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Business Systems Laboratory

E-BOOK OF ABSTRACTS
FIFTH BUSINESS SYSTEMS LABORATORY INTERNATIONAL SYMPOSIUM

COCREATING RESPONSIBLE FUTURES IN THE DIGITAL AGE:
EXPLORING NEW PATHS TOWARDS ECONOMIC, SOCIAL AND ENVIRONMENTAL SUSTAINABILITY

UNIVERSITY "FEDERICO II" OF NAPLES
JANUARY 22-24, 2018

ISBN 9788890824265

EDITOR
GANDOLFO DOMINICI

ONLINE FREE VERSION

Business Systems
B.S.LAB
E-book Series

COCREATING RESPONSIBLE FUTURES IN THE DIGITAL AGE:

Exploring new paths towards economic, social and environmental Sustainability

5th Business Systems Laboratory International Symposium

Università di Napoli "Federico II", Napoli - January 22-24, 2018

BOOK OF ABSTRACTS

Editor: *Gandolfo Dominici*

ISBN 9788890824265

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While focusing on the Systemic perspective the Symposium is also open to all the scientific approaches in order to foster constructive debates and confrontations to create new perspective of research and practice in the field of business.

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"Cocreating Responsible Futures in the Digital Age"

Inter, Intra, and Multi-Disciplinary Teams That Really Succeed

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ABSTRACT

As professionals of the 21st century, we are witnessing an important change in the paradigms that govern the development of solutions for the digital society in which we live immersed, and the knowledge required to offer such solutions to new challenges. Today's solutions, and even more importantly those of the future, need to embrace a holistic vision, typical of Renaissance thought, for the challenges that the society and business organizations are expected to face on a daily basis. This is in contrast to the fact that most professionals of the 21st century have been trained in the Cartesian and Newtonian thinking of ever increasing specialization, based on reductionism and particularization, which focuses on the parts rather than the whole, assuming that by solving each part separately a global solution can be achieved, ignoring the characteristics of interactions among the parts that give rise to the system's fundamental nature.

This situation incorporates a layer of difficulty when dealing with the complexity and scope of the problems and situations we face today, because professionals expected to solve such problems are qualified in their specializations only, and thus cannot solve problems that require a holistic perspective. This situation is even more important in the context of ever increasing information flows, making it essential for professionals to work together in order to achieve better solutions. In this situation, it is critical that specialists work in a multidisciplinary fashion. But, what does it mean for a team of technologists; such as automotive, electrical, electronic, industrial, computer engineers, and social scientists; to work together to build, for example, an autonomous vehicle?

Systemic thinking seems to be the solution to a holistic approach to complex problems of today and the future. However, how do we make teams of specialists to work together using systemic thinking? Can we use existing methodologies to approach complex problems? Are our professionals prepared to work in a multidisciplinary way, using systemic thinking in a replicable and systematic fashion? As stated by Sull and collaborators (Sull *et al.*, 2017), "describing a strategy favors complexity, but executing it requires simplicity." This project focuses on developing a methodological guide for placing different teams into complex situations, and guiding them into creating an effective and results-oriented reorganization to accomplish the desired goal. This methodological guide resulted from our analysis of an extensive set of diverse technological and human processes in existence today, documenting whether they include systemic thinking or not. The results clearly indicate that they do not, thus rendering a conclusion that professionals who follow such processes do not follow systemic approach to problem solving. Consequently, we cannot expect that professionals approach their work holistically if their training and processes they follow do not endorse systemic principles.

Beyond the problem of professionals not being exposed to systems principles and holistic perspective, there is a second handicap hidden in the term "multidisciplinary teams." This term often represents just a code word for "more than one discipline," which severely over-simplifies the phenomenon that may take on any one of the following forms: inter-, intra-, and multi-disciplinary problems. Holistic thinking and problem solving are often different in each of those cases, thus rendering it critical that professionals understand the true nature of the team and the problem they are attempting to solve.

From our experience with using systemic thinking to solve complex problems, we propose an adaptation of the Soft Systems Methodology (SSM) (Checkland, 1993, 2000), that can be followed by a team of professionals who are attempting to address a complex problem jointly. This adapted methodology can be systematically used to carry out inter-, intra-, or multi-disciplinary projects in a holistic way, taking into account that most members of the team have not had training in systems thinking. SSM is capable of dealing with complex problems requiring holistic solutions, and so this work aims at addressing the complexity of teams that need to organize in effective ways for achieving collective goals for which differentiating among inter-, intra-, and multi-disciplinary teams for facing problematic situations through a methodological guide is a plus to current management and leadership trends.

Keywords*:* multi, intra and inter disciplinary holistic works, systemic thinking to cocreate.

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Generativity Space:

A paradigm shift in collective value generation

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ABSTRACT

There are many visions of the future of the economy, markets and value exchanges. Some of them propose decentralization of transactions, in an almost peer to peer exchange technologically mediated by blockchain platforms. This including going away from fiat currency exchanges, giving place to other ways of valuating flows, such as cryptocurrencies.

Within the currently prevailing industrial mindset and economy, value generation within a system involves several assumptions: There exists a need from a market, a promise to fulfill that need, a value offering created by a supplier, a value flow from the supplier to the demanding actor, and a compensation of some kind in reciprocity for the received value. That dynamic value exchange closes a dialogic and resource flow loop similar to that named workflow by Fernando Flores (Flores et al, 2000).

If we extend that workflow to a network of workflows, the construct may take the shape of a value network (Allee et al, 2015), in which there are several roles that act as sources and recipients of dynamic resource flows.

This type of common market dynamics exhibits the following behaviors, features and attitudes: Value exchanges are transactional. Transactions have to be closed. There exists an expectation of reciprocity. The attitude is that of quid pro quo, meaning that each party expects something in return after she has offered something to the other party; and egocentric. They are usually anchored in fear and in scarcity.

This work proposes an alternative to the aforementioned industrial mindset construct: The Generativity Space.

This alternative is very different from the traditional value exchange that may be mapped in causal loop diagram, in a value network, or in a value flow stream diagram.

First of all, the generativity space isn't an exchange. Each actor in the space generates value, which can have many types of expression. Eventually, similarly to a ripple caused by throwing a stone in a pond, the value propagation will reach another actor that will perceive and experience that effect. As all actors would be behaving the same way, rather than a value network, what would emerge is a value propagation field, with an emerging experience: a commons, human being and values centered gain, expressed in a diverse set of value dimensions.

Actors in a generativity space let go of ego. In a generativity space there aren't transactions.

A generativity space isn't egocentric, but commons-centric. There aren't expectations of reciprocity in a generativity space. A generativity space is boundary/less or its boundary is porous. In a generativity space there is no room for a quid pro quo attitude. Value can propagate from any actor to another, therefore there aren't any needs expecting a promise nor a specific satisfaction and compensation workflow loop to close.

The value propagation field will affect all actors over time. Modeling of each value ripple is given shape with the conjecture that human contribution in a generativity space is dependent on time, attention, and experienced value, and inversely proportional to actors' ego.

There are preconditions for belonging and being in a generativity space: Co-creating a commons and a values centered attitude, mindset and behavior while unlearning the industrial mindset, with its deeply ingrained concepts, constructs, feelings and behaviors.

In the bridging phase from the latter to a human generativity mindset, what is advised is to define safe sandboxes where the new can be tried, tested and experienced over time while still living within the industrial mindset driven culture.

Keywords: Value, Field, Propagation, Human Values, Commons.

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Platform Innovation: From Technology to Leadership Platforms

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ABSTRACT

Introduction

Digital business is the creation of new business designs by blurring the digital and physical worlds. It promises an unprecedented convergence of a) people, b) businesses and 3) things/smart things/smart machines that changes existing platform business models and creates new revenue opportunities and platform designs (Cearley et. al, 2017; Yablonsky, 2016, 2017).

In digital business, business and technology are inextricable. To model the business, managers must understand what is needed for the business to achieve its goals, and how these goals translate into actionable strategy. For example, turning products into digitalized services that generate a steady revenue stream implies significant changes within all the other components.

As it was shown by Brousseau & Penard, 2006; Gawer, 2009; Osterwalder & Pigneur, 2010; Zott et al., 2011; Nylen & Holmstrom, 2014 digital business requires much more than technology (for

example, leadership, talent and skills, and new business models). Digital business platforms empower flexible and dynamic digital business (Gawer, 2009; Yablonsky, 2013; Gawer & Cusumano, 2014; Hagiu & Wright, 2015). To architect a digital business platform, managers must guide their business and IT peers to take a business-driven, outside-in approach. Unlike a traditional business, with a clear inside and outside, a platform provides the business with a foundation where resources can come together in a different combinations — to create value.

Some resources may be inside, permanently owned by the company; some will be shared; and some can come from outside ecosystem. The value comes largely from dynamic connection of the resources and actors, and the network effects between them.

The platform design facilitates matches among providers and consumers ("users") or the creation or exchange of goods, services and social currency, so that all participants can capture value.

Answers to the question where the value could be captured are not limited to digital business platform technology decisions, but also include businesses, markets, economics, partners, customers, human capital, processes, information and technologies.

This paper addresses the questions: What are the necessary platform components (technology, leadership, talent and skills, delivery, trust, marketing, ecosystem and business models) required to support the capabilities of digital business innovations? How they should be organized and managed?

So we investigate existing innovation platform frameworks by analyzing different dimensions and layers of platform concepts. Particularly, we look at innovation platforms and examine how platforms' providers are managing interactions between different groups of platform ecosystem actors (contributors) in order to receive new ideas, feedback and solutions for improving consumers products and services. As a result we propose a strategic framework for innovation platform management.

The remainder of the paper is structured as follows. First, we discuss about the methodology.

Than we start an overview of the current understanding of platform research. Third, we outline multidimensional platform innovations framework. Finally, the results are discussed, including the implications for theory and practice, and further possible research directions are outlined.

Research design and methodology

During the exploratory and descriptive phases of the work secondary sources are mainly used. These are books, scientific and professional articles in journals, and also information from professional online communities.

Primary sources were used as well. Qualitative empirical study was conducted in order to acquire relevant data to get opinions of companies' top management from industries that might potentially use and/or be interested in providing platform for consulting innovation services. As the approach implies we chose to use the semi-structured interviews to get in-depth answers from our respondents.

After the framework had been applied for relevant firms, the results enabled an evaluation of the appropriateness of the framework. Required modifications were identified and a refined framework is proposed.

From Technology to Leadership Platforms

Lets define what are the platform building blocks an enterprise needs to support digital business.

We have selected such dimensions of platform innovation (Figure 1).

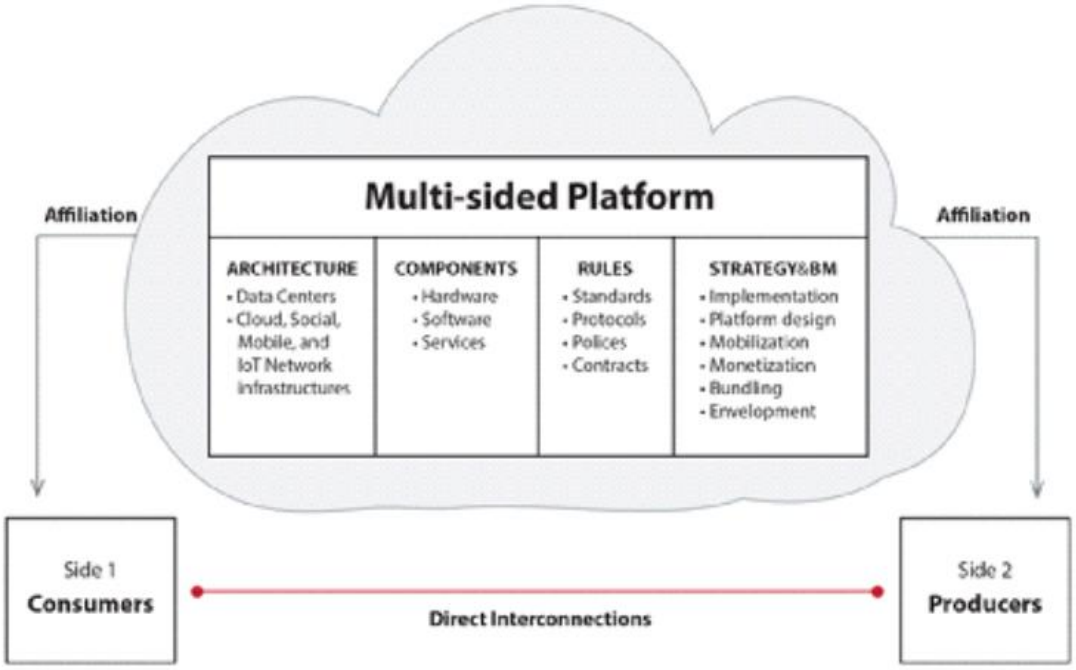

Figure 1. Platform building blocks

Three basic platform dimensions:
– components,
– rules, and
– strategies.

Four proposed additional platform "actors/sides" dimensions:
– Partners,
– Customers,
– Employees, and
– Smart Machines (Smart things).

Innovation technology dimensions (cloud computing, big data, mobile, etc.).
We propose such 7 main platform types dimensions related with seven dimensions of platform innovations:
– business model/value platform,
– leadership platform
– talent platform,
– delivery platform,
– promotion platform,
– trust platform,
– technology platform.

We provide a multidimensional platform innovation taxonomy/lightweight ontology, which is a conceptualization and formalization of the elements, relationships, vocabulary, and semantics of different dimensions of platform innovations (Figure 2).

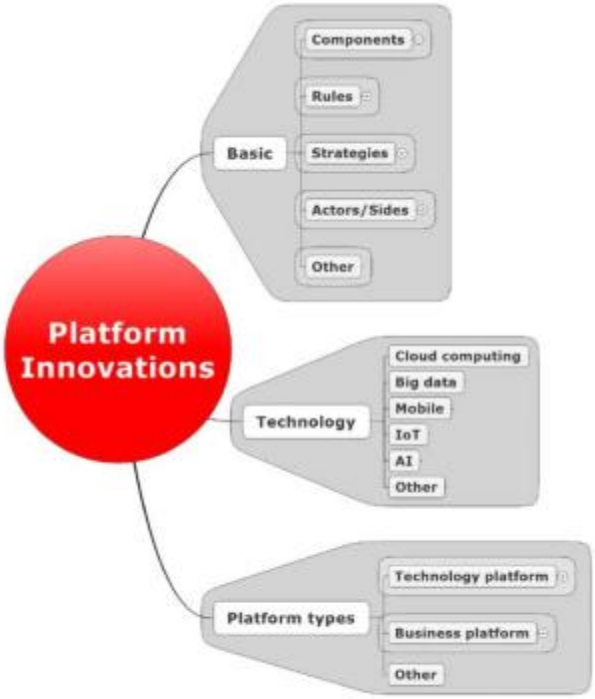

Figure 2. Platform innovation taxonomy

Usually the first six mentioned platforms are supported by technology platforms in seven overlapping areas:

− Information systems platform (ISP) — Supports the front and back office and operations,

such as ERP and core systems.

− Customer experience platform (CEP) — Contains the main customer-facing counterparts, such as customer and citizen portals, omni channel commerce, and customer apps.

− Data and analytics platform (DAP) — Contains information management and analytical capabilities. Data management programs and analytical applications fuel data-driven decision making, and algorithms automate discovery and action.

− IoT platform (IOTP) — Connects physical assets and smart machines (smart things) for monitoring, optimization, control, analytics, and monetization. Capabilities include connectivity, analytics and integration to core and OT systems.

− Ecosystems platform (EP) — Supports the creation of, and connection to, external ecosystems, marketplaces and communities. API management, control and security are its main elements.

− Blockchain platform (BP) — Supports the creation of trust.

− Integration platform (IP) — Supports integration of all above platforms that allows for maximum flexibility to support business transformation demands.

Conclusions

We proposed the new concept structure and definition of the multidimensional platform innovations. With the right set of concepts in hand management can forge a new operating model for the platform company, one that is designed to withstand future market disruptions. This process starts by identifying the most important platform components needed for success. A clear and precise description and structuring of the information of the innovation multidimensional platform components are prerequisites for a common understanding of the innovation platforms.

We offered an innovation multidimensional platform components taxonomy/lightweight ontology, which is a conceptualization and formalization of the elements, relationships, vocabulary, and semantics of different types of innovation platforms. It is structured into several levels of decomposition with increasing depth and complexity. Ontologies, taxonomies and other types of controlled vocabularies are the preferred means to achieve such a common understanding by specifying the terms of the platform's domain, disambiguating them from each other, controlling synonyms, and structuring the domain via term relationships.

A digital platform innovation strategy should answer the question: "How do we use a digital platform (business models, leadership, talent, delivery, trust and IT infrastructure platforms) to enable a digital business model or work with some other organization's business model design?".

This paper looks at emerging strategic issues that are becoming important and will require action in the nearest future. The evaluation logic presents a tool that managers, company owners and investors can use for identifying innovation multidimensional platform components to interact with different groups of contributors in order to receive new ideas, feedback and solutions, so that it can be later used to evaluate the effectiveness of innovation platforms, and in decision-making regarding the design of the value offering of a platform products and services.

Since the framework has been specifically designed for evaluating the innovation potential of platforms, it should prove to be particularly convenient for analyzing different types of platforms. It can be used not only to evaluate the effectiveness of innovation platforms, but also in decision-making regarding the design of the different value offering of an innovation multidimensional platform components and products/services.

We developed a diagnostic tool that supports platform firms in taking the first step of implementing the framework (Yablonsky, 2018). Based on the framework, the tool consists of Likert-style questions. Here, organizational members are asked to score the firm’s current platform operations by assigning a value for three questions in each key dimension.

This paper makes a number of contributions. First, we offer a deeper understanding of the evolution of research on platform business model innovation through an ontological map that identifies the key thematic areas in the literature. Second, we develop a multilevel model that clarifies the concept of platform BMI, by identifying its drivers, contingencies, and outcomes.

Third, this paper provides clear and specific directions for future research as well as suggestions about research design, creating an informative road map for the future.

Keywords: economy of innovations; digital economy; digital business; multi-sided platform; business model/value platform; leadership platform; talent platform, delivery platform; trust platform; technology platform

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Service innovation within service system networks: a business transformation perspective

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ABSTRACT

Relationships, networks, interactions, value co-creation are all considered to characterize modern service operations. In this dynamic and turbulent environment, enterprises need to find new resources in order to explore and develop new service value propositions. However, collaboration for service innovation within business networks is not an easy task. It may require transformative change that may have critical impact on the strategy, the structure, and/or the operations of an organization. Our research aims to shed light to this business challenge through a Service Science viewpoint. In this article, we present a model for helping a service system (i.e. a business firm): a) understand the key areas that it needs to account for, in order to participate in a SSN; b) assess the impact of such a participation, in terms of transformative changes that it may need to impose on itself.

Keywords: service science; service systems; service innovation; business transformation; business ecosystems; service system network; e3-value

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Collective Reflexive Capacity: The Highest Level of Capacity, or Challenge, to Leaders of Human Systems in the Context of Civilization Evolution

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ABSTRACT

Background

Recently my colleagues are discussing about "the evolution of cybernetics" and how our leaders of the 21st century could be benefited from it. In my view, the evolution of cybernetics or system theory must be a part, or a branch, of the evolution of science, which in turn, must be a part or a branch of the evolution of civilization. Let me shorthand them respectively as E1, E2 and E3.

The number of people doing (thus responsible for) E1 globally cannot be more than 1000. (American Society for Cybernetics might have, I guess, 100 regular members. International Federation of System Research has 45 member organizations, but 1/3 of them inactive. Assume the rest 30 active associations each have 100 active members in average, we have a total of 3000 people in "System Research" globally. Assume less than 1/3 of them are involved in studies of cybernetics, thus the estimated number of 1000 on this planet working with, thus relevant to, E1.

For E2, the population of scientists for the whole planet is hard to estimate, but we can use the situation in US as an example. In 2015 there are 4.7 million people with science degrees worked in US. For the convenience of building my perspective, assume 470 people working on cybernetics (4.7 times of the number of ASC members), the ratio of people involved in E2 are 10,000 times in E1. To compare, the total population (involved in E3) of US in 2015 is 322 million, or 68.5 times of U.S. scientists. Considering the whole planet, the current population is 7.5 billion human beings, which consists the playground of E3. Immediately we realize that the guiding principles of E3 is not just E2, because besides science we have religions, ideologies and popular philosophies, all of them evolutionary processes, that are parallel to E2.

The purpose of the above comparison is to set our perspective into perspective, i.e., whole picture first, then zoom in. I think it is important that we keep in mind the position of E2 within E3 and of E1 within E2, so that those of us focus on E1 won't lost contact with "the real world," in which our leaders function.

I suggest that we use the Multi-Layer Self-Organization framework (MLSO), （Hu, 2011, 2013, 2014, 2017）which could provide more distinctions in our understanding of the whole picture as well as of the specific cases.

Conceptual Tools

Multi-Layer-Self-Organization : In (Hu, 2011) I tried to distinguish six different layers of self-organization results/processes, highlighting a key phenomenon that they are built one layer at a time and one layer after another, after reviewing an earlier work synthesizing ideas self-organization from Ashby, von Foerster, Prigogine and Haken, which are all implicitly single-layer. The six layers are: Concepts (in single brain); agreements (in multiple brains); shared beliefs (in groups); common values (in communities); institutions (in political entities); and globalization (in whole planet).

In (Hu, 2013) I used this framework to explain the emergence of a constitutional government, in answering questions raised from the best seller "Why Nations Fail" (Acemoglu & Robinson, 2012). In (Hu, 2014) I discussed the compatibility of this MLSO framework with the evolution of human societies and theories of Maslow and Kohlberg. In (Hu, 2017) I used the same framework to discuss the literature phenomena of constructing multi-layer realities with the case of Don Quixote. In this paper, I wish to follow up the previous build-ups of this MLSO framework and push it to above mentioned three-dimensions or four dimensions.

New Dimensions: Build-ups; Abstractions; Complexity; and Time (BACT): The three basic dimensions are: 1st: Physical (hands-on) **B**uild-ups; 2nd: Conceptual (intra-brain and inter-brains) **A**bstractions; and 3rd: Cognitive (recognized) **C**omplexity of the system observed. (Short-hand as **BAC**). Adding the time dimension **T**, indicating the accumulated results (i.e. the realities being constructed and becoming part of pre-conditioning environment) of all self-organization and multi-layered-self-organization processes, the total frame can be referred to as BACT，following Einstein's construction of the space-time continuum. (Similarly, the BACT is more like a fact, because a good number of evidences can be identified.)

The 1st Dimension: The physical build-up dimension is the easiest to understand: The primitive humans built simple huts from tree branches to reduce the impact of rains and hot suns; stones were shaped and piled up as walls; mud bricks were invented; followed by settlement walls and houses; churches; multi-floor buildings; skyscrapers; etc. Parallel to this process there were stone tools; invention of copper, bronze, iron, steel, etc. in tools and weapons, Jewries and utensils, telegraph-radio-TV… all the way to computers and smartphones. The multi-layered self-organizing processes on the physical build-up are still going on. The point is, each new layer has to grow out from the previously successfully stabilized layer. The key character of it is that the process is done eventually by hands – either human hands or robotic hands – and stays within the realm of physics, chemistry, biology up to neurophysiology (e.g. in the cases of artificially enhanced biological humanoids or "Robocop").

The 2rd Dimension: The conceptual abstraction dimension can be observed on the intra-brain processes (cognition and thinking) and inter-brain processes (communication and consensus forming). But instead of the previous discussion of the six-layers (concepts, agreements, shared beliefs, common values, institutions and globalization awareness) which are socially oriented, here I would like to focus on the "abstraction" processes that we humans build up our conceptual tools inside our brains. The major difference of this dimension versus the previous one is that, we build-up not with our hands but with our minds. In Heinz von Foerster's words we "construct our realities". I have tentatively classified the different types of such construction (different ranks of reality being created by our brains) in the table 1 (Hu, 2017).

The 3rd dimension: Cognitive (recognized) **C**omplexity of the system observed, needs a bit effort to contemplate. I have presented in July this year at ISSS Eight Levels of Complexity of Relations within observed system as the following.

For the concept "system", let me use the initial classic definition S={E,R}; (i.e. System= {Elements, Relations}), defined by an observer. So, the system thinker (observer) starts from including multiple elements into his/her observation. What elements, and how many of them, should be included, forms the first task – system definition – i.e. to identify, for the problem at hand, the needed elements, or a boundary, of the system being considered. This is a highly subjective process; thus, any system is defined by an observer with a purpose for doing so.

For the concept "Elements in the formula S={E, R}, we know that entities discussed in the previous two dimensions (either physical or conceptual build-ups) can all be members of E. For the concept "Relation" in the formula S={E, R}, we can identify different types, or different levels of complexity, of these relations we care about. The extremely simple one would be "no relation or zero relation" – but then we would have no system. (R0)

Starting from the simplest but significant type, i.e. "these elements all belong to this system, that we need to consider." This way we get the simplest format of ST – a laundry list, or a check list, or finger-counting in some cultures. (R1)

The next level of relation is causality, but linear, examples are those established by Newton's Laws in physics. A causes B, B causes C, f=ma, etc. This level of system can be represented by an Excel spreadsheet. A longer causality chain is possible, so are a tree-structure, or a fishbone structure, defining the relationships among the elements. Here we have connected variables (such as all the financial variables of a corporation on its CFO's spreadsheet). (R2)

The third level of the relationship identifiable within the system, is when the causality become circular. I.e. A causes B causes A. Paradoxes in philosophy shows up here. Feedbacks, negative or positive, or both, come to the center of attention by the observer defining the system. Classical control theories, with all their engineering capacities, are here, namely "rocket science." "Homeostasis", equilibrium, and Ashby's Law of Requisite Variety works here. Self-fulfilling prophecies in psychology and sociology are found here. We also have System Dynamics

Modeling working well here as a killer application with capacity of computer simulation. Time starts to become a significant variable at this level. (R3)

When the causality becomes not only circular (and direct) among the elements, but also crossing the layers of elements (and indirect), i.e. from a micro layer to a macro layer, we have phenomena called "emergence", i.e. self-organization, in our system. A repeating process among elements at the micro level, after some time, generates something observable, i.e. an "order" or a "structure" at a macroscopic level. Or reversely, a self-emerged phenomenon is being generated by simple and repeating principles (algorisms) functioning at a lower level. Here, the central attention is given to "eigen-value", "eigen-behavior", "attractors", "slaving principle", "far-from-equilibrium-structures", etc. (R4)

Next level, more complexity is identified by something Heinz von Foerster called "internal state Z", which, if presenting, qualifies the system as a "non-trivial machine". This is a system with its own "memory." Systems that contain memory are able to change their behaviors, just like they start to have their own minds("self-minding"). Possibility of evolution – the interaction between the system and its environment changing each other - starts from here. In the business world, we have "learning organization" as example at this level. History starts to become a significant variable at this level. (R5) (random processes and probability theories are finished here)

What is more complex than memory is self-awareness, consciousness, and what we call "free-will" (self-directing). One of the mysteries of life, it is presented in psychological systems, organizational behavioral systems, social systems, economic systems, political systems, cultural systems, all the way to our whole civilization. At this level, cybernetics becomes second-order cybernetics. Note that the second dimension of time, as defined by Elliott Jaques, time of intention, or in the format of "time span of discretion," starts to be significant here. (R6)

Above (the entry-level) self-consciousness and free-will, I would say, subject to discussion, "reflexivity" (self-reflecting) becomes the center of attention of the observer. Observing the observer to improve observation, hypotheses testing, trial and error process, double-loop learning, learning to learn, opening new paths for self-development, all these might be the most complex system on this planet. (R7)

The above eight levels of system thinking requires a step by step approach to learn. One level takes the previous level as pre-requisite. One step a time, and it takes time to allow each step to self-organize – from a new concept, to something familiar, to something one can automatically apply to deal with a suitable situation. Each level of these system thinking types needs sufficient time for students to digest, to apply to real cases, and to practice to the level of proficiency, before they can be successfully progress to the next level. This is what I meant by the dimension of complexity.

(We don't have to discuss the 4th dimension for now.)

Three Threads of Evolutions: of Cybernetics, of Science, and of Civilization

Based on the above framework, we can now come back to our topic, and consider two important questions. 1: What is the relationship between E3 and E2, i.e. the Evolution of our civilization and the Evolution of Science; 2: What is the relationship between E2 and E1, i.e. the Evolution of Science and the Evolution of Cybernetics? I don't think we have consensus on these two answers, but I can propose a bold guess as the following.

Within E3, the competing "species" seem to be systems of stories – i.e. myths, religions, ideologies, and popular beliefs. Science, hopefully, is the one and the only one of such system of stories (hypotheses) that maintains its uniqueness – it seeks to increase the depth of our knowledge (what's, why's, how's) rather than to decrease it, (such as religions and ideologies). Therefore, science increases the complexity of our understandings (our "objects") and thus increases the complexity of our cognitive capacity (while religions and ideologies seek to simplify it.)

Within E2, hopefully, E1 should, at least in part, take a leading role among all possible disciplines, simply because, cybernetics focus not to specific subjects but to the structure of causalities. Based on the 3rd dimension discussed above, we have different levels of complexity of the dominating relations, thus different levels of causality structures, identifiable within our targets of system being analyzed. We can have multiple-cause linear system (R1); system with linear causality in a tree structure(R2); system with circular causality loops (feedback and feedforward) (R3); self-organizing systems (R4); self-memorizing systems (non-trivial machine in the term of Heinz von Foerster) (R5); self-directing systems (or purposeful systems, freewill systems, value-directed systems)(R6); and self-reflexive system (which reflect on its own values and engage actively in double-loop learning)(R7).

It is interesting to note that, in this conceptual framework, from Rank-3 to Rank-7 we have reflexivity on different levels. Rank-3 is reflexive at pure signal level – negative feedback or positive feedback signals as in classic cybernetic systems. Rank-4 is reflexive between macroscopic and microscopic levels, i.e. the microscopic algorithm or agents, caused, after many iterations of local reactions, an emergence of eigen-state/self-emerged order on the macroscopic level, which would in turn has reflexive effect on the microscopic level. Rank-5 is reflexive in terms of the system's internal state being formed and changed by the previous experiences, i.e. the very feature of memory is serving a reflexive purpose, what we call "lessons from history". Rank-6 is reflexive in the process of the system's "goal-setting", i.e. the ontogenesis of a purpose emerges within the system. Finally, Rank-7 systems is reflexive on the guiding principles that generate purposes, i.e. to reflect on systems values and making decisions to change them. It is at this level that our society progresses and our civilization evolves.

To related the above with the Lepsky's work mentioned at the beginning, we are now able to switch the defining feature, from classic/post-classic/post-post-classic, or subject/object – subject/subject – subject/meta-subject, to a spectrum of complexity as indicated in our 3rd dimension. In other words, "Classic Science" maps to causality (one directional, linear, non-

linear, Newton, Einstein, etc.), maps to our Rank-1 and Rank-2 systems. "Cybernetics (classic) maps to circular causality (feedback, feedforward, negative for stability, positive for growth, time-lag, anti-intuitive behavior, easier to computer situation with difference equations), maps to our Rank-3 system. "Post Classic-Cybernetics" maps to circular causality across systemic levels: Self-organization (microscopic algorism/agent causes macroscopic changes over repeating iterative operations over time, emergence of "order" (self-organization) or emergence of entropy (self-disorganization), duplication of genotypes (biological genes AND cultural genes), maps to our Rank-4, Rank-5 and Rank-6 systems. And "Post-Post-Classic-Cybernetics" maps to interactions among different genotypes, evolution, forming and competing for ecological niches, "self-developing reflexive systems(environments)", dynamics among different P-individuals (value-goal communities, of which science is just one of them), that is, our Rank-7 Systems.

If all of above are basically correct, then I can make a statement that "Collective Reflexive Capacity is the highest level of capacity achieved by our human systems in the evolution of our civilization," as my contribution to this conference.

Keywords: evolution, leadership, cognitive capacity, rank of reality.

Table 1: Ranks of Reality being constructed by human beings. Read from the middle row R0, then upwards and downwards

Rank of Reality	Type	Stability	Examples
Rank 3	Highly abstract ideas that exist in one brain	Completely subjective, stability low and local	Paintings of Kandinsky
Rank 2	Subjectively modified perception of R1 (or directly of R0)	Aesthetics and ethics enter the construction game. Stability subject more to the observer(s) consensus	Paintings of Picasso, Dali, von Gogh, unrealistic stories (unicorn, Santa Claus, Harry Potter)
Rank 1	Direct mapping of R0 or directly generated from R0, story told	As Stable as the audience/reader/viewer willing to accept	Photo, video, VR data package of R0, realistic stories
Rank 0	Our **directly contactable** physical world, confirmable via human sensors directly	**Highly stable over significant timespan**, each object has different lifespans	Cities, buildings, furniture, physical books, all stuffs that we can touch
Rank -1	Internal structure (unseen) that needs to be opened to become R0, or seen with tools (tele- micro- MRI etc.)	highly stable with reliable tools or "opening procedures" based on R-3 that "opens black-boxes"	Electricity/water supply system, foundations, anything that is not seen at R0 but support the existence of R0
Rank -2	Scientifically identified facts/natural laws in physics, electronics, abstract format	Super stable as long as base-hypothesis not falsified	Designs, principles, & capacity, of engineering, that support R-1
Rank -3	Fundamental natural laws that can support/derive R-2	Super stable until replacement laws are found	Quantum physics, theory of general relativity,

Note that both R3 and R-3 exist in one place I call "Cloud of pure ideas". They are usually stored in either media (publications, books, painting, video, databases, etc.) or in human brains.

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ISBN: 9788890824265
Book of Abstracts of the
5th Business Systems Laboratory
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"Cocreating Responsible Futures in the Digital Age"

Innovation and tradition-based firms: the case of the fashion industry

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ABSTRACT

The aim of this paper is to understand how fashion firms, can implement innovative products, both remaining anchored to the past and opening-up their internal boundaries by entering into relationships with a plethora of external actors. This allows firms to interiorize and reinterpret both past and new knowledge in a novel and creative way. In this direction, it becomes important also to concentrate the attention on the entrepreneur's ability to generate novel, useful ideas or problem solutions (Amabile et al., 1996). This is what literature defines as entrepreneurial creativity (Amabile, 1997; Ward, 2004; Perry-Smith and Coff, 2011; Zampekatis and Moustakis, 2006). Specifically, creative entrepreneurship refers to an overall process of creation, both in front of opportunities and threats coming from outside and with reference to firm's resources, their combinations and changes (Della Corte and Del Gaudio, 2017). Successful ideas are often a balance between novelty and familiarity: the generation of a new idea may be determined by the way in which both existing and external flows of knowledge are accessed (Ward, 2004).

At the firm level, two ways to look at innovation can be distinguished. First, innovation can be studied as a process of development and change (Teece, 1996; Grunert et al., 1997). In this direction, the innovative process is directly influenced by the way R&D is carried out (Pavitt, 1984; Molero and Buesa, 1996), by the "technological" characteristics of the innovations, by the level of tacitness of knowledge, by the capacity to accumulate know-how within the organisation (Teece, 1996) and by the degree of appropriability of innovation from external sources. Secondly, innovation can be conceived as the firm's ability to satisfy the needs and preferences of its potential customers, using its own resources (Grunert et al., 1997; Traill and Meulenberg, 2002). In this sense, innovation is linked to the market orientation of the firm and to its marketing activities. Consistent with this view, in the fashion industry the process of innovation is focused on both production and commercial activities.

