle to Understand the Interactions between Levels

The virtuous circle has substituted the vicious circle to address the organizational tensions (Smith and Lewis, 2011). As in the corporate sustainability the boundaries between organizational levels and sustainability dimensions are blurred as Figure (4 and 5) points out,

a recursive circle is introduced through the tetragram logic Figure (3). A recursive circle could reduce the effect of the second law of entropy because the energy dispersed is inserted again in the system to produce a new order. The chaos/disorder has been banished from sociological positivism as it impedes to determinate the cause-and-effect relationship between categories or variables. But it is ever more present in social life. Thus, complex thinking reappropriated of disorder linking it to order because an aleatory part of casual relationships within a disorder/chaos organizes under unknown norms to form a new order. The challenges lie to understand, but not to control the aleatory part and knowing how organizing. Complex thinking does not predict the future, but it learns to re-learning for a new order creating a new pathway. Thus, the academic scholars are invited to understand the aleatory part of interactions between the individual/organization/systemic levels with the sustainability issues and capture the unknown norms to understand how the corporate organizes itself for a new order.

#### Towards a Whole Sustainability against a Partial Sustainability and Vice-versa

Although corporate sustainability is evaluated by its performance achieved across time and space, a partial sustainability or business sustainability 2.0 so called by Dyllick and Muff (2016) cannot challenge the whole sustainability. The levels point out in Figure 1 stands out these inseparable and separable between them, although the simplification paradigm has viewed only the separability between them. What we want to point out is that the sustainability achieved at each level produces, transforms, and regenerates the biological, the physical, the economic, the social, the ecological sphere. The whole sustainability is beyond the creation of “common good” as Dyllick and Muff (2016) have advocated, the whole sustainability is partial sustainability as well. The study of sustainability dimensions has been reduced to the management of company obligations, the company’s existence, and incorporation and government context (Lozano, Carpenter and Huisingh, 2015). This has created partial sustainability because of the decontextualization of the economic sphere in detriment of the biologic, physical, social and ecologic sphere. The academic scholars need to address the cognitive barriers deconstructing their reference frames anchored in the causal-and-effect model. Introducing the hologram principle in their studies, the academic scholars have the major opportunity to contribute to organizational theories for corporate sustainability focusing on the relationships between the smaller changes in corporate to bigger changes and vice versa.

#### REFERENCES

- Allen, S., Marshall, J. and Easterby-Smith, M. (2015) ‘Living With Contradictions: The Dynamics of Senior Managers’ Identity Tensions in Relation to Sustainability’, *Organization & Environment*, 28(3), pp. 328–348. doi: 10.1177/1086026615575048.
- Aragón-Correa, A. J. and Sharma, S. (2003) ‘A Contingent Resource-Based View of Proactive Corporate Environmental Strategy’, *Academy of Management*, 28(1), pp. 71–88.
- Bansal, P. (2002) ‘The corporate challenges of sustainable development’, *Academy of Management Executive*, 16(2), pp. 122–131.

Bansal, P. and DesJardine, M. R. (2014) 'Business sustainability: It is about time', *Strategic Organization*, 12(1), pp. 70–78. doi: 10.1177/1476127013520265.

Bansal, P. and Knox-Hayes, J. (2013) 'The Time and Space of Materiality in Organizations and the Natural Environment', *Organization & Environment*, 26(1), pp. 61–82. doi: 10.1177/1086026612475069.

Bertalanffy, L. Von (1950) 'An outline of general system theory', *British Journal for the Philosophy of Science*, 1(2), pp. 134–165. doi: 10.1093/bjps/I.2.134.

Boons, F. (2013) 'Organizing Within Dynamic Ecosystems', *Organization & Environment*, 26(3), pp. 281–297. doi: 10.1177/1086026613498755.

Branco, M. C. and Rodrigues, L. L. (2006) 'Corporate social responsibility and resource-based perspectives', *Journal of Business Ethics*, 69(2), pp. 111–132. doi: 10.1007/s10551-006-9071-z.

Burrell, G. and Morgan, G. (1979) *Sociological paradigms and organisational analysis*. London, UK: Heiemann Educational Books Ltd.

