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DIVERSITY IS NOT INCLUSION: A FOUR-DIMENSIONAL APPROACH TO CORPORATE CREATIVE-INTENSIVE ECOSYSTEMS

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Abstract. This paper aims at presenting a four-dimensional approach to studying and managing creative-intensive ecosystems, namely flows, spaces, temporalities, and processes. The study departs from a sociocultural approach and draws on the authors' qualitative research on innovation management, historical facts, and related studies on creativity. The research corpus includes 11 semi-structured interviews (13 hours and 37 minutes) with innovation managers with experience in large companies in Brazil and interpreted with a framework analysis technique. The text concludes that the potential of corporate creative processes lies in their ability to manage communication flows, spaces, temporalities, and processes that allow for systemic differentiation between more conservative social arrangements. The dimensions are deductively implied from the results of the framework analysis.

Keywords: communication, creativity, innovation, management, space, time.

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1. Introduction

Innovation has become a mantra in the corporate world. However, at its base, innovative processes depend on an enterprise's capacity to foster and manage a myriad of creative processes without falling into a chaotic state. This paper explores four different dimensions of corporate innovation management drawing on interviews with Brazilian executives who served large companies (Table 1).

The authors' investigation of innovation management consisted of a qualitative and exploratory study. The research corpus includes 11 semi-structured interviews (13 hours and 37 minutes) with innovation managers with experience in large companies in Brazil and interpreted with a framework analysis technique. The framework analysis technique is a deductive technique that seeks to interpret the corpus based on a double reduction process consisting of five steps: familiarization, thematic framework identification, indexing (first reduction), charting (second reduction), and interpretation (Ritchie & Spencer, 1994).

The thematic framework identified 43 emerging themes related to different aspects of innovation management processes, including metrics, key drivers of innovation, funding, networking with external stakeholders, challenges, and communicational aspects, among others. However, only the themes directly related to the four dimensions of creative-intensive ecosystems discussed in this paper will be addressed, as shown in Table 2.

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Table 1. Profile of the companies where the interviewees worked (source: created by authors)

	Scope	Sector	Employees in Brazil	Brazilian operation net revenue in United States dollars
A	Multinational	Food and drink	31 000	5 212 808 235 29
B	Multinational	Mining, cement, and oil	34 658	3 274 509 803 92
C	Multinational	Consumer goods	22 000	2 921 568 627 45
D	National	Health	116 000	271 960 784 43
E	Multinational	Technology	10 000	4 549 019 607 84
F	Multinational	Technology	8200	1 000 000 000 00
G	Multinational	Consumer goods	5109	7 235 294 117 65
H	Multinational	Chemistry	1852	1 021 706 666 67
I	National	Pharmaceutical	5600	396 543 725 49
J	Multinational	Chemistry	2700	882 352 941 18
K	Multinational	Consulting services	13 000	730 132 352 94

Table 2. Thematic framework: four dimensions of creative-intensive ecosystems (source: created by authors)

Dimension	Thematic framework
Flows	Communication dimensions in innovation processes: ■ Need for empathy with employees; ■ Training as a form of dissemination of knowledge; ■ Attention to the role of innovation in the reputation of the organization; ■ Communication of processes and results.
Spaces	External stakeholders involved in the innovation process: ■ Universities; ■ Startup companies; ■ Partner companies; ■ Government; ■ Customers; ■ Ecosystem facilitators (accelerators, incubators, and entrepreneurship promotion organizations). Current challenges for improving innovation: ■ Culture; ■ Communication.
Temporalities	Aspects valued in innovation culture: ■ Long-term vision; ■ Autonomy; ■ Flexibility/agility.
Processes	Governance model: ■ Committee/innovation department with a centralized stage gate; ■ Matrixial innovation management with multiple parallel stage gates.

To investigate the relation between innovation management and creativity, this paper uses a sociocultural approach, which implies the understanding that companies are social systems, but wherein individual biological systems interact in an embodied manner. Note, however, that when the adjective creative qualifies a social system, a differentiation is established between creative-intensive ecosystems and other systems. This matter will be addressed in the following sections.

2. Creative-intensive ecosystems

This paper is about corporate social arrangements whose intentionality is to constantly produce new products, services, or processes, defined here as creative-intensive ecosystems. Such organizations will be addressed as social systems. Hence, the discussion here is about that kind of creativity socially recognized as something new and with social value for a community or society. However, before moving forward, one must break down the concept of a creative-intensive ecosystems.