According to Grunert et al. (1997), every successful firm counts on a "dominant orientation" that shapes the firm's behavior. This orientation can be of three types: product orientation, when firms' culture is dominated by product quality; process orientation, in which firms are guided by principles of flexibility and efficiency and, finally, market orientation, that is to produce what the market desires. The firm's dominant orientation relies on a set of core competencies (product, process, or market), but a successful firm will also have to meet basic standards with respect to the other two criteria. These supplementary competencies may be outsourced, unlike the core competence (Traill and Meulenberg, 2002).

More in detail, in the most recent years, most of studies concentrate on the concept of open innovation that is for the first time defined by Chesbrough (2003). The cornerstone of open innovation is that a company uses external knowledge to speed its own internal innovation process up. Open innovation can be defined as "the proportion of innovations generated in cooperation/collaboration with universities, industry associations, clients, competitors, business consultants as opposed to innovations that are entirely generated within the company" (Dries et al., 2013, p.). This approach is about harnessing the in-bound and out-bound flows of ideas, technology and skills across a firm's boundaries, with the pursue of speeding up internal innovation processes and establishing external ways to commercialise its own outcomes (Chesbrough, 2003; Simard & West, 2006, Sarkar & Costa, 2008, Gatignon et al., 2002; Hauser et al., 2006, Antikainen et al., 2010).

To date, open innovation has been commonly associated with fast-growing, technology-intensive industries, like the ICT sector. There is, however, increasing evidence that this concept may also prevail in more traditional and mature industries, such as the fashion industry (Huston & Sakkab, 2006).

In order to pursue the research goal, this paper is structured as follows: the first section reviews the extant literature on innovation with reference to both the use of external knowledge and the traditional components (in terms of codified and tacit knowledge derived from the past). Both of them are linked to the knowledge developed by the firms in the fashion industry. The second section illustrates the research methodology adopted in the empirical analysis. The third paragraph presents and discusses different case studies.

Keywords: tradition, innovation, fashion industry.

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Online academic networks as knowledge brokers. The mediating role of organizational support

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ABSTRACT

The current research proposal aims to advance an original theoretical and empirical framework on the role of online academic networks as knowledge brokers. In this vein, knowledge brokers refer to the individuals or organizations that yield benefits from transferring ideas from where they are well-known and developed to where they engender innovative opportunities. Placed in the framework of knowledge management, knowledge brokerage (brokering) has come forth as a topical research interest, with a special focus on the private sector. Nevertheless, addressed as a comprehensive pathway to spread knowledge within and across organizations and as an innovation facilitating mechanism, knowledge brokerage has incrementally surpassed the boundaries of the business environment, immersing in the public sector. At this level, three different settings have been advanced on purpose to capture its objectivation functions beyond the private sector, that is the knowledge system framework (i.e., referring to the facilitator role of knowledge brokerage in the generation, diffusion and capitalization of knowledge), the transactional framework (i.e., portraying knowledge brokers as linkage agents who ensure substantive bonds between knowledge creators and users) and the social change framework (i.e., approaching knowledge brokers as enhancers of knowledge conducive to positive social outcomes or to capacity building). Either seen as knowledge transfer facilitators or as innovators, knowledge brokers are acknowledged for their capacity to translate knowledge and to harmonize social differences, to act as individual or organizational entities which leverage the potential of specialized networks to access, combine, transform knowledge in new useful ways.

Building on this logic and given the fact that knowledge brokerage is yet to be thoroughly researched beyond the private sector, the current paper intends to discuss the role of online academic networks as knowledge brokers able to generate significant value by bridging scholars from developed economies with their counterparts from emerging economies, by allowing and

potentiating the access to cutting-edge studies, projects, events, etc. to educational and research centers with less available resources. By means of sharing knowledge among the network members (be they individuals or organizations), the online academic networks underpin the advent of a collective intelligence founded on intensive usage of the information technology, on keeping people connected and stimulating cohesive network structures. In this front, the research challenge is twofold. On the one hand, its focus is to investigate the relationship between the knowledge brokerage function of online academic networks in terms of knowledge transfer from well-reputed scholars and organizations to their less-resourceful counterparts (including here lower research budgets, poorer research infrastructure and logistics, less experience and expertise of research teams in specialized fields, etc.). On the other hand, emphasis is laid on the mediating role of the organizational support in knowledge brokerage performance. Here, the research questions regard whether less-resourceful organizations encourage, both formally and informally, that their members access and capitalize the resources made available by knowledge brokers and to what extent is innovation influenced by such actions.

Stemming from these considerations, the research relies on a questionnaire-based survey with more than 200 scholars from European countries, affiliated to various academic networks with a transnational vocation. The collected data is analyzed by means of the partial least squares structural equation modeling technique (PLS-SEM), namely via SmartPLS software. It is expected that the findings highlight the positive influence of the online academic networks on the innovative capacity of less-resourceful scholars and organizations and that organizational support stands for a significant mediator within the targeted relationship.

Keywords: Knowledge Brokers, Brokerage, Online Academic Networks, Organizational Support, PLS-SEM.

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Mapping digital co-creation for urban communities and public places

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ABSTRACT

The new ICT paradigm, mobile communication, social media, Internet of Things and cloud computing, increasingly put the end user at the center of innovation processes, thus shifting the emphasis from technologies to people. The success stories of services such as Google, Wikipedia, and Facebook rely on their users to create value with Internet 2.0 tools. In the private sector, the paradigm has been conceptualized under Service Dominant Logic (SDL) and Open Innovation 2.0 approaches where the focus of co-creation is the value created for and by the users. The public sector implemented the change through the New Public Governance and Open Government initiatives, which suggest that the public value no longer needs to be created by the governments alone, but could be generated in collaboration between the public entities, private sector, civil society organizations or citizens (Quadruple Helix model). The co-creation concept fundamentally differs from traditional public engagement approach, while it focuses on the collective influence and responsibility of all stakeholders by creating the public good. The *„bottom up"* co-creation processes in digital enabled urban communities are important enablers for implementing the smart and inclusive society vision. The modern communities not only involve the citizens into process of public value creation, but also influence the emergence and development of collective intelligence in the society. While traditional approaches to public engagement and governmental reforms remain relevant, this article focuses towards the growing potential of networked urban communities to solve their social problems. It expands co-creation field and provides theoretical framework for public spaces with a communitywide participation making use of creative, innovative and cooperative applications of ICT. The sample size for a web-based monitoring consist of 10 online urban communities in Lithuania, identified by the pilot research. The communities will be investigated as collective intelligence systems, which integrate all criteria inherent for such kind of systems (openness, dynamism, decentralisation, critical mass for "swarm effect", etc.). The research results explain how different technological, organisational and other social factors influence on the quality of co-creation results.

Keywords: co-creation, public places, communities, social technologies.

ACKNOWLEDGMENTS

This research was funded by the COST TU1306 project CYBERPARKS ("Fostering Knowledge about the Relationship between Information and Communication Technologies and Public Spaces")

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Early warning systems in management

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ABSTRACT

Innovation and the creation of new knowledge are key drivers for the success of organizations (Ilinitch, D'Aveni & Lewin, 1996; European Commission, 2010). Research differentiates between two types of innovations (Ettlie et al., 1984): Incremental innovations are characterized by only minor changes or improvements (e.g., adapting or adding small features), while radical innovations entail changes on a more fundamental level. In most cases radical innovations are not just linear extrapolations or adaptive extensions of past experiences, products, services, or business models, but rather fundamentally new and future-relevant/driven (Peschl & Fundneider, 2013). Radical innovations can open up completely new categories, new knowledge spaces, or even markets (O'Connor & DeMartino, 2006), however, it is unclear how they can be achieved (O'Connor & Ayers, 2005).

Early-warning system is of great importance, specifically due to its possibility to improve organization's performance. Few studies employ early-warning systems in the field of management. The aim of our study is to conduct literature review on early-warning management systems, to examine geographical area of the study, journal, where the article was published and areas in management where they are used and define critical factors of emergency, useful for early-management systems. The findings are based on meta-analysis. Content analysis of the articles was used to summarize and compare qualitative data. Results indicated that early-warning management systems are mostly used in the field of tourism, project and strategic management. Critical factors of emergency, useful for early-management systems, are management issues (experiences, strategic approach), rapid and instant response and early recognition of the problem. Contribution of our study is the widened understanding of usage of early-warning management systems and defining its critical factors of emergency. Further studies should be focused on deeper investigation of this topic and could include case studies of early-warning systems in management with qualitative data.

Keywords: early-warning systems, management, crisis management, quality management, emergency

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On the Efficiency and Optimality of Innovation Cluster Structure

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ABSTRACT
The article presents an analysis of the research on the impact of networking of an innovation cluster on its performance, its evaluation and management and optimization of innovation cluster activity. Optimization of activity is one of the main preconditions for increasing the efficiency of innovation creation and implementation, and, in addition, the economic viability of innovation cluster at al. In the case of innovation cluster the main factors. Having impact on the optimization is the geographic localization and proximity (for cooperation in manufacturing), the structure of business cluster (for transfer of technologies and knowledge under information asymmetry), uncertainty (defines the nature of innovation) and systemic risk (covering both external and internal factors). There is no comprehensive research in the literature that reveals the innovative structure of a business cluster that is most conducive to innovative activity, and clearly identifies what are the necessary and sufficient conditions for an efficient creating of innovations. The literature does not have clear answers to the question of which structure would help a network-based organization to achieve the best results; only fragmented studies suggest that a clique-based structure is conducive to cluster-based activity. In most cases the clique-based network ensures that hierarchy is eliminated and trust and monitoring remain important factors for efficient sharing of resources with respect to scope economy and competition with external entities. This explains why the clique-based cluster structure is optimal for innovative activity. In this paper, we introduce the combination of systemic risks and treat the activity of innovation cluster as similar issue to investment portfolio. We analyze the optimality of cluster structure in the context of risk, uncertainty and information asymmetry which means that cluster structure is heterogeneous. The article also attempts to find out what conditions are most favorable for the emergence of synergies in the context of information asymmetry and systemic risk in innovation cluster, as well as attempts to determine the extent to which the universal cluster structure is optimized for different activities.

Keywords: clique, networking, optimality, systemic risk.

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ISBN: 9788890824265
Book of Abstracts of the
5th Business Systems Laboratory
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"Cocreating Responsible Futures in the Digital Age"

Open Innovation for Accessibility in Museum Organizations: The case of Museo Archeologico Nazionale di Napoli

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ABSTRACT

The role of museums in the society has changed over the years. These organizations were initially created as a way for private collectors to store the various artifacts that they had previously gathered and they were not supposed to be visited by other people even if they, in some cases, came to occupy entire buildings (Simpson, 2007). Today these institutions are expected to be open to everyone and attract all sorts of people (Martins, 2012).

Actually the International Council of Museum (ICOM) defines a museum organization as a "non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment".

Solima (1998, 2000) holds that the ICOM definition gives equal dignity to the various activities each museum have to carry on in order to fulfill their social function in the modern society, that is to contribute to the cultural development of the community as a whole creating and communicating a whole body of knowledge. Several authors (Gilmore & Rentschler, 2002; Ballantyne & Uzzel, 2011) have highlighted that these definition has just registered an evolution

in the museum social function. Today these organizations are moving away from the idea of an institution entrusted with the purpose of storing, caring for, and exhibiting heritages to reach a new function built around a broader concept as a non-formal educational institution engaging visitors with findings and experiences.

The direct consequence of giving an educational social function to museum is to acknowledge that they have to become attractive to a broaders set of visitors (Hein, 2006). At the same time Walters (2009) hold that visitors in a museum can fully access the cultural heritage only if the management of the museum is able to become more accessible, i.e. they must be able to overcome some specific barriers limiting these institutions in fully accomplish their social functions.

Several authors consider the accessibility topic as one of the main concern museum management should be able to address in order to fully accomplish their educational function in the society (De Luca, 2007; Walters, 2009; Solima, 2012; Rappolt-Schlichtmann and Daley, 2013). The museum accessibility can be limited by a broad range of factors as the architectonic barriers (Vescovo, 2002); several other authors highlight more subtle accessibility barriers - those related to the visitor knowledge resources (Addis, 2002; Rovidotti, 2004) - that can be more relevant as their impacts cannot be easily solved.

In a more general approach the report from Dodd and Sandell (1998) was able to identify eight different classes of "access" that museum management should address in their path toward getting an accessible organization. They hold that a museum cannot be considered really accessible only when it tackle the physical access to the exhibition but, instead, it will become really accessible only if, leveraging the local area culture and improving its educational level, it is able to create stable relationships with its stakeholders and engage them in creating new, context-oriented, programs. For example, they urge managers to take into account the "sensorial" access as a way to help impaired visitors to get the full museum experience using a diverse set of media, such as hearing induction loops, audio guides, touch tours, information in Braille or large print, in organizing to have the audiovisual materials subtitled and/or using sign languages.

Solima (2012), identify four main dimensions of accessibility: physical, cognitive, economic, and digital accessibility.

The first dimension attains to all the physical barriers that can hinder some of the visitors from experiencing these organizations' services. Some of these barriers are internal to the organization's building (f.e. ramps) both some other are external ones (f.e. parking lots) and asks management to leverage a dense network of relationships in order to overcome them at the urban area level. The cognitive accessibility, ask the managers to design educational processes, to satisfy the various visitors with different set of knowledges engaging them in a learning process without making them feel ignorant as that would risk alienating them (Presta, 2010). It follows that the a museum not able to overcome the cognitive barriers will not be able to fulfill the educational function.

Third form of barriers are the economic ones. Museums should consider that the "ticket" is not the full visitor cost of attending an exhibition but they should take into consideration the opportunity costs, even those linked to the information gathering processes needed to fully understand the piece of arts that will be shown.

Finally the fourth dimension is the digital one needed to follow the evolution of the society and to increase the level of audience engagement (Prahalad & Ramaswamy, 2004).

The many, different, types of accessibility that a museum organization has to tackle at the same time requires them to get access to a broad set of competences that they do not traditionally have but that they can reach, or develop, using their network of relationships with external stakeholders (Sciarelli & Tani, 2013). Leveraging their network of relationships the museum can attain the strategic ambidexterity needed to really innovate their services, using the external knowledge, while keeping the focus on their core competences (March, 1991; O'Reilly & Tushman, 2008). These processes can help them in becoming more effective at successfully innovate their services as, according to Sammara and Biggerio (2008), the effectiveness of an innovative process depends mostly on the heterogeneity of the knowledges and competences it can leverage. According to the resource-based view of the firm (Barney, 1984) the positive effect of enlarging the knowledge base of the organization using the relationship with external actors depends more on the knowledge complementarity rather than their similarity (Harrison *et al.*, 2001). It follows that the organizations should can enhance their innovations performance adopting an *open innovation model* (Chesbrough, 2003), leveraging inter-firm cooperation (Belussi et al., 2010; Teirlinck and Spithoven, 2008) to create two processes: the "inbound, open innovation", referring to the acquisition of and use of external knowledge internally; and "outbound innovation", referring to the external use of internal knowledge (Huizingh, 2011; Dahlander and Gann, 2010).

In this paper we focus on a specific example of innovative process that the Museo Archeologico Nazionale di Napoli (MANN) has carried on to answer the needs of a particular type of visitors: the children with autism.

Tackling this specific class of visitors can be seen as a daunting process for a museum organization as this visitors can fully enjoy the museum experience only when several accessibility barriers are overcome, both physical, economical and, above all, cognitive ones. (Langa, *et al.* 2013; Mulligan, *et al.*, 2013).

In particular, in order to help these young visitor affected by a neurobehavioral disorder, the museum organization must be able to provide a specific way to interact with the piece of art, they must be able to provide a specialized assistance to overcome the children issues with verbal and non/verbal communication and, above all, to prevent the negative effects linked by their problematic social interaction.

In order to offer this set of services the museum has to leverage a set of knowledges and competences that, often, its employees do not have. So the MANN management has chosen to

create a new relationship with a local association specialized in dealing with impaired children, and leverage it since the first stages of designing the activities in the project: Argo Association, one of the partners in the project of the FOQUS Charity.

Moreover the management has decided to turn this partnership in a real learning process targeted to increase the internal resource endowment of MANN while innovating the museum services in order to accommodate the specific needs of children with autism

In this paper we propose to analyze the first stages of these learning process in order to highlight how they have managed the knowledge flows between the two main partners and how the interaction between the two in the new project, a classic example of knowledge exploration, has helped them to become more effective in exploiting their main competences and, consequently, to adopt an ambidextrous strategy.

Keywords: Museum, Accessibility, Open Innovation, Autism, Learning.

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ISBN: 9788890824265
Book of Abstracts of the
5th Business Systems Laboratory
International Symposium
"Cocreating Responsible Futures in the Digital Age"

Shareholder ecology. A Luhmannian framework

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THE PUBLICATION OF THE ABSTRACT WAS NOT AUTHORIZED BY THE AUTHORS

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ISBN: 9788890824265
Book of Abstracts of the
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Non-Profit Institutions: a delicate balance between values, business orientation and accountability. Evidence from Italy.

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ABSTRACT

Basic theories and literature review

The Non-Profit phenomenon is a topic conceptually much debated by scholars, both at national and international context (DiMaggio & Anheier, 1990; Salamon & Anheier, 1996; Giddens, 1998; Anheier & Kendall, 2001; Powell & Steinberg, 2006; Bronzetti, 2007; Gidron & Bar, 2010; Ishkanian & Szreter, 2012; Salamon, 2012; Anheier, 2014): "Non-Profit sector", "third sector", "voluntary sector", "social economy" or "social enterprise" are just a few examples of the wide range of terms that can be used to describe a diversity regarding:

- its real manifestations,
- subjects involved,
- objectives pursued.

Of course, no one of these terms and correlative definitions is exhaustive to a universal description of the theme but, at the same time, each one of them may be potentially usefulness regarding the part of reality to describe (Anheier, 2014, p. 61).

In this sense, according the purpose of this research work, we can start from a structural-operational approach (Salamon & Anheier, 1992) which is focused on basic structure and operation of Non-Profit Institutions (NPIs). More specifically, this definition is based on five characteristics of NPIs, of which the most important one for this study is Non-Profit-distributing criterion:

'[…] nonprofits ensure that whatever surplus revenue might be generated is devoted to their mission and activities and is not distributed to their owners, members, founders, or governing board. […] Thus, nonprofits organizations, unlike private businesses, do not exist primarily to generate profits, either directly or indirectly, and are not primarily guided by commercial goals and considerations' (Anheier, 2014, p. 73).

The high dynamism of the phenomenon we are trying to describe is demonstrated by many recently and new concepts which seems to be useful to do this, like "civil society" and "social capital": in this respect, some Author underlines that "civil society" (Gramsci, 1971; Etzioni, 1993; Gellner, 1994; Putnam, 2000; Anheier, 2001; Keane, 2009) represents the macro-infrastructure where NPI operate; while "social capital" (Coleman, 1990) refers to specific characteristics and actions of them:

'In other words, these concepts are the pillars of an approach that tries to go beyond the state versus market perspective that dominated the social science thinking and policymaking for much of the twentieth century' (Anheier, 2014, p. 94).

In this sense, the explanation of why the organizations exist lies in many theories most of which are relatively recent (DiMaggio & Anheier, 1990; Ben Ner & Gui, 1993; Hansmann, 1996; Rose-Ackerman, 1996; Salamon et al., 1999). Concerning the objectives of this research, particularly relevant are the Trust-related theories (Arrow, 1963; Nelson & Krashinsky, 1973; Hansmann, 1987; Ortmann & Schlesinger, 2003) and the Entrepreneurship theories (James, 1987; Rose-Ackerman, 1996; Dees et al., 2001) which seems to pose a crucial question: whether market economies are aimed at profit, why are there some organizations that decide not to foresee profit as a priority of their system of values?

Trying to answer this question, we need to point out that NPIs are "Non-Profit-distributing" organizations (although, not "Non-Profit-making") (Anheier, 2014, p. 196) and, mainly, they are built on a very deep value system which necessarily influences their organization and performance. These two features imply that NPIs appear to be organizational entities that must coexist in a conceptual space that is intermediate between business and public government; furthermore, their value system imply a very complex performance behavior because the achievement of their goals is conditioned by values pursued within their mission and vision (Kramer, 1981, 1987; Najam, 1996; Zimmer, 1996; Toepler & Anheier, 2004): politics, religion, ethics, voluntarism, philanthropy, compassion are just some example.

Given the above brief considerations, it is clear how complex the management of NPIs can be. Furthermore, in this perspective, Non-Profit literature has highlighted the need for NPIs to be more "business-like" oriented: many recent writings (Dart, 2004; Austin, 2000; Brinckerhoff, 2000; Frumkin & Andre-Clark, 2000; Moore, 2000; Weisbrod, 1998) ask for almost a necessity of a social entrepreneurship (Emerson & Twersky, 1996) or to employ for-profit tools and strategies to gain success in Non-Profit Sector (Kearns, 2000), although without declining the specific characteristics of that orientation.

Undoubtedly, NPIs are currently facing increasing uncertainty, especially in financial matters (Deakin, 1995; Bowman, 2011). Consequently, these types of organizations manifest a great need

for managerial techniques (Drucker, 1990): despite for-profit organization, in Non-Profit Sector measuring of performance could be very hard. Thus, the real question could be: NPIs may face an obvious confusion because of the absence of traditional for-profit price mechanisms that are usually helpful to balance revenues and expenditures, supply and demand, or goals with their activities as in other sectors (Anheier, 2000). This confusion, together with the heterogeneous nature of NPIs (DiMaggio & Anheier, 1990; Skelcher & Smith, 2015), may lead to an "overload" of managerial schemes, each potentially useful depending on the specificities of different organizations. This could be somewhat dangerous because adaptation of managerial approaches could have serious organizational and managerial consequences (Downe et al., 2010; Kislov et al., 2017).

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In this perspective, this work tries to deal with NPIs management challenges, addressing a potential response to the need of managerial approaches and schemes for a better understanding of phenomenon.

In particular, this research aims to identify the main trajectories on which to build a potential managerial model useful also for a better understanding of the management and performance of NPIs. This especially because NPIs performance and accountability systems and levels are tightly linked with service delivery (Poister, 2004; Pettijohn & Boris, 2013; Fyffe et al., 2017): performance measurement represents the main tool for accountability (Behn, 2001; Ricci, 2016), particularly for NPIs (Wholey, 2001; Hatry et al., 2005; Moynihan, 2007).

Research questions

NPIs are currently facing increasing uncertainty, especially in financial matters (Bowman, 2011). Consequently, they manifest a great need for managerial techniques (Drucker, 1990). NPIs may face an obvious confusion because of the absence of traditional for-profit price mechanisms that are usually helpful in measuring performance (Anheier, 2000). This confusion, together with the heterogeneous nature of NPIs (Skelcher & Smith, 2015), may lead to an "overload" of managerial schemes.

This research aims to identify the main trajectories on which to build a potential managerial model for a better understanding of the management and performance of NPIs. Performance and

accountability systems (Behn, 2001; Ricci, 2016) are tightly linked with service delivery (Pettijohn & Boris, 2013; Fyffe et al., 2017): the first represents the main tool for the latter (Hatry et al., 2005; Moynihan, 2007).

Methodology

After the analysis of the main literature on NPIs, the research will deal with the analysis of key elements of their management, to identify the most critical aspects.

In the second section, the work will explore a case study represented by a sample of small-medium NPIs. We will treat this part within the framework of structural equations modeling (SEM) in order to investigate the connection between the performance and the organizational aspects of the NPIs. The study will cover a specific sample of NPIs rather than a wider context: its goals is to develop concepts and viewpoints for a potential theoretical model rather than an analytical description of a national or cross-national phenomenon (Yin, 1994). The statistical analysis will allow to test the coherence of theoretical insights and to draft trajectories and dimensions of a possible multifaceted management model for NPIs into which coproduction may play a very important role for service delivery (Nabatchi et al., 2017).

Keywords: non-profit, third sector, management, performance

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The autopoietics of sustainability reporting

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ABSTRACT
In globalized society, large business firms show an increasing engagement in sustainability. But despite a magnitude of information, their reports appear as poor bases for decision-making; nor do they seem to enhance organizational legitimacy. This paper suggests that these sustainability reports constitute a specific literary genre, which is self-referential, devoid of conflict, and optimistic. Rather than promoting social responsibility, sustainability reports promote the organization economy.

An increasingly dystopian global society, where the Arctic ice is melting, rare species are made extinct, inequality between nations and within nations is increasing, and the number of migrants is alarmingly high, coincides with an increasing interest in sustainability. Large business firms appear as keen as political leaders to engage in a development that 'meets the needs of the present without compromising the ability of future generations to meet their own needs' (Brundtland 1987: 41).

A development of more and more firms producing ever more voluminous sustainability reports has been attributed to a persistent demand from external stakeholders: Customers and potential investors expect firms to show accountability by making their organizations transparent and communicating their sustainability initiatives (Borglund et al. 2017). Should the reports function as – perhaps temporary – window-dressing devices rather than bases for decision, they still serve to enhance organizational legitimacy (Jutterström and Norberg 2011). In both instances, there is a 'business case' for sustainability reporting (Carroll and Shabana 2010). And perhaps the very reporting affects actual behavior, in which case the demand for reports has performative implications (Christensen et al. 2013).

In this paper, we question these rationales. When scrutinized in detail, sustainability reports from large business firms make curious reading: Random numbers combine with stylized imagery, and proclamations that concern the distant future, or rest on abstractions such as 'value' and 'responsibility'. Most importantly, the firms rarely mention the economic, social or environmental impact of their main production. Even if the sustainability reports reflect actual organizational work, they are too fragmented, unsystematic and upbeat to function as bases for decisions. Only in rare cases might they help enhance organizational legitimacy. But neither do

they appear as instances of mere cynicism. Sustainability reports from large business firms seem self-referential and self-supporting – autopoietic. We suggest that they constitute a specific literary genre – 'poetry for managers.'

Inspired by our students in the course 'Accounting communication and environmental reporting,' which we taught at Jönköping University in the fall of 2017, we use the 2016 sustainability report of Saab Technologies, producer of inter alia fighter aircraft (JAS 39 Gripen), portable anti-tank weapons and radar equipment, to illustrate our line of reasoning.

Time and space unbounded

Like other large business firms, and irrespective of the nature of its products – weapons and other military equipment – Saab describes its work in sustainability-friendly terms. Sustainability is the core of a strategy of performance, innovation and market (p. 14), and sustainability information is integrated into Saab:s annual report of 152 pages. Like other firms, Saab has a vision – it is a human right to feel safe – and a mission – to make people safe by pushing intellectual and technological boundaries. It has a business idea and three core values; expertise, trust and drive (p. 12). Because the innovative, cost-efficient and high-tech systems that Saab produces may also be used in conflict, responsibility becomes a priority in which many firms should engage, Saab declares: 'Taking responsibility for people and the environment is a strategic choice for modern companies' (p. 5). Saab, however, considers its own sustainability: 'The purpose of Saab's goals is to ensure the company's success and sustainability' (p. 18).

Saab finds itself on a 'journey of growth' and with a considerable order backlog (p. 6). Though recognizing war, conflicts, migration and unpredictable terrorism, Saab concentrates on meeting customer needs and remaining competitive. It promotes equal rights, teamwork and gender equality and explicitly refers to the legitimacy rationale.

'To stay viable in the long term, we have to choose sustainability.'

- President and CEO Håkan Buskhe, p. 7

Non-linguistic illustrations – diagrams, pictures, photos – supplement the text – as when Saab illustrates value creation by a relaxed young woman leaning on her desk, or its sales to Brazil by the famous Jesus statue in Sao Paolo – in green – or its exports to India by a golden, peaceful photo of the river Ganges.

'It is important strategically that we act now and work on becoming a part of India.'
- Jan Widerström, Saab India Technology, p. 31

Indiscriminately, Saab blends external and internal circumstances – as when geopolitical factors are described as a challenge to satisfy customer demands (p. 12). It employs various measurements – as when a reduction of greenhouse emissions is put on equal footing with a program for gender equality within the firm (p. 19) – and uses 'sustainability' polysemously – as when subsuming an engagement in education, leadership, anti-corruption, innovation and an aspiration of becoming the 'employer of choice' under 'sustainability work' (p. 50). A repetitive use of 'sustainability' and other abstractions with positive connotations gives emphasis to the firm's dedication.

An absence of boundaries, such as those of linear time, where there are fixed time periods and the past is kept separate from the future, or organization, where the interior is kept separate from the exterior, makes the sustainability reporting flexible; Saab relates limited energy resources and climate change to its growth aspirations (p. 11). Flexibility allows for selectivity, and Saab omits references to any productive use of its products; it does not mention death or casualties, or the effects of more cost-efficiently produced weapons in various parts of the world. Any dystopian world-views convert into optimism when transformed to an organizational perspective and advantage:

'We are borrowing the world from future generations, and our promise to them is to manage and develop it in the very best way. Therein lies a strong incentive for Saab: to stay on the forefront of innovative solutions.'

- Marcus Wallenberg, Chairman, p. 4

A mirror

Ideas of accountability, transparency and legitimacy presume organizations that communicate in a constructive way with their environments. The reports function as open information-output –

'allopoietic' – systems (Maturana 1987), and the information that organizations provide allows external stakeholders to respond, one way or another.

But sustainability reports, like that of Saab create confusion; the only viable response is no response. The report is no instrument of communication. Though verbose and beautifully designed, it provides little information. Visions, missions and other future-oriented descriptions of situations that do not yet exist, in combination with sporadic accounts for past performance, make the report largely fictional, and de-coupled from actual organizational work. A conflation of external and internal concerns further serves to camouflage what the organization accomplished, as do a frequent use of abstractions.

Studies of the value of sustainability reports are rare and inconclusive, as are studies of whether there is a 'business case' for sustainability reporting (Arvidsson 2017, Carnevale and Mazzuca 2014, Reverte 2016). Saab refers to the legitimacy aspect of its sustainability work nevertheless, as if to convince itself:

'For Saab, responsibility for people, communities and the environment

comes naturally as a way to create sustainable, profitable growth.' (p. 11)

Rather than serving as a medium of external communication, sustainability reports appear as instruments of organizational, internal communication. Only the organization can synthesize information, utterance and understanding; thus, the organization speaks to itself. Stakeholders are not components within a communication system, as stakeholder or window-dressing ideas posit, but belong to an irritating environment (Luhmann 1995).

We conclude that sustainability reports constitute a self-referential and self-supporting – autopoietic – system relevant only to the organization. Only the organization can apprehend the text in the sustainability report as communication: Narcissistically, it looks in a mirror with an opaque though flattering image of itself. While from an extra-systemic perspective words are fluid in meaning, and any discernment of time periods, actual and future numbers, abstractions and platitudes are muddled, they are meaningful within the system: The text makes sense within the boundaries of its own communication structure. And in parallel with increasing social complexity the reports grow in size and complexity (Luhmann, 1982).

Poetry for managers

Saab's sustainability report is a grim contrast to its production of weaponry and growth aspiration. To external observers it seems incomprehensible that the production of more innovative and increasingly effective weapons contributes to a safer world. Only when any mention of the products and their use is omitted, as in the Saab report – and Jesus is called upon to illustrate the production – does this seem feasible. Saab's sustainability report does not describe actual circumstances – 'reality,' but is beautiful – in linguistic and non-linguistic terms – within the context of the report Within this context, the only available option for Saab is to

promulgate simplicity, harmony and optimism, as the system is not designed to accommodate anything but its own self-referential language and imagery (Luhmann 1995).

By converting (for example) 'war' into 'increased political and economic insecurity', and 'more weapons' into 'defense solution' Saab makes the communication within its system of sustainability reporting poetic. The shape of the communication builds the system and *is* the system; its beauty becomes an inherent and self-promulgating rhetoric. In effect, Saab communicates 'that which cannot be communicated' (Luhmann, 2001).

Because the idea of sustainability reporting is inscribed within a rhetoric of accountability, transparency and legitimacy, large business firms, like Saab, may present themselves as 'good citizens.' Prevalent ideas of open-system communication then support the autopoietic, closed-system character of the sustainability report: They conceal the mirror. This does not mean that sustainability reports are non-functional in a pragmatic sense. But rather than informing about the organization's impact on global sustainability, they help strengthen individual organizations and the organization economy (Simon 1991).
'By acting sustainably in working to create long-term profitable growth,

we build trust among shareholders, customers, employees and society,

and contribute to a more secure world.' (p. 12)

Keywords: autopoiesis, poetry, Saab, sustainability reporting

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Book of Abstracts of the
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International Symposium
"Cocreating Responsible Futures in the Digital Age"

Awareness and application of corporate code of conduct – status and further development

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THE PUBLICATION OF THE ABSTRACT WAS NOT AUTHORIZED BY THE AUTHORS

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Responsibility in a food company: the case of Pomì

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ABSTRACT
Nowadays more and more companies communicate their social and environmental efforts also for marketing purposes, in particular to strength their image, essential to influence consumers' choices. Companies use some tools to communicate their values and their responsible conduct.

First of all the so-called code of ethics, which does not reflect a legal perspective but the idea of corporate responsibility towards the stakeholders (duties towards customers, employees, suppliers, tax authorities, competitors, political representatives, the surrounding community…). According to Lee et al. (2014), in a study focused on the Korean services industry, they found that the code of ethics influence corporate philantrhropy and organizational engagement. Other tools are represented by certifications, such as ISO 14001, SA 8000, OHSAS 18001. The interest for sustainability as a paradigm for marketers has been developed during the 70s, initially in reference to the environmental dimension, later considering also the social one (Kumar et al., 2012). According to Porter and van Der Linde (2002) sustainability represents an opportunity for companies and not simply a source of costs. Some studies have shown that communication of sustainability is relevant to increse a company's reputation (Bronn e Vrioni, 2011; Mark-Herbert and Von Schantz, 2007) and a responsible commitment can be positive also from the point of view of financial indicators (Miles and Covin, 2001). From this perspective, however, it is important to consider the tendency of some large companies to conceal their negative behaviour through a non transparent communication: this is the phenomenon of greenwashing (Delmas and Cuerel Burbano, 2011; Grant, 2009).

A recent study carried out by Wang and Sarkis (2017) highlights the positive effects deriving from the achievement of CSR objectives, for example a superior financial performance; this is also confirmed by Miles and Covin (2000), who underline through a literature review how most of research shows the positive consequences on financial indicators.

Another tool is represented by Social Footprint (Kaldellis et al., 2016; McElroy et al., 2007). This certification can be defined as "a measurement of the social impact of a product, through the

analysis of the organization, people and industry…it concerns the social valuation of the Supply Chain of Products and Services" (http://www.bureauveritas.it): through this certification the objective is to make consumers more aware about their purchases(http://www.socialfootprint.it).

Methodology

In this study the case study methodology has been applied (Yin, 2009). In particular Pomì, an Italian food company, specialized in tomato processing, represents the first Italian food company to obtain the Social Footprint certification.