Van der Byl, C. A. and Slawinski, N. (2015) 'Embracing Tensions in Corporate Sustainability: A Review of Research From Win-Wins and Trade-Offs to Paradoxes and Beyond', *Organization & Environment*, 28(1), pp. 54–79. doi: 10.1177/1086026615575047.

Carollo, L. and Guerci, M. (2017) "'Activists in a Suit": Paradoxes and Metaphors in Sustainability Managers' Identity Work', *Journal of Business Ethics*. Springer Netherlands. doi: 10.1007/s10551-017-3582-7.

Costanza, R. and Daly, H. E. (1992) 'Natural Capital and Sustainable Development', *Conservation Biology*, 6(1), pp. 37–46. doi: 10.1046/j.1523-1739.1992.610037.x.

Derry, G. N. (1999) *What Science is and How it Works*. New Jersey: Princeton University Press.

Diesendorf, M. (2000) 'Sustainability and Sustainable Development', in *The corporate challenge of the 21st century*. Sydney: Allen & Unwin, pp. 19–37. doi: 1 July 1999.



Doppelt, B. (2010) *Leading Change toward Sustainability: A Change-Management Guide for Business, Government and Civil Society*. Edited by 2nd. Sheffield: Greenleaf Publishing Limited.

Dyllick, T. and Hockerts, K. (2002) 'Beyond the Business Case for Corporate Sustainability', *Business Strategy and the Environment*, 11, pp. 130–141.

Dyllick, T. and Muff, K. (2016) 'Clarifying the Meaning of Sustainable Business', *Organization & Environment*, 29(2), pp. 156–174. doi: 10.1177/1086026615575176.

Elkington, J. (1998) *Cannibals with Forks: the Triple Bottom Line of 21st Century Business*. Gabriola Island: New Society Publishers.

Fang, K., Heijungs, R. and De Snoo, G. R. (2015) 'Understanding the complementary linkages between environmental footprints and planetary boundaries in a footprint-boundary environmental sustainability assessment framework', *Ecological Economics*, 114, pp. 218–226. doi: 10.1016/j.ecolecon.2015.04.008.

Farjoun, M. (2002) 'Towards an organic perspective on strategy', *Strategic Management Journal*, 23(7), pp. 561–594. doi: 10.1002/smj.239.

Farjoun, M. (2010) 'Beyond dualism: Stability and change as a duality', *Academy of Management Review*, 35(2), pp. 202–225. doi: 10.5465/AMR.2010.48463331.

Figelj, R. R. and Biloslavo, R. (2015) 'Organisational dualities: an integrated review', *International Journal of Business and Systems Research*, 9(3), p. 235. doi: 10.1504/IJBSR.2015.071828.

Freeman, E. R. (1984) *Strategic Management: An Stakeholder Approach*. Marshfield, Massachusetts: Pitman Publishing Inc.

Georgescu-Roegen, N. (1986) 'The Entropy Law and the Economic Process in Retrospect', *Eastern Economic Journal*, XII(1).

Geyer, R. (2003) 'Beyond the Third Way: the science of complexity and the politics of choice', *British Journal of Politics and International Relations*, 5(2), pp. 237–257.