What is creative? According to recent research by the World Economic Forum (2020) about the future of work, creativity is a human trait highly regarded as having the utmost importance in companies. The literature indicates that providing a consensual definition of creativity is a rather slippery domain. The debate goes back to the 19th century, but perhaps one of the earliest objective definitions can be traced to Stein (1953) in an article published in 1953 (Runco & Jaeger, 2012). In Stein's (1953, p. 311) own words, "creative work is a novel work that is accepted as tenable or useful or satisfying by a group at some point of time".

As the debate goes on, other pairs can be found, for example, originality and value, and originality and effectiveness (Runco & Jaeger, 2012). Others will follow a tripartite variation when considering a creative idea: 1) original; 2) useful, and 3) amazing. Each of the three elements is necessary for an idea to be considered creative, but none of the elements on their own would be sufficient (Simonton, 2018).

A sociocultural approach collaborates with the theory suggesting the need to consider psychological, social, and material – physical and embodied dimensions considered – aspects when addressing creative processes. Creativity, in this case, is seen as "a form of doing or making", namely, a "creative action" (Glaveanu et al., 2020, p. 742). Creative action is performed within social systems in an embodied manner, that is, with an intentionality that perceives the world and expresses it through the body (Merleau-Ponty, 2001). Therefore, a creative is process is not simply social reproduction, but encompasses the singularity and diversity of each human being's engagement with the world (German: *Lebenswelt*).

To the end of this paper, and as a working definition, the adjective creative qualifies social systems that produce original new information which is incorporated back into the system. Information is whatever element that "irritates" the system, demanding an adaptation to the new situation (Luhmann, 2016). In this sense, every social system is creative, but some a more than others.

The working definition of creative, however, does not fully address the expression that appears in the title of this paper: creative-intensive ecosystem. To advance the reflection, an "ecosystem is the interacting system made up of all the living and nonliving objects in a specified volume of space" (Weathers et al., 2013). Eco-, from Greek *oikos*, means the extended family unit (household, members of the family). Therefore, an ecosystem is fundamentally a system where several elements (living and nonliving) inhabit.

To a large extent, the expression creative-intensive ecosystem echoes Howkin's (2010, p. 11) "creative ecologies", defined as "a niche where diverse individuals express themselves in a systemic and adaptive way, using ideas to produce new ideas". Nonetheless, the choice for the expression system is required to be truthful to the theories invoked in this discussion,

such as Niklas Luhmann and Francisco Varela or the reference to ecosystem science presented before. Systems, social or biological ones, are the object of study, not the field of study. From an etymological perspective, the word ecology refers to the study (Latin: *logos*) of the *oikos* (household).

In an ecosystem where human beings inhabit, several social systems co-exist (societies, corporations, interactions, *etc.*), which are autoreferential systems capable of autoproducing themselves, differentiating them from the environment (Luhmann, 2016). Social systems have a structure, the elements in the system, and an organization, how the elements function with each other. A creative-intensive ecosystem, as a social system, will be recognized by its organization and not necessarily by its structure in the same way living beings are identified by their organization (a class) with different structures.

What allows an observer to distinguish a creative-intensive ecosystem is the fact that systems are self-referred and autopoietic, be it a single organism or a whole social system. Living and social systems have a closure that differentiates them from other systems, with the capacity to autoproduce the conditions of their existence coupled with the environment (Luhmann, 2016; Maturana & Varela, 1980; Varela et al., 2017).

Howkins makes a similar point when he writes that "the relationships and actions that count, not the infrastructure" in self-organizing systems – Howkins recognizes that he draws on the vocabulary provided by physics and biology but he does not mention any specific theoretical reference at this point (Howkins, 2010, p. 11). Later in his book, he adds that we need a systems-based theory that takes account of all creative processes, including doing, performing, and making) (Howkins, 2010, p. 33).

For example, in an educational context, one should consider living (human interaction) and non-living (architecture, objects, and even the rules) that orient behavior in that given space. Second, the space of interaction can be limited, meaning that there is an organizational closure that allows for differentiation between the educational environment and other ecosystems (family, professional, *etc.*).