Pomì and its responsibility

Pomì is a trademark belonging to Consorzio Calasco and represents an example of a food company that shows attention to its social and environmental impact. The values at the base of Pomì are: sincerity, transparency, simplicity, sustainability, innovation, guarantee, salubrity, ethics (www .pomionline.it). The consortium is particularly sensitive to the theme of sustainability, as shown before, so that the president Paolo Voltini highlights how it should be achieved considering the whole chain, from the agricultural to the production phase, to the final consumption (CDO Agroalimentare, 2012). Specifically, Pomì brand products are certified for the attention to the environment that characterizes their production. Firstly to this aim the carbon footprint is calculated, this index indicates how much the company has reduced its carbon dioxide emissions (Van Loo et al., 2015). In this regard, carbon dioxide emissions from Pomì L + production are balanced through the Cookstove project in Kenya, through which some low-emission CO2 boilers have been installed in a rural area of this country, with positive effects on pollution decrease. With regards to the Social Footprint certification, it was obtained in 2016. There are references to this certification on Pomí products, highlighting the company's commitment against child labor and the commitment of suppliers to the social footprint. Another element that identifies the commitment to the environment is packaging: the FSC (Forest Stewardship Council) label on packaging indicates that the paper used comes from trees that are managed by environmentally friendly forests (https: // www.pomionline.it).

Pomì products obviously follow the same policy as the Consorzio Casalasco, which pay much attention to the impact of its activities on the environment. In its Environmental Declaration of 2013, the company states the results obtained by considering several factors, including:

- water consumption: in the two-year period 2011-2012 there was a decrease in water consumption. As regards waste of water, they are treated by active sludge treatment plants;

- waste production: recycling and recovery are carried out. The parts of the tomato that have remained unused during the passage phase, such as seeds, are used as animal feed or vegetable biomass for energy purposes;

- emissions in the atmosphere: the most significant are those generated by the combustion fumes of industrial boilers powered by dense gas / oil: they are constantly monitored in particular with reference to CO, O2 and temperature parameters (Dichiarazione ambientale 2013-2016, downloaded from https://www.ccdp.it).

Conclusions

This case study is particularly interesting because it shows how responsibility may have a deep impact on a company, considering all the chain, from harvest to consumption. Since it is the first Italian food company to obtain the Social Footprint certification, now it is often identified as an example of a responsible company and that is communicated strongly to consumers (by using communication on website and on packaging).

Keywords: CSR, Case study, Food companies, Environment, Social Footprint .

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The implementation of the Directive 2014/95/EU in Polish banks and his influence on the environmental responsibility this institutions

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ABSTRACT

The matters of Corporate Social Responsibility increase in importance, both for manufacturing and service enterprises, including financial services. This trend can be observed in both Polish and foreign literature on the subject. The development of research fields related to sustainable development and Corporate Social Responsibility (CSR) is also the effect of current EU law. The 2014/95/EU Directive concerns sharing non-financial information and information on diversity by some large entities and groups (directive 2014/95/EU – disclosure of non-financial and diversity information), and requires that the public interest entities, including banks, disclose information on, among other matters, their involvement in environment protection.

The problems of environmental responsibility of business institutions, including banks, become especially important in the light of the EU strategy already mentioned, and the 2014/95/EU Directive on disclosure of non-financial information, including environmentalist actions. These laws come into force for Polish institutions on the 1st of January 2017 and include public interest institutions, commercial banks among them.

According to the Directive text, the public interest institutions must disclose, in their reports or separate documents, important information concerning: environmental matters, social and HR matters, respecting human rights and counteracting corruption and bribery.

Transposition of the regulations contained in the above Directive to the Polish legal system took the form of an amendment to the text of the Accounting Act. According to art. 49 of the Accounting Act, disclosure of non-financial information applies as obligatory to those entities that satisfy the following requirements: employ over 500 employees on average over one year period, the sum of their assets is over 85 million PLN or the sum of their income from selling goods and products exceeds 170 million PLN.

Questions arise as to how can we measure the extent to which a bank is involved in implementing the corporate social responsibility ideas, with special focus placed on respecting the environment, on all three levels: public relations, internal eco-management and financing green investments. And are environmentally responsible banks still financially effective? How do they fare, economically, when compared to other banks – listed banks, and the entire banking sector?

An analysis of the subject literature shows that very few works take up the subject of measuring the ecologisation of modern banks, and of the economic effectiveness of environmentally responsible financial institutions. Professional literature provides little evaluation of those aspects of research that address correlations between financial effectiveness and corporate involvement in the realisation of the CSR idea in the banking sector, and environmental protection in this segment of economy is examined individually by only few authors (Paulik et al. 2015), (Zabawa 2013), (Zabawa 2014).

Works were dedicated first of all to one of these subjects, namely the actions that modern banks take to protect natural resources (Dziawgo 2010), (Marcinkowska 2013), (Borys 2000), (Burianová, Paulik 2014), (Ganzo 2014), (Lewicka 2013), (Wiegler 2008). Further works were dedicated to the economic effectiveness of Polish and foreign credit institutions. Some works take up the subject of economic effectiveness of financial institutions, with special attention paid to the crisis phase, but they do not scrutinise environmental responsibility (Capiga 2011), (Iwanicz-Drozdowska, 2012), (Stefański 2010), (Moradi-Motlagh, Babacan 2015).

There is also a lack of works on the extent (measuring) of banks' involvement in ecologisation. Our goal is, therefore, to measure the extent of banks' involvement in ecologisation, and to examine the relationship between their ecological responsibility and their financial results. We plan to examine all commercial and cooperative banks of the Polish sector. According to the National Polish Bank data, this means 35 institutions: 33 commercial banks and 2 affiliating banks. This fact is due to the specific nature of its business (including legal conditions) and market share of types of banks (share in the assets of the banking sector: commercial and affiliating banks 93.2%, (NBP 2015). We can thus state two main goals of our research:

1. Measuring the extent to which Polish commercial banks are involved in ecologisation based on pre-established procedure, this being one of the indicators of commitment to the ideas of Corporate Social Responsibility.
2. Examining the relationship between the environmental responsibility of Polish banks and their financial effectiveness. For each of the phases of environmental maturity of a bank, this relationship will be examined using chosen statistic tools. This will also be an attempt to answer the question whether environmentally responsible banks are economically effective.

This research seems very important in the light of the aforementioned 2014/95/EU Directive coming into force in Polish law.The research will be conducted after the first quarter 2018, after the preparation and publication of non-financial reports for 2017 according to the Directive 2014/95/EU. This research presents an innovative procedure that can be employed for the

evaluation of banking institutions' involvement in activities designed to protect natural environment and its resources.

Keywords: bank, CSR (Corporate Social Responsibility), green banking, Directive 2014/95/EU, financial effectiveness

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The Ethical approach in Investment Management Institution Self-Presentation. A Content Analysis on UK and Italian IMIs

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ABSTRACT

The role of ethics in investment decision has been an hot topic in the last couple of decades (Dobson, 1993). However, until the 90's of the last century, ethics were considered only as a constraint to the investor behavior (Dobson, 2010); this gives a different approach from the usual one, prescribing ethics as a behavior motivation, not as a constraint (Beauchamp, 2001). In reverse, in the last few years, it has become more and more widespread as Investment Management Institutions (IMI) have acknowledged that some of the investors are making their financial decisions taking into considerations other non financial aspects as the long-run impacts their investment decisions can have on the society as a whole (Sparkle, 1998; McLachlan & Gardner, 2004; Hockerts & Moir, 2004). Sauer (1997) stated that socially responsible investors use their personal value systems to set their investment criteria.

IMIs can answer these needs screening specific companies or sectors, focusing investments in sustainable industries, or analysing companies for their environmental, social or governance performance, and for their stakeholder engagement practices (Bilbao-Terol, Arenas-Parra, & Canal-Fernandez, 2012).

One consequence has been the rise of social and ethical investments during the last decade (Bauer & Koedijk, 2005), in the form of Socially Responsible Investing (SRI). Ziegler and Schroder (2009) have found a 1200% growth in SRI assets from 1995 to 2005 in the US (they now cover

approximately the 10% of the total US management assets and over 10% of European funds). According to the European Sustainable Investment Forum (EUROSIF) in Europe all SRI strategies have experienced high rates, raising between 2011 and 2015 98.329M € and with a growth of 385% only over the last two years (European SRI Study 2016).

This has highlighted the need to communicate to the investors the key intangible aspects related to social responsibility, shedding light on the sustainable aim and nature of the investment funds (Boulstridge & Carrigan, 2000). As regards the consequences of this change of perspective, the issue of coherence between the core values and the communication of these to the different categories of investors has become more and more relevant.

Hence, as a corollary, the analysis takes into account the perception of the degree of ethics about the socially responsible investment funds by the potential investors. Infact, if the company want to attract resources from ethically oriented investors, it has to communicate their value-proposition, making ethical aspects relevant and recognizable. In relation to this, different authors (Hoeffler e Keller 2002; Sen e Bhattacharya, 2004) note how the benefit deriving from socially responsible behavior can only be obtained by managing to maintain constantly the same conduct over time. The strict bond with time establishes an integral part of the concept of "corporate association" (Brown & Dacin, 1997), as the whole of the perceptions the single stakeholder has achieved about company's behavior during the time and it actively contributes to influence his interpretation about the actions taken by the company (Brown, et al., 2006). Furthermore, the companies can also benefit from maintaining a socially responsible behavior by implementing, even for specific products, a differentiation strategy when consumers associate greater value with socially responsible behavior (Carroll and Shabana, 2010).

Moreover, companies have been taking advantage of the web to communicate their socially responsible activities and, according to Castelo Branco and Rodriguez (2008), the study of this media is essential to understand how much a company is sustainable. In fact, companies use the web to make the stakeholders conscious about their socially responsible activities (Williams and Pei, 1999) with more details than those they could provide otherwise (Esrock and Leichty, 2000).

This short literature review has highlighted the different roles that SRIs can have for a IMI and a need to complement the traditional financial communication with a more ethically oriented one in order to become legitimated actors in the new SRI's markets and be able to tap in this more and more widespread market.

Accordingly, in this paper, we have decided to look into the communication processes of the IMIs in order to understand if a potential investor is able to evaluate their ethical approach and if they perceive a gap between the IMI's activities, their investment decisions, and the image they are communicating through their websites. We have focused on the websites as they are the main channel for the voluntary disclosure of modern companies (Castelo Branco & Rodriguez, 2008) and the main source of the company's self-presentation (Esrock & Leichty,1998; Maignan, & Ralston, 2002).

In order to test these hypothesis we have looked to the IMIs that have explicitly expressed an interest in SRI and we have engaged Students enrolled in a Business Ethics course in order to know how they perceive the products (investments funds) and the IMIs.

We have selected the IMIs starting from those that have chosen to be members in one of the national chapters of the EUROSIF, the European Sustainable Investment Forum. Moreover we have decided to focus on two countries that have been already used in previous literature on the topics of Ethics, Sustainability, and CSR (Burlando, 2001; Albareda, *et al.*, 2006; Smith-Doerr, 2009) as they are deemed to be really different: Italy and the UK. Moreover,as we wanted to investigate the perception of a general retail investor, we have focused only on those IMIs that are actively involved in creating funds to sell at retail investors not considering those that operate only in the asset management or in the impact investing segments of the financial market.

The analysis have been conducted using the Content Analysis approach (Krippendorf, 1989; 2012; Neuendorf, 2002) in order to get a richer evaluation of the IMIs starting from the way they communicate using their Websites. The Content Analysis approach has been selected as it helps in understanding the meaning of a content taking into account the context it has been selected out.

We have asked the students to evaluate the selected IMIs website on three main dimensions. At the first step they have looked into the corporate part of the website in order to understand the IMI's self-presentation. In this way they could evaluate the role Ethics, sustainability and social responsibility had in the image each IMI has been trying to project on the market. A second step in the analysis has focused on how these institutions describe their methodology and on how they present the ethic- and the sustainability-related topics in their financial documents (Methodological Approach, Fund Reports, Key Investors Information Documents). Finally we have asked them to evaluate the relevance of ethics, sustainability and social responsibility in their communication channels.

A specific part of the analysis has been geared toward the stakeholder engagement practices these IMIs do communicate as they have been already considered as a good proxy for the communication transparency that is needed to be a legitimate actor in modern markets (Morsing, & Schultz, 2006).

After the various analysis we asked them to state their perception of the relevance of Ethics for the various IMIs. We have used the various statements given from the students on the various parts of the IMIs' self-presentation in order to infer how much these institutions, that have chosen to be part of the SRI market, are using the ethics in a instrumental or in a principal way. Moreover we have used them to asses if they have a different ethical approach to manage funds.

These results have then been compared to the Morningstar rating of the funds in order to understand the relationship between the perceptions and the rating agency evaluations.

Keywords: Ethical Finance, Investment Management Institutions, Content Analysis, Voluntary Disclosure, ESG Paradigm, Socially Responsible Investment.

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Nurturing a Corporate Culture of Change as the Key to Organizational Sustainability

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ABSTRACT

We can't be sure of many things but one thing that we can be sure of is change. Everything changes. People change, the climate changes, organizations change, cultures change and of course political entities change. As the world changes organizations of people in the world must change in response to the changing physical, social and economic environment or it will cease to exist or minimally fail the needs of its stakeholders.

The notion of sustainable systems has been becoming more normative; and yet there is no common definition of "sustainability" Shaharir (2012). It seems that of late values have become more and more important in the factors that should be considered within the context of "sustainability"; Metzger, Ellen P., Curren, Randall R. (2017). The factors that may be considered in any boundary critique of a "sustainable" system are varied and legion; Ord, Sarah L. (2011).

The presence of variety and number of the factors that contribute to the process of determining the sustainability of any particular system is compounded by the recognition that a consideration of values must be undertaken as a part of the inquiry and of any boundary critique. The factors and values of any system will change as the environment the system exists in changes. Unless the systems itself changes to accommodate the changes to its environment and its values it will cease to serve the needs of its stakeholders and will by any definition become unsustainable it the form that it exists.

Those charged with the delivery of an organization's mission will discover from time to time that the organization's environment (or its values) has changed and to continue to be sustainable the organization itself must change. Most organizational change initiatives fail; Kotter (2012). They fail for a few reasons; one of those reasons is a resistance to change.

Approaches to change management generally take the general approach of "unfreezing" the status of the organization; effecting the desired change and then "refreezing" the status.

The goal of this exercise is to bring the organization into a new state of sustainability. This state of sustainability will exist until the environment changes and the process is repeated. This process of incremental change will by necessity accelerate not at a linear rate but at a geometric rate to keep pace with the social, geophysical and other changes in the environment. To keep pace with these geometric changes resistance to change must be reduced or eliminated. In other words the

resistance to change that seems to be an obstacle to every change initiative must be militated and can only be militate is the individual and culture adopts a virtue of change.

For change to become the norm as opposed to a resistance to change within any organization it is necessary for a culture of change not only to be adopted by the organization; it must be nurtured through constant positive feedback and support.

Mead (1934) argued that the mind grows from the social process. The mind develops through the process of social communication through significant self-conscious communication, or language. The mind then comes to exist within the context of a social system and is a social phenomenon. The social process and the elements of verbal and non verbal communication that results from that social process can be conveniently called a culture; Martinez, et al (2015). In this paper I argue that it is the specific choice to engage in the constant (as opposed to periodic) verbal and non verbal communication that accepts and supports the value of change that will create a culture of change which in turn will support a sustainable organization.

Keywords: sustainability, change, change initiative, corporate culture, G.H. Mead, organization, virtue, value.

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SYSTEM DYNAMICS MODELING

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System dynamics of interacting populations

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ABSTRACT
The Social Systems dynamics encompass the interactions between individual actors, where multi-loop nonlinear feedback systems intersect (Forrester, 1971). In this context, the aim of this paper is to examine the logic of Combinatory Systems and of Complex Adaptive Systems, in supporting and explaining the dynamic behavior of collectivities or populations (men, animals, plants and also bacteria and viruses) which, by interacting with one another, determine the reciprocal dynamic and produce interesting forms of self-control. In fact, by applying the endogenous perspective, introduced by von Bertalanffy, any biological collectivity appears to be composed of distinct individual units, or agents, whose characteristics, behaviors and dynamics differ from those of the collectivity they compose (von Bertalanffy, 1968).

In particular, despite the species considered, each population is characterized by at least two trends: the quantitative evolution of the number of individuals of the population over time, and the qualitative change of the features of its component individuals. The purpose of the study is to investigate the quantitative aspect, and to model the dynamics of interacting populations and ecosystems by implementing System Dynamics models.

The model in *Figure 1* shows the main and general factors that determine the quantitative dynamics of any population.

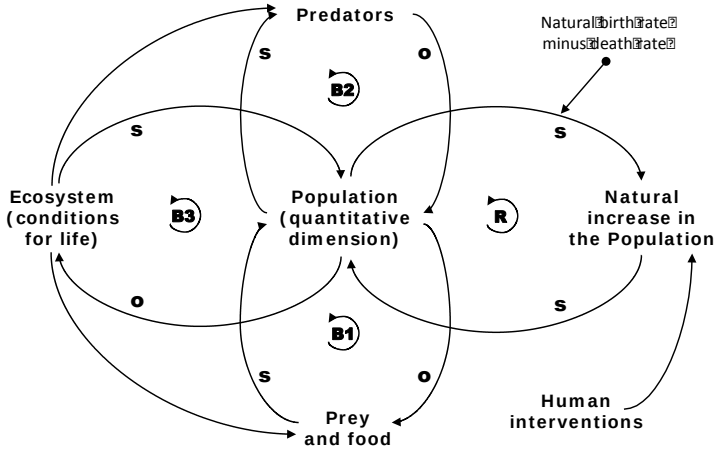


Fig. 1 - Main factors that affect population dynamics [Source: Mella, 2014, p. 313]

Among the many aspects of population dynamics, we want to examine the effects on the number of elements of two or more populations which interact in the struggle for life and, in particular, on quantitative dynamics of populations that may be considered "prey" and "predators" that are connected to the food chain. When the individuals in a population are the prey of other predator populations, a "natural" Control System (Mella, 2012, 2014) tends to carry out a reciprocal control of the number of individuals in both populations, often succeeding in producing an equilibrium state or an oscillating dynamics. This co-evolution between two populations A and B can be studied with the well-known Vito Volterra (1931) and Alfred Lotka's (1925) equations which show how two prey and predator populations can have a different dynamics in relation to the variation rates for the populations, which are a function of the number of individuals in each population:

$$A_{n+1} = A_n + a\,A_n - b\,A_n\,B_n \qquad (1)$$

$$B_{n+1} = B_n - c\,B_n + d\,A_n\,B_n \qquad (2)$$

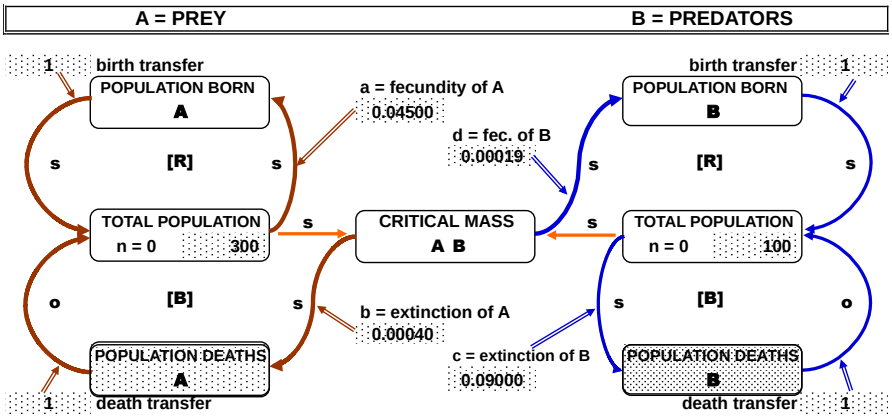
and where the rate of decrease of A – that is "-b" – and of increase of B – that is "d" – are a function of the number of individuals in both populations, forming a critical mass, calculated as the product of the prey and the predators, $A_n\,B_n$,:

$$Critical\ Mass = (A_n\,B_n) \qquad (3)$$

It is clear that, according to Volterra and Lotka, the mass of the two populations increase and decrease at two different fixed rates. This hypothesis stems from observing that in a prey-predator interaction, the rate of prey capture and prey density are connected by a relationship which represents the functional response of a predator-prey system as a whole. In fact, as Staddon observed, the risk at which the prey is exposed and the size of its population are strictly connected and depend on the predation rate of the interacting predator population (Staddon, 2016).

The dynamics deriving by equations (1) and (2) are demonstrated in *Figure 2*, in which the hypothesis on the required rates are made explicit. Other variations have been introduced to

"enrich" the system (for example, the competition for food among predators) but the variants do not modify in any way the basic logic of the system (Casti, 1985; Takeuchi, 1995).



YEAR (n)	POPULATIONS PREY A	POPULATIONS PREDATORS B	PREY births a A	PREY deaths (-) b A B	CRITICAL MASS A B	PREDATORS births d A B	PREDATORS deaths (-) c B
0	300.00	100.00			30000.00		
1	301.50	96.70	13.50	12.00	29155.05	5.7000	9.0000
2	303.41	93.54	13.57	11.66	28379.47	5.5395	8.7030
3	305.71	90.51	13.65	11.35	27669.62	5.3921	8.4183
4	308.40	87.62	13.76	11.07	27022.14	5.2572	8.1459
5	311.46	84.87	13.88	10.81	26433.97	5.1342	7.8859
6	314.91	82.25	14.02	10.57	25902.38	5.0225	7.6383
7	318.72	79.77	14.17	10.36	25424.89	4.9215	7.4029
8	322.89	77.42	14.34	10.17	24999.32	4.8307	7.1795
9	327.42	75.21	14.53	10.00	24623.77	4.7499	6.9681
10	332.30	73.12	14.73	9.85	24296.59	4.6785	6.7685
11	337.54	71.15	14.95	9.72	24016.41	4.6164	6.5804
12	343.12	69.31	15.19	9.61	23782.11	4.5631	6.4036

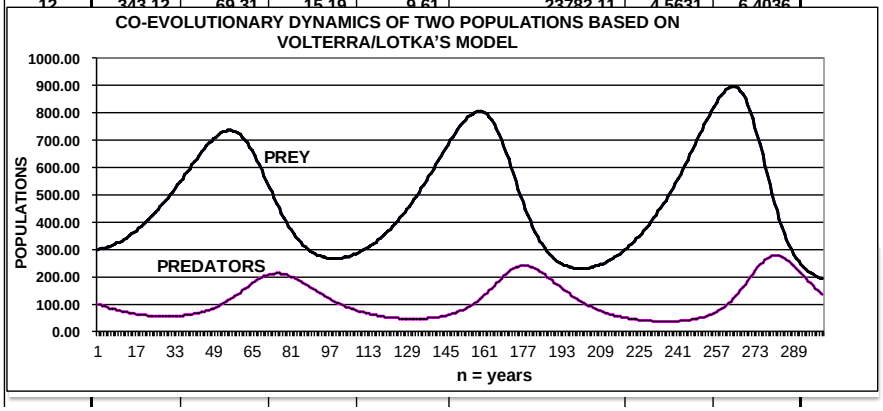


Fig. 2 - Model of a the dynamics of two populations forming an ecosystem, based on Volterra-Lotka equations

The dynamics described in *Figure 2* can be connected to the action of a "natural" control systems, because, as we can see, the "natural" control leads the two populations to maintain a reciprocal relationship that produces an oscillating dynamics, which is, in fact, similar to that of the sardines and sharks in the Adriatic Sea (observed by the zoologist Umberto D'Ancona), which was the basis for Volterra's famous equations. However, it is possible to introduce an "exogenous" control when the population reaches an upper limit; for sake of simplicity in *Figure 2* this control is not implemented.

Classical ecological models have focused on two species (May, 1973; Hassell, 1978) also if several authors identified limitations related to the consideration of only two populations (Price et

al., 1980; Paine, 1966), in particular related to the extent to which they are limited to achieve and equilibrium or to limit a cycle (Segel, 1984). However, the study of the dynamics between more than two populations forming a multilevel eco-system may contribute in exploiting more phenomenon that are exhibited in nature (Hastings and Powell, 1991). For this purpose, the same logic applied to the simulation of two populations can be useful for any number of populations. This allows the identification of additional behaviors that may arise in model systems. An example is provided in *Figure 3*, where the dynamics of five populations forming an eco-system are displayed.

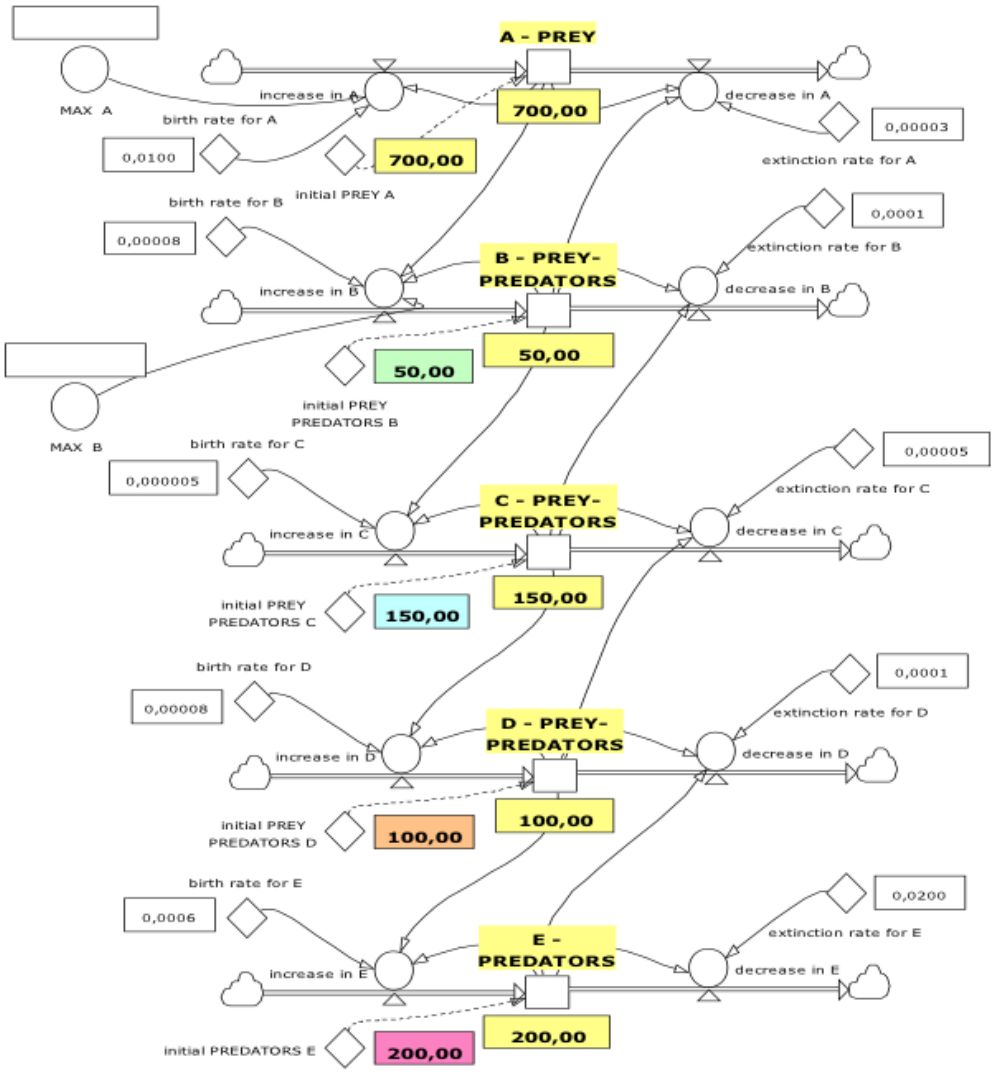


Fig. 3 - Model of an ecosystem of five populations forming a food chain.

Although additional interactions and more accurate models can be exploited by considering multiple populations, without external control their dynamics may result chaotic. This is

explicitly showed in *Figure 4*, where the upper graph represents the dynamics of an ecosystem without external control.

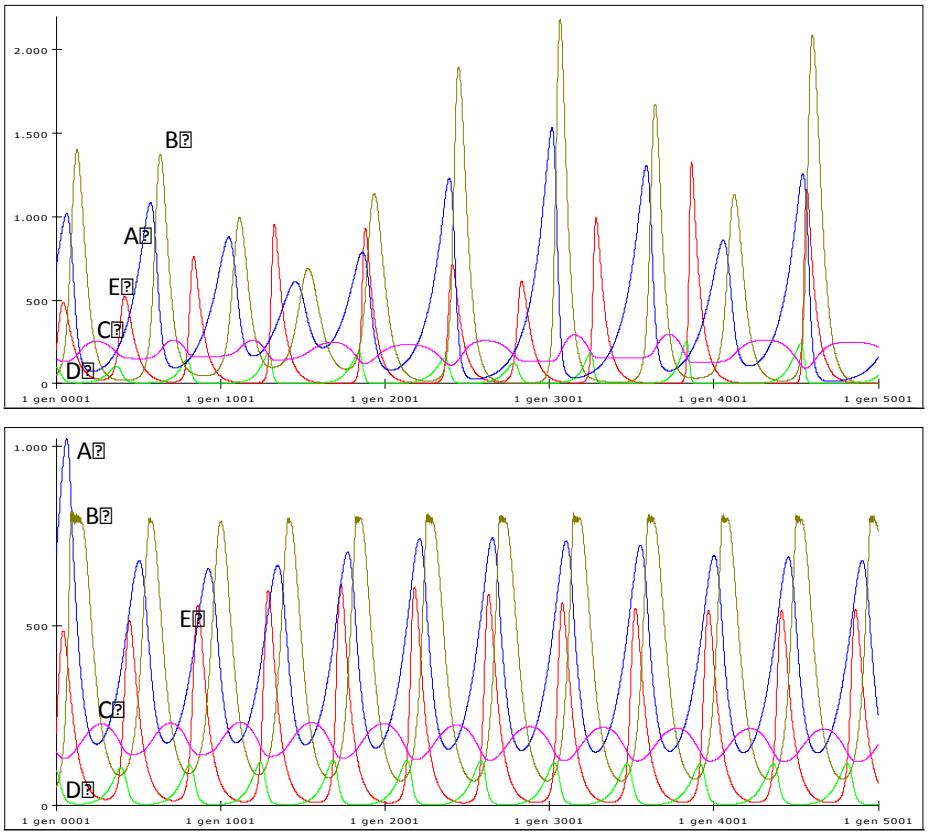


Fig. 4 - Dynamics of five populations of an ecosystem, without (top graph) and with (lower graph) external control

The results of the application of an exogenous control can be observed in the bottom graph in *Figure 4*. In fact, while in the first graph the populations move independently and not regularly, an "exogenous" control can stabilize their dynamics. However, we should bear in mind that the simulations of ecosystems are very difficult to implement, since they are the results of many complex interactions of different populations which, if observed as a whole, represent a complex system. In this sense, as stated by Lovelock, these relationships cannot be entirely translated into mathematical terms (Lovelock, 1988).

As stated before, each species evolves even in qualitative terms, that is in the qualitative features of its individuals. In this sense, the quantitative dynamics of populations and species also influence the qualitative dynamics. In fact, a change in the features of the individuals of a population, considered useful in the struggle for life, may produce an alteration of the number of individuals in the ecosystem (Buchanan, 2000; Dennett, 1995).

An example can be provided in *Figure 5*, where the balancing of qualitative features is represented by the strength of predators and the chances for survival of the preys.

Predators with refined weapons (whatever the interpretation we choose to give to this term) have an advantage in their predation (s1), thereby reducing the chances for survival for the weaker prey (o1) (defenders); the lower number of weak prey increases the probability of procreation

(o2) by the prey with strong defenses (hereditary transmission of traits), which leads to an increase (s2) in the effectiveness of the defenses for an increasingly higher number of prey. The descendants of the stronger prey have a high probability of inheriting the effective defense capabilities of the parents; thus an ever higher number of prey can escape from their predators (s3). The strengthened defense capacity of the prey reduces the probability of survival of the weaker predators (o3) (attackers); with more effective offensive weapons, the remaining predators can reproduce with greater frequency and with a good chance of passing on their weapons to their offspring (o4). On average the predators have become stronger (s4) and can thus eliminate the weaker prey, thereby ensuring that those with more effective defense capabilities can procreate and spread these capabilities to their descendants. The loop repeats itself, generation after generation (the system is repetitive), thereby producing a gradual improvement in the predators' weapons (a lengthening beak, more powerful jaws, greater speed of attack, etc.) and in the defense mechanisms of the prey (improved mimesis, thicker shells, greater speed of escape, etc.).

It is clear that living beings need to keep track of the past history in order to build successful strategies to succeed in the future (Staddon, 2016). In fact evolution implies a strengthened ability to hunt for descendants of predators and a strengthened defense capacity for descendants of preys. The loop repeats itself, because of the repetitiveness of the system, thereby producing a gradual improvement in the predators' ability to hunt, and in the defense mechanisms of the prey.

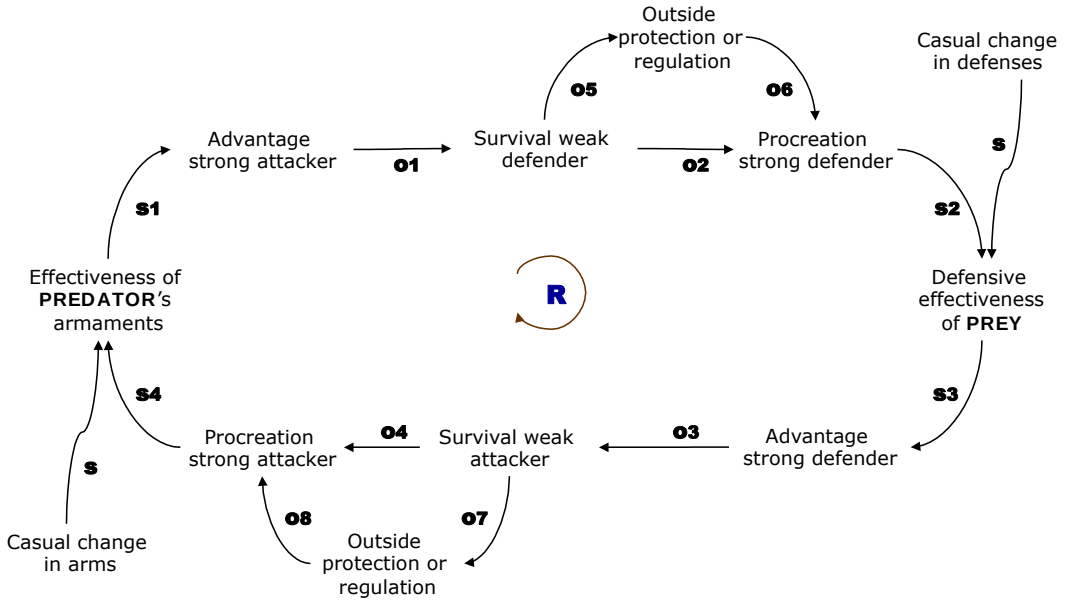


Fig. 5 - Model of the evolution of phenotypes based on the process involving the struggle for life

As supported by Yoshida, the evolution of the prey, in response to the change of the predator, or vice-versa, affects the relationship between the predator and the prey (Yoshida et al., 2003). As demonstrated before, this alters the population dynamics, and, therefore, it implies that the interactions governing ecological dynamics are then continually changing through rapid evolution (Staddon, 2016) due to the action of a powerful Combinatory system of diffusion (Mella, 2017, Sect. 2.6.5).