- Gladwin, T. N., Kennelly, J. J. and Krause, T. (1995) 'Shifting Paradigms for Sustainable Development: Implications for Management Theory and Research', *Academy of Management Review*, 20(4), pp. 874–907. doi: 10.5465/AMR.1995.9512280024.
- Haffar, M. and Searcy, C. (2017) 'Classification of Trade-offs Encountered in the Practice of Corporate Sustainability', *Journal of Business Ethics*. Springer Netherlands, 140(3), pp. 495–522. doi: 10.1007/s10551-015-2678-1.
- Hahn, T. *et al.* (2010) 'Trade-offs in corporate sustainability: you can't have your cake and eat it', *Business Strategy and the Environment*, 19(4), pp. 217–229. doi: 10.1002/bse.674.
- Hahn, T. *et al.* (2014) 'Cognitive Frames in Corporate Sustainability: Managerial Sensemaking with Paradoxical and Business Case Frames', *The Academy of Management Review*, 39(4), pp. 463–487. doi: 10.5465/amr.2012.0341.
- Hahn, T. *et al.* (2015) 'Tensions in Corporate Sustainability: Towards an Integrative Framework', *Journal of Business Ethics*, 127(2), pp. 297–316. doi: 10.1007/s10551-014-2047-5.
- Hart, S. L. (1995) 'A Natural-Resource-Based View of the Firm', *The Academy of Management Review*, 20(4), pp. 986–1014.
- Holling, C. S. (2001) 'Understanding the Complexity of Economic, Ecological, and Social Systems', *Ecosystems*, 4(5), pp. 390–405. doi: 10.1007/s10021-001-0101-5.
- Kleine, A. and von Hauff, M. (2009) 'Sustainability-driven implementation of corporate social responsibility: Application of the integrative sustainability triangle', *Journal of Business Ethics*, 85(SUPPL. 3), pp. 517–533. doi: 10.1007/s10551-009-0212-z.
- Landrum, N. E. (2017) 'Stages of Corporate Sustainability: Integrating the Strong Sustainability Worldview', *Organization & Environment*, p. 108602661771745. doi: 10.1177/1086026617717456.
- Lélé, S. (1991) 'Sustainable Development: A Critical Review', *World Development*, 19(6), pp. 607–621.
- Lewis, M. W. (2000) 'Exploring Paradox: Toward a More Comprehensive Guide', *Academy*

*of Management Review*, 25(4), pp. 760–776.

Linnenluecke, M. K. and Griffiths, A. (2010) ‘Corporate sustainability and organizational culture’, *Journal of World Business*, 45(4), pp. 357–366. doi: 10.1016/j.jwb.2009.08.006.

Lozano, R. (2008) ‘Envisioning sustainability three-dimensionally’, *Journal of Cleaner Production*, 16(17), pp. 1838–1846. doi: 10.1016/j.jclepro.2008.02.008.

Lozano, R. (2014) ‘Creativity and organizational learning as means to foster sustainability’, *Sustainable Development*, 22(3), pp. 205–216. doi: 10.1002/sd.540.

Lozano, R., Carpenter, A. and Huisingh, D. (2015) ‘A review of “theories of the firm” and their contributions to Corporate Sustainability’, *Journal of Cleaner Production*. Elsevier Ltd, 106, pp. 430–442. doi: 10.1016/j.jclepro.2014.05.007.

Málovics, G., Csigéné, N. N. and Kraus, S. (2008) ‘The role of corporate social responsibility in strong sustainability’, *The Journal of Socio-Economics*, 37(3), pp. 907–918. doi: 10.1016/j.socec.2006.12.061.

Marcus, A., Aragon-Correa, J. A. and Pinkse, J. M. (2011) ‘Firms, regulatory uncertainty, and the natural environment’, *California Management Review*, 54(1), pp. 5–16.

Mathias, B. D., Mckenny, A. F. and Crook, T. R. (2017) ‘Managing the Tensions between Exploration and Exploitation: The Role of Time’, *Strategic Entrepreneurship Journal*, 38(12), pp. 2039–2045. doi: 10.1002/sej.1287.

Matos, S. and Silvestre, B. S. (2013) ‘Managing stakeholder relations when developing sustainable business models: The case of the Brazilian energy sector’, *Journal of Cleaner Production*. Elsevier Ltd, 45, pp. 61–73. doi: 10.1016/j.jclepro.2012.04.023.

Meadows, D., Randers, J. and Meadows, D. (2004) *Limits to Growth: The 30-Year Update*. United States: Chelsea Green Publishing.

Mebratu, D. (1998) ‘Sustainability and sustainable development: Historical and conceptual review’, *Environmental Impact Assessment Review*, 18(6), pp. 493–520. doi: 10.1016/S0195-9255(98)00019-5.

Michael, V. and Paul, A. (1997) ‘A resource-based perspective on corporate environmental performance and profitability’, *Academy of Management Journal*, 40(3), pp. 534–559. doi: 10.2307/257052.

Morcol, G. (2001) ‘What Is Complexity Science? Postmodernist or Psotpositivist?’, *Emergence*, 3(1), pp. 104–119. doi: 10.1207/S15327000EM0301\_07.