Every ecosystem is in contact with the surrounding environment and other ecosystems, sometimes in a coupled and dependent relationship. A systemic closure does not mean an isolated system hanging in a void. For example, a single human being is a biologically closed system coupled with its environment. Consequently, research can focus on existing exchanges both internally and externally in a chosen period and be limited to a specific space, the structure of its elements and their organization.

But who sets the limits of an ecosystem? One way to answer this question would be: the observer, according to his or her questions if the interactions and elements can be identified, described, and have their fluxes analyzed (Weathers et al., 2013).

However, the identification of a system's limit is not a purely subjective matter. The observable characteristics will guide the identification of a system. The task of the researcher is, in part, to describe comparable structural and organizational differences between systems to identify their limits and understand their organizational closure.

Living and social systems do not only have structural and organizational closure, but they are also autopoietic. Autopoiesis refers to the system's capacity to autoproduce (Greek: *poiesis*) itself. Be it a living or a social system, the elements and organization of the system have

a closed, dynamic, and circular process that allows the system to evolute (Maturana & Varela, 1980, p. 9). The easiest way to understand this phenomenon is to look at how a cell reproduces itself to become a complex living system. The cell can reproduce itself when interacting with the ambiance; it depends both on its structure and organization, and on the interactions with the environment. The concept of autopoiesis can be applied to social organizations (Luhmann, 2016). Therefore, a creative-intensive ecosystem should be able to autoproduce itself, thanks to a specific structure and organization which are interacting with the environment.

A new element that can be incorporated by the system, increasing its complexity, will allow for new ways to interact with the world. In a way, this definition echoes the bipartite definition of creativity of something new and useful, as discussed in the previous section. In system theory's vocabulary, one can speak of an "irritation", a "noise", a new input that is articulated by the system according to its structure and organization.

However, this paper attempts to shed light on ecosystems that are permanently producing socially inspiring, original, and, hopefully, astonishing novelties that impact society. What is then a corporate creative-intensive ecosystem? It is a social system where its operations are arranged in a way that it must produce irritation permanently.

From a phenomenological perspective, there is an intentionality, a driving sense toward the world, that impinges the system to produce novelty incessantly as a way of differentiation from other systems. Luhmann (2016), for instance, speaks of the system's intentionality drawing upon Husserl's (1982) phenomenology. Varela's enaction theory, in turn, will be inspired by Maurice Merleau-Ponty's phenomenological approach to consider the embodied action and its intentionality in cognitive processes within systemic arrangements.

Luhmann's theory does not consider the individual embodied action, but he sets the ground to better understand social systems. Varela's approach, on the other hand, considers embodied action within a systemic setting, opening space to discuss creative processes at the individual level as well. A sociocultural approach will consider both systemic theories and embodied action (Glaveanu et al., 2020, p. 742). As Rampley (2008) notes, Luhmann's approach, though offsetting many theories by not referring to individual subjective agents, offers an interesting provocation to think about creativity and even to raise questions about the need for any specific theory of creativity.

A living or social system is always aiming at maintaining its balance or seeking homeostasis in face of internal and external changes in the environment. Equilibrium is what will guarantee the ecosystem's survival, otherwise, the system is subjugated by the forces of entropy. However, a creative-intensive ecosystem, as discussed in this paper, is paradoxically and permanently producing novelty driven by its intentionality – to the point of even sowing the seeds for its destruction in a Schumpeterian way (Schumpeter, 1961). The concept of intentionality points to where and how the system evolutes in its relation to the world; there is a driving force, a sense that emerges from the system's tension between the possibilities of its constitution (complexity) and the world before it (Luhmann, 2016).

In a creative-intensive ecosystem, and this is very important to differentiate from systems only seeking homeostasis, the production of novelty is a permanent activity, even though there is no need for new adaptations to the environment. Other systems are creative, but only when required. Here, there is also a matter of the intensity of the creative processes

performed. Hence it becomes possible to differentiate, for instance, innovative companies from conservative ones by identifying creative-intensive organizations.

Innovation ecosystems are good examples of creative-intensive ecosystems. See, for instance, MIT D-Lab's initiative to map innovation ecosystems in different cities around the world (Global Ecosystem Dynamics Initiative, MIT D-Lab: Local Innovation Group, 2020). The researchers list the elements which constitute the system such as articulators, enablers, linkers, knowledge generators, promoters, and community. The system's operation and structure allow for a permanent production of novel ideas that feed back into the system and impact society.