Keywords: Social Systems, Combinatory Systems, System dynamics, Multiple populations

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A template to visualize sustainability data with Resource Mapping: insights from Integrated Reporting practices

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ABSTRACT
This study illustrates a template to code qualitative data contained in sustainability reports to generate a formalized Resource Map developed according with System Dynamics (SD) principles and concepts. The resulting System Dynamics-based resource map can be used to assist decision makers in discussing and developing sustainable value creation policies, as well as understand their short-, medium- and long-term consequences if the resource map is translated into a full working SD model.

In detail, the study focuses on the analysis of a specific model of corporate reporting, the so-called Integrated Report, including information and data on the organization's performance represented according to a holistic perspective. As stated by the International Integrated Reporting Council (IIRC), Integrated Reporting aims to (IIRC 2013) bring together financial and sustainability reporting practices, with the ultimate goal to support strategic decision-making processes and create long-term sustainable value (Abeysekera 2013; Adams 2015). Notably, Integrated Reporting is currently receiving an increasing attention within the management accounting literature (Beattie and Smith 2013; Atkins et al. 2015; Burke and Clark 2016; Dumay et al., 2016) and is even mentioned as a powerful "contemporary managerial innovation" (Busco et al. 2013, p. 34).

Our research was motivated by two key factors.

First, we were stimulated by the great emphasis that the concept of sustainability and sustainable management have been receiving in the last few years. In broad terms, the critical conditions of many natural resources, the high levels of pollution generated by human and industrial activities, and the variety of long-term impacts of the management policies carried out on a daily basis,

clearly demonstrate the necessity to put "sustainability" at the center of our agendas. In this regard, it is nowadays widely accepted that sustainability has to be managed adopting a holistic perspective (e.g., Eccles and Krzus, 2011; Eccles and Saltzman, 2011).

Second, the high (and increasing) number of reporting tools used by organizations all over the world to report and disclose relevant information on the results they achieved and the impacts produced in terms of sustainability (e.g., de Villiers and Sharma 2017) caught our attention. These reports, although potentially very useful, highly differ in terms of their content and forms of communication, spanning from very quantitative reports to very qualitative ones (Beattie and Smith, 2013; Barnabè, 2016). This undoubtedly impacts on their ability to communicate in a clear, complete, formalized and shared way key data and information about the value creation processes in place, and to assist decision-makers and other stakeholders in developing shared sustainable policies.

Subsequently, key questions arising in this context include the following ones (see also de Villiers et al., 2014, and Cheng et al., 2014): which are the resources at the organizations' disposal? In which way is value created and distributed over time? Which are the key outputs and outcomes, and which is their impact in terms of sustainable value creation over time? How can be the organizations' business models and strategies presented and which are their interconnections? How does the systemic structure of the business domain under analysis influence decision-making and sustainable value creation?

To address these questions, we first advocate the use of a specific qualitative mapping technique, called resource mapping (Kunc and Morecroft, 2009). In detail, building on the combination of the System Dynamics principles (Forrester 1961 and 1968, Richardson and Pugh 1981, Sterman 2000) with the Resource Based View of the Firm -RBV (Penrose 1959; Wernerfelt 1984; Barney 1991; Peteraf 1993), resource mapping provides a visual and analytical technique which can be used to formally represent the causal linkages between the key resources at the organizations' disposal, the policies being carried out and the outputs and outcomes which represent the final targets of those actions. Overall, resource mapping can be regarded as a (qualitative) methodology developed to help managers and organizations to visualize the system of strategic resources, i.e., the "resource profile", based on the key System Dynamics concepts of stocks, flows and feedback processes (Kunc and Morecroft 2009). Therefore, resource mapping effectively integrates both RBV and SD principles, anyhow not necessarily leading to a quantitative model as we might expect dealing with traditional SD modelling.

In more details, this study develops an Integrated Reporting-based resource map starting from the data and information related to a specific organization and its integrated report, that was accessed through the "Integrated Reporting Examples Database" provided by IIRC. This case study (Eisenhardt 1989; Yin 1994) is to be considered as an illustrative one (Ryan et al., 2002), useful to demonstrate the coding and mapping process, at the same time providing practical information and guidelines for building Integrated Reporting-based resource maps for every kind of organizations, regardless their industry, localization or size.

Overall the expected contribution of this study is twofold.

First, the study is of interest for the academic debate as well as for practitioners presenting a real case study in which resource mapping was used to translate qualitative and quantitative sustainability data into a formalized resource map.

Second, the study presents a general template which can be applied to model sustainability reports (in this case Integrated Reports), extracting data from them according to a few guidelines that could be generally applied.

Keywords*:* Resource mapping, qualitative System Dynamics, Integrated Reporting, Sustainability, Resource Based View.

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Understanding the root causes of water scarcity through System Dynamics: the Italian case of the Bracciano Lake

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ABSTRACT
Although there are some countries where water scarcity is a long-established problem (for example, in most of African countries, for both geographical and, evidently, economic factors), the climate change has harmed water availability in many parts of the world. In California, for example, despite a recent respite, the long-running drought cost the agricultural sector an estimated $2.7 billion in 2015 and the state expects to experience chronic water shortages in the future (US Official News. June 5, 2015). Another example occurred in Sri Lanka, where the worst drought in 40 years affected more than 1 million people by acute water shortages (Xinhua News Agency. January 21, 2017).

According to European Environment Agency (2008), water scarcity is defined as a situation where "insufficient water resources are available to satisfy long-term average requirements". Similarly, Van Loon and Van Lanen (2013) considered that "water scarcity represents the overexploitation of water resources when demand for water is higher than water availability". Estrela and Vargas (2012) noted that "drought is a natural hazard that results from a deficiency of precipitation from expected or normal, which can translate into insufficient amounts to meet the water demands of human activities and the environment."

As stated during the 23rd Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC), on 6-17th November 2017: "Around 40% of the world's population will face water shortages by 2050, accelerating migration and triggering conflict, while some regions could lose up to 6% of their economic output, unless the water utilization is better managed."

Water scarcity in a given region is a phenomenon that can be explained by the analysis of multiple factors and each one of these, influences the system with a different intensity and on different levels, depending on the characteristics of the studied region (economic, political, geographical, demographical).

The Intergovernmental Panel on Climate Change (IPCC, 2015) reported that unabated climate change has the potential to strongly impact freshwater resources with wide ranging consequences for societies and ecosystems. Furthermore, there are other dynamic factors that must be considered within water scarcity issue, including economic growth, technological progress, national water endowment, structure of production (at sectoral level), international trade, and population growth (Distefano and Kelly, 2017).

Nowadays, one of the most challenging problem Italy is facing is certainly the water crisis that damages almost all country's regions, from north to south. The decrease of rainfall index was 47.4% when compared to the historical average. "In the north, rainfall scarcity reached alarming 72.3% of the average value, causing, according to the biggest association of representation and assistance of Italian agriculture, Coldiretti, the worst water crisis of the decade Two-thirds of the crops along the Italian peninsula are dry. The damages caused to the plantation and livestock amount to more than 2 billion of Euros" (Cipriani, "Allarme siccità", Repubblica).

In the face of these numbers, it is clear the need of addressing this issue and understanding which kind of actions would be more effective in mitigating the huge damage that water scarcity produces for the economy. The current management of the water reservoirs, especially for Italian case, is not faced by institutions in a sufficient in-depth manner and without sharing data with stakeholders (consumers, local municipality etc). Generally, the volume of water withdrawn is quantified according to the instant needs of the users, agencies which responsible for water management often do not use any type of forecasting tool in order to predict future trends of demand, reservoir capacity and potential environmental damage. These aspects lead to a defective monitoring process.

The case we discuss in this study is the water crisis that afflicted Rome during 2017's summer, which had strongly upset the hydrogeological equilibrium of Bracciano lake. At the time of this writing (November 2017), Bracciano lake's level is 193 cm below its hydrometric zero point (43 cm below the maximum limit beyond which the system can be considered at risk). For this reason, the municipality of Lazio region has recently forbidden further withdrawals, carried out by ACEA (the water system operator), until the lake reaches its safe operating water level (161.90 cm).

The Roman case might represent a good opportunity for testing new approaches to tackle the complex and unsolved problem of water sustainable supply that plagues many countries around the world. Although the problem appears to be softened and mitigated, unfortunately, it is very likely it will reappear in the future again, mostly due to the climate change, which is straining the hydric infrastructure system present in the territory. In Italy, there is a water dispersion of almost 9 billion of liters per day due to losses recorded along the water supply network (474.000 Kilometers of aqueducts). Every 100 liters of water inserted inside aqueducts, almost 40 liters are lost for the obsolescence of distribution network, representing one of the highest average of Europe (Fontana et al., 2011).

This study aims to address the issue of water scarcity taking into account different stakeholders' perspectives (public administration, water system operator and general population) and putting considerable weight on sustainability point-of-view. For achieving this objective, a simulation model is proposed, which allows policy-makers to make decisions based on scientific analysis of future scenarios and provide them with a supporting tool that could be used in synergy while planning and defining water withdrawal rate limits, especially during a dry period like the one experienced in the 2017's summer. Furthermore, the model will be able to give useful insights about which kind of policies (among feasible ones, like investments on infrastructure, rationing, etc.) are the best to preserve the adequate service level according to consumers' needs, keeping a good level of cost efficiency.

This study makes use of systemic approach, in particular the system dynamics methodology. It consists in an iterative process to define a dynamic hypothesis, develop a formal model, test and validate it, and formulate and evaluate different intervention policies (Coyle, 1996; Richardson & Pugh, 1981; Sterman, 2000). The features of system dynamics include non-linearity, information feedback, time delay, and dynamic complexity (O'Connor and McDermott, 1997). This approach was chosen due to the intrinsic characteristics of the water crisis problem complexities and the presence +of a multiplicity of variables interacting with each other, which can produce emergent and unpredictable behaviors.

We aim to build a model that represents the structure of water management system within Municipality of Rome and Bracciano Lake area, including hydrogeological, demographical and economic variables through a stock and flow diagram, which is one of the system dynamics modelling tool. This diagram describes the structures and behaviors of the water supply system,

and explains how ultimately such dynamics could be monitored and also be affected by intervention actions trying to disrupt a harmful trend.

In particular, this study could help in the evaluation of the long-term impact of past policies and new policies that are currently under consideration, especially policies to decrease the natural demand for water from consumers or infrastructure renewal.

The outcome expected from this study is an awareness improvement on the management process of water availability, which is recognized as a major problem by the highest world regulatory bodies. Italy, as other countries around the world, requires adapting to a new and challenging scenario, characterized by climate change, population growth, and desertification. To adapt, water authorities can take concrete actions, for example, improving the infrastructures technologically to decrease losses and waste of water, by questioning the decision-making processes of institutions and water agencies and by making assumptions on future in order to understand whether the actual system can withstand extreme conditions in the future. In this scenario, a decision support system based on the proposed simulation model could be more than helpful.

The main limit of this study is the lack of reliable data. From 2007, information on water withdrawal from Bracciano lake by ACEA has no longer been available (Taviani & Henriksen, 2015), we think that a shared view on historical data may lead to a better comprehension of the problem and push scientific side for searching newer and better solutions. For this reason, establishing a shared work with both the agency and the institutions, leveraging on their willingness of improvement, is a necessary condition for achieving the stated goals of this study.

Keywords: Water crisis, water scarcity, climate change, water supply system management, System Dynamics.

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International strategies and declusterization: A simulation-based dynamic theory of Italian clusters' international sustainability

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ABSTRACT

The purpose of this paper is to study the decline and death of industrial clusters. The most important contributions in the literature on clusters and districts provide an explanation for cluster performance and, more broadly, a rationale for their success (MacKinnon, Cumbers & Chapman, 2002; Human & Provan, 1997; Sydow & Windeler, 1998; Paniccia, 1998; Manskell & Malnberg, 1999). Other contributions focus their attention on the origin of clusters and how they can evolve (Human & Provan, 2000; Gulati, 1998; Morel & Ramamujam, 1999). Our perspective is symmetric and aimed at understanding the mechanisms that lead to cluster decline and death. The focus of our attention is on the effects of internationalization strategies of companies upon the industrial cluster they belong to. We define this process of slow death of the clusters as declusterization, a term that refers to the slow emptying of the cluster that involves, at different stages, the various actors within the cluster. The research question we address in this context is "why do cluster die/declusterize?". Therefore, we are interested in understanding this phenomenon by providing a description of the different phases, analyzing the mechanisms that activate the declusterization (and that could be also leveraged to reverse the process) and measuring the speed that characterizes the whole process.

The paper grounds upon insights that originate from three streams of literature: the research on clusters (and networks if we adopt a broader perspective), the theoretical framework offered by resource-based view and the literature on relational capital. By adopting a combination of a traditional econometric and non conventional methodology based on simulation, we build a theoretical framework that we test by collecting empirical data in Italian footwear clusters.

The main contribution of our study is twofold.

First, methodologically, we present a computational and system-based approach to theorization. Secondly, theoretically, we contribute to the literature on clusters/districts.

As for our theoretical contribution, prior researches, have explored in a systematic way the impact of clusters on the wealth of nations as well as their economic impact on the limited geographic area they are located in. The engine and the main drivers of the clusters have been explored identifying the key contribution of focal firms or other institutions promoting the development of the cluster. Few studies have tried to understand the development of clusters's lifecycle adopting an evolutionary perspective (Nadvi, 1999). Our analysis focus its attention on clusters decline and death, trying to identify the main drivers of this decline and the actions that can be implemented to invert this trend.

Is declusterization impacted more by cluster members internationalization or by foreign competition? Our analysis suggest that the causes of the decline (and the phenomenon that we have named "declusterization") of the clusters must be identified in decisions endogenous to the cluster. In fact it is not – as it is argued by many studies that - competition from outside have put into crisis this business model; instead the internationalization strategies developed by the main actors of the clusters are responsible for it.

Also the speed of the declusterization process vary depending on the geographic distance of the countries selected as target markets. Finally, the declusterization process is characterized by a cycle that involves the various actors of the clusters with a different timing that depends on the role they play within the cluster.

This study also contribute to the broader literature on international business, with specific reference to internationalization processes. The mainstream literature tend to describe the internationalization process as a linear and progressive approach and identify various phases of the internationalization that vary depending on the number of phases (Cavusgil, 1982; Johanson & Vahlne, 1977 and 1990; Root, 1998; Wiedershaim-Paul et al, 1978; Chang & Rozensweig, 2001). Most of these studies tend to state that internationalization strategies impact positively on firms performance and, therefore, internationalization is seen as an important driver for companies growth. We argue that internationalization is not always beautiful, focusing our attention on the flip side of the coin, and, therefore, on the long term consequences of individual internationalization strategies. For that reason, we do not conceive the internationalization process as a linear one but rather as a circular one, where companies take into account the impact of their own internationalization strategies and their suppliers' internationalization strategies; because of this feedback loop they revise their strategies in international markets accordingly. Finally, we contribute to this stream of literature by proposing a theory on internationalization processes that focus its attention on an aggregate of companies (the cluster) rather that the individual firm, as in the mainstream literature.

We also contribute to the advancement of the research on innovation analysed from the point of view of aggregates of companies (collective innovation). RBV perspective provides the

theoretical framework used to understand aggregate companies behaviour. Increasingly, a relational view of strategic management (Dyer and Singh, 1998; Lado et al., 1997; Madhok and Tallman, 1998; Paulraj et al., 2008) argues that the roots of companies competitive advantage lies in their relationship rather than in the unique resources and competencies they possess individually. The resources contributing to companies competitive advantage are generated and renovated by the interplay among the actors; by adopting this perspective it is also possible to provide a dynamic interpretation of RBV.

The paper is structured as follows: in the first paragraph we give a definition of industrial cluster. In the second one we combine two theoretical framework - the RBV of the firm and the network perspective – and apply them to the industrial cluster to understand the innovation process that takes place within the cluster. In the third one we develop the hypothesis. In the fourth one we discuss methodological issues. In the final session we present results and discuss them and their implications for theory and practice, limitations and future research.

Keywords: industrial clusters, international strategy, sustainability, computer simulation, System Dynamics.

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International Symposium
"Cocreating Responsible Futures in the Digital Age"

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ABSTRACT

Increasing demand for goods in urban areas has turned into a surge in freight traffic, with negative consequences on traffic congestion and pollution. These trends have led researchers, practitioners and public administrations to shift their efforts toward solving these problems and City Logistics (CL) has emerged as a concept for coordinating all stakeholders into optimizing urban freight activities and reducing the negative impact of urban freight distribution on the citizens. In fact, public stakeholders are called to implement policies aimed at reducing the level of pollution and traffic congestion and other negative effects generated by freight transportation activities, but also to foster the efficiency of CL systems. Efficiency is in fact the major goal of private freight transport operators, and is directed towards the improvement of logistic services, maximizing revenues, and reducing costs.

Several initiatives in CL have been devised and implemented over recent years. However, the results achieved by these initiatives in terms of efficiency and environmental benefits are not always promising and were abandoned after the experimental phases. One of the most common reason for failure is the lack of profitability for the private operators. For instance, some of these CL initiatives could be financially viable only if subsidized. Hence, a thorough exploration on the commercial and business attractiveness is needed to increase the likelihood of involving private operators to cooperate and invest their capital assets in the project.

The evaluation of the potential outcomes of CL projects has been the focus of several types of modelling techniques. In fact, modelling CL can be quite useful to understand and assess the impacts of selected policies. However, more research is needed to explore both operational and economic aspects of a CL system in order to fully grasp the interconnections between actors and variables that shape the system.

To this end, a System Dynamics (SD) model is proposed to model a CL System, taking into account its major actors, together with operational an economic variables. In particular, we focus on local administrations and freight transport operators. Local administrations can implement and enforce freight traffic regulations, but can also grant public subsidies to virtuous private operators, who in turn strive for operational efficiency and profitability.

The model structure and feedback loops are derived from pertinent CL literature. Balancing Loops are developed to link selected public and private policies on the operational and economic factors that drive the global outputs of city logistics systems, in terms of road occupancy, fuel emission and profits. These variables then drive the adoption of selected policies, and thus the feedback loops embedded in the system (as shown in Figure 1 and 2).

The objective of the model is therefore to evaluate the outcome of public and private policies on the city logistics system as a whole. As such, the proposed SD model provide for a holistic and aggregated view on the effects of public and private policies in a CL system, which are responsible for the global outputs of the system itself in terms of economic gains and losses as well as environmental sustainability. Such view enables the modeler to draw useful insights on the topic at issue that might be otherwise overlooked. We hope that the results of the SD model simulation would provide a background work for a deeper exploration on the topic of long-term operational and economic sustainability of CL systems, which is highly needed in light of the afore mentioned issues with their large scale diffusion.

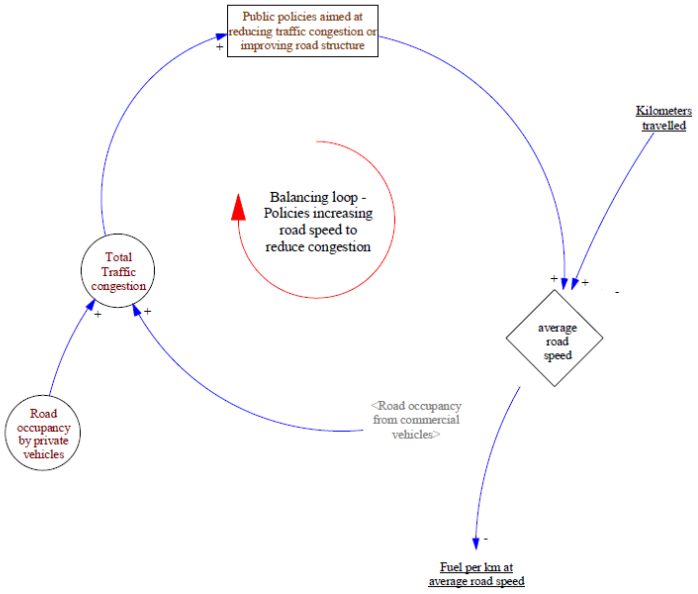

Figure 1 Balancing loop generated by public policies aimed at reducing traffic congestion

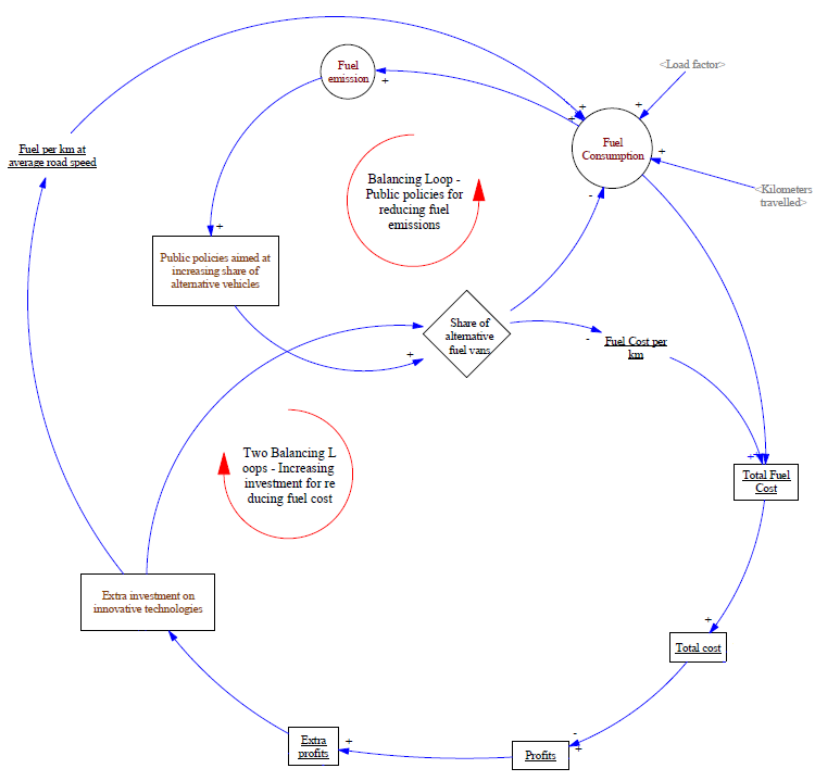

Figure 2 Balancing loop generated by public policies and private investments to reduce emission and fuel costs

Keywords: City Logistics, Urban Systems, Evaluation, Simulation, long-term sustainability.

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ISBN: 9788890824265
Book of Abstracts of the
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Toward a General Theory of Societal Collapse. A Biophysical Examination of Joseph Tainter's Theory of «Diminishing Returns of Complexity»

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EXTENDED ABSTRACT

The fall of large social systems is a much-studied subject, but also one where an agreement on the cause (or causes) of the fall seems to be extremely difficult to find. For, instance, in the case of the Roman Empire, Demandt[2] (1984) describes around 210 theories on why Rome fell and this is probably an incomplete list. Overall, however, we can divide this domain into two main subsets: theories based on several independent causes acting together (concauses) and theories based on a single cause that generates a cascade of different effects. An example of the first approach – many concauses - is the recent study by Cline on the collapse of the Bronze Age Mediterranean Civilization[3]. A recent example of the second approach, - single cause – is Douglas Reynolds' book, "Cold War Energy"[4] which attributes the fall of the Soviet Union to the cascade of negative effects generated by the growing difficulty of the system to produce a sufficient amount of oil for the industrial and military system. This phenomenon eventually resulted in oil production "peaking" a phenomenon that was immediately followed by the political collapse of the Union.

In the field of "single cause" approaches, a well-known theory has been presented by Joseph Tainter's study "The Collapse of Complex Societies"[1] where he identifies a general factor in the decline and fall of civilizations and empires what he calls as the "diminishing returns of complexity." Here is how Tainter describes his interpretation:

> Human societies and political organizations, like all living systems, are maintained by a continuous flow of energy. From the simplest familial unit to the most complex regional hierarchy, the institutions and patterned interactions that comprise a human society are dependent on energy. At the same time, the mechanisms by which human groups acquire and distribute basic resources are conditioned by, and integrated within sociopolitical institutions. Energy flow and sociopolitical organization are opposite sides of an equation. Neither can exist, in a human group, without the other nor can either undergo substantial change without altering both the opposite member and the balance of the equation. Energy flow and sociopolitical organization must evolve in harmony.
>
> More complex societies are more costly to maintain than simpler ones, requiring greater support levels per capita. As societies increase in complexity, more networks are created among individuals, more hierarchical controls are created to regulate these networks, more information is processed, there is more centralization of information flow, there is increasing need to support specialists not directly involved in resource production, and the like. All of this complexity is dependent upon energy flow at a scale vastly greater than that characterizing small groups of self-sufficient foragers or agriculturalists. The result is that as a society evolves toward greater complexity, the support costs levied on each individual will also rise so that the population as a whole must allocate increasing portions of its energy budget to maintaining organizational institutions
>
> It is the thesis of this chapter that return on investment in complexity varies, and that this variation follows a characteristic curve. More specifically, it is proposed that, in many crucial spheres, continued investment in sociopolitical complexity reaches a point where the benefits for such investment begin to decline, at first gradually, then with accelerated force. Thus, not only must a population allocate greater and greater amounts of resources to maintaining an evolving society, but after a certain point, higher amounts of this investment will yield smaller increments of return. Diminishing returns, it will be shown, are a recurrent aspect of sociopolitical evolution, and of investment in complexity.

Tainter's thesis is not based on any kind of model that could be used to describe historical data. For instance, Tainter shows a graph for the content of silver in the Roman denarius for a period that goes from the 1st to the 3rd century AD. The decline of the content of precious metals in the coins is taken as an indication that the Roman government was experiencing increasing financial difficulties. Tainter attributes this phenomenon to the increasing cost of the Roman bureaucracy, including the imperial court, and that this phenomenon was a major cause in the decline that led, eventually, to the demise of the Empire during the 5th century AD. Curiously, Tainter never mentions the depletion of the Roman silver and gold mines in Spain, even though this phenomenon can be said as the primary cause of the decline in the silver content of the Roman coins.

Tainter's model is well known and it is also relevant to our current situation. If civilizations and empires are systematically brought down by the increasing costs of bureaucracy then, clearly, our

civilization is at risk, too. But it is also true that the model remains qualitative; a series of the hypothesis that is consistent with some historical trends but that cannot be said to be a real proof that Tainter's ideas are correct. Is it possible to put the model on some more firmly footing? This is the approach of the present model in which we use system dynamics in order to create a semi-quantitative model where some of the parameters of Tainter's model are present as "stocks" and where their behaviour is described in the form of flows. We find that it is possible to reproduce Tainter's ideas with a simple "mind sized" model[5] where the increasing cost of bureaucracy is taken into account as well as the increasing costs of mining generated by bureaucracy. The model generates new insights in our understanding of the collapse of complex structures.

Keywords: system dynamics, society collapse, resources, bureaucracy, complexity

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ISBN: 9788890824265
Book of Abstracts of the
5th Business Systems Laboratory
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A model-based framework for cybersecurity analysis of cross-border and cross-domain digital platforms.

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ABSTRACT

EU is making significant steps toward the implementation of cross-border eGovernment Services and interoperable technical solutions. The implementation of such services involves the need to interconnect socio technical systems that span different communities and join a variety of policy domains. Moreover, the technical implementations of these systems are themselves based on a variety of technical solutions and standards. Such openness and diversity create a fertile soil for vulnerabilities at many different levels: from malicious cyber-attacks on the hardware infrastructure to the high-level social engineering attacks that can undermine the trust between communities. This calls for novel security models that would address the emerged threats and vulnerabilities, while at the same time being adaptable to a single general systemic model.

In a more general view, in such a complex environment, the adoption of a systemic framework for addressing the entire lifecycle of the system design would appear to be mandatory. As one cannot limit to deducting the system's lifecycle properties and, with that, its security threats a priori, relevant tools must be adopted for facilitating inductive reasoning and threats discovery. System Dynamics (SD) offers a powerful tool for the inductive forecasting of security threats. Moreover, it can complement in a seamless way even a pre-defined cyber-security strategy in the aforementioned multi-stakeholder and cross-cultural environment. Finally, it is able to encompass a variety of tools that would be managed through the adoption of a multi-paradigm framework, leveraging the relevant set of tools, models and interconnections between them into a single cyber-security methodology.

Cybersecurity cannot be regarded only as a domain or a sector-specific issue. Every entity that is part of a system (be it public administration, an organization or an ordinary user of services) concurs to the specific security aspect of that system. In addition to actively interacting with

citizens and users on cybersecurity issues, governments, public administration and organizations are expected to enable end-users' reporting and feedback.

Starting from the lowest level possible, training of both public administration, citizens and workers needs to be enforced, since knowledge and behavior of end-users is among the first lines of defense against cyber-threats. Information exchange platforms are crucial to the correct functioning of infrastructure and services that rely on interconnected information systems. This is also integrated in the security objectives of the ENISA guidelines (Security Objective 6 in Domain 2): Human resources security. Collaborative sessions of threat modelling using System Dynamics can be a powerful learning environment both for ICT specialists and for non-technical people[1].

Currently, the NIS Directive is the main piece of legislation of the "2013 EU Cybersecurity Strategy" and it is aimed at ensuring a high common level of network and information security across the EU[2]. Being part of the Framework Directive 2009/1401/EC within the Telecom Package, the set of obligations in Article 13a aims at ensuring the security and integrity of electronic communication networks and services, dealing mostly with availability of services. As a response to the directive's requirements, ENISA, Ministries and NRAs from member states, have initiated a series of meetings in order to achieve a harmonized implementation of Art. 13a. Three non-binding technical documents were provided as guidance to the NRAs in the EU member states: Technical Guideline on Incident Reporting, Technical Guideline on Security Measures and Technical Guideline on Threats and Assets.

The main objective of this work is to pave the way towards a model-based approach for cyber-security analysis on an architectural level. This is a means for users' understanding of an organization's products and services about how the organization[3] addressed critical aspects of information security. One major contribution from such a model would be provision of a common way to express a cyber-security evaluation for all of the organization's solutions and components. The approach shall also support technical employment of (a combination of) several components, i.e. a solution requiring security assessment of several components being incorporated into a single operational whole.

The objectives and the results of a cyber-security evaluation are meant to be communicated to a variety of stakeholders for whom a strong technical background should not be a prerequisite.

[1] E.g.: https://insights.sei.cmu.edu/sei_blog/2016/09/modeling-and-simulation-in-insider-threat.html

[2] It requires the operators of critical infrastructures and digital service providers (trading venues, central counterparties, internet exchange points, domain name system service providers, top-level domain name registries) to adopt appropriate steps to manage security risks and to report serious incidents to the national competent authorities. The regulation and protection of the sectors that involve dealing with sensitive data and critical infrastructures' maintenance is becoming a key factor for the sustainability and resilience of the whole Digital Service Infrastructure. The digital service providers are also subject to compliance with the network and information security ("NIS") Directive: online marketplace, cloud-computing services.

[3] By 'organization' we mean any entity that provides products and services to users, and that has adopted a cyber-security strategy in any part of its systems' lifecycles

Thus, the information must be easy to read for a non-technical person who would in most cases not be acquainted with formal security models or questions regarding security technology. In order to achieve these objectives, a commonly agreed model of information security must be adopted: in this case the Reference Model for Information Assurance and Security (RMIAS[4]) has been selected as the backbone supporting the analytical framework.

The RMIAS identifies the following security aspects (dimensions) of the Information System: Life Cycle, Information Taxonomy (Classification), Security Goals and Countermeasures. Although it integrates the countermeasures dimension, the RMIAS is mainly aimed to support a goal-based security management, as "focusing on goals allows security experts to communicate with other stakeholders using concepts that do not require technical knowledge." It is precisely this generality of the model and its overall usability that makes it adequate for employment for a multi-stakeholder environment. In addition to modelling security goals/objectives, modelling security risks/threats can be regarded as equally usable since each addresses the others' main concern implicitly. In order to provide a holistic evaluation of the Digital Service infrastructure with respect to security, a threat-based view on security management is also part of the analysis. With the RMIAS being complemented with some threat-based view on security, an extended reference model is obtained. The security model supports both goal-based and threat-based security assessment. In a goal-based approach, the security goals are first defined, and the countermeasures helping to reach these goals are then selected. In a threat-based approach, the threats and vulnerabilities of the system to be secured are analyzed, and the countermeasures mitigating the threats and vulnerabilities are then selected.

The ENISA technical guidelines on security measures builds on an extensive list of national and international EU electronic communications standards and sublimes them into a set of security objectives divided by domain. It outlines 25 security objectives, each of which is further analyzed through various security measures and supported by a set of evidence that serve to justify a statement that some objective was met. The security measures are grouped in 3 sophistication levels, whereas the security objectives are divided in 7 domains of application. This leads to an approach that is general enough to be understood by all the relevant experts and the management team in an organization, and specific enough to deliver the threat analysis necessary to complement a goal-based approach. For these reasons, the ENISA guidelines can provide a complementary point of view to the goal-based security evaluation based on RMIAS in order to define a suitable cyber security evaluation framework. However, this framework is deemed to be too focused on the technical aspects of design and fall short in addressing and detecting potential design conflicts (c.f. Uncommon criteria)[5]. Therefore, both approaches can be combined

[4] http://users.cs.cf.ac.uk/Y.V.Cherdantseva/RMIAS.pdf

[5] *An example of a problem arising from this point would be a system that is supposed to implement both anonymity and auditability. Therefore, a more general framework may be needed that would be both understandable enough by the non-technical person, but that still offers sufficient technical guidelines that are expected from a threat-based approach.*

coherently, thanks to the extended model, and more specifically the integration of the goal view and the threat view.

When considering the architecture of the system to be protected (high-level of abstraction), a goal-based approach is usually deployed. A threat-based approach requires detailed analysis of the complete system vulnerabilities, and therefore knowledge of the detailed design of the system (including software, hardware, network and organizational processes). In addition, threat- or risk-based approaches are usually in need of statistics of former system behavior or other data to thoroughly evaluate risks and vulnerabilities of a system. However, data like that is not available during the development phase of a system. Therefore, it is important to stress that the threat-based view is complementing the goal-based approach, whereas the information that is relevant for the threat-based analysis will be extracted from the concrete solutions (working technical systems).

The goal-based assessment method is performed as follows:

1. The architecture of the system to be protected is described, and the various stages of information manipulation are identified;

2. For each stage, the information manipulated is classified, according to the information view of the security model. The associated security goals are then deduced;

3. Each of the security goals are then analyzed and catalogued in relation to the relevant architecture.

Clearly, in the extended framework the components of the RMIAS and ENISA models are intertwined in a seamless and interlocking way. The residual issue resides, like in any complex environment or discipline is the passage from the resulting model to meaningful information (the researchers usually attain this), then on to knowledge (shared, contextualized and actionable information) and possibly the wisdom level, where the knowledge becomes an asset. There is a quantum leap between any cyber security assessment and the conversion of the results into information and then knowledge. Information implies an insight that may trigger a change and often we discern the relevance of some information as the result of a discourse between different perspectives. In this context, System dynamics offers an outstanding tool for the discovery of vulnerabilities through collaborative modeling, supporting the design of a more general model. Moreover, it enables linking the domain knowledge into a high level view on the system's security properties. This not only produces actionable results, but also leads to overcoming some drawbacks of the two theoretical frameworks, which may lack for an immediately recognizable application in concrete situations.