Morin, E. (1992) ‘From the concept of system to the paradigm of complexity’, *Journal of Social and Evolutionary Systems*, 15(4), pp. 371–385. doi: 10.1016/1061-7361(92)90024-8.

Morin, E. (2001) *Il metodo 1: La natura della natura*. Milano: Raffaello Cortina Editore.

Morin, E. (2002) ‘O Paradigma da Complexidade’, in *Introdução ao Pensamento Complexo*. Lisboa: Instituto Piaget.

Morin, E. (2003) ‘Da necessidade de um pensamento complexo’, *Para navegar no século XXI: tecnologias do imaginário e da cibercultura.*, pp. 1–27.

Morin, E. (2004) *Il metodo 2. La vita della vita*. Milano: Raffaello Cortina Editore.

Morin, E. (2005) *Ciência com Conoscenza*. 8<sup>a</sup>. Rio de Janeiro: Bertrand Brasil. doi: 10.1017/CBO9781107415324.004.

Morin, E. (2007a) *L’anno I dell’era Ecologica*. Roma: Armando Armando s.r.l.

Morin, E. (2007b) ‘Restricted complexity, general complexity’, in *Science and us: Philosophy and Complexity*. Singapore: World Scientific Co. Pte. Ltd, pp. 1–25. doi: 10.1142/9789812707420\_0002.

Morin, E. (2008a) *O Método 3: O Conhecimento do conhecimento*. 4<sup>a</sup>. Porto Alegre: Sulina.

Morin, E. (2008b) ‘The Epistemology of Complexity’, in *On Complexity (Advances in Systems Theory, Complexity, and the Human Sciences)*. England: Hampton Press, pp. 226–378.

Morin, E. and Le Moigne, J.-L. (2000) *A Inteligência da Complexidade*. Peirópolis.

Muttitt, G. (2016) *The Sky’s Limit: Why the Paris climate goals require a managed decline of*

*fossil fuel production*. Washington, D. C. Available at: [http://priceofoil.org/content/uploads/2016/09/OCI\\_the\\_skys\\_limit\\_2016\\_FINAL\\_2.pdf](http://priceofoil.org/content/uploads/2016/09/OCI_the_skys_limit_2016_FINAL_2.pdf).

Panayiotou, A., Putnam, L. L. and Kassinis, G. (2017) 'Generating tensions: A multilevel, process analysis of organizational change', *Strategic Organization*, p. 147612701773444. doi: 10.1177/1476127017734446.

Prigogine, I. and Stengers, I. (2017) *Order Out of Chaos: Man's New Dialogue with Nature*. London, UK: Verso.

Putnam, L. L., Fairhurst, G. T. and Banghart, S. (2016) 'Contradictions, Dialectics, and Paradoxes in Organizations: A Constitutive Approach †', *The Academy of Management Annals*. Taylor & Francis, 10(1), pp. 65–171. doi: 10.1080/19416520.2016.1162421.

Ramirez, G. A. (2012) 'Sustainable development: paradoxes, misunderstandings and learning organizations', *The Learning Organization*, 19(1), pp. 58–76. doi: 10.1108/09696471211190365.

Rasche, A., de Bakker, F. G. A. and Moon, J. (2013) 'Complete and Partial Organizing for Corporate Social Responsibility', *Journal of Business Ethics*, 115(4), pp. 651–663. doi: 10.1007/s10551-013-1824-x.

Redclift, M. (1987) *Sustainable Development: Exploring the contradictions*. Routledge Taylor & Francis Group.

Sasse-Werhahn, L. F., Bachmann, C. and Habisch, A. (2018) 'Managing Tensions in Corporate Sustainability Through a Practical Wisdom Lens', *Journal of Business Ethics*. Springer Netherlands, 0(0), p. 0. doi: 10.1007/s10551-018-3994-z.

Schad, J. *et al.* (2016) 'Paradox Research in Management Science: Looking Back to Move Forward', *The Academy of Management Annals*, 10(1), pp. 5–64. doi: 10.1080/19416520.2016.1162422.