3. A four-dimensional approach to creative-intensive ecosystems

3.1. Flows

The research conducted with innovation managers in Brazil indicates that communication flows are vital to fostering innovative culture and processes at companies. The thematic framework revealed several themes which implied a direct need to increase and manage communication flows to produce new insights, such as:

- Involvement of external actors such as universities, startup companies, partners, companies, government, customers, ecosystem facilitators;
- Dissemination of knowledge increases innovation and impacts the company's absorptive capacity for new ideas;
- The challenge of managing internal communication flows that generate new ideas and prototypes.

What was evident in the research is also recurrent throughout human history. Communication has been one of the most important drivers of human evolution as a complex and social species. The cognitive revolution, 70 000 to 30 000 years ago, the tree of knowledge mutation, sparked an intense communicative process that allowed for the development of myths, new social arrangements, and collaboration strategies that set the foundation for humankind to become dominant on planet Earth (Harari, 2015).

The evidence of a cognitive revolution would be more than enough to argue in favor of how communication flows spark systemic creativity, increasing complexity, and, consequently, its possibilities of engaging with the environment. Other historical periods repeated the same pattern, such as the Italian Renaissance or the flourishing activities of Londoners' coffee shops at the turn of the 18th century.

Take, for instance, the Italian city of Florence, under the ruling of Leonardo Bruni where the local intelligentsia had the liberty to engage with different perspectives on pagan learning and Christian dispensation to foster the seeds of a new humanism, architecture, arts, science, and literature. Beyond the political and economic battles behind the thriving Florentine atmosphere, the locals were able to engage in a dynamic organization wherein there was a constant need for experimentation to accomplish something great for humanity (K. R. Bartlett & G. C. Bartlett, 2019).

Another example of the impact caused by different communication flows is the role played by English coffeehouses in the 17th and 18th centuries century London, United Kingdom.

Places like the club *Temple Coffee House* offered adequate space wherein science and sociability became intertwined, fostering new scientific developments and culture at the Royal Academy of Arts, London, and society (Coulton, 2012).

Our present times and places like the city of Boulder, Colorado, United States, testify about the importance of communication flows among local businessmen and women, entrepreneurs, universities, and local authorities to foster a thriving innovation ecosystem. Some even speak of the Boulder Thesis (Feld, 2012).

What happens at the societal level emulates what occurs to human beings individually as a living system. Research shows that the dynamic variation of brain mechanisms, the possibility of activating different neural networks upon contingent situations, has a direct relation to the production of creative outcomes (Abraham, 2018; Feng et al., 2019; Kenett et al., 2018).

In sum, a greater intensity of communication promotes the diversity of the gaze, a criticality for the perception of differences, room for new forms of collaboration, and, consequently, gives space to an increased ability to adapt to changes and produce new ideas and solutions to existing challenges. In the end, communication is the central process that differentiates a social system from its environment (Luhmann, 2016).

3.2. Spaces

The second dimension to be addressed in this paper is space. Not the traditional notion of Cartesian space but lived spaces wherein non-living and living elements interact. The systemic arrangement of objects, whether natural or artificial and the systemic dynamic of human actions constitute the space (Santos, 2023). Therefore, what is at stake are spaces in their physical and symbolic dimensions.

In short, creative-intensive ecosystems "make space" for creativity, as was the case of the Hasso Plattner Institute of Design at Stanford University, Stanford, California, United States (Doorley & Witthoft, 2012). The need for a physical and symbolic space, in a humble trailer on the campus' outskirts, wherein people from different departments and ranks could meet to safely try new ideas and face all kinds of challenges has bootstrapped the history of one of the most acclaimed design schools in the world.

Innovation managers in Brazil also testify to the impact of opening room for innovation. This is what, in part, is behind the drive to go beyond the walls of a company headquarters, extending the limits and capacity to produce new knowledge. The thematic framework revealed links with:

- Universities;
- Startup companies;
- Partner companies;
- Government;
- Customers;
- Ecosystem facilitators (accelerators, incubators, and entrepreneurship promotion organizations).