Considering the fact that we are aiming to only complement the goal-based analysis with a threat-view on cybersecurity, mapping the contextual and the security traits of the RMIAS to the ENISA framework would be the next logical step to provide the necessary and sufficient practical and scientific rigor in accomplishing the task of a holistic cybersecurity evaluation. This may also

ISBN: 9788890824265

help in extracting more specific guidelines and recommendations for the security measures that are required to meet the objectives relevant in the context of implementation.

Keywords: Keywords: System dynamics, cyber-security, threat-modelling, interoperability.

MARKET-ING SYSTEMS

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ISBN: 9788890824265
Book of Abstracts of the
5th Business Systems Laboratory
International Symposium
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Branding Successful Start-ups: Insights from the Romanian Coffee Shop Industry

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ABSTRACT

The birth of startups is related to various factors, such as economic conditions, regulations, mentalities, cultural values etc. Studies show that for Romania and some of the former communist countries such as Bulgaria, Slovakia, Czech Republic, but also for Portugal and Spain, the cultural factors strongly influence the launch of business startups (Erk & Erk, 2011). Other factors, such as the age of the entrepreneurs and his/ her risk aversion are relevant (Hatos et al. 2015).

Nowadays Romania faces a paradox: while the number of start-ups founded in the last years is significant, the average life-span of Romanian start-ups is only 1.3 years (European Startup Monitor, 2015). This places the country on one of the last positions in the European Union regarding start-ups life-span and raises questions regarding the factors determining the failure of entrepreneurs. The context seems favorable for entrepreneurs to succeed: the Romanian Government has launched various programs to support entrepreneurs build start-ups, consultancy companies flourish, and a number of hubs have been founded (Barometrul afacerilor de tip startup din Romania, 2016). Speculations regarding the causes of the rather small rate of start-up durable success have been made. There are voices that point to the lack of financial management knowledge, to the difficult access to funding needed to support initial investments, or the lack of knowledge regarding marketing research and brand communication (Lance, 2016)

Startups are in many cases characterized by innovative business models. This makes them distinctive and even intriguing; they could be more appealing to the early adapters segment of the market, composed of youngsters and more dynamic people. This specific features also facilitates convincing branding strategies. Nevertheless, the business models and the branding strategies are also tightly related to the perspectives and personality of the founder(s). A successful approach for ensuring the effectiveness of a start-up is the lean approach (Blank, 2015). This strategy involves integrating experimentation and customer feedback into the business model, flexibility

and iterative design development. This approach would also add consistency to a more convincing branding strategy.

This paper aims to explore the role of brand communication in the case of Romanian start-ups in the competitive coffee shop industry, where strong global brands such as Starbucks and Second Cup are already present. We measured aspects regarding brand communication knowledge and brand strategy crafting from the perspective of the coffee shops owners and marketing specialists they work with. The paper also aims to understand the relationships between innovative business models, the knowledge and adoption of a lean approach and the development of the brand. To complement the research and identify what branding strategies are more appealing, an additional qualitative study investigates aspects regarding the perceived brand image of these start-ups by youngsters and what makes a coffee shop appealing.

The sample of the interviewed persons consists in 5 owners of coffee shops who adopted innovative business models / have launched concept coffee shops. 3 focus groups and a questionnaire with youngsters (including students, young professionals and entrepreneurs etc.) complement the image of a successful branding process in the investigated field.

As expected, the owners of the successful coffee shop start-ups pose extended knowledge regarding relevant brand strategy in their field, and the implementation of relevant brand strategy and of appropriate brand communication is considered vital for business success by the owners. Also, previous business and entrepreneurial experience are key factors in ensuring the success of business. Another relevant factor identified by owners is the ability to raise the interest of media (leading to various forms of exposure in social media, but also in business media or even traditional media). Coffee shops brand image has been described by the participants to the focus groups to be: eco-friendly, warm, nice, "close to our heart", more personal, unique and affordable.

Keywords: start-up, brand communication, brand strategy, coffee shop industry.

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Experiment on Information Stickiness in Word-of-Mouth Transmission

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ABSTRACT

Information stickiness refers to an ineffectiveness of information exchange in terms of slow flow, discontinuous update, growing loss, and roaring costs in the process of collecting, understanding, and absorbing information. In the context of WOM transmission, stickiness is evident microscopically by the declined volume of information exchange and perceived information valence as well as the decreased engagement in WOM among individuals. From the other side, the stickiness is also shown by a certain aggregate pattern of WOM evolution as time goes on, including prosperity and propensity in WOM. This research aims to unveil the extent of WOM stickiness, mechanism of WOM stickiness formation, and conditional outcomes.

WOM motivation is generally rooted in personal usage experience, affection, commitment, length and quality of relationships. Literature has widely discussed a few individual motives and impediments in consumer behaviours which underpin the selectiveness, detention, or decay in absorbing information. Roughly, three categories of reasons explain these factors, i.e., solicited individual factors (information preference, acceptance threshold), noise in the environment (information decay), and purposeful intervention (promotion). To study how the micro-level motives and restrictions colligate and form a higher level of information exchange pattern, this research adopts a series of experimental results via simulation to model the WOM's interpersonal transmission and furthermore to reveal the mechanism of information stickiness at micro and macro levels.

The results first show that information preference has an impact on the aggregate information amount for exchange, actual connection and transferal of individuals in the network, and information exchange propensity. When the mass preference is on credibility over transparency and affluence, surprisingly, the information will have a higher increase rate of information utility (defined as WOM prosperity in this paper). Second, it's testified that when information recipients have wide information acceptance thresholds, the information prosperity will receive a mild rather than dramatic growth overtime as well as a declined average information exchange times.

Third, the environmental noise moderates the information stickiness. A high information decay which is usually evident in a noisy environment will lead to a more obviously declined connected number between senders and recipients, and a restrained self-efficacy on information acquisition. Last, the external promotion activities also impact on the stickiness via boosting the self-efficacy, information valence, and WOM prosperity, while having insignificant influence on connected times and propensity. This research bears s theoretical significance by revealing the hidden causality between the micro inputs (e.g., individual preference, interactive process, and purposeful action) and macro sticky outcomes (e.g., prosperity and propensity).

Keywords: stickiness, preference, decay, acceptance threshold, promotion

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Value co-creation and co-production in the interaction between citizens and Public Administration. A Systematic Literature Review

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ABSTRACT

The general aim of the proposed systematic literature review is to address the theoretical framework of the value co-creation and co-production in public administration sector, especially when P.A. communicates with citizens during natural calamity, in order to provide a 'state of the art' of the theoretical academic approach and how it evolved over time. Several studies and authors tackling this issue tend to separate two concepts, that of value co-creation from value co-production. As a matter of fact, Whitaker (1980), Levine and Fisher (1984) use to refer the term 'co-production' to the participation of citizens in the delivery and better performing public services. As well as Sharp pointed out in his research (1980), referring to the co-production of public services as a 'determinant of success involvement of citizens in co-producing safety and security in the community' or better generating a common value universally usable. On the contrary, the term co-creation, it is applied to the rudimentary precept that the involvement of 'both the customer and the producer is required to create value'. Thus, it appears that value co-production is a necessary process which, indeed, tend to benefit the whole actors involved in the dynamic interaction: on the one hand public administration, which need to manage not only logistically but also communicatively the phenomenon to avoid congestion of daily life (give – for instance – live time traffic information on roads available, hospital structures where they may be able to meet any relatives involved in the accident), better coordinate any volunteer activities (foster an accurate request for goods / services in those areas affected by cataclysms) and provide an efficient service for citizens to promote a long-lasting trust; on the other citizens, which, affected by the catastrophe, must be able to know the risks that

occurs during that crisis, vital and / or specific information related to facilities, services unavailable, and so long. In order to achieve their needs, they need to cooperate exchanging information with each other to help improving those processes available in that particular situations.

Keywords: public management, crisis communication, value co-production, value co-creation, active citizenship

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Using Active FSVM Learning Method to Elicit Individual Tacit Knowledge of Brand Consideration

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ABSTRACT

Individual brand consideration is one of valuable customer tacit knowledge as vast marketing literature has generally found brand playing an important role in consumer choice of products. Thus, it is constructive for both customer knowledge mining and marketing research to develop an effective approach that could efficiently elicit individual tacit knowledge of brand consideration on the fly. Since IT increases knowledge accessibility for both firms and customers, it enables us to derive tacit customer knowledge through direct observation of consumer behaviors instead of market research. Meanwhile, conventional knowledge elicitation methods based on complex scale and regression are too inefficient and complicated in current information era. According to previous researches of deriving individual knowledge of brand consideration, the limitation is obvious. Firstly, the methods are not flexible enough for inevitable response errors of consumers, as consumers often choose what they have claimed to be unacceptable. Another disadvantage is that their data acquisition methods are often unreliable and inefficient when the respondent is uncertain about the brand.

As information technology advanced, data of consumer brand consideration behavior could be directly obtained through the Internet. Additionally, several innovative machine learning methods have been successfully applied in marketing and management area, which makes it possible to use the active learning method to elicit implicit brand consideration knowledge of each consumer. Inspired by those researches, the active fuzzy support vector machine learning approach is applied in this study which could effectively derive individual consideration rule of brand on the fly through several brand consideration questions. In our approach, an adaptive brand selection method is applied to obtain individual brand attitude by several brand consideration questions instead of collecting complex scales of consumer's perception of each brand, which enables us to directly mine customer knowledge of brand on the fly. Meanwhile, a fuzzy algorithm is adopted to eliminate the effects of respondent errors, which makes our model more flexible to handle usual response errors among consumer perception and consideration.

Then, the support vector machine is used to divide all brands into two categories (consider and not consider), which could immediately identify which kind of brand has a higher possibility to be considered by the consumer.

Our process framework to elicit individual knowledge of brand consideration could be summarized as following four steps. Firstly, our process initializes by asking each respondent to select one brand taking into account the influence of price, which is the brand he or she most prefers and most likely to purchase. Subsequently, we will generate a brand which is totally opposite to the favorite brand of the respondent. Then the most preferred brand is labeled as +1, the other one is labeled as -1 as the initialized anchoring points of our approach. The following procedure is to select next brand consideration question based on initial part-worths. Additionally, we adopt results of previous respondent with same anchoring points to select next question instead of using initial part-worths directly. Otherwise, the initial part-worths based on support vector machine algorithm is used to select next brand query. Then fuzzy support vector machine algorithm is repeatedly applied to update the part-worths of the respondent based on actual choice of each customized brand consideration question. We also repeatedly use the adaptive brand consideration question selection algorithm to choose appropriate query after every update of individual part-worths, until the change of each update of part-worths is continuously less than the threshold. The final part-worths of respondent is regarded as the elicitation that most approximates his or her genuine brand consideration knowledge.

In our study, all the tested brands are converted into vectors consisting of several brand features and influencing factors of consumer brand consideration. According to comprehensive analysis on both existing empirical results of previous researches and actual situation in our study, we finally select the perceived quality, the brand uniqueness, the brand credibility, the price, the brand gender, the country-of-origin, the brand leading and the brand popularity as attributes of brand vector. Due to the uncertainty of consumer on every tested brand, we adopt rigorous expert score to quantify each tested brand instead of direct scales. In addition that 62 volunteers has participated in our empirical experiments to test the performance of our proposed method. In the end, the hit rate, KL divergence, F-measure and U^2 are adopted in our study as measurement to verify the correctness and effectiveness of our models. And the final results of our empirical study indicate that our proposed method not only is an effective approach to elicit individual tacit knowledge of brand consideration on the fly, but also has a significant performance improvement to the benchmark methods.

Keywords: customer knowledge management, individual brand consideration, active learning, fuzzy support vector machine

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ISBN: 9788890824265
Book of Abstracts of the
5th Business Systems Laboratory
International Symposium
"Cocreating Responsible Futures in the Digital Age"

Specifics of marketing activities in scientific organization of the humanitarian profile

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ABSTRACT
The accumulation of fundamental knowledge is a long-term process with unclear and unpredictable results. Enterprises need application technologies that cannot appear without fundamental scientific developments. Fundamental science offers no explicit results and requires additional time to revise applications suitable for implementation. In this study, performed with support of the RFBR (project 17-02-00095), we analyzed the evolution, structure of approaches to financial support and the set of marketing instruments for scientific organizations using the systems economic theory of Kleiner G.B.

In present conditions of stagnation of Russian economy we can state a decrease in demand for scientific products from enterprises. A significant contribution to solving this problem can be the formation of a positive image of a scientific organization, which in marketing is usually called a brand.

In this work we propose following characteristics for what is called a brand of the scientific organization of the humanitarian profile: an integrated and regularly updated presentation of information about this scientific organization, its scientific results and research subjects, as well as about the scientific services offered for use and practical application in the scientific literature and social media. The term "target audience" we will understand as a certain group of people, at which all marketing communications of the brand of this scientific organization are directed. The interaction of the brand of a scientific organization with its target audience is determined by influence groups of each segment of target audience.

Description of characteristics and composition of each segment of the target audience is necessary for the development of marketing strategy and planning of marketing communications of the scientific organization. Segmentation of the target audience of the brand of a scientific organization can be carried out according to several parameters: goals of interaction, types of interactions, expected results of interactions and types of funding for future activities (see the Table 1).

Table 1. *Specifics of interaction between the scientific organization of the humanitarian profile and segments of its target audience*

Segments of the target audience	**Goals of interaction with representatives of the target audience**	**Types of interaction**	**Expected results of interaction for the representatives of target audience**
Employees of other scientific organizations	Production of new knowledge, including cross-disciplinary	Joint research projects and scientific events	New scientific results presented in joint publications
Heads and specialists of private and state companies	Using the results of the scientific organization in business practice of companies	Acquiring patents, copyrights, algorithms, software, contracts for scientific results redesign for special needs, consultation services	Innovative principles of business processes organization, launching new software, etc.
University professors	Transfer of new knowledge from scientific activities to educational processes	Inviting of scientific organization employees as professors for teaching part-time, participation in joint scientific events	Creating new educational techniques, manuals, improving of the quality of teaching, increasing the university prestige
Government officials	Preparation of materials to support decisions of public authorities, scientific expertise	Participation of employees of scientific organization in expert councils, commissions, groups, etc.	Expert assessments of draft decisions of public authorities, development of strategies
Students and post-graduate students of universities	Professional orientation and determining of the prospects of future employment	Participation in scientific events, theses preparation	Improving of qualification and knowledge
Employees of non-profit public organizations	Using new techniques and other scientific results	Consulting, personal contacts, orders for special research	Increasing the efficiency of said NPO

Source: Authors' elaboratorion

Until recently, the main funding source for activities of scientific organizations was the state budget, which allocated funds for research: purchase of equipment, maintenance of buildings and structures, payroll, etc. This approach to financial support will be further called *objective* approach. In general, it has survived to this day. But due to reduction of the amount of funding for science, budgetary funds have become insufficient to carry out research activities, especially in the field of basic research.

The second approach to financial support for scientific organizations will be called *process* approach. It emerged during the Soviet era, when scientists started to get involved in educational activities. This way two problems were solved at once. On the one hand, the students communicated with representatives of scientific community, performing cutting-edge research. Thus, science attracted talented youth. On the other hand, this solved the problem of providing scientists with additional source of funding. To attract students and post-graduate students of universities, a scientific organization should organize a variety of scientific events (conferences, workshops, seminars, webinars). Employees of scientific organization should also participate in these and similar activities. Information about this activity should be disseminated in social networks, in electronic and printed scientific periodicals, on the website of a scientific organization.

The third approach (called *project* approach) to financial support of scientific research was formed not so long ago. It's based on the competition of scientific projects for grants. Important role for winning in such competition plays the fame and positive image of a scientific organization in info-communicational space and in research community. Employees of other scientific organizations and university professors joining with a scientific project may secure advantage in such competitions.

The fourth approach to financial support of scientific organizations, called the *environmental* approach, emerged as a business-related activity based on contracts with enterprises, that are interested in implementing of new results of fundamental and applied research.

Systems structuring of these methods of research funding and segmentation of target audience will allow to develop our well-founded recommendations on how to find additional financial sources for scientific activities. For each approach it's necessary to choose specialized, most appropriate marketing tools. This will give a significant advantage in resource provision.

Keywords: marketing, scientific organization brand, systems approach, funding source.

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Marketing Analysis on the Water Production Sector in Kosovo. Case Study "Dea Water"

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ABSTRACT

The drinking water is one of the most important factors about which the whole World is paying a great attention each and every day more and more. This is happening because the mankind has done a lot of distraction of the environment, as a lot of construction, a great development of infrastructure, air pollution caused by cars and different thermo- systems, and a lot of other bad indicators have influenced on destroying the quality of drinking water. As a result of this, many countries in the World are being in crises of securing quality drinking water.

Kosovo is also one of those countries which have insufficient water reserves that would be one of the limiting factors for economic and social development in the future.

This is the main reason that we have chosen as a case study one of the water production company in Kosovo, named "Dea", to better understand and analyze the strengths and weaknesses which this company and other companies in the same sector are dealing with in their daily operations in our country.

Also, we have analyzed the whole sector of the drinking water production in Kosovo, marketing mix of the DEA Company, and the actual markets in which this company is operating and the markets where it aims to penetrate in the future.

The data derived from this study have helped us to conduct conclusions and recommendations, which would be useful for this company that we have studied and also for other companies which are actually operating and will operate in the future in the same sector.

Keywords: Marketing, marketing mix, production, drinking water, SWOT analysis.

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The role of social network advertising telegram in ensuring readers to purchase goods

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ABSTRACT
The aim of this study was to evaluate the role of social network advertising telegram in ensuring readers to buy goods.

To assess the validity or utility study to test the reliability and validity study, Cronbach's alpha was used.

Based on Cochran sampling formula, the sample size among cable users in the geographic area of research, 384 were identified and sampling in this research is the method of synthesis. Product, there is a significant relationship.

It was found that people have little trust ads on social networking telegram, the telegram would have less to purchase goods or services. Also, the use of celebrities, attractive image) design and graphics (use of symbols and signs, animated promotional and attractive slogans to draw attention to social network advertising Telegram and buy goods there is a significant relationship. For whatever they seem to have attracted less, have less to buy goods and services act.

Keywords: Marketing, Promotional messages, advertising", Telegram, The Social Network, product.

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The Effect of Social Networking Facebook on increasing the Social capital in Society. A study of Iranian users actions on Facebook to identify the indicators of social capital.

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ABSTRACT
The purpose of this paper is to examine the impact of virtual social networks - especially Facebook - to enhance social capital in the community.
The problem is to study the actions of Iranian users on Facebook and identify indicators of social capital reflects on this site.
The main research question is: Do people with higher social capital in the social network Facebook, the more social capital in the community have?
The main hypothesis of this study are as follows:
Between social capital and social capital in Facebook social network in the community there.
The theoretical framework used include Putnam's social capital theory that networks and norms, the main constituent components of social capital and knows the theory of Pierre Bourdieu's theory of Francis Fukuyama and the network society Castells.
This survey research and tools used in the two questionnaires.
The study group included 80 people randomly selected targeted and random snowball. Among the undergraduate and graduate communications Global Allameh Tabataba'i University and Islamic Azad University Science and Research in Tehran.
Data collected through questionnaires, using SPSS software were analyzed and based on the final results showed that the main hypothesis was accepted.
Keywords: Social capital, social network, Facebook

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Marketing Analysis on the Energy Drink Production Sector in Kosovo. Case Study "Frutex – Golden Eagle"

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ABSTRACT

Along the mankind history, people have used to drink different drinks and supplements for raising their body and mind energy. Trends have moved from drinking tea, coffee to soft drinks, and so on. However, with improvement of technology has also evolved the society and the production of new drinks for mankind: namely have been added some chemical elements to the soft drinks, which have proved that this mixture has the power to increase the people's energy on body and mind. These kinds of drinks are known as the "energy drinks". From 2008 to 2012, the market of energy drinks has been increased to 60% in the whole World[6].

Even in Kosovo, the energy drink's market has been raising from year to year, so this was the main reason why we have chosen this sector, namely "Frutex" company with their energy drink named "Golden Eagle", as our case study. This company is the first of its kind which have started to produce energy drinks in Kosovo. At its beginning, it has operated only in Kosovo, but now it has expanded its market broader.

During the study of this company, we have tended to analyze in details the advantages and disadvantages that this company is dealing with in the energy drinks sector in Kosovo, market aspect of the company, its marketing mix, and markets where it actually operates.

Results derived from this study may be helpful for the "Ftrutex" Company to improve its weaknesses, and also will be as a guide for other companies which are part of this sector and others that pretend to be in the future.

[6] http://wallstreetinsanity.com/the-history-of-energy-drinks-a-look-back/

Keywords: Marketing, marketing mix, production, energy drinks, SWOT analysis.

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The New Dimension of Digital Market Development and Cooperation. The European Union regulation policy new approach and economic perspectives.

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ABSTRACT

The fast growth of the new technologies transformed in many cases the present global flows and market exchange principles of goods, services and people. The ongoing globalization process is transforming global market by launching the new dimension of global commerce. Nowadays the digital trade are the one of the most important component of economy. The key factor for the market digitization is internet development, which broaden access to the global market and still accelerate these developments. The observed changes brought mostly positive effects for many companies, as internet infrastructure transformed logistics and supply chain and reduce participation costs in trade. The impact of positive effects contributed to the establishment of new economic activities and launch the new business models, by increasing entrepreneurship and the number of SME's. The digitisation of global flows has been a key contributor to the explosive growth of cross border data flows. Digital trade is affecting a broad range of stakeholders in different geographical areas, as well as international organizations and established frameworks of cooperation between the states. There are a number of reasons for the significant divergence between domestic and cross-border e-commerce. The rise of digital global trade in new and diverse forms, and the growing business competition that accompanies it, create several sets of challenges for governments and policymakers. Governmental bodies are facing the challenges to adapt their policy and regulatory package to deal with the arising new form of market in digitisation and digital trade. Especially policymakers need to address sensitive issues regarding the consumers data security, privacy, and Internet governance.

European Union facing the global market and economy changes launched the Single Digital Market Strategy. By adopting the principles of digital market, the European Union introduced the legislative package and digital market regulation for the better access for consumers and business to the digital services and good across the Europe, create the good condition for the innovation and network in the digital market as well as enhanced the consumer personal data protection. Launched numerous regulation brings public discussion and many doubts in the

business environment regarding the digital market development and its future perspectives. However the new regulation of data protection can significantly contribute to increase the SME's competitiveness and innovation.

The article provides a comprehensive analysis of the globalization technological changes and thefuture perspectives in terms of general overview, by creating the new digital market and its impact on the European Union policy and economy development. The methodological approach is based on qualitative second documents and literature overview as well as quantitative statistic data analysis. The conclusion show the digital market development perspectives within the European Union, the impact of economic convergence in the digital market as well as consequences of launched new dimension of free flow personal data within the European Union.

Keywords: globalisation, digital market, European Union, e- commerce, trade.

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SMALL AND MEDIUM SIZED ENTERPRISES

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Firm's reputation, people's support and online networking: findings from methodological triangulation

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ABSTRACT
Meant to examine the marketplace relationships between consumer behavior and the perceptions regarding firms as depicted from people's opinions, declared intentions, reactions and facts, our paper seek to gain insights from a qualitative approach doubled by an experimental setting designed to investigate the drivers of consumer supportive actions towards companies (and / or brands) which are voluntarily taken in the online medium.

More specifically, the parameters of interest reflect the predictive ability of consumer perceptions on behavioral outcomes generation, suggesting explanations for consumer-brand engagement (Andrei & Zait, 2014; Andrei et al, 2017; von Wallpach, 2017). Central to our interest are online users' perceptions and interactions with companies in the online area which are investigated via multiple methods of data-collection and analysis. In this vein methodological triangulation (Denzin, 2009; Heesen et al., 2016) - conducted by both qualitative and quantitative means - is used to get a more complete and precise picture of the underlying aspects which motivates online users to voluntarily adopt supportive behaviors towards companies.

While quantitative data-collection is based on experiments and survey, the qualitative part is based on a specific method of unveiling unconscious thoughts, known as metaphor elicitation technique. Focusing on individuals' underlying beliefs and on the provision of a thorough hierarchical value map of various insights, this qualitative method enables researchers to examine multiple types and levels of deep grounded thoughts by exploring the chain of perception, cognition and action (Zaltman, 2005).

Results of the qualitative inquiry are expected to provide information about hidden knowledge, to reveal the unconscious thoughts underlying person's behavior, namely those thoughts which are inaccessible by other techniques addressing exclusively the awareness level. Therefore, this

qualitative method is used for its recognized ability of overcoming the usual disadvantages induced by the fact that people's deep motivations which impact their behavior are frequently lost in translation (Larkof & Jonhson, 1980). Moreover, getting access to information that reside from processes below the level of people awareness, the use of this method reduces the risk of obtaining incomplete answers which would lead to off-target conclusions and sterile recommendations for business practice.

The results derived from the employed methods will be compared and discussed, highlighting the common findings, as well as the additional details and insights gained from each of the data-sets and analysis techniques which were used. In this regard, the methodological triangulation is expected to increase both the accuracy and the richness of the research findings, opening new horizons for understanding the interplay of perceptions, rational expectations and emotions (Berg et al., 1995; McAllister, 1995; Dunning, 2012) which would explain consumer's decision to deliberately support some firms, but to neglect or manifest adverse reactions to others.

As preliminary findings indicate, among perceptions denoting the rational and affect-based trust (McAllister, 1995), such as integrity; reliability; credibility; fairness; truthfulness (which were also mentioned in previous findings of Morgan & Hunt,1994; Doney, 1997; Kumra & Mittal, 2004; Hardin, 2006), the perceptions regarding firm's performance in social scene (such as: benevolent intentions; firm's openness towards community; firm's tendency to act as a good citizen) seems to gain an increasing weight in people's attitudes and behaviors.

From a practical perspective, findings are supposed to bring valuable information for the entrepreneurs and managers willing to address both business-related and community-related expectations of technology empowered customers (especially of the civic-minded ones) by adopting comprehensive strategies of reputation building based on people's support and online networking.

Concluding that the use of both qualitative and quantitative approaches allow enhanced investigations, the paper explains why researchers should sometimes extend the examination using more elaborated exploratory tools. Finally, our paper shows how different methods are used to analyze specific types of collected data and provide a more accurate and detailed picture of the phenomenon under study, offering in the same time a much greater practical applicability of the obtained results.

Keywords: Methodological triangulation, Corporate reputation, Online networking, Consumer perception, Consumer behavior.

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Family Business Model Canvas

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THE PUBLICATION OF THE ABSTRACT WAS NOT AUTHORIZED BY THE AUTHOR

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The integration of sustainable development in business as a driver for SMEs growth

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ABSTRACT
The approach of companies towards the integration of sustainable development in their business is different. Some companies integrate into their business sustainable development from the beginning of their activities during the strategic planning phase, others integrate more later or others reject it with the belief that sustainability involves only creating additional costs, (Di Maggio, & Powell, 1983). The concept of eco efficiency indicates the relationship between performance economic and environmental achievement through a process according to which the value is increased to the maximum by reducing the use of resources, waste and pollution (Schmidheiny & Zorraquin, 1996). In a highly dynamic system if corporate leaders also implement sustainability as a driver for enterprise growth, the integration process must be focused on involving all the functions and organizational levels of new values and principles that can guide the behaviour and daily work of all involved subjects (Klassen & Mclaughlin, 1996). Business improvement will have a positive impact on SDGs and at the same time can strengthen stakeholder relations and gradually transform the company into an integrated organization capable of generating long-term profitability and simultaneously highlighting the human side of corporations, and their leaders' personal commitments to contribute to the community and society of which they are a part.

In this paper we present companies that have close contact with the territory, support of environmental protection campaigns, integrating them into their productive activities and we will analyze the contribution of companies operating in the private lightweight health care industry. in particular we will study their contribution to some of the UN Sustainable Development Goals 20130, (Gazzola & Querci 2017). These businesses operate in mature environments where innovation is innovating the old business.When a company implements an incremental innovation, where an existing product or service is made better, faster or cheaper is called ambidextrous skills. Who have ambidextrous abilities uses elements of enterprise, and existing capacity for reconfigure their business, creating new opportunities. When faced with this step, dedicated investments will be made and organizational learning can be promoted so that a repeatable process can be initiated (O'Reilly & Tushman, 2004). In many cases they are prime mover companies (Norman, 2002) that launch innovations, invest in the development of new products and accept the risk of exploring unknown territory. The companies that have been

studied have reconfigured their business, in about 10 years, following first the low cost philosophy, then environmental protection (Querci 2015), then social responsibility and integration with the social environment in which they operate.

They have repeatedly replicated their business across the Italian territory, by adopting also franchising strategies.Two companies will be analyzed through the methodology of case works: Medical Center Santagostino and Nau!, These companies operate in Italy and are born in northern Italy, (Hartley, 1994).

Keywords: Sustainable development, prime mover, SDGs, environment, ambidextrous skills, case works.

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International Symposium
"Cocreating Responsible Futures in the Digital Age"

Changes in the world of work and skills for the future

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ABSTRACT

Small and medium-sized enterprises (SMEs) contribute to economic growth and employment, creating two-thirds of all jobs (International Labour Conference, 2015). In EU, between 2002 and 2010, they were responsible for 85% of the employment growth (De J. de Kok et al., 2011).

SMEs are far from being homogeneous. They cover different areas of business, and include micro-companies in unskilled activities and high technology start-ups. Depending on their size and area of activity, they face several constrains (IFC, 2013). One of the most significant constraints faced by SMEs across countries is an inadequately educated workforce and insufficient skills to keep pace with a globalised and technology-driven business environment.

The list of changes that have shaped the modern world of work is long. It includes the digitalization of work, the gig economy, among many others. Photo and video technology, eyetracking, wearable sensors, to name a few, are more accessible to organizations than ever making possible to collect and analyze data in new and different ways.

Self-driving cars, drones, virtual assistance, software for translations, surgeries performed by robots will replace people who are now doing these jobs. Barcode scanners are already replacing cashiers in supermarkets and ATM replacing bank tellers.

In 2013, researchers calculated that 47% of current jobs in America were susceptible to automation (*The Economist*, 12/02/2017). Projections by the World Economic Forum (2016), five million jobs will be gone until 2020 due to Game Changers, namely artificial intelligence, robots and nanotechnology. However, not all jobs are being eliminated by technology. Some are being transformed rapidly. For example, demand for data analysts has increased by 372%, and demand for data visualisation skills has grown by 2,574% (*The Economist*, 12/02/2017). Technology forces change upon companies and people. Old skills become quickly obsolete, new ones are needed. The constant need of acquiring new skills is becoming an economic imperative.

Moreover, available research shows that investing in employees helps to retain them and gain competitive advantage.

Against this background, the question is how SMEs manage the above challenges. This question is addressed in this study and we argue that, despite all the changes, Human Capital will remain

the most valuable asset an organization can use to gain competitive advantage. Therefore, investing in the development of skills is the best strategy for the future.

Skills for the future

Historically, the word skills have been used to refer to individual characteristics. However, in the concept advanced by Prochno (2001), although the skills always refer to the individual, all of them have two dimensions, the individual and the collective (organizational).

The concept has been studied by several authors (e.g., Ellström, 1997; Mulder (2000; Norris, 1991). Skills development prevails as a research issue in higher education because it is the main goal to be achieved by the students. Skills development is perceived as a strategic management tool to cope with the current business environment (Nyhan, 1998), mainly because the market has changed from mass production to customisation where quality, price, and speed of delivery are stressed. The above change has brought new challenges to many organizations: new and emerging customer segments, cultural diversity in a global marketplace, market volatility, raised customer expectations about quality of products and services, and the impact of the internet on an organization's core business (Markowitsch et al., 2001).

Regarding the job market, there has been a growth in higher level jobs, such as managerial and professional positions that require flexibility and problem-solving skills. In this context, the complexity and the uncertainty, partly due to the globalization and accelerated rhythm of technological change, demand Human Resources with skills that help the organizations to overcome these challenges.

The study

The research question that have guided the present study was "What are the critical skills for the future identified in the literature?

The study used a qualitative methodology approach and included a literature survey and document analysis. In order to answer to the research question, a content analysis of the literature review was conducted. This method was used to analyse the presence of skills associated to the following dimensions: "technological skills for game changers", "critical skills for the future of organisations" and "skills for sustainable organisations", covering the period between 2012 and 2017.

The content analysis revealed that the constant technological evolution leads to the need of development of a set of skills, which are nuclear to the present and the future challenges faced by organisations and people to achieve sustainable employability. These are: Complex problemsolving,

Critical thinking, Creativity, People management, Coordinating with others, Emotional intelligence, Judgment and decision making, Service orientation, Negotiating, Cognitive flexibility (Table 1).

The perceived impact of all the new technologies being integrated in organisations and in people's lives will include: lower labour costs; greater flexibility and shorter delivery time for products to the market; robots performing dangerous tasks (patient care or automate manual work); productivity growth, higher quality products; safer surgeries and better quality of life for the elderly and disabled; new challenges in employment and education; in the nature of work, at

the manufacturing level (namely robotics); analysis of large amounts of data with task automation, organizations can enrich the roles of workers; creation of new products and services; change the way companies and other organizations structure themselves.

The motivation for this research has its roots in a lack of a systematic development approach about SME and prospective skills. There was little or no support for connecting these two dimensions, which have made it a very interesting challenge to embrace.

This research identified through a literature survey and document analysis the following prospective skills for the future, contributing to achieve sustainable employability: Complex problem-solving, Critical thinking, Creativity, People management, Coordinating with others, Emotional intelligence, Judgment and decision making, Service orientation, and Negotiating, Cognitive flexibility.

It is hoped that the study helps SMEs to rethink their strategies and respond to challenges by investing in the development of the adequate skills for a continuously changing business environment.

Table 1 – Critical Skills for the Future

Critical thinking and problem solving	Asking questions is the basis of critical thinking. It is necessary to ask questions to solve a problem, to get answers that allow critical analysis and questions about what is causing the problem.

Collaboration in networks and leading by influence	Increased focus on global collaboration. Leadership of a team implies leading by influence and not by authority - group influence, alliance building towards a common goal.
Agility and Adaptability	Agility and adaptability to the unpredictable consequences of technology. Continuously learning is a must.
Initiative and Entrepreneurship	Development of a sense of initiative and entrepreneurial skills. Entrepreneurs try to find workers who consistently seek new opportunities, ideas and new strategies for business growth.
Effective oral and written communication	Communicating clearly is an extension of clear and logical thinking. To be able to present an argument persuasively. To inspire others. To capture in a concise way the essentials of communication. Get to promote oneself or promote a product / service.
Evaluating and analysing information	Learning to access and select valid information in the digital world. Knowing how to evaluate the source and evaluate the content of the information and what information is up-to-date.

Curiosity and imagination	Curiosity is a powerful search engine for new knowledge and innovations. It is necessary to stimulate the imagination to create new knowledge. Students need to be encouraged to ask questions and seek answers. Thinking "out of the box" needs to be considered with the same level of importance as physics or math.

Keywords: SMEs,Change,Technology, Skills for the Future.

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Intellectual Capital and Firm Performance in SMEs: a Systematic Literature Review

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ABSTRACT

The purpose of this study is to conduct a systematic Literature review on the influence of intellectual capital (IC) on firm performance in Small Medium Enterprises (SMEs). In fact, while the Literature about intellectual capital in large firms is abundant (Rohana e Abdul Razak 2009), the relationships among the IC sub-domains in SMEs (Khalique et al. 2011), and how they impact firm performance need further investigation (Cohen e Kaimenakis 2007).

The rise of the importance of intangible assets occured in the era of the knowledge economy, when they started being considered as determinants of competitive advantages (Chen et al. 2006). In fact, when assessing the value of a company, the financial capital is not the only aspect considered. Instead, it is complemented by the value of the intellectual capital, which is always greater than the financial one (Chen et al. 2006). However, it is important to effectively manage these resources in order to gain from them competitive advantage (Cohen e Kaimenakis 2007). At this aim, many definitions of IC have been proposed in the Literature (Chen et al. 2006).

However, just few studies had explored the IC in SMEs, although they differ from large firms in many organizational aspects. In particular, since only 0.3% of firms are classified as large corporations in the European Union, further research on IC in SMEs is necessary (Cohen e Kaimenakis 2007).

With this study, the review of the Literature aims at advancing knowledge on the importance of IC in SMEs, providing some insights on the interactions among IC and firm performance identified in previous studies, and by mapping the application of theoretical concepts in a real business environment.

The research has been conducted by selecting publications in the following electronic databases: Web of Knowledge, Scopus, and Google Scholar. Relevant studies have been identified using the following keywords:"Intellectual Capital", "IC", "performance", "SMEs", and "Small-Medium entreprises".

Keywords: Intellectual Capital, Firm Performance, Small-Medium Entreprises, Literature Review

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Self-perceived employability in SMEs: Investigating the response of generation z students

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ABSTRACT

This paper aims to examine the expectations of the generation z (born after 1995) students regarding employment in small and medium-sized enterprises (SMEs) (which employ fewer than 250 persons). In order to improve the prospects for student employment success in SMEs it is necessary to know their perceptions of employers' demands. The findings could help universities understand better what they could do that their graduates to get and keep a job in medium and small firms. Prior research has examined in a systematic way students' expectations regarding labour market (Metz et al. 2009, Qenani et al., 2014, Jerrim, 2015), nevertheless little attention has been given to the new generation of students that have lived their life in a digital world connected by internet and particularly by social media.

Even if there is not a general agreement regarding when the generation z was born, in general, it is considered that this generation is composed by people born between 1995 and 2000 (Kubátová, 2016). Therefore, the undergraduate students aged between 17 and 22 years in 2017 (traditional students) have particular work related attitudes. The Kubátová (2016) research findings indicate that generation z use technologies mainly to search for information, prefer personal communication, and need autonomy at job. Due to these, they prefer to work in coworking centers that fulfil their need of autonomy, virtual environment, and good relationship with others. On the other hands, Bencsik et al. (2016) consider that for generation z teamwork and knowledge shearing are only on virtual level, with superficial relationship, with no sense of commitment, and they live for the present. The eventually contradictions between different authors regarding the specific features of this new generations show us the need for more studies on this topic.

Given that across the European Union two third of the employment is in SMEs and 30% in enterprises with less than 10 employees (European Commission, 2016), most of the graduates will get a job in these firms with specific cultures. Previous studies ascertain that the size of the company has significant influence on organizational culture (Zeng and Luo, 2013). The size of the working group can determine the quality of the interpersonal relationship. The small groups (with less than 40 members according to Vlăsceanu, 1993) give the opportunity for face to face relationship and higher emotional involvement (Schifirneț, 2002). A number of evident reasons advocate the view that in the process of organizational learning, the interpersonal trust and the employee commitment can increase the firm performance (Sanzo et al., 2012, Lee and Zhao, 2015).

This study explores the self-perceived employability in SMEs of generation z students. Using data form a survey conducted in three Romanian universities on undergraduate students, through the use of regression analysis, the paper examines the relationship between students' expectations of getting and keeping a job in medium and small firms after graduation and related variables in order to identify the factors that improve the student employment success in SMEs. The research findings underline the role university can play in developing students' employability and can support possible recommendations to SMEs to employ and keep generation z graduates.

Keywords: generation z students, small and medium-sized enterprises, employability.

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Evaluation Model for Microcredits granted to SMEs

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Abstract.
The attempt of a small or medium enterprise (SME) to be active on new markets is a risky entrepreneurial act, but also a rewarding one, in the case of success. However, such companies should think their market entry strategies very thoroughly, in order to avoid the negative impact of some risks like: country risk, contractual risks, currency risk, so on. Non-Bank Financial Institutions support entrepreneurs who start their business, or who want to develop the existing ones and thus they are a key factor for stimulating the Romanian economy. The list of Non-Bank Financial Institutions in the National Bank of Romania Special Register included a total of 41 entities at the end of October 2017, out of which 12 grant micro-credits. There are, definitely, enough opportunities for further companies to enter this market, taking into account the growing segment of small and medium enterprises sector in Romania.

The current study proposes a perspective on the strategic options available to new entries, by analyzing the lending potential and the risks while taking into account the regulations, the local resources and the specific regional and global context. The paper takes into account the economic and social dimension of the lending business. Practically, this work has as main objective creating a Microcredit Evaluation Model (MEM), able to offer support to any Small or Medium Enterprise that would like to enter a foreign market, in the form of a Non-Bank Financial Institution. Non-bank financial institutions can carry out, among others, the following lending activities: granting micro-credits, including, but not limited to: consumer loans, mortgages, real estate loans, commercial transactions financing, factoring, discounts, lumpsums.

This new coming player on the local market will have the opportunity to use this MEM, meaning that it will introduce the indicators that are characteristic for its own activity in the last 5-10 years and will get an overall image and a perspective of how it will succeed in adapting itself to the Romanian business and micro-credit environment. The MEM relies both on the statistical

(historical) comparison and also on analysis and forecast. The calculation system used within the MEM is two-dimensional, combining the results of the analysis upon the new coming bank characteristics (prudential ratios, quantitative and qualitative indicators) and the ones of the economic, business and banking environment in the host market. If the newcomers decided to use our proposed methodology in making the decision about if and how to enter the local Non-Bank Financial Institution market in Romania, they should analyze a series of indicators and their evolution trends in time. This is possible by using a working instrument called Microcredit Evaluating Model (MEM) for avoiding the failure on a new micro-credit market. Newcomers should understand the local perspectives of this market and this paper gives them all the necessary information they need to be properly prepared.

The entrepreneurial environment in Romania had some significant improvements in the latest years, in terms of entrepreneurship education and increasing number of start-ups, so further improving access to finance for SMEs can help reduce inequalities of the economy by increasing the supply of jobs.

Keywords: Microcredit Evaluating Model, risk management, qualitative and quantitative ratios, microcredit analysis, financial stability.

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Sustainable outsourcing in Italian SMEs

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ABSTRACT

The aim of the paper is to understand how sustainable outsourcing can be an opportunity for Italian SMEs. In the new millennium outsourcing and offshoring have by now become the standard for firms constantly in search of new frontiers in order to compete worldwide. Quinn e Hilmer (1994) have clearly summarized the benefits of outsourcing in a strategic perspective. With outsourcing the manager optimizes the company's resources in four main ways:

1. maximizing the efficiency of internal resources by focusing on investments and engaging in core competencies;

2. Developing core competencies by building barriers to current or future competitors seeking to enter the areas of interest of the enterprise, thus protecting competitive advantages;

3. Using the investments of external firms, their innovations, their skills and their specializations, that could be kept in house with continuous investment and innovation;

4. reducing the risks in rapidly changing markets with high technologies; an outsourcing strategy reduces the risks of technological upgrading and R&D costs by shortening production cycles and making the response to customer needs more flexible and quick.

The goal often becomes to redefine the core competencies and to distinguish between core and non-core competencies by outsourcing activities and processes that are not considered part of the core business (Pellicelli, 2009). In this way companies can potentially be more efficient and effective in the global market. This is necessary but it's not enough to be competitive. Firms are facing growing stakeholders demand for social and environmental sustainability goals (Mella, Gazzola, 2004). Therefore sustainability has an increasing role in outsourcing strategies. In a competitive and technological environment, that is vaster and more dynamic than in the past, firms must deal with complexity and turn to new strategies (Becker, Zirpoli, 2017; Doval 2016) to build long term sustainable competitive advantages, not only for big corporation but also for small and medium enterprises (SMEs). They need to pursue sustainability in order to win a good reputation as socially responsible. Sustainability is essential for a business and remain

competitive, many companies choose to outsource some of the creative, analytical and administrative work to a knowledge process outsourcing provider. Sustainable outsourcing is one way for small and medium enterprises to be flexible. Outsourcing is more than a cost-saving measure for businesses. Based on the definition of sustainable supply chain management (Carter, Rogers, 2008; Seuring, Müller, 2008), Li et al (2014) define "sustainable outsourcing as the strategic integration and achievement of a firm's social, environmental and economic goals in its sourcing to a third party entity". However sustainability in this field is little investigated and sustainable or green outsourcing are studied connected with Information Technology (Beath, Ross, 2006; Bhamra, 2012). In the paper we propose an approach based on the qualitative and quantitative analysis of the Small and Medium Enterprises in Italy.

Keywords: outsourcing, sustainability, sustainable outsourcing, SME, offshoring.

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Towards sustainable digital ecosystems

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ABSTRACT

Within more open and democratic societies responsible performances and behaviors are requested in order to build sustainable social and business systems. The aim of this study is to elucidate a pattern in order to identify the drivers leading digital ecosystems towards a sustainable path driving ethical and responsible practices and behaviors. Within post-industrial economies brain intensive and knowledge oriented where digital and information and communication technologies (ICTs) contribute to designing and maintaining a global digital ecosystem the small and medium enterprises (SMEs) tend to play a relevant role as engines and drivers of economic growth and development but also as agents of social innovation and responsible action driving people and consumers to appreciate and follow the ideas and values that contribute to increasing the health and wealth of communities by learning through social and responsible behaviors and initiatives. Within knowledge-based societies and economies, technology-driven government, business and people cooperate to develop innovation, sustain growth and co-create social and public value. «Business ecosystems tend to refer to intentional communities of economic actors whose individual business activities share in some large measure the fate of the whole community» (Moore, 2006, p. 33). Organizations and consumers collaborate in order to create value and compete to extract economic value. A value co-creation approach requires to build new infrastructure capabilities driving a high quality of the relationships between the customers and the companies by enabling personalized co-creation experiences. «Co-creation converts the market into a forum where dialogue among the consumer, the firm, consumer, communities and networks of firms can take place» (Prahalad and Ramswamy, 2004, pp. 11-12). Technology is opening up to new markets and opportunities for democracy leading businesses and organizations towards a new season for market and social innovation, enabling increasingly the creation of economic, public and social value. An open government should design new forms of public governance relying on participation and consultation between government, citizens and private organizations. Following the perspective of digital ecosystems in which governments agencies, businesses, civil societies interact directly by promoting and sustaining new ways for democratic and responsible production and consumption learning and knowledge oriented, the advent of digital technologies and social media is emerging as a means for widening the opportunities of digital ecosystems. A digital

ecosystem could be defined as an infrastructure relying on ICTs-enabling organizations and people to cooperate in order to support knowledge sharing and value co-production for building a digital business ecosystem as structure and place where digital species tend to evolve, adapt and mediate services and knowledge. Within modern societies it is not only necessary that economic value is created but it is also requested that social responsibility can emerge in the strategies and operations of enterprises developing new sustainable business models. Technology can encourage the communication between businesses and citizens leading to develop new forms of cooperation and collaboration for promoting value co-creation. According to European Commission the enterprises are responsible for their impacts on society having to integrate social, environmental, ethical, human rights and consumer concerns into their business operations maximizing the creation of shared value, identifying, preventing and mitigating their possible adverse impacts. SMEs playing a relevant role within business ecosystem in terms of value creation and development are increasingly embracing the Internet and digital technologies for selling products, managing services and marketing activities, doing business and sustaining innovation. SMEs are becoming digital companies actively communicating with people and consumers using technology in order to address responsible behaviors and actions. SMEs should develop in long term a strategic approach to following corporate social responsibility by strengthening the opportunities and the potential of ICTs.

Keywords: digital ecosystem, small business, social responsibility, sustainability, digital technologies.

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Employability and SMEs. Evidence from Romania

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ABSTRACT

SMEs represent in terms of number the vast majority of companies in all economies. Consequently, it is acknowledged that SMEs have a substantial contribution to the creation of Gross Domestic Product, but also they are a large supplier of jobs in an economy (Savlovski and Robu, 2011) and in this quality it manifests as the demand of labour coming from SMEs. On the other side, the supply of labour coming firm people needs to fit with the demand of labour coming from SMEs, so that the work force to be employed. In this context, the issue of employability becomes important for both SMEs and individuals. Starting from the fact that employability is seen as "a set of achievements – skills, understanding and personal attributes – that make graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy" (Yorke, 2004), the present paper recognizes the importance of looking at employability from a double perspective: the employer's perspective (in our case the SMEs) and the individual perspective (the potential candidate to obtain a job in an SME).

From the point of view of SMEs, employability can be related to human resource practices and human resource management. Attracting and selecting employees as important activities in human resources (Marlow, 2006) are the activities that can be related to employability. The skills and competences required by SMEs in order to hire individuals are decisive decisional factors that affect the employability of individuals. Further on, the other human resource policies, such as wages policies, career developments policies, etc are factors that can influence the longevity of jobs.

The present paper will analyze the evolution in time (period 2012-2016) of various human resource practices in Romanian SMEs. Selection and evaluation criteria for employees will be analyzed in dynamics to identify changes. Consequently there are analyzed how skills and competences required by SMEs from potential and present employees, evolved over time, in

order to identify influences on employability. The analysis is detailed at the level of different types of SMEs in terms of size, field of activity and others.

From the other perspective the one of the individuals, employability can be looked at as how attractive are SMEs for potential employees. In other words, how willing are potential employees to use their skills and competences in SMEs. The present paper tries to build a model that can study the attractiveness of a job in an SME for potential employees and identify influencing factors. In this context the paper analyzes how different human resource practices in SMEs, such as wage practices or training practices evolved over time and how they differ on different categories of SMEs. Such factors can act as important influencers, so that to determine potential employees to choose to work in an SME and to remain to work in an SME.

The final purpose it to determine how requirements (skills and competences) asked for by SMEs as part of their human resource policies fit with what individuals look for in a job offered by an SME, so that on overall to match the demand of labour coming from SMEs with the supply of labour coming from individuals who are willing to work in an SMEs.

Keywords: SMEs, employability, human resource management, competences and skills, Romania.

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ISBN: 9788890824265
Book of Abstracts of the
5th Business Systems Laboratory
International Symposium
"Cocreating Responsible Futures in the Digital Age"

The impact of business simulation in changing attitudes towards launching innovation by SME's

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ABSTRACT

Innovativeness and availability to start a new SME'a were among the topics of interest in the field of entepreneurship. The most used theory for interpretation was the theory of planned behavior (Ajzen, 1991). According to this theory, the attitude towards an act refers to the favorable or unfavorable evaluation of the behavior in question; thus, behavior becomes a function of beliefs relevant to the behavior. Several authors explored the reasons to start a SME, by using this theoretical frame. For example, combining a sample from Catalunya with a sample from Puerto Rico, Veciana, Aponte and Urbano (2005) tested the general availability of students to launch a SME, their perception on the social status of the entrepreneur, and the importance of the family tradition (an entrepreneur in the family). Another series of studies focused on the role of education in enhancing innovativeness – as the study of Packham, Jones, Miller, Pickernell and Thomas (2004), which used the same method to investigate the situation in three countries (France, Germany and Poland).

Starting also with the theory of planned behavior (Ajzen, 1991), Marcati, Guido and Peluso (2008) built an alternative frame whose aim was to counter balance the cognitive model with the psychological factors (as personality features). The authors observed that several studies were focused on a human capital perspective, while the psychological features were not dependent by the family context or other life context of the respondents.

Studying the perceived barriers to innovation perceived in a developing country Hadjimanolis (1999) found among the external barriers perceived by respondents the easiness in copying innovation, governmental bureaucracy, lack of governmental assistance as the first three problems. The importance of barriers was not correlated to innovativeness, and neither to horizontal networking (Hadjimanolis, 1999, p. 566).

This paper intends to explore the role of communication in shaping attitudes towards innovation and SME's launching, by using a simulation as complex method of research. "Lions Arena" was a reality TV show, the Romanian variant of the British reality show "Dragons Den" in which a

series of entrepreneurs were pitching their business ideas to business angels. As a consequence of the presentation and multiple round of questions, the jury of businessmen was able to take the decision to finance the most attracting from the projects. Because the format of this show had a clear education role, it was implemented as a simulation in the course "Internal communication" for two master programs with specialization Business Communication and, respectively, Brand Communication, in a Romanian university. Students present their project of innovation for launching a business in no more than 10 minutes, after which they receive questions from their colleagues, who play the role of business angels. Finally, the audience, by secret vote, take the decision to "finance" the project or not.

The paper explores the impact of communication in this simulation frame in influencing the perception of barriers and obstacles for launching a SMS and the propensity to innovation. The quantitative method (survey by questionnaire) will be applied twice, at the beginning and at the end of the simulation exercise. By repeating the same instrument of research we are going to investigate if the presentation of the project followed by a debate could change important variables as innovativeness, risk perception and availability for launching an SMS. Communication as a variable will be decomposed, in order to explore which factors are responsible for the changes observed after simulation and debate. In the same time, testing communication as a variable, after considering that the attitudes of people are changed by the exercise, is an opposite perspective with the view which considered the personality features and the family model as a determinant.

Keywords: entrepreneurship, innovation,, controlled action

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ISBN: 9788890824265
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Individual characteristics and environmental factors as predictors of SMEs employees' self-assessed health

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ABSTRACT

Emerged as one of the most frequent health measures in the economics area, the self-assessed general health (SAH) mainly relies on subjective ratings provided by respondents. The extant body of studies has objectivized a broad spectrum of items depicting the individual's perception on his/her overall or specific health status. Beyond conceptual and methodological limitations, SAH has been operationalized in multiple research settings integrating various economic factors, among which income, education, socio-economic status, in this front, a compelling strand of research addressing the relationship between SAH and housing characteristics, the latter being predictive of the former.

For instance, in what housing is concerned, two complementary dimensions were considered, namely the effects of neighborhood and of bad dwelling conditions on health. Likewise, World Health Organization (2010) disentangles the internal housing conditions – with a special focus on the inter-class variations, and the external residential conditions – with a special focus on environmental quality. Assuming that the residential characteristics are predictive of different levels of exposure and risk, emphasis is laid on how these factors influence the ratings of the targeted populations. This situation often triggers inefficient coping mechanisms directly afflicting the SAH ratings.

Building on similar arguments, various studies posit that both individual and environmental factors have significant influences on the individuals' health and are prone to potentiate the degree of vulnerability. For instance, either psychosocial (insecurity, anxiety, depression, work rhythm), or physical (work conditions, noise, temperature, ambient air quality), the environmental stressors have emerged as catalysts of poorer health. Furthermore, the perceptions

on a specific residential location, namely neighborhood (including here the living conditions) have statistically significant effects on poorer health.

Giving credit to the research stream examining the influence of individual characteristics and type of housing on individuals' self-assessed health, but stepping forward to include additional factors in the equation, the current paper aims to investigate whether the type of the employer industry affects the overall evaluation. The main assumption is that both housing and work characteristics are indicative of how individuals perceive and rate their health and, implicitly, of their self-image.

The focus is set simultaneously on all three dimensions and on their specific influences on SAH while the targeted sample is compounded of small and medium-sized enterprises (SMEs) employees from European emerging economies. The choice for SMEs as unit of analysis is supported by the incremental pressure exerted on their employees to become more productive and, thus, to directly contribute to the organizational competitiveness in a globalized world. Here, the inclusion of the employers' characteristics in terms of industry along with the individual and housing characteristics is presumed to reconfigure the existent relationships between variables, yet enhancing their pertinence. To some extent, the research challenges the fact that individual and housing characteristics can entirely account for health inequalities and, consequently, it draws on a particular dyad among the environmental factors, that is living and working conditions. In this sense, credit is given to the imperative to determine the health effects of the interaction between social, physical and personal aspects which are often analyzed separately and, subsequently, lead to partial results.

Keywords: SMEs, Employer Industry, Self-Assessed Health, Environmental Factors, Individual Characteristics.

SUSTAINABLE DEVELOPMENT

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ISBN: 9788890824265
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Product Life Cycle: Coverage and Invariability

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ABSTRACT

We based our study of economic systems on the General Systems Theory (GST) of Ludwig von Bertalanffy (1968) who defined a system as "a set of elements standing in interrelation among themselves and with the environment".

Graph theory is essential for the study of economic problems, and Leontief's input-output tables (Leontief, 1966). are precisely an example of one of its main instruments. The input-output analysis, using linear algebra and matrix calculus, has proved to be essential to describe and analyze the structure of economic production, as it enables to calculate the vector of total productions from the vector of final demands.

The Product Life Cycle (PLC) was introduced by Theodore Levitt (1965) in his article "Exploit the Product Life Cycle". It describes the period of time during which a product leads to sales and profits including the stage of product development. Products develop, grow, mature and die. At the beginning, sales are nil and expenses and investments are generated. Profits and sales then increase, the product finally declines, eventually resulting in death or recycling.

A particular case is that of ecological products that have an impact on sustainable development. Calomarde (2000) comments «*there is no ecological product per se, as the factors that make it ecological depend on its environmental behaviour throughout its life cycle, from the analysis of the raw materials that compose it, its overall production processes, its use, the waste generated by its distribution and transport, to its final reuse or disposal. Therefore, a product is ecological when it fulfils the same functions as equivalent products, but the damage it causes to the environment throughout its life cycle is inferior*. »

A major problem in using PLC is that it has not been formally modelled in mathematical terms. This means that many of its properties do not appear in short and rigorous evaluations but over long developments, which, although from an economic point of view, totally capture the meaning of property, presents the inconvenience of not being sufficiently manageable. One benefit of the network perspective is that a large body of mathematics exists to help analyse many forms of network models. If an economic system is suitably modeled, then it becomes possible to utilize relevant mathematical tools, such as graph theory, to better understand the way the market works.

Interpreting the PLC using networks allows us to employ the concepts of coverage, invariance, orbit, attractor and the structural function supply-demand and competition (Esteve & Lloret, 2006; Lloret-Climent, et al., 2016) and interpret them from a circular flow perspective, in cases where products are reused.

In our model, as in the GST, a certain parallelism exists between economic systems and ecosystems. So it makes sense to interpret the life cycle of products as elements of an ecosystem and to apply relationships such as competition and predator-prey. Companies compete on products, and the predator-prey relationship is evidenced by patents, monopolies, takeover bids, etc. The state equations are represented by the structural functions associated with competition and supply-demand relationships.

Keywords: networks, product life cycle, structural function, coverage, invariability.

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ISBN: 9788890824265
Book of Abstracts of the
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International Symposium
"Cocreating Responsible Futures in the Digital Age"

Big Data, Nonlinear Entropy Production Accounting and the Balance Sheet of Entropy Efficiency in the emergent Digital Age

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ISBN: 9788890824265
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Co-learning for Climate Protection through Systems Thinking – Use of an Interactive Computer-Based Simulation Game & Systems Analysis

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ABSTRACT

"*How will tomorrow´s world look like?*" Considering the global wide acceleration of climate change and environmental contamination, municipalities are confronted with the task to implement measures for CO2-reduction with the objective to reach the goals of the Paris agreement and healthy urban environments. This new task is a special challenge for most municipal administrations and citizens.

The complexity to govern large cities, regions or small municipalities, as mostly intransparent networks of interdependent influences of economic, technological, financial, social and ecological changes, would already demand an overview about these complex interconnections in order to find the right ways for a future-proof development towards a viable future for urban health and wellbeing.

Additionally, the new task to develop and implement effective and compatible measures for CO2-reduction very often takes administration and citizens at the limits of their capacities. Insufficient knowledge about climate change as of the dynamics of technological and social changes often prevent the development and implementation of measures.

Under the title: "shared learning with interconnected thinking for climate protection", a group of experts in climate management as well as in systems thinking, conceived and carried out a pilot project for the municipality of Murg in Baden, Germany.

The project should identify influence factors and criteria for a sustainable development of the municipality. It was intended that actors and stakeholders gain insight in the complexity of the

decision-making processes and how they could develop and successfully implement local measures for Green-house-Gas reduction measures in the sector of mobility.

"Interconnected thinking" (Vester) seems to be a promising approach to understand and manage this kind of highly dynamic complexity. Frederic Vester developed very early his "biocybernetic" approach as a methodology, and combined with concrete digitized tools, like his simulation game "ecopolicy® and his planning instrumentarium "Sensitivity Model (Vester, Malik)".

In the pilot project, in a first phase municipal councils and citizens experienced the basic principles of the management of complexity playfully with the simulation game "ecopolicy®" (Vester, Grafe). While simulating to govern this virtual country, with an apparently simple structure with only eight variables and eighteen interconnections, the participants achieved an intense exchange about their investment decisions and the mostly unexpected results of their usually linear strategies.

Based on these insights, the next step conducted the participants towards the systemic oriented examination of the real-world influence factors and interconnections in their municipal system, focusing on the reduction of CO2 in the sector of mobility.

In two days workshops, moderated by experts in system analysis, the group applied the first steps of a "Sensitivity Model" (Vester) – collecting and describing variables and visualizing their interconnections. This process – shared learning about the context and an objective common understanding of the main levers led to a completely new cooperation of politicians and citizens. On the basis of their shared systemic insights, they identified the relevant influence factors and feedback cycles and thereupon based suitable "system relevant" measures for CO2-reduction in the mobility sector.

Maybe the most important finding and learning through this shared systemic learning process was, that the central feedback cycle for a successful implementation and change of traditional mobility behavior was the interaction between education, political and civil engagement: only with more knowledge about climate change and possible measures, and conjoint political and civic engagement effective and efficient measures can be found and implemented.

"*To realize the climate goals in our community, this kind of workshop should be a required course for all municipal counse*llors".

The methodology of the Sensitivity Model has been applied in many practical projects (see Vester). Especially actual projects are in the context for megacities (e.g. Wulfhorst), federal innovation systems (Gebhardt) or in the context of the Smart City Research (Mohr).

The application in this pilot project shall be the basis for further research and multiplication of the concept with other municipalities. From Germany to China, municipalities are struggling if and how to implement climate protection measures. The pilot project showed a way to support communities with systems thinking and systemic tools to make concrete, manageable and playful

steps towards the shared development and implementation of measures for their future viability and resilience.

Keywords: Interconnected Thinking, Simulation Game, ecopolicy®, Change of Awareness, Shared Learning, Sensitivity Modeling, Climate Change, Measures, Civil Engagement and Participation

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ISBN: 9788890824265
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Considering ICT Development in Digital Cutting Edge as Freedom. Perspective on Iranian Northern Disadvantaged area

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Asymmetric Impact of Operational Risk on Stock Returns in Supply Chain between Upstream and Downstream Firms

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ISBN: 9788890824265
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Co-creating sustainable supply chains: which engagement?

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ABSTRACT

Aim

This paper seeks to investigate corporates best practices in sustainable supply chain management with a focus on the value and effectiveness of the different suppliers' engagement approaches.

The literature review shows that integration, objectives sharing and engagement between the actors of the supply chain not only are desirable preconditions for a major impact on sustainable development but need to merge together into a behavioural pattern.

In this context, the paper wants to contribute to explain best practices for sustainable supply chain, with a focus on the manner to collaborate with suppliers. About this aspect, as literature underlines the importance of the sustainability in the supply chains, does not always deepen the approach and the motivations which lead companies' behaviors in the decisions of engagement with suppliers.

Sustainable supply chain: literature review

In literature, there are at least three branches of researches around the themes of values, strategies and tools.

In the first one, the debate is concentrated on the importance of business values and on the influencing power of headquarters imposing their systems of values to the supply chain (Gonzales-Padron *et al*. 2008). A few studies relating to the global supply chain and the location of suppliers in developing countries, address the cultural and economic imperialism of the big western enterprises (Khan and Lund-Thomsen 2011): «*such as when Western brands insist on eradicating child labor from the process of football stitching, without considering that such forms of labor might be a way for children to learn a new skill to help them support themselves and their families*» (Lund-Thomsen *et al.,* 2016, p. 17).

A second line of studies is focused on programs and strategies for the development of sustainability within the supply chain (Carter and Jennings 2004). *Logistics social responsibility*, *purchasing social responsibility*, as well as *sustainable supply chain management* (Teuscher *et al*. 2006) are some of the main approaches highlighting the efficiency of social responsibility practices based on collaboration, and the strategic role played by suppliers (Vurro *et al.* 2009).

The third line of researches deals with the implementation of standard measures – codes of conduct (Oehmen *et al*. 2010), implementation problems (Kolk and Van Tulder 2002), monitoring and performance controls programs (Tran *et al*., 2013)– in the operation procedures.

The debate seems to deal with the stakeholder engagement in general. In the work of Mathur et al. (2008) are synthesized different views: (1) the *management perspective*, whereby the stakeholder engagement acts as a powerful catalyst for knowledge that fosters partnerships and innovation; 2) the *moral perspective,* identifying stakeholders as citizens entitled to determine or influence social operations; 3) the *social learning perspective,* allowing stakeholders to draw together and share information. However, some people see in the stakeholder engagement a convenient way for enterprises to maintain their '*business as usual'* mindset and particularly Collins *et al.* (2005), in their work, claim that the stakeholder engagement legitimises all managerial efforts towards a rather 'mild' sustainability practice.

A dialogue-based approach seems, so far, the most viable solution. The different ways stakeholders pave the way for dialogue have been accurately outlined by Noland and Philliphs (2010), in two main different positions: a) the *habermasian supporters* (named after the German philosopher Habermas), who claims that engagement has to be freed of all strategic bias for it to be morally accepted. Hence, the interaction becomes the only purpose for reaching an agreement beyond personal interests; b) the *ethical tacticians,* who state that the stakeholder engagement cannot be separated from the business practice.

There are a number of contributions and *ad hoc* empirical researches (Habisch *et al.* 2011), complaining about the lack of a viable managerial model.

Empirical Research

Strategies and tools, underlined in literature, are investigated in the companies' practices through the analyse of firms which have obtained a recognition for the best practices used.

For this aim the database of Global Compact has been chosen. It informs on companies that have implemented the UN Global Compact sustainability Management Model in their supply chains. The research focused on two operative phases which, applying the UN Global Compact Ten Principles in the supply chain, required companies to:

- *define*: set targets, strategies and policies in compliance with the UN Global Compact ten principles. The research has focused on issues applied in the supply chains;
- *implement*: enable further alignment with the ten principles within the business in order to avoid negative impacts on suppliers' performance The research has investigated practices and tools used for reaching the engagement with suppliers.

The research has examined, between January and July 2016, 38 businesses that have been indicated by the Global Compact as being consistent with the abovementioned model and rank high in the implementation of their best practices.

In analytical terms, the research has pinpointed:

- ✓ Corporate' characteristics, their legal names, their countries of origin and operating sector as well as their geographical context
- ✓ The issues covered, which remain under the strict purview of the UN Global Compact ten principles. Another examined aspect covers the different business approaches adopted during the implementation of the Global Compact Management Model

✓ The tools used by each company for the implementation of socially responsible activities within the supply chain and the overall assessment of achieved results.

Research main results

The 38 companies that rank high in their supply chain performances are multinationals. Regarding the issues covered in the supply chain relating to the four areas included in the UN Global Compact ten principles, that is human rights, labour, environment and anti-corruption, the research shows that 30% of the companies is more environmentally driven. Therefore, the practices call into questions the suppliers to improve environmental policies through the promotion of greater responsibility into business practices and use of clean technologies. 23% of companies is engaged with human rights domain, in particular, undertaking policy to ensure better working conditions (22%).

Moreover, the research observes that – with regard to the businesses – the environment is the major concern for those companies whose activities have greater impact on the environment itself, such as food and beverages or personal and household goods. Conversely, the technological and telecommunications sectors show an increased interest in general issues and human rights and labour concerns.

The analysis of practices implemented by companies in the supply chain considers two aspects: the type of practice adopted, based on the GC model, and the tools used. Ultimately, it can be stated that the research highlights that companies, in relation to the model drawn up by the GC, adopt specific attitudes with reference to the "define" phase, namely the definition of objectives that they want to pursue within their supply chains, and the issues of sustainability faced.

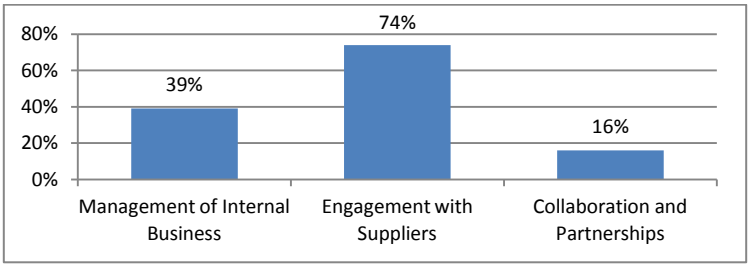
In the implementation phase there are similar behaviors in the choice of practices dictated by the model, which distinguishes three approaches:

✓ Management of Internal Business: the company manages the internal alignment to ten principles of GC, roughing out an example for supply chain

✓ Engagement with Suppliers: the company engages with the suppliers in sustainable practices;

✓ Collaboration and Partnerships: the company lay the groundwork for a real collaboration with the suppliers to realize practices of sustainability, inspiring partnership also between more suppliers.

Figure n.1 Preferences in using the practices of GC model



The analysis of the documents on the company websites allows to better specify the nature of the involvement promoted with suppliers. From research, it appears that companies are interested in

establishing a collaborative approach with suppliers so that they can better communicate their business policies and ensure their application.

The company's code of ethics (23%) and reports for suppliers (23%) are the most frequently used tools. In many cases (20%), the companies have developed specific ethical codes for suppliers, ignoring the generic issues while focusing on elements and principles directed to suppliers. Suppliers are required to sign them and abide by the principles and standards contained in it so as to both strengthen the existing business relationships and tie potential new ones.

Discussions

What clearly emerges from the survey is that the investigated businesses are primarily multinationals. While this data shows, on the one hand, the complexity of the Global Compact Management Model, on the other hand, it leaves a big gap as to the implementation of sustainability practices in the supply chain of smaller players, which, as a consolidated reality internationally should not act as mere executors of larger enterprises policies. This statement seems also to be supported by another data emerging from the analysis on business practices. In this respect, the research highlights a greater use of engagement practices that we may connote as 'elementary' in which supplier commitment is exclusively required (57%) for the implementation of sustainability policies devised by multinationals, along with 31% of those corporates indicating a behavioural pattern that should be replicated by the supply chain (*Management of Internal Business*).

The UN Global model proposes practices which are different for the company's commitment to involvement of the supply chain to sustainability projects, and the results of the survey show that businesses, albeit rewarded, are "stranded" in practices where suppliers' participation is mainly concentrated at the stage of carrying out of processes (*implement*), in the social and environmental sphere. In these practices, suppliers may play a key role in fulfilling the agenda and the objectives set out by the large enterprise although their form of engagement could be referred to as 'unilateral', namely from the business to the supplier, which will commit as a mere executer of multinationals policies.

The results on the use of the tools also confirm this role, where research highlights the greater use of systems of evaluation of the supplier's activities.

It is certainly clear that the extent of business engagement requires a sustained level of commitment, which appears to be rather challenging even for larger enterprises, but for the purpose of contributing to the debate on managerial implications, the need for a broader collaborative approach needs to be emphasized, not only with regard to the number of subjects involved in the sustainability project but also on the aspect of the involvement method that, it is believed, should recognize to supplier an active and proactive role, starting from the statement phase of objectives (*define*).

Policies' implications derived, regard the need for, in the first place, the international organizations (GC, OECD, etc.) to invest more resources in order to understand the importance of pursuing sustainability projects at supply chain and network level, to develop competences in companies towards more extensive forms of involvement of the supplier, to develop management models that can be replicated even by smaller businesses.

Keywords: sustainable supply chain, engagement, best practices, the UN Global Compact sustainability Management Model

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ADVANCEMENTS IN SYSTEMIC THEORIES

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ISBN: 9788890824265
Book of Abstracts of the
5th Business Systems Laboratory
International Symposium
"Cocreating Responsible Futures in the Digital Age"

Managing the growth addiction. A systems therapy approach to capitalism

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THE PUBLICATION OF THE ABSTRACT WAS NOT AUTHORIZED BY THE AUTHOR

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Blurred binary codes for a systemic resilience

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ABSTRACT

For many early cultures, the first mythological distinction was the separation of land and sea, and this operation was the creation of the universe. From mythos to logos: George Spencer-Brown, with the publication of Laws of Form in 1969, provided a mathematical system, which deals with the emergence of anything out of the void. He showed how the mere act of making a distinction creates space, and how time too emerges out of the undifferentiated world that precedes distinctions (in the guise of re-entry into the system). A decade after, Francisco Varela's Principles of Biological Autonomy (1979) extended Spencer-Brown's work, since self-reference joins the mark and the not-mark as the three primary entities that constitute all reality. Now, evolution progresses by making distinctions that are ever more complex. Mathematician Norbert Wiener invented the term "cybernetics" to investigate the self-reflective, informational dynamics of such distinctions. The article The frog's visual cortex (Lettvin, Maturana, Mc Culloch, Pitts) shows that the frog's perceptual system, rather than recording reality, builds it. The concept of the observer, which is a pillar of the Luhmann's theory, arise within the so-called second order cybernetics, which reflects on the role of the observer in the observed universe. The subject/object distinction of traditional epistemologies is abandoned and it attempts to include themselves (as observers) between their objects (what one observes). Therefore, Systems Theory focuses on the observer's observation. This approach is evident in Heinz von Foerster's Observing Systems (1981), where the title's wordplay yet states that the observer system can be itself the observed system, that is, the system can be both the object and the subject of observation, and each system can observe other systems in its environment ("second-order observation").

Starting from this interdisciplinar theoretic background, Luhmann realizes a new sociological paradigm: a fascinating integration between hard sciences and humanities. In fact, the concept of "form" as elaboration of a distinction is the theoretical premise of the distinction between system and environment. Systems observe themselves as systems-in-a-environment, so the system/environment distinction is a form of their own observations and descriptions. According to Luhmann, social systems are located in an "environment" (Umwelt), which represents everything that is not part of the system. In addition, man (psychic systems) are part of this environment. With regard to the external environment, social systems are autonomous

(Ausdifferenzierung or "External Differentiation") and, at the same time, they are differentiated inside (Differenzierung or "Internal Differentiation"). The environment seems to be the source of a non-specific noise, from which, however, the system could gain meaning in the context of its operations. Then, the system can self-organize and develop its own order, certainly in dependence on the environment and never in the absence of an environment, but not determined by it: this is the principle of "order from noise". In sum, the general theory developed by Niklas Luhmann grounds on functional differentiation and operational closure, which make the autopoiesis of the societal system possible.

However, in the current age, social change, globalisation and digitisation constitute factors of change that require a critical review of the theory, as well as the identification of the disconnection between the theoretical assumptions and factual reality. In particular, it seems that tension emerges between the maintenance of social identity and the need to adapt to external changes. Therefore, the paper proposes a shift from the centre to the boundaries of the system, thanks to a dynamic perspective that focuses not on the system itself but on its environment. As for the methodological approach, the general systems theory is characterised by universalism. Therefore, the critical reading uses the conceptual kit belonging to systems theory and maintains a high level of abstraction. Besides, following the example of Luhmann himself, who draws on sciences such as biology and cybernetics, employs concepts borrowed from other disciplines, specifically; one can adopt concepts from economics and mathematical analysis (inverse proportionality, tangent point, and hyperbole).

In conclusion, one could propose the replacement of a rigid 'binary code' with a communication code that includes shades between the two extremes. Therefore, from the total operational closure produced by binary codes, one could adopt a more flexible vision, where the boundaries are seen as permeable membranes that allow an osmotic relationship with the environment. Staying within a systemic functionalism, the paper proposes a possible integration of Luhmann's theory in order to emphasise the capacity of the system, during the self-reproduction, to survive by absorbing and rearranging the environmental changes. In particular, it shows the trade-off relationship between openness and closure of the system. This interpretation allows the discovery of an equilibrium point, to which the system must tend; in this way, it avoids not only the excessive openness (which involves the destruction of the system for absorption by the environment) but also the rigid closure (which implies the splitting of the codes when environment changes happen). The key concept to enable the optimal combination may be an intersystemic communication. Thus, the thesis, although moving in the functionalist and systemic tradition, aims to address the problem not of system reproduction, but of transformation. The constitutive and evolutionary dynamics seem to be connected with the optimal combination of 'closure' and 'openness' and with the ability to establish the intersystemic communication channels, which provide the resilience of the system according to the environmental changes. It is this constant disposition to change that makes the survival of the social system possible.

Keywords: System Theory, Binary code, Openness/Closure, Trade-off, Resilience

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Oscillate Wildly or Business as Usual? A systems perspective on governance and partnership in the UK shared transport sector.

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ABSTRACT

Recent contributions to systems theory (see the special issue of *Systems Research and Behavioral Science*, 34, 2017) have witnessed a revival of certain features of Niklas Luhmann's work in order to focus attention on the organizational forces outside the boundaries of formal organizations. The work shows how functional differentiation and communication media both confine the possibilities for joint action among actors engaged in highly complex public policy areas and can create new opportunities for partnership and governance in areas of public policy where numerous stakeholders attempt to shape the future (La Cour & Højlund, 2017). This is macro-level theory, a top-down view. It promises a glimpse of how individual and recognizable organizations might form, expire, merge, de-merge, collaborate and compete within the wider system of which they are part. From this high-level view we may be able to see new possibilities for untried and imaginative forms of partnership and action. Alternatively we may be tempted to look at complex public policy debates and conclude that "it's business as usual", that the slow-to-change elements of public policy are indeed slow-to-change because of poor coordination. Despite the opportunities that functional differentiation affords, the different agendas and hopes of the actors and stakeholders who try to steer complex public policy cannot be reconciled and remain uncoordinated; a case of "oscillating wildly", or for some "business as usual".

An alternative perspective would be to take a bottom-up approach and work with individual organizations to study their processes of environmental scanning and to study the ways in which they devise and implement strategy. No macro-level theory is required here, but we can still make use of systems theory, systems methodology, systems methods and tools to help devise strategy and explore new futures. The limitation, however, is that systems methods are little used by practicing managers and organizations tend to resort to well-worn management ideas and tools which more often than not fail to adequately capture any sense of the whole. Busy managers resort to simple solutions, but these often "fail because they are not holistic or creative enough" (Jackson, 2004). This may require then another revival; a revival of ideas from soft systems

thinking (Checkland & Poulter, 2006; Wilson & Van Haperen, 2015) to re-energise the strategy making process in highly complex public policy debates. Within this context it becomes legitimate to ask the question of whether soft systems ideas can be combined with ideas of functional differentiation to create more imaginative interventions in public policy. In doing so, this paper hopes to address the call by Roth et al (2017) to develop existing management tools and management research agendas by taking a "systematic approach to functional differentiation".

In order to address this question this paper takes a case-study approach by examining the strategy making processes of a small UK charity involved in the shared transport sector, more commonly known in the industry as "shared mobility". Shared mobility is an umbrella term which refers to shared transport modes, including car sharing, ride sharing and bike sharing. The charity aims to influence the way people travel to reduce the environmental impact of transport and to improve access to transport for those who may be disadvantaged. The charity is a key player in the sector and promotes car sharing, car clubs, bike sharing and ride sharing. It provides an accreditation scheme for car club and bike share operators. Accreditation is recognized by the Department of Transport and by Local Authorities and is often a requirement for the license to operate a shared mobility scheme. The charity works with and alongside a diverse range of stakeholders, all of whom seek to shape the policy space for shared mobility. This includes government, shared mobility operators (entrepreneurs), automobile manufacturers, transport consultants, other associations and trade bodies with similar ambitions for shared mobility, and technology companies. The sector is fast changing and dynamic. For example, a number of disruptive changes have occurred as a result of entrepreneurs launching new bike-share schemes in various cities worldwide. The charity has to plot its future in this turbulent environment, creating new partnerships in order to sustain its influence and address the priorities which support its mission and purpose.

Some preliminary and tentative research findings are reported in this presentation. The author has enjoyed access to board members (trustees) of the charity and to executive directors. Observation methods have been used in collecting some of the data and soft systems ideas were used to explore options with one of the directors. The research reports some findings on the utility of soft systems ideas in helping to clarify strategic issues and options, and compares these with methods used by the charity itself. Some tentative conclusions are drawn in respect of how certain function systems - particularly the education system - appear to be dominant within the sector and how these have influenced the medium-term strategy of the charity.

The limitations of a single case study approach to the question posed earlier are self-evident, but it is hoped that the work stimulates further work on how an interest in functional differentiation can be combined with more practical systems methods and tools in order to make systemic intervention more effective.

Keywords: Shared Mobility, Sharing Economy, Functional Differentiation, Soft Systems Methodology.

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ISBN: 9788890824265
Book of Abstracts of the
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"Cocreating Responsible Futures in the Digital Age"

Three Extensions to Original Self-Organization Theories

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ABSTRACT

In order to better our understanding of psychological, organizational, social (economical-political—cultural) phenomena, and the ground processes of evolution in biological, social and civilizational scopes, we need to upgrade the previous available theories of self-organization (SO).

Original SO by refers to authors of Ashby, Von Foerster, Prigogine, Haken: They can all be viewed as One-Step Emergence at-macro-level observables (i.e. order) through many iterations of the micro-level-agent/algorithm, presented in different languages by those original authors.

Extension One: After a certain level of consensus understanding of the one-step emergence dynamics is achieved, we need to zoom out our scope of observation to see the bigger picture, i.e. multi-layer self-organization (MLSO) (Hu 2011). Linkages/chains of different one-step emergences must be identified to improve our understanding of the pre-requisites and meta-level causality chains. MLSO helps on this regard.

Extension Two: Self-organization processes are driven by their agent algorithms. Some of these agent algorithms are in the form of Belief-Behavior-Codes (BBCs or values), i.e. the overt or covert instructions leading to behaviors. I have identified that for a certain type of living systems, two opposite BBCs are needed and if the system is in good health, they take turns to dominate the system at specific time period. These are stability-oriented BBCs and change-oriented BBCs. Thus the Principle of Dual-Phase Dynamics (PDPD). (Hu, 1988).

Extension Three: In an (any) ecology of individual living systems in a given environment, multiple processes of SOs and MLSOs can grow in the same time frame, competing for resources for survival. At the plantation scope, different plants compete for sunlight and water. At the animal kingdom scope, species compete for survival niches and position on food-chain. At the human society scope, different "story-systems" (religions, ideologies, political parties, value-specific groups) compete for attention, consensus of beliefs, enrollment and affiliation, commitment to vision and mission, etc., from the society's individual members. We call this scenario Multiple-Competing-Self-Organizations (MSCO). (Hu & Liu, 2017)

These three extensions establish a new ground view for us to re-visit a good number of phenomena both in the current world as well as in history. Examples are provided for each extension case followed by some discussions.

Keywords: self-organization, multi-layer self-organization, belief-behavior-codes, dual-phase-dynamics, multiple-competing self-organizations.

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Book of Abstracts of the
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Integration of Science, Engineering and Systems

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ABSTRACT

The central issue in the living sphere [plants, animals, humans] in particular in human activity scenarios at an individual or social level, is 'problem solving' for survival, sustenance and achievements of ambitions. Problem solving is as common in the living sphere as the action of gravity in the material sphere. The ability of their brain/mind apparatus aided by the possibility of exploitation of resources in their environment enables living objects to accomplish this fate. Basically problem solving begins with identification of a 'problematic issue' in an 'initial state' and its 'transformation' into a chosen 'final state' subject to the consistency condition, of selected objects as shown in Fig.1. Objects are identified as concrete, abstract, symbolic or imaginary parts of the world.

The three elements of problem solving in Fig.1. can be grouped as follows :

Case 1. IS + FS are known and TR is sought is 'design'

2. IS + TR are known and FS is sought is 'analysis' 1.

3. FS + TR are known and IS is sought is 'troubleshooting'.

Case 1. is of interest here. The perception of an initial state as a problematic issue and the identification of a final state or the resolution of a problem is a matter for insight, intuition and inventiveness. It is the means of transformation which has been the subject matter of a 'variety of inquiries' of human intellectual endeavour over the long past, present and future times. The purpose of the totality of this endeavour is to attempt to devise the theoretical means to improve understanding of how transformation takes place. The objective of this presentation is to examine the nature of these inquiries, their effectiveness in understanding the process of transformation and their contribution to its design leading to a 'new science of systems'.

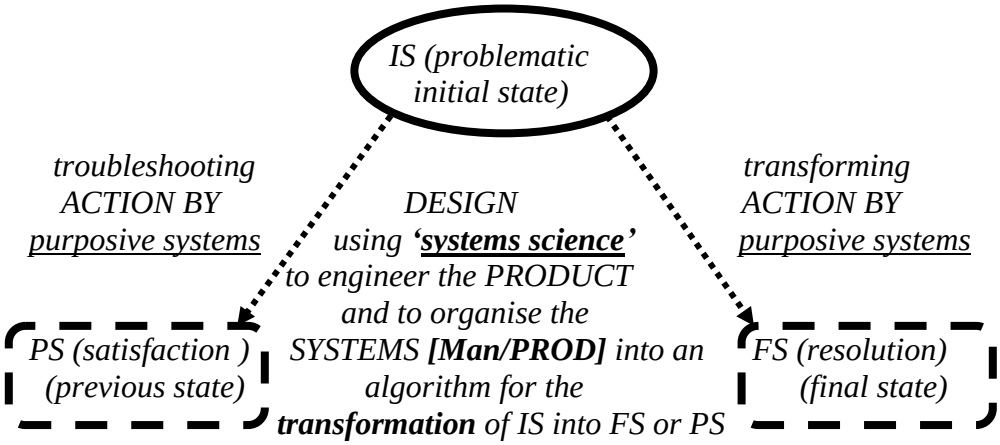

Fig.1. Structure of problem solving

We consider a number of inquiries or approaches to the description, effectiveness and the kind of transformation each one is intended to accomplish. For example, the art of 'music' after listening to a 'concert' is capable of transforming the mental state of a person from indifferent to having a pleasurable experience.

1. Experience, craftsmanship and common sense
2. Mysticism, superstition and religion
3. Alchemy
4. Fine and performing arts
5. Conventional engineering of products 2.
6. Conventional science of physics
7. Systemic or structural view of parts of the world including systems engineering.

Problematic issues arise from the malfunction of one or more constituent part of a scheme of transformation or 'scenario' which can lead to the malfunction of the 'whole'. Conventional engineering deals with design at the product level, conventional science is interested in generating reliable knowledge of single objects and as such has served as the knowledge base of engineering over the last few hundred years. The 'systemic view' is concerned with representation or modelling of scenarios. However, as currently practiced this view has a number of 'problematic issues' one of them is that it ignores and indeed has discarded conventional science as reductionist.

The purpose of current work by the author is aimed at developing a 'systems theory' including modelling transformation that can integrate conventional science and engineering within its

framework and is friendly to problem solving and design. The following is a brief outline of the 'new science of systems'.

There are two ways of viewing parts of the world in static or dynamic state. Through :

I. Qualitative and/or quantitative properties giving rise to the view of every day and 'scientific' thinking, and/or

II. Structural properties giving rise to the 'systemic or structural or action view'.

Practically the whole of human intellectual endeavour has taken place along path I. shown in Fig.2. with sporadic references to path II. like solar system, admin systems, the system broke down etc, or the 'systemic or structural view'. More systematic developments of this view have taken place during and since the 2nd WW :

1. Engineering control systems theories with their inherent problems due to characteristics of purposive behaviour and 'signal basis' alien to the philosophy and methodology of 'conventional science'. This science has been the only theoretical approach for centuries for handling problems in the natural world and offering aid to the artificial. This anomaly has caused serious problems in engineering education which as far as known have not been resolved due to lack of 'engineering or problem solving theory' but perhaps masked by the huge development and application of computers [**2nd problematic issue]**.

2. The 'systemic view' or 'systems thinking' initiated by von Bertalanffy and colleagues in the 1950's. They recognised the universal applicability of this view to parts of the world including human activity scenarios but they did not recognise the empirical nature of the 'systems phenomenon', thus, their approach remained at the speculative level which by and large has continued to the present day. Fragmentation and modelling with ill defined concepts and lack of fundamentals are the characteristics of this approach to thinking about the empirical world [**3rd problematic issue]**.

In short, inconsistency of purposive thinking with thinking along the view of conventional science and the absence of scenario-based, problem solving, design biased theory is seen as the core of the problem.

This presentation is directed at the **3rd paradigm change** shown in Fig.2. seen as the 'new science of systems' which is intended to offer a remedy of the **3rd problematic issue** or to supplement current thinking as described under point 2. and to some extent point 1. Basically this 'science' is based on the immensely successful methodology of conventional science written as exp.3.

'general principles and operational models with
in domain(s) of science' mathematical structure 3.

Thus, the methodology of the 'new science of systems' can be expressed in exp.4.

'general principles and operational models with
in the domain(.) of systemic view' linguistic structure 4.

in which the 1st term means :

***I.** The principle of existence [all pervasiveness of the systemic view],

II. The principle of complexity [arrangement of parts into a whole],

III. The principle of change [manner of change is by purpose or chance].*

and the 2nd term arises from the argument :

According to observation the world appears to consist of 'matter' and matter has structure from the elementary level such as the arrangement of 'atoms into molecules' into systems to every day levels of experience like 'steel girders' arranged in a roof structure or 'constructing the channel tunnel'. It is possible to extrapolate and say that all parts of the world are material or structural or systemic in static as well as in dynamic states. It is advantageous to people if they have the means of representation or model of experience of such a world which reflects the systemic property of the world. The primary model with innate syntax and acquired semantics of properties of this world is natural language which is the modelling technique of the 'new systems science' called 'linguistic modelling'.

Integration of conventional and systems science takes place by recognising that engineering deals with perceiving, contriving and arranging the constituents of a single object or a scenario in the spirit of problem solving. In other words, there is an envisaged, desirable change of state of a selected object, FS in Fig.1., achieved by a specific arrangement of 'interacting product and producer/management system', 'systems engineering'. Knowledge of characteristics of its constituents are provided by conventional science and knowledge of its structure are provided by systems science. Thus, engineering is a methodology, it has no knowledge content, it uses conventional and systems sciences to fill in the void. The void is filled at a single constituent level by conventional science and at the structural level by systems science.

Conclusions

Subject to acceptability through debate, this theory would : Accommodate conventional science to lead to 'scientific enterprise', Would be a part of design thinking, Based on accepted branches of knowledge, Would generate novel teaching courses at school and university levels and perhaps Would affect thinking of members of society at large.

However, the human intellectual endeavour as outlined briefly and diagrammed in Fig.2. has not evolved in isolation, it is embedded in 'human physical endeavour'. People through their inventive and innovative ability have been taking advantage of resources in their environment which they transformed into artefacts for their use. People have been constructing artefacts from times immemorial for aiding their survival and sustenance, travel, warfare, communications towards convenience and amusements, works of art, monuments and cathedrals for glorification of the great, to worship and remember dead heroes. Many of these constructions or 'static systems' present or past have survived and in active use today as part of 'dynamic systems' like an 'airplane in flight'. However, their constructors or 'producer systems' from the past and present have faded out of the picture.

'Human intellectual endeavour' despite the huge success of physical endeavour in inventing new machinery and materials and constructing 'systems' for convenience and achievements of ambitions or goals, has been scares at the level of structural aspects. Before the appearance of conventional science of physics in the 16th century, apart from mysticism, superstition, the guiding thinking in construction of artefacts were craftsmanship, experience based on tradition. There has not been a comprehensive 'systemic or structural theory' of scenarios although the process of such complex constructions must have demanded a very high level of organisation of artefacts, men and machines. Despite the asymmetry or imbalance in theoretical development as implied in Fig.2. humanity has managed to accomplish immense feats like building huge bridges, space travel and so on. The question then arises what can a 'systemic or structural theory' add to further or aid the accomplishments at the physical level.

A possible answer lies in the propensity of people to generate 'ideas' for having future events and/states at simple and more complicated levels. For example, the idea of 'going on holiday' can occur to an individual or the idea of 'connecting England and France' can occur to the prime minister. In either case, there are alternative ways of accomplishing an idea or there are 'different policy options' each involving a 'scenario' with feasibility, cost, problems etc at 'individual' and 'systems level' and needs to be evaluated. In this effort modelling of 'alternative ways' can be useful. This seems to be the current tendency perhaps derived from engineering tradition as opposed to just speculation or 'methodical thinking'.

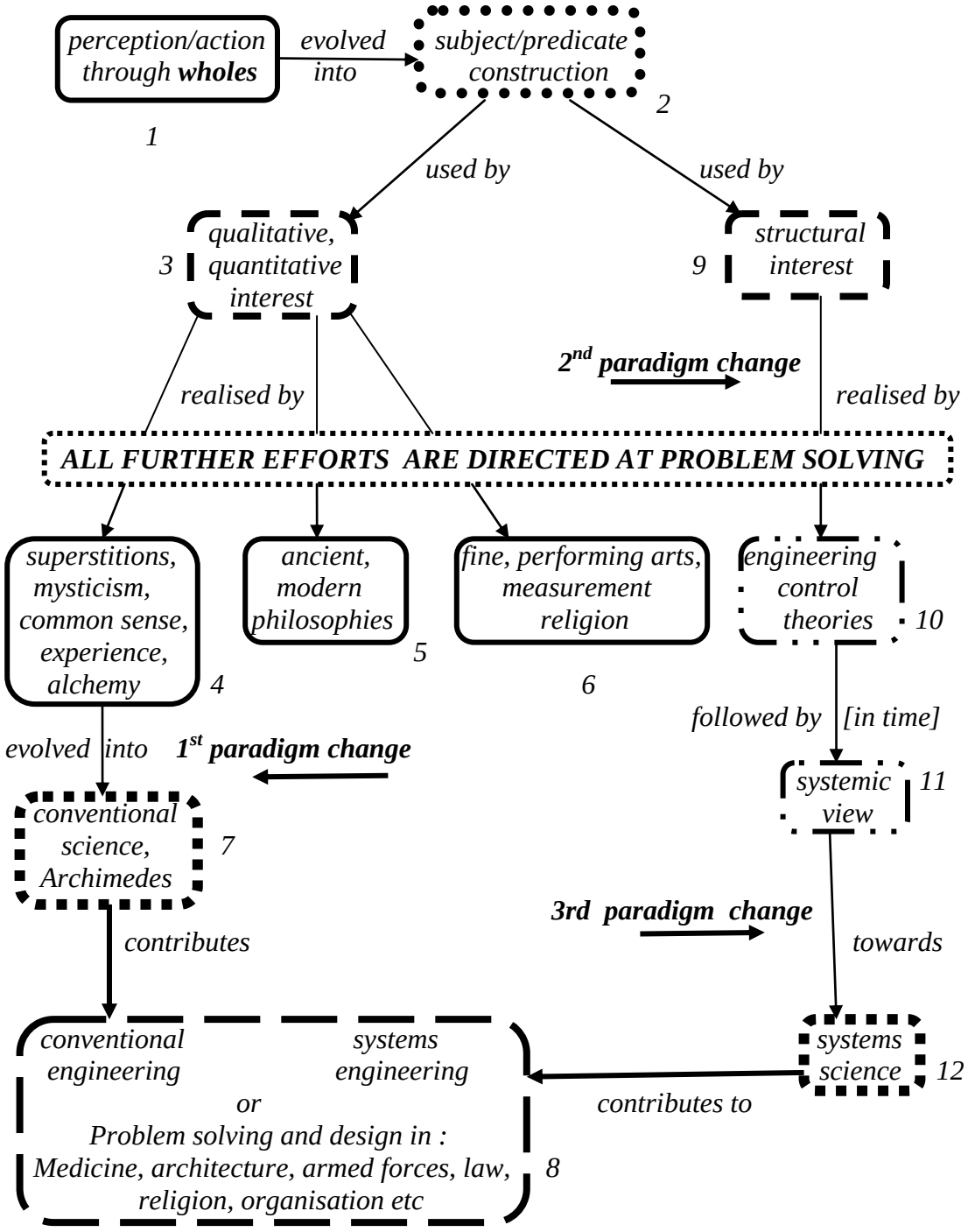

Fig.2. Diagram of constituents of human intellectual endeavour

Keywords: conventional and systems sciences, general principles of systems, linguistic modeling.

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Unlearning of What? Using Agency Theory Modelling to Define Levels of Unlearning in Organizations

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ABSTRACT

Introduction

The concept of organizational unlearning has been attracting interest in knowledge management, organizational learning and change management. While organizational learning refers to processes where knowledge is being acquired or added to the knowledge structure, the idea behind unlearning stresses the opposite as there may be times when organizations need to get rid of knowledge. Periods of unlearning may be necessary when organizations want to create new knowledge which stands in contradiction to old knowledge or when old knowledge becomes obsolete and is not needed (Tsang, 2016).

Issues in the Unlearning Research

Most recently, a debate has been sparking across influential outlets, such as *Management Learning* and *The Learning Organization*, which highlights a number of issues.

Some criticize that it is unclear how far unlearning can go. Howells and Scholderer (2016), in reviewing empirical studies on unlearning, point out that no study was able to show that knowledge that was held at t was literally unlearnt at a later point in time t_{+1}. They argue that what is being referred to as "unlearning" may rather reflect processes of change.

Another issue deals with the question of how unlearning should be defined. While, metaphorically speaking (Cornelissen, Oswick, Thøger Christensen, & Phillips, 2008), unlearning can be seen as "discarding" or "removing" knowledge, there is no coherent definition that captures the processes that are involved (Tsang, 2017).

Furthermore, some take the position that unlearning refers to processes which are part of learning (Howells & Scholderer, 2016). In that regard, there are conceptual issues of how unlearning can be an independent concept (Visser, 2017).

One way of making sense of the current debate is to highlight that there is no coherent paradigm in which the unlearning research is embedded. Early work on unlearning has been inspired by psychological studies within the paradigm of behaviorism (Postman & Stark, 1965; Postman & Underwood, 1973). Behaviorism put exclusive focus on measuring behavioral responses while excluding all mental events; once a recall of items could not be measured anymore, it could be thought of as being unlearnt. In a similar vein, when the idea of unlearning had been introduced to the management community, the dominant view of knowledge was that of an 'object' which exists independent of individuals and is easy to store, transmit and modify (Chiva & Alegre, 2005; Huber, 1991; Orlikowski, 2002). Unlearning, then, leads to 'removing' or 'eliminating' knowledge. It is important to note that these approaches seem inappropriate within contemporary paradigms; the 'cognitive turn' in psychology superseded behaviorism and shifted attention to mental processes (Thagard, 2014), and organizational studies emphasize that knowledge is embedded in social and physical structures, favoring the idea of knowledge being an ongoing process. Thus, old views of unlearning seem inappropriate (Grisold, Kaiser, & Hafner, 2017).

Another way of understanding the aforementioned issues is to look at the levels on which unlearning has been investigated. Starbuck (2017) argues that there has been a confusion between unlearning that occurs on the organizational level and unlearning that occurs on the individual level. Certainly, both are tightly interwoven and there is a 'micro-macro'-link which mediates between the two (Felin, Foss, Heimeriks, & Madsen, 2012; Hitt, Beamish, Jackson, & Mathieu, 2007). However, both come with different attributes and qualities (Starbuck, 2017).

Towards Levels of Unlearning

Yet another way to make sense of the 'unlearning dilemma' may be found in the different levels on which organizational unlearning can be placed. Literature on individual and organizational learning emphasize that there are different levels on which learning can occur. Knowledge can manifest itself on surface levels (e.g. specific responses to stimuli and/or situations) and on deeper levels (e.g. thoughts about myself in relation to responses). Popular theories to classify different levels of learning have been proposed by Argyris and Schoen (1996), Bateson (1972), and others (e.g. Lant & Mezias, 1992).

Arguably, unlearning on surface levels targets at artefacts that are different to unlearning on deeper levels. Likewise, unlearning on deeper levels may need conditions and enablers that are not relevant for unlearning on surface levels.

So far, there is no study that investigates levels of organizational unlearning or proposes a classification to analyze and categorize unlearning processes.

One might suggest to use the aforementioned levels of learning. However, this seems problematic as we might lose precision for two reasons. First, if we take into account what researchers define as an unlearning process (besides as 'removal' or 'elimination' of knowledge), we will encounter rather general definitions such as "changing assumptions and/or routines" (Akgün, Byrne, Lynn,

& Keskin, 2007). Thus, by focusing on definitions of unlearning we might run in circles and find that in most cases, unlearning appears to occur on a double-loop learning level. Second, when we use learning levels to define unlearning levels, we will be confronted with the question of how far learning and unlearning are interwoven (and can be separated); we would need to look at learning and unlearning at once and in that respect, we will lose focus for unlearning.

Using Agency Modelling to Define Levels of Unlearning

Another way of approaching this problem is to look at the object-related aspects of unlearning, i.e., to analyze *what* is or can be unlearnt.

Drawing on research from (knowledge) cybernetics and systems science, we can see organizations as complex systems (Yolles, 2000, 2006). Grounded in the cognitive research by Bandura (1986) and the complex systems theory (Schwarz, 1994), this approach conceptualizes organizations as autopoietic and autogenetic systems that are composed of an internal system hierarchy.

Through interactions with the environment, these hierarchies produce specific outcomes while they stand in dynamic interaction to maintain the stability of the system. With reference to Yolles and Fink (2015), these systems can be labeled as the (1) *operative system*, which defines first-order responses of an organization to its environment, (2) *figurative system*, which refers to second-order processes to create new forms of adaptations, and (3) *cognitive system*, which holds underlying beliefs, assumptions and norms that drive the behavior of the organization.

This basic schema can be applied to various forms of organizations to explain how they behave (e.g. the creation of paradigm shifts in Yolles and Fink (2015)).

In this research, we will use this approach to define levels of unlearning. To do so, we will follow three steps.

First, we will define what organizational artifacts correspond to what system in the internal hierarchy.

Second, we will review research on unlearning to analyze and classify existing approaches.

Third, by taking into account the implications of the respective levels, we will point to general attributes of each unlearning level.

With respect to the aforementioned issues in the unlearning research, our study may contribute in three ways. First, we may be able to shed light on the question of how far unlearning can go by taking into account on what level it occurs, i.e. how fundamental it is for the organization. Second, by comparing unlearning processes on all system hierarchies, we may be able to find general patterns which in turn, may point to a coherent and holistic process definition of unlearning (Grisold & Kaiser, 2017). Third, by taking a systems science perspective to consider the dynamics among the hierarchies, we may be able to see how unlearning at one hierarchy level

influences the behavior of other levels, and by that, we may be able to better differentiate learning from unlearning.

Keywords: organizational unlearning, levels of unlearning, agency modelling, organizational learning, knowledge management.

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Paradox of the perception of the mafia in the populations of the northern Italy in comparison to the reality. A change in the visions and perceptions

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ABSTRACT

Italy is, perhaps, the most known country in the world. Whoever you demands to find it on a world map, inevitably he will find it. This not only for the shape that characterizes its geography - that boot with the triangle of Sicily down under - but also because it is the country that was able to produce the greatest number of artworks, of monuments and, not to mention, plenty of good wines and kitchen dishes!

Yet Italy - unfortunately - is it famous not only for that! Still less is it Sicily, and with her the Sicilians, because from Sicily the biggest and florid firm was spread to the world. One of the most ancient corporation and, for sure, the one that can boast the greatest articulation at global level, together with the higher profitability level on its own investments. This despite its *managers* try with all of their *best* energies to maintain the lower profile as possible.

For that few that has not understood yet what this firm is; this firm that doesn't appear in the stock market, but that so much it is able to do! So we will disclose to you that we are talking about *Mafia Inc*.

But that's not only an economic and criminal phenomenon, it is more still a sociological phenomenon and the geographical and cultural origin of whom would be observing it made possible that it should be perceived in very different ways in time and space.

Even today a great number of Italian peoples (but not only italian) still manifest the trend to identify some *stigmas* of a success-life with that kind of crime-life after the vision of wide screen classics as *The Godfather* or *Scarface*, or attending tv serial as *Gomorra* – the one drawn by Roberto Saviano's book. Too often this mis-vision drive peoples to misunderstanding and mis-valuing this phenomenon and it over the best intentions of (some) authors.

This is a problem that concerns both the social systems and the formalities of articulation of the mainstream System Thinking.

An emblematic example of such distortion in peoples' perception is made clear when we consider how many peoples ask to go (or, sometimes, is brought) in places as Corleone - the native village of the recently passed away *boss of the boss*, Totò Riina - as tourists in the (vain) hope of finding moustached men in black gilet exhibiting a rifle on their shoulder.

In the same way it happens that people coming in Italy from abroad, but even people living in Italy too (typically from the northern area) has such distorted vision and marvels themselves discovering the magnificence of the palaces and the richness of nature in southern Italy.

So they discover, furthermore, that over there is it extremely different from the *far west* they were waiting for. **A real *paradox of the perception***.

Upon was stated above it seem evident as it will be opportune - or better: necessary - to stimulate a different approach from the actors in field:

the Central State organization;

the local administrations entities;

the organs of press;

the populations (local and not).

Actually should be perceived as compulsory to replace the (un)official paradigm in the communication of the politics as it was articulated in the last one hundred years. Years in which an entire world has been painted presenting a predatory and parassitarian south that bleed the productive north and during which years such paradigm has been - sometimes not by chance - exported (also) on the foreign press.

So, the matter is, and is one of the bigger mistake until now done, that decision makers considered that like a local problem, and not a systemic (social) lacking of knowledge, as really is it.

This distorted vision mislead decision makers to not consider the existing loop who depict southern society as retrogrades (even thanks to a partisan storiography) and peoples who don't know (or sometimes misperceive) their own history and (real) culture.

In order to foster these changes is it necessary to substitute that with a paradigm founded upon the unity of the country and recognizing the historical contribution given by the southern Italy to the economy of the north, both in historical terms (compulsory financing of the campaign of unification of Italy through the subtraction of the golden reserves from the Bank of Naples and the Bank of Sicily) and economic terms, through the purchase from the areas of the south of goods produced by northern firms.

In conclusion, such change in the cognitive paradigm passes through the analysis of the social and underlying systems that hands to a radical change of the formalities in which the same society "*thinks*" itself.