Schoenberger, E. (2000) 'The Management of Time and Space', in Clark, G., Gertler, M., and Feldman, M. (eds) *The Oxford Handbook of Economic Geography*. Oxford: Oxford: Oxford University Press.

Sharpe, S. and Agarwal, R. (2014) 'Strengthening Industrial Ecology's Links with Business Studies: Insights and Potential Contributions from the Innovation and Business Models Literature', *Resources*, 3(2), pp. 362–382. doi: 10.3390/resources3020362.

Slawinski, N. *et al.* (2017) 'The Role of Short-Termism and Uncertainty Avoidance in Organizational Inaction on Climate Change', *Business & Society*, 56(2), pp. 253–282. doi: 10.1177/0007650315576136.

Slawinski, N. and Bansal, P. (2015) 'Short on Time: Intertemporal Tensions in Business Sustainability', *Organization Science*, 26(2), pp. 531–549. doi: 10.1287/orsc.2014.0960.

Smith, W. K. *et al.* (2017) 'Adding Complexity to Theories of Paradox, Tensions, and Dualities of Innovation and Change: Introduction to Organization Studies Special Issue on Paradox, Tensions, and Dualities of Innovation and Change', *Organization Studies*, 38(3–4), pp. 303–317. doi: 10.1177/0170840617693560.

Smith, W. K. and Lewis, M. W. (2011) 'Toward a theory of paradox: A dynamic equilibrium model of organizing', *Academy of Management Review*, 36(2), pp. 381–403. doi: 10.5465/AMR.2011.59330958.

Springett, D. (2003) 'Business conceptions of sustainable development: a perspective from critical theory', *Business Strategy and the Environment*, 12(2), pp. 71–86. doi: 10.1002/bse.353.

Stacey, R. (1995) 'The Science of Complexity: An Alternative Perspective for Strategic Change Processes', *Long Range Planning*, 28(6), p. 124. doi: 10.1016/0024-6301(95)99970-B.

Starik, M. and Rands, G. P. (1995) 'Weaving an Integrated Web: Multilevel and Multisystem Perspectives of Ecologically Sustainable Organizations.', *Academy of Management Review*, 20(4), pp. 908–935. doi: 10.5465/AMR.1995.9512280025.

Steurer, R. *et al.* (2005) 'Corporations, stakeholders and sustainable development I: A theoretical exploration of business-society relations', *Journal of Business Ethics*, 61(3), pp. 263–281. doi: 10.1007/s10551-005-7054-0.

Tsoukas, H. and Chia, R. (2011) *Philosophy and Organization Theory*. Edited by H. Tsoukas and R. Chia. Emerald Group Publishing Limited. doi: 10.1108/S0733-558X(2011)00000320.

Wals, A. E. J. and Jickling, B. (2002) “‘Sustainability’ in higher education’, *International Journal of Sustainability in Higher Education*, 3(3), pp. 221–232. doi: 10.1108/14676370210434688.

White, M. A. (2013) ‘Sustainability: I know it when I see it’, *Ecological Economics*. Elsevier B.V., 86, pp. 213–217. doi: 10.1016/j.ecolecon.2012.12.020.

Whiteman, G., Walker, B. and Perego, P. (2013) ‘Planetary Boundaries: Ecological Foundations for Corporate Sustainability’, *Journal of Management Studies*, 50(2), pp. 307–336. doi: 10.1111/j.1467-6486.2012.01073.x.

Williams, A. *et al.* (2017) ‘Systems Thinking: A Review of Sustainability Management Research’, *Journal of Cleaner Production*. Elsevier Ltd, 148, pp. 866–881. doi: 10.1016/j.jclepro.2017.02.002.

Winn, M. I. and Pogutz, S. (2013) ‘Business, Ecosystems, and Biodiversity: New Horizons for Management Research’, *Organization & Environment*, 26(2), pp. 203–229. doi: 10.1177/1086026613490173.

Wong, E. M., Ormiston, M. E. and Tetlock, P. E. (2011) ‘The effects of top management team integrative complexity and decentralized decision making on corporate social performance’, *Academy of Management Journal*, 54(6), pp. 1207–1228. doi: 10.5465/amj.2008.0762.