But it is not only about opening physical spaces. All interviewees highlighted the importance of developing different cultural aspects that foster innovative spaces. Cultural traits such as:

- Pioneering;
- Intra-entrepreneurship;
- Appetite for risk;
- Long-term visions;
- Autonomy;
- Flexibility/agility.

Architecture itself impacts and shapes human behavior. The physical elements of any space direct human action. Thus, the landscape can promote or inhibit communication flows, encounters, or incompatibilities. It can also foster collaboration or protect individuality, both of which are necessary for creative processes. In creative processes spaces for collaboration are as vital as spaces for concentration.

Experiences across different landscapes promote multiple perceptions and the production of new meanings. Sometimes collective work benefits from systemic informal exchanges, as it happens in open offices, which promote interaction between professionals. At other times, it is essential to ensure individual spaces for focused and reflexive tasks.

Spaces shape and are shaped by human action in a circular interactive process. That is an ontological condition for human beings, who share the same vital process with the environment and all its living and non-living elements (Maturana & Varela, 1995).

However, only fancy open offices will not guarantee innovative organizations if proper human actions are in place. Beautiful architecture will not overcome a dictatorial system of human interaction. The emergence of creative-intensive ecosystems depends upon a systemic equilibrium between the intentionality of human actions and the intentionality of the systemic arrangement of objects.

Creative-intensive ecosystems constitute a space, as a set of systems of actions and systems of objects, which will favor creativity. Within such spaces, there must be room for a diversity of experiences: collaboration, concentration, intense communication, silence, that is, different experiences that will enrich the repertoire of possible paths for human imagination to flourish.

What is at stake, when it comes to space, is the fact that creative cognition is not only "embodied" ("to see through tools and materials", but also "embedded" to see with, as an extension of their bodies), but also enacted, when

> "people construct cognitive niches for creativity by interacting with, altering, and moving between settings to engender, sustain, and enhance different modes of creative thinking" (Malinin, 2016).

3.3. Temporalities

Temporality is a particular interpretation of time, in other words, it is defined by how each human being or social organization experiences time. The diversity of different temporalities has a direct relationship with creative processes. Temporalities have their specific dimensions when it comes to understanding creative-intensive ecosystems:

- The proper time for an idea to succeed (Ancient Greek: *kairos*);
- The time dedicated to creativity (Greek: *chronos*);
- The different creative processes that emerge throughout time.

The old meaning of the Greek word *kairos*, as used by Aristotle, means the opportune moment. The philosopher brings up the concept when reflecting upon the contingencies of moral behavior, in contrast with the idea of *chronos*, which refers to the actual time. The idea may well apply to creative insights: today's interest is no longer tomorrow's interest; what is useful to this one is not useful to that one; what is useful in one way is not useful in another, wrote Aristotle (2017) when reflecting upon the contingent aspects that influence moral behavior.

The concept of *kairos* helps us understand why and when an idea is successful or is ahead of its time. It comes as no surprise that the authors' research managers highlighted the need for long-term vision when dealing with creative processes. The recognition of the social value of an innovative product or service is a tricky business. Look at what has happened to so many artists who were considered geniuses only after they had passed away: Vincent van Gogh, Emily Dickinson, and Franz Kafka to name a few.

The concept of *chronos*, in turn, is equally important. Creativity requires chronological time to have a slot on the actual schedule. There is a discipline to managing time and trying out new ideas (Sinfiel et al., 2014). This time management is very much like the effort to find time to exercise and stay healthy. For most companies, chronological time is a scarce asset these days, and creative time is frequently overrun by operational performance indicators and profit goals. The situation is not so different in schools, wherein curricula every so often favor content required to enter universities, sometimes under the pressure of parents themselves. Society should not ignore performance indicators or more formal content in school; however, the issue is about the time reserved for creativity.

Chronos is also the place for another important debate. When are human beings the most creative? The creative potential of every human being is immense and can be limited over time, as shown by Land and Jarman (1993) and who researched 1200 children for 10 years and then passed creativity tests to 200 000 adults. Land and Jarman (1993) concluded that, by the age of 5. 98% of children had completed the highest level of creativity in the established scale, a figure that drops to only 2% by the age of 31.

Whether or not to limit creativity is a political decision for any society. Throughout life, when properly stimulated, different creative modes develop. David W. Galenson, who studied the creative heights of painters, authors, and Nobel laureates, identified two types of creativity: conceptual and experimental. His work shows evidence that these two different modes of creativity may be related to age (Galenson, 2009).