Keywords: Paradox; Sicily; Italy; Misperceiving; Mafia.

EDUCATIONAL SYSTEMS

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Education, Tranformation and Learning: An Enactive Management View

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ABSTRACT

Education, teaching and learning have been the focus in the last forty years looking at 21 century scenario. Multiples initiatives and resources have been allocated to conserve and change curricular programs. Education Institutions, private and public, are questioned in their ability to provide knowledge, skills and capabilities to enact complex problem situations through the use of technologies and methodologies in and further the classroom.

A huge literature, authors, books and papers have been explored, studied, evaluated and interpreted due to dissatisfaction regarding their effectiveness, sustainability and contextual conversations.

The purpose of this paper is to expose the use of an ontological tool, CLEHES, in two dimensions:

I) An educational program in teaching and learning to enact in three strategies considering a technology to solve complex problem situations in organizational context.

II) A process of change in the classroom where teachers design their performance as choreographers in the enactive construction of distinctions: autonomy, embodiment learning, leadership and common sense, rather than a teacher as ¨information transmitter" in the cognitive way.

These experiences have been developed in higher education, in pre and postgraduate in Engineering and Education of the teachers through a mentoring program. Learning of these experiences and proposal are presented as a radical educational offer instead of the traditional paradigm.

Keywords: Learning- Teaching- Enaction-CLEHES-Higher Education

Aknowledgements:
The authors acknowledge the support of DICYT-USACH under project 061617GDLC, "Tecnologías y herramientas enactivas de apoyo al gobierno y la gestión organizacional" 2016-2018, in the systematization of their experiences. Special thanks are due to Renato Orellana for his invaluable comments, discussions and insightful ideas.

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Evolutionary Universities: Designing for Parallel Experimentation

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ABSTRACT

The tension between academic autonomy and planning represents a major challenge for the administration of universities (Kenny, 2009; Raelin, 1991, 2003). This paper proposes to understand that tension as the same tension between freedom and control that Popper (1972) identified as successfully handled by evolutionary processes. An evolutionary stance addresses *change*, *adaptation* and *innovation*. Evolutionary theory, understood as a broader theory for complex systems—as for example Dennett (1995) proposed—can be used as a heuristic for designing social systems able to adapt to changing environmental conditions while handling an equilibrium between freedom and control. In particular, universities are social systems that are expected to create and develop knowledge. To acknowledge the uniqueness of this type of "business" demands to look for appropriate forms of organization that match the dynamics of knowledge (Goedegebuure & Hayden, 2007). To recognize knowledge as an evolutionary process then represents a key for designing organizational forms with which universities can handle freedom and control. This paper will articulate a Darwinian evolutionary scheme known as "Parallel Experimentation" (Ellerman, 2004, 2014) for suggesting organizational forms that universities can pursue for generating innovations in pseudo-"controlled" organizational arrangements.

Knowledge as a Darwinian process

Karl Popper (1972) and Donald Campbell (1987) suggested to understand the growth of knowledge as a process that follows an evolutionary logic in which "information regarding the environment is literally incorporated…in surviving organisms through the process of adaptation. Adaptation *is*, for Darwinians, an increment of knowledge" (Bartley, 1987, p. 23). Two mechanisms are the creative force of evolutionary change: variation and selection (Mayr, 1984, 2001).

Variation provides the "raw material". Darwin already knew that variation should be generated in copious and dependable amounts and should be *undirected* (Darwin, 1859; Gould, 2002). Campbell (1960) coined the expression *blind variation* for denoting that "variations are produced without prior knowledge of which ones, if any, will furnish a selectworthy encounter" (p. 381). He emphasized three conditions: (i) Variations should be independent of the environmental conditions of the occasion of their occurrence. (ii) Individual occurrences of trials are

uncorrelated with the solution—specific correct trials are no more likely to occur at any point in a series of trials than another correct one, nor than specific incorrect trials. (iii) The rejection of the notion of a "correcting" process between variations, that is, a variation subsequent to an incorrect trial is not a "correction" of an earlier one. Hence, knowledge variations (trials) in such a Darwinian epistemology means that knowledge is *conjectural* and *unjustified* (Campbell, 1960, 1987; Popper, 1972).

The direction of evolutionary change is granted to the second mechanism, selection, which works upon variation. Variations are generated, selected, maintained and propagated through evolutionary cycles. Trial and error-elimination processes run through multi-layered systems of flexible, evolving, *plastic* controls—the term is coined by Popper. In this heterarchical system "the controlled subsystems make trial-and-error movements which are partly suppressed and partly restrained by the controlling system" (Popper, 1972, p. 245). Selection occurs either by the elimination of unsuccessful variations or by the evolution of those controls (Popper, 1972). Evolving selection criteria are nested in this heterarchy: "What are criteria at one level are but 'trials' of the criteria of the next higher level, [a] more fundamental, more encompassing, less frequently invoked level" Campbell (1987, p. 56). Unsuccessful trials are eliminated, but, "if successful, they increase the probability of the survival of mutations which `simulate' the solutions so reached, and tend to make the solution hereditary, by incorporating it into the spatial structure or form of the new organism" (Popper, 1972, p. 245).

Evolutionary processes produce adaptive designs with no prior knowledge (as for example the *a-priori* one that a traditional "designer" would have) regarding which variations would be successful (Ayala, 2007). Popper (1972) used this evolutionary logic for addressing an old concern: the combination of freedom and control. Evolution can be used as an heuristic for designing social systems in which freedom and control must coexist for warranting adaptive behavior .

Darwinism in practice for designing innovative universities: Parallel Experimentation

The mechanisms of variation are usually overlooked (Dewitte & Verguts, 1999; Dobzhansky, 1959; Mayr, 1959). Ellerman (2004, 2014) proposed a Darwinian scheme known as "Parallel Experimentation" in which multiple experiments run concurrently in order to promote and accelerate blind variations in social environments. The core conditions are:

- Different simultaneous experiments run with some common goal.
- Experiments work in semi-isolation from pressures of immediate success.
- Benchmarking comparisons between experiments.
- Migration of discoveries between experiments.

Parallel Experimentation can be complemented with heterarchies of flexible "controls" for designing universities as evolutionary social systems. Evolutionary units (e.g. students, professors, teams, research groups, departments, even faculties) may produce undirected

variations and make concurrent "bets" through different blind initiatives and put them to test. This means that *beforehand* there are no restrictions for exploration—which in Darwinian epistemologies mean to recognize a-priori "ignorance" in front of genuine uncertainty (*ex post* learning). Any initiative is as good as any other *before* any actual test. Instead of focusing resources to one "best" or a few most promising, validated/justified, initiatives (as in serial experimentation), an experimenting university can spread resources over competing probes that are compared against each other. Only *after* the fact experimenters "see what works".

Here the dilemma between type I error (rejecting good initiatives) and type II error (accepting bad initiatives) is resolved in favor of the latter. Parallel Experimentation accepts some bad initiatives but seldom rejects good initiatives. Different organizational architectures promote different types of error. Sah and Stiglitz (1985) compared organizational architectures and conclude that "polyarchical organizations accept more bad projects… while hierarchical organizations reject more good projects. The fact that the two systems make different kinds of errors suggests that there will be circumstances under which one or the other performs better" (p. 293). A *polyarchy* is a system in which decision-making is not concentrated in just a few authorities but in decentralized sub-systems that are less sensitive to the quality of key decision-makers and in which a good (adaptive, effective, innovative) initiative has many opportunities to be accepted in spite that the system will also accept "bad" initiatives (Sah & Stiglitz, 1986). Ellerman (2004) highlights that "when a bad project is selected then only some time, energy, and economic resources are wasted. Failure is not fatal; indeed some economic institutions such as the limited liability company and social safety nets promote innovation by taking some of the sting out of the death of a project" (p. 83).

Hence, an experimenting and polyarchical design for universities demands to promote exploration through cross-fertilization of ideas between sub-populations of trial-making probes. It also requires to have an organized method for evaluating concurrent experiments—a sort of "parallel selection" in which an initiative is put to trial under different, concurrent evaluations. Such "horizontal" learning demands to have open communication channels and a culture of trust for learning from the mistakes of others. Moreover, as any evolutionary system, this design requires to be willing to spend some resources that will go to initiatives that certainly will fail. The university will require also not only incentives and forms that promote exploration but also the promotion of a culture that acknowledges error not as a source of judgement but a source of learning. Such systems must promote the production of errors that boost evolutionary adaptations.

This type of organization may be a way to handle several challenges for the administration of universities such as the management of academic freedom e.g. (Aberbach & Christensen, 2017; Butler, 2009; Roepnack & Lewis, 2007; Tierney, 2004), the tensions between Faculty and Administration regarding academic planning (Del Favero & Bray, 2010), the growth of the managerial team and centralization of decision-making (Krücken, Blümel, & Kloke, 2013; Shattock, 2013; Waugh, 1998) and the questioned validity of hierarchical management for

universities (Braun et al., 2015). Following the "experimenting society" proposed by Campbell (1969, 1991), the *experimenting university* will be an *active*, *nondogmatic* university that tries things out and explores possibilities *in action*. The paper will inquire about the advantages and the challenges of designing experimenting universities conceived as evolutionary systems of knowledge that must be designed for balancing freedom and control. The lessons of the evolutionary epistemology proposed by Campbell and Popper (the view that knowledge grows through Darwinian processes) should be relevant for designing social systems whose "business" is knowledge.

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ISBN: 9788890824265
Book of Abstracts of the
5th Business Systems Laboratory
International Symposium
"Cocreating Responsible Futures in the Digital Age"

Contribution of the Knowledge Competitions in Education related to Systems Science

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ABSTRACT

Rising complexity of the societies brings about the need for rising the awareness and competences of general population in dealing with that complexity in a satisfactory way. This article discusses possible ways of contributing to the enhancement of public understanding of systems science: formal education conducted by higher education institutions or by schools, informal education conducted by professional societies and different other types of institutions, knowledge competitions, art projects, other interdisciplinary projects, public presentations, popularly written magazines, etc. The possible ways differ in their duration, thoroughness of participants' preparation and the percentage of the population involvement. These characteristics influence the goals that can be achieved as well as the topics that can be offered to public.

The emphasis is in this article put onto the formal, class-based education of pupils. It has twofold purpose in serving the stated need for dealing with the complexity of the contemporary societies. On the one hand, among the pupils there are future scholars and researchers of systems, so their earlier involvement in the systems thinking and related disciplines appropriate for their level, seems beneficial for their overall future achievements. On the other hand, pupils which will not continue their education in fields explicitly related to systems science will have some moderate understanding of systems science. They will be more susceptible to team work and to participate in the interdisciplinary projects in which systems science experts will be included. That applies no matter whether they will become decision makers, opinion makers, managers or other types of employees. Both from the system point of view and from the point of view of existing educational premises, we analyze expected goals and possible realizations of such an education, as realized through a different number of classes. The society is modelled following the tripartite structure of the triple-helix innovation model in such a way that the schools represent one helix while the society, government but also the universities and other higher educational institutions are included within the other two helices.

As a case study, the existing middle school, state-level knowledge competitions "Describing systems", held annually in Croatia, continuously since 2005, are presented and analyzed. These knowledge competitions originated as an endeavor of a smaller group of teachers and enthusiasts precisely as a result of the analysis how to increase the level of understanding of the systems concepts by general population. Since then, these knowledge competitions have gradually reached the level of the official state competition for middle school pupils. The competition consists of three parts; the written essay, the exam and the public presentation of the same topic about which the essay was prepared. The exam consists of a simplified general situation followed with the questions about it asked from the point of view of systems science. The attitudes of participants, both the pupils and their teachers as mentors, are almost unanimously favorable for such an educational activity.

Guidelines are given for other scholars who could be interested in establishing national or international knowledge competitions about systems thinking and systems related topics.

Keywords: systems thinking, knowledge competitions, education, triple-helix.

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ISBN: 9788890824265
Book of Abstracts of the
5th Business Systems Laboratory
International Symposium
"Cocreating Responsible Futures in the Digital Age"

From Digital Citizen to Digital Professional

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ABSTRACT

The term Digital Citizen covers a broad range of "Citizen". In this paper, we are interested in today higher education students, who will be the professionals and leaders of tomorrow society. Despite being born in the Internet era and feeling comfortable using ICT, these millennials are ill prepared to integrate cutting- edge technologies in their future personal and professional life.

To address this need, at Universidad de los Andes, the undergraduate general studies class "The thousand faces of The Internet" prepares, each semester, seventy students from any undergraduate program to use cutting-edge ICT in a responsible, efficient and innovative way both in their personal and in their professional life. Although the course doesn't cover thousand subjects, it aims to analyze ICT from a lot of perspectives: technological, social, legal and from various vertical sectors and to promote students' critical engagement with information and communication technologies. Experts from various disciplines are invited to the course each semester. Making sense of all these aspects for such a broad audience is a big challenge.

This paper presents the case study of the redesign of this course, based on a constructivist approach and centered on the students personal and professional background, and reflects on the need as well as on the challenges of integrating interdisciplinary general studies classes around global societal issues in the Higher Education.

The first version of the course was based on lectures given by experts on each topic and short homework Initial surveys show that although students gained global knowledge related to ICT, they weren't making connections between the technologies studied and their own life and discipline. In 2014, the course was redesigned, based on a constructivist approach, around three

components: ICT appropriation, a team research, and a personal reflection. While ICT appropriation deals with literacy on cutting-edge technologies and their application, the research project allow students to deepen their knowledge in one of this subject. But it is through the personal reflection that students connect the previous two elements with their personal interests and professional paths.

A case study was conducted between 2015 and 2016. Students global evaluations of the class during 2012 and 2014 were confronted against the 2015 and 2016 evaluations. A more focused qualitative and quantitative survey was conducted with 145 students of the redesigned version of the course as a case study. Students considered that the redesigned course prepared them to identify innovative uses of ICT in different context of society being aware of privacy and security issues. Applying cutting-edge ICT to their everyday lives and relating ICT and their own discipline were identified as main achievements of the course.

In the first section of the paper, we present the importance and challenges of interdisciplinary general studies classes around global societal issues in the Higher Education and in particular issues related to ICT. Section two explores existing proposals to tackle this challenge. Section three presents the course "The thousand faces of the Internet" in terms of goals, students' demography and course evolution and underlines the problems identified before the redesign of the course. Section four explains the rationale behind the constructivist approach proposed for the course redesign and summarizes the current course instructional design and components, seen from the lens of the future digital professional. Section five describes the case study methodology while section six presents the results of the study. In the final section, we build on our experience with this course to reflect on the challenges of designing and teaching interdisciplinary general studies classes around global societal issues in the Higher Education.

Keywords: Information and Communication Technologies, Digital Citizen, Higher Education, digital literacy, constructivism**.**

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ISBN: 9788890824265
Book of Abstracts of the
5th Business Systems Laboratory
International Symposium
"Cocreating Responsible Futures in the Digital Age"

Pedagogical mentoring and transformation of teaching practices in universities

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ABSTRACT

This study was conducted within the framework of a curricular reform that was taking place in a regional university in Colombia, in response to an evident need to review and transform the teaching practices to achieve the expected changes. For this purpose, they sought cooperation from an external team comprised by a group of teachers of CIFE (Center for the Research and Training in Education from Los Andes University), who carried out different processes of pedagogical training and mentoring between 2014 and 2017. Figure 1 shows the timeline of processes and activities developed, as well as the number of teachers who participated in them.

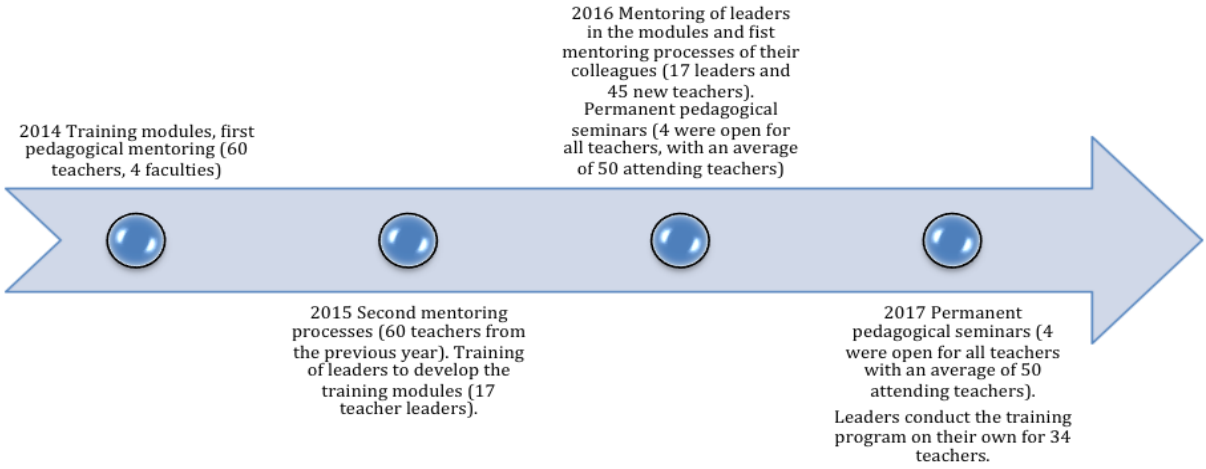

Figure 3.Timeline of the process developed by the Regional University and the team of CIFE.

The different phases were designed based on the curricular perspective of the CIFE team, aimed at the empowerment of teachers in their role as designers, promoters and evaluators of the

curriculum (Montoya 2009, Posner, 1995; Stenhouse, 1984). Furthermore, this strategy of continuous teacher training promotes regular discussion and reflection about learning, the curriculum and the democratization of education based on processes of innovation, transformation and research about own practices in the classroom (Elliott, 1993; Sthenhouse, 1984).

The concept of Zone of Proximal Development introduced by Vygotsky (1986) is adopted, interpreted as a "social system" in which the interaction through language goes beyond mere communication to give place to an inter-subjective production of meanings and agreements. This shared zone of construction enables the incorporation of knowledge in the individuals' personal repertoire, generating a dynamic relation between learning and development that gives place to movement and change (Baquero, 1997; Roth, 1995; Wertsch, 1988).

This is a qualitative research that used the systematization of experiences, guided by the question: How are teaching practices transformed by processes of pedagogical mentoring? To answer this question, three objectives were established: 1. Involve teachers in the proposal of pedagogical training and mentoring. 2. Identify changes in their pedagogical practices. 3. Identify key elements in the process of pedagogical mentoring that enable transformation.

The CIFE team designed instruments and the teachers of the regional university prepared products in the different activities developed to collect information about teaching practices and their changes. Also, focus groups were conducted with participating teachers at the end of the process to inquire about changes in the teachers' conceptions on their students' learning and the decisions they made to transform their practices. In addition, information was collected from the reflections of the teachers in the permanent pedagogical seminars regarding the pedagogical and curricular processes addressed in the sessions. The information was analyzed by means of grounded theory, using InVivo software. The results were presented and discussed according to the activities conducted every year.

In 2014, the academic vice-rectory invited the teachers that had been working in the curricular reform to participate in the mentoring process, to strengthen the processes of transformation of their practices. Nonetheless, one of the teachers said the following in one of the focus groups:

> "When we started, most of the teachers were reluctant; few of them were willing to participate, especially because the CIFE team is foreign for them, because they come to teach us things that we already know" (Focus 1 teachers).

However, out of the 60 teachers that started the training and mentoring processes with the CIFE team in 2014, 51 completed the process and made changes in their pedagogical practices by introducing collaborative learning, PBL, projects, use of simulators and inverted class. One of the teachers said:

> "I did a lot of things in my class trying to involve the students: exercises, questions, presentations. But those activities were not articulated and in the conversations with my

> mentor I was able to develop a structure for my class... Now I am articulating the evaluation that seemed to be so difficult" (Focus 1 teachers).

Therefore, several participating teachers requested a continuation of the process during 2015 to give stability to the transformations. In the second focus group, a teacher stated:

> "I started realizing that this process should not be only for the course in which the mentoring started, but should go further into all my other courses; but for that, I needed to continue with my mentor to be able to talk with someone about the crazy things that I was doing. Because my other colleagues [those that are not in the training] told me: you are crazy, every time we pass your classroom we only see a mess" (Focus 2 teachers).

By the end of this second year, the teachers in this group identified that establishing a reliable relationship of reflection with the mentor enabled a gradual but continuous change that the teachers identified as durable.

In this same year, the team of leaders that had been established in the regional university before the work with CIFE, and which participated in the activities of the first year started their training. The objective of this phase was to provide these teachers a deep sense of the training sessions and the mentoring process proposed by the CIFE team. In one of the training sessions, one of these teachers expressed:

> "Now that I can see in detail what happens in the training sessions, I understand that there is a lot of aspects that I don't notice from the other side [as participant] … Like the coherence of all that you do, the ultimate purpose... And there is only 6 sessions. That is why I feel intimidated to be there with other colleagues without being an expert in education" (Reflection in the leader training process).

As a result of these reflections, during 2016 the CIFE team participated as mentors of the first sessions of the training and mentoring process conducted by the leaders for a group of 45 new teachers. The main role of the CIFE team was to observe the sessions and support subsequent reflection processes of the leaders to strengthen the pedagogical and curricular knowledge of the group. At the end of this process, the leader teachers identified that one of the main lessons learned was the following:

> "Understanding that helping the reflection is an intended process during the mentoring, and if we don't learn to do that it is unlikely to happen in a productive way for the transformation of their practice. This is precisely how we can contribute to institutional change" (Final reflection of the leader training process).

Moreover, 4 seminars were conducted; they were open for all the teachers from the university. In these seminars, the CIFE team addressed the following topics: Pedagogical systematization and teacher portfolios; The curriculum and its relation with the conceptions of learning; Analysis, assessment and evaluation of the use of technology in pedagogical processes; Evaluation and learning. Around 50 teachers participated in these seminars, some of them in training and others

that were part of the first mentored group. It was evident that the transformation in the practices of these teachers was still taking place:

> "This has been about understanding the curriculum centered in the students; actions such as reviewing one activity to change the learning result. In the past, students just got a grade and that was it; the more they failed, the better the teacher. It was as if we could not react in relation to the students' learning" (Final reflections, seminar 2).

During 2017, 4 more seminars have been conducted to answer some questions that arose in the process of transformation of learning practices: Strategies to mentor the learning in teams of students; Making thought visible; Evaluation of learning; and Pedagogical Systematization and reflection in the classroom. Different products were developed in these seminars as a result of the teachers' awareness that courses in different areas and semesters require different pedagogical strategies and activities that promote learning in the students. It was also evident that one of the challenges that appear repeatedly is evaluation, which has the double function of being formative and in turn quantifying the achievements in the processes developed.

As a final result, we found that the team of leaders has developed the training and mentoring process on their own with a third group of teachers, with which finally 134 teachers participated in this process of transformation of practices. This is an important result for the CIFE team and the regional university because it shows that the initial objective has been achieved. In this regard, one of the leaders shared the following reflection:

> "We have been able to generate a community that is intentionally reflexive, committed to a continuous change to improve the learning processes of their students... An actual community of practice".

The results presented show that the participation of the teachers in the processes of transformation of their practices only take place by means of a dialogical process among peers. This is in line with Vygotsky's (1986) Zone of Proximal Development in the sense that the mentor intentionally helps the mentee to reflect about his or her own practice (Stenhouse, 1984; Elliott, 1983). In this dialogue, the practice is transformed by means of a critical comprehension of the teachers of their role as makers of the curriculum. At the same time, the mentors (CIFE team) also generated important lessons learned through this experience - the longest and with the largest number of participants it has developed - in terms of the processes, challenges and opportunities that must be developed within the framework of curricular reforms and the transformation of pedagogical practices in higher education, where contextualized research in education play a fundamental role in decision making.

Keywords: Pedagogical mentoring, reflection on the practice, Alternatives for re-structuring education, curricular reforms.

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ISBN: 9788890824265
Book of Abstracts of the
5th Business Systems Laboratory
International Symposium
"Cocreating Responsible Futures in the Digital Age"

Education and entrepreneurship. Mapping the territory towards an action plan

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ABSTRACT

Policy makers and regulators have turned to promote entrepreneurial skills among young people to generate new labor opportunities and reduce the unemployment rate (European Commission, 2016). The relevance of entrepreneurial initiatives for economic prosperity has generated a lively debate even among academics (Robinson et al., 1991; Hatten and Ruhland, 1995; Mitra and Matlay, 2004; Kuratko, 2005; Matlay, 2006; Stuetzer et al., 2013). For instance, a large amount of research has analyzed some of potential factors (i.e. intentions, motivations, previous experiences, education, attitudes, personal traits, and social contexts) that may influence the start-up of entrepreneurial initiatives (Minniti, 2008; Politis, 2005; Zhao et al., 2005), (Harris and Gibson, 2008; Hussain et al., 2008, Hatten and Ruhland, 1995; Krueger et al., 2000), (Martin and Osberg, 2007; Abu-Saifan, 2012) (Baum et al., 2014; Omorede et al. 2015).

Despite the interest generated among policy makers and academics, little is still known about the determinants of entrepreneurial intentions, motivations, and actions, across different countries. Therefore, a better understanding of factors affecting such dynamics is of fundamental importance to researchers, policy makers and practitioners, (Di Paola et al, 2017). This is even more relevant if the issues relating to entrepreneurship are referred to youngest people and

students, as it involves manifold emotional concerns. Thus, leveraging a unique dataset and adopting the Ajzen's Theory of Planned Behavior (TPB) (Ajzen, 1985), we analyze the factors that may affect the entrepreneurial intentions, motivations and actions, of a sample of undergraduate students in management of five European Universities (located in Italy, Latvia, France, Spain, and Poland) We focus on the students in management due to their intrinsic potential interest and attitude towards entrepreneurship (Harris and Gibson, 2008).

With the aim of moving a step forward in this field of inquiry, and in line with prior studies (Fayolle and Liñán, 2014; Kautonen et al., 2011, 2015) we analyze three main attitudes of the entrepreneurial intention, namely: 1) personal attitude towards the behavior, 2) perceived social norms, 3) perceived behavioral control. The first and the second reflect the perceived desirability of performing the behavior, while the perceived behavioral control reflects the perceived feasibility of performing the behavior and is thus related to perceptions of situational competence (self-efficacy) (Shaver, 1987).

Building on TPB, we created a four-points Likert-based questionnaire (ranging between strongly agree to strongly disagree) and employed an even scale to avoid the bias of central risk (Caldarelli et al., 2016). In doing so, we divided the questionnaire into two parts. The first part of the questionnaire is related to personal data, while the second part includes a total of 42 questions concerning attitude, subjective norm, perceived behavioral control, behavioral intentions, motivations, and actions.

The questionnaire was disseminated to an initial sample of 60 subjects in order to test the scale. Then, we used an exploratory factor investigation by using the principal components analysis (PCA) (Hu & Bentler, 1995; Brown, 2015). This procedure was used to suppress indicators with a correlation lower than 0.3, or whose exclusion increased the Cronbach's Alpha value, which should not be lower than 0.7 (Bland and Altman, 1997). We eliminated two factors concerning subjective norms and one factor of perceived behavioral control. We had an overall Crombach's Alpha of 0,88 that is considered an acceptable value.

Finally, we assessed measures of model goodness-of-fit and quality indices, which value considered acceptable in literature. More specifically, we obtained the following results: a goodness-of-fit index (GFI) of 0.91 (ideal > 0,90), adjusted goodness-of-fit index (AGFI) of 0.83 (considered good if > 0,8), comparative fit index (CFI) of 0.93 (ideal if > 0,9), normed fit index (NFI) of 0.91 (ideal if > 0,9), relative fit index (RFI) of 0.90 (ideal if > 0,9) and, finally, root mean square error of approximation (RMSEA) of 0.05 (ideal < 0,08). Also, we carried out the average block VIF (AVIF) obtaining a result of 1.567 (considered acceptable if <= 5, ideally <= 3.3), the average full collinearity VIF (AFVIF) was 2.012 (acceptable with values less or equal to 5, ideally <= 3.3). Finally, we have a R-squared contribution ratio (RSCR) of 1.000 (acceptable if >= 0.9, ideally = 1). All these indexes suggest that the overall model fit is considered acceptable.

After the test of the goodness of fit, we carried out a structural equation modeling (SEM) (Bagozzi et al., 1991). In line with prior studies, our results document that subjective norms and perceived behavioral control are significant predictors of individual's motivation to engage an

entrepreneurial activity in all the countries. In addition, we show that subjective norm is the main factor that affects business students' entrepreneurial intentions.

This paper contributes to the academic and policy debate about entrepreneurial intentions, education and training, offering a comprehensive investigation on the factors that affects students' intentions and motivations to promote an entrepreneurial activity. Also, this study provides an initial evidence to develop further understanding of the causal relationship between entrepreneurial intentions and personal variables.

This study has two main limitations. First of all, while behavioral intention is the most important predictor of intention (Armitage and Conner, 2001; Ajzen, 1991; Ajzen & Fishbein, 1980), it does not always result in actual behavior (De Groot and Steg, 2007). This is a typical limitation of the theory of planned behavior. Second, our conclusions are based on cross-sectional data. This means that our model represents just a snapshot. In future research we should enlarge our study by using a longitudinal study to investigate students' entrepreneurial intentions during different time periods, making comparisons and providing more insight into the phenomenon. Finally, there could be few cultural and national limitations of these findings generalization due to cultural differences, personal values, personal skills, etc. This phenomenon requires further investigation; it will be helpful to replicate this study on a wider scale with different national cultures in order to generalize the findings.

Keywords: education, entrepreneurship, territory, action plan.

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Rethink university system: toward entrepreneurial university

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ABSTRACT

Purpose – The role of knowledge has become increasingly important in the modern economic system. The knowledge is the main strategic asset for the creation and growth of new firms. For this reason, the higher educational system play a role in the national innovation process. The main objective of this exploratory study investigates on modern changes in the education system of today. The study will be to understand the relational context in the process of creating academic spin-offs (ASOs). In particular, the analysis of the coordination and relation mechanisms in the process can show how different geographies factors, with different mechanism of relations, can favour the creation of new academic entrepreneurship.

Design/methodology/approach – Analysis of entrepreneurial universities are based on the views of many famous scientists, namely, Audretsch (2014), Awbrey (2003), Etzkowitz and Zhou (2008), Guerrero et al. (2016), Rasmussen and Wright (2015), Walshok and Shapiro (2014), Jacob et al. (2003), Dominici and Levanti (2015), Sharif and Baark (2008), Wright and Fu (2015) etc. We propose an approach divided in two-step. In the first step we want to make a longitudinal study on literature of educational system, academic entrepreneurship and spinoffs. In particular, we want to understand the main challenges that the higher educational system faces in the modern economic system.

In the second phase, by a cross analysis of databases we will attempt to theorize the main aspects of the recent changes on higher educational system. The first database[7] created from the collaboration between the Center for Entrepreneurship and Innovation at the Polytechnic University of Marche, Netval and Institute of Management of the Scuola Superiore Sant'Anna, which collects all the spin-offs in Italy. The data have been observed until the date of 08/14/2016. At that date, the spin-offs appear to be no. 1287. The large number of sample being analyzed has allowed highlighting different aspects of the phenomenon. The other databases include the data on incubators[8] and universities[9] in Italy. All databases are public. In this work, we use qualitative and descriptive tools.

[7] Available to: http://www.spinoffricerca.it

[8] Available to: http://www.registroimprese.it

Originality/value – The paper wants to examine the current role of the university in modern economic system. The originality of this investigation lies in its ability to offer a picture and first analysis about main actors and of the entrepreneurial university system. In particular, we offer several consideration about the entrepreneurial university and spin-off system. The continuous changes of university system generates profound on academic spinoff. This study highlights these changes.

Practical implications – The outcomes of this study have different implications. First of all the results will help the university to better manage the process of changes and exploitation of the academic knowledge through the spin-off creation. At the same time, the findings can help the external actors of the university to understand the business opportunities based on academic knowledge and competitive advantage in the market.

Keywords: Spin-off, ASOs, Entrepreneurial University, Education, knowledge management.

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[9] Available to: http://www.cineca.it

ECONOMIC AND FINANCIAL SYSTEMS

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Measuring causes and effects of firms deleveraging process

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EXTENDED ABSTRACT

Following the two crises that hit the world financial system in 2007 and 2011, there has been a progressive deleveraging process involving non-financial corporations operating in the euro area.

After about a decade of growth in the use of financial debt, in the second half of 2009, companies began to reduce this level of indebtedness. This circumstance can be seen analyzing data provided by the Bank of International Settlements regarding the ratio between the European non-financial corporation's financial debt and the GDP, as well as the European Central Bank reports.

Data show that the system raised this ratio from 80.1% (in 1999) to 106.3% (in 2009).

The debt expansion period then faced a gradual contraction that has been consumed since 2009 onwards. This contraction is also extremely clear by observing how the same ratio, firm's financial debt to GDP, was 91.9% in 2016.

The deleveraging we are witnessing is undoubtedly a central issue for business scholars as well as for banking and macroeconomics researchers.

From the point of view of corporate finance, it is clear that the period of deleveraging can be the perfect field in which testing some of the most well-established theories on the financial structure, from the pecking order theory to the trade-off theory, as well as, from a more strictly applicative point of view, the dynamics of the financial structure can be analyzed regarding their relationship with the business performances and corporate investments.

With reference to the banking sector, it is evident that a progressive process of deleverage in non-financial corporations is reflected in banks lending. In this light, the effects of deleveraging are of

great interest both in terms of composition of banks assets and in terms of profitability and risk of the banking system.

On the macroeconomic side, the bank-enterprise relationship is relevant to a variety of aspects. In first instance, the fact that firms are less bank-lending dependent, open the discussion on the capability that firms have to financially support new investments which may lead to higher employment of the Eurozone. This issue is taking more and more momentum since we are witnessing a concomitant process, in particular in some countries, of contraction in the public deficit and of reduction in the value of real estate assets and government bonds (which are the typical savings allocation). This circumstance may result in a reduction in other potential classical external sources of funding (public contribution and equity) which, coupled with a reduction in bank lending, are likely to strongly limit the ability of firms to promote new investments and thus to develop their own revenues. In addition, the eventuality that financial constraint could limit new investment and hence employment, has undeniable implications also in maintaining inflation at the levels of 2% and in achieving a sustainable relationship between public debt and GDP.

The aim of the research will be to investigate the trend of the financial debt of European non-financial corporations between 1999 and 2016, analyzing the evolution of key leverage ratios. Subsequently, in a context of reduction of such sources of funding, the dynamics of investment and of alternative sources of financing will be analyzed. In other words, we will try to verify whether a reduction in bank financing have had a negative impact on non-financial investment or whether the gap resulting from bank-debt reduction has been offset by an increase in the equity and the debt-type alternative sources.

It is quite clear that a reduction in long-term funding, in the case of stable investment, because of financial homogeneity, should be accompanied by an increase in company's self-financing or other long-term sources. Once we look at the dynamics regarding the structure of loans and sources of funding, the research will continue to investigate two more interesting aspects of banking deleveraging. Both the consequences of deleveraging in terms of income performance (including debt sustainability) and the causes of deleveraging will be analyzed.

In fact, it is clear from the latter point that the reduction in bank lending in non-financial corporations can have a double origin.

A first cause of bank credit reduction could be attributable to banks capability to finance firms. In other words, debt reduction could have been caused by