For instance, in the fury of his youth, at the age of 26, Pablo Picasso, a conceptual creative, breaks all the rules of Cubism. On the other hand, Paul Cézanne, an experimental creative, finishes his masterpiece at the age of 67: *The Bathers* (French: *Les Grandes Baigneuses*, 1898–1905). In short, the hypothesis is that young people exercise their creativity loaded with fewer rules, but at an older age there is a wisdom that connects the dots of a life full of experiences and a larger repertoire. Therefore, the gloomy picture depicted by Land and Jarman has less to do with biological characteristics than with the social conditions to exercise creativity. The possibility of counting on conceptual and experiential creativity may be key for innovative processes.

3.4. Processes

The fourth and last dimension to be addressed is process, as the tacit or formal rules that allow for communication to occur. Creative-intensive ecosystems are social arrangements that can be differentiated by their organization, and the processes in place that guarantee their functioning and interactions. To be able to produce ideas is not sufficient to be considered creative. As proposed in this paper, the idea must add value to the system. In other words, the idea must be incorporated into the system's organization helping it to keep on existing.

To go beyond the idea requires some sort of discipline, method, or framework that will allow for testing, sketching, and prototyping before it becomes valuable for the system. There is a long tradition in creative research that points to the possibility of training people to be more creative. Divergent and convergent thinking, for instance, has long been promoted as a technique to enhance creativity (Guilford, 1950; Osborn, 1953). More recently, new research suggests advancing creative training towards a theory of narrative creativity (Fletcher & Benveniste, 2022).

The discipline required for creativity in social systems cannot be overlooked. Be it Picasso's 42 preliminary studies for the *Guernica* (1937) or the uncountable attempts made by Thomas Edison – "I have not failed 10 000 times – I've successfully found 10 000 ways that will not work", he once said – there must be some sort of process in place to achieve success.

The research with innovation managers in Brazil reinforces the need for processes. For instance, the thematic framework revealed two main innovation management models:

- Committee/innovation department with one centralized stage gate;
- Matrixial innovation management with multiple parallel stage gates.

For those unfamiliar with innovation management vocabulary, the stage-gate model is the process that controls de development of an idea to become a product for the consumer. In short, there is a gate to decide whether an idea should go to research and development, and another gate that determines if the prototype should go into production and to the market.

In science or art, the creative process takes advantage of certain initial chaos but requires discipline and method to achieve results. Paradoxically, the risk is becoming a hostage of the method. The process can turn into a cage for creativity. Any method allows for some answers, leaving other possibilities behind. Diversity, again, of approaches to a creative challenge may be key to more creative answers. This is in part, what is behind the well know dynamics of scientific paradigms revolutions (Kuhn, 1975).

4. Conclusions

Every social system produces new elements that are constantly incorporated into the system, hence useful, in order to adapt to the environment – the new information may be not original though in terms of adaptation if compared to other systems. The distinction between a creative-intensive ecosystem and other social systems is its intentionality to permanently produce new elements, beyond their needs of adaptation. This approach, however, requires going beyond systemic theories and encompasses phenomenological approaches to "embodied action".

Flows, spaces, temporalities, and processes, these four dimensions are all imbricated in every creative-intensive ecosystem. They are part of an organization that allows for new ideas to emerge, be tested, and be socially validated. One can change the structure, for instance, speak of educational spaces and not industrial spaces, art or science, a formal environment, or an informal community, but the intensity and accomplishments of every creative-intensive ecosystem, in whatever field, will depend on the four dimensions discussed in this paper.

What is interesting to note in each of every four dimensions is that diversity plays an important role. Diversity of communication flows will increase the repertoire and allow for comparison; diversity of spaces shapes different behaviors such as collaboration or individual concentration; diversity of temporalities, brings to the table conceptual creativity and experimental creativity, diversity of processes allows for answering old questions in new ways.

Though the potential of creative processes lies in diversity, this is not enough. The challenge is to include the diversity of human experiences, that is, to make diversity work, in favor of creativity, as one of my communication students, Renata Juliotti, once told me. Diversity is a given, it is part of nature, an ontological condition for human beings; making it work toward common goals is the challenge of every creative-intensive ecosystem.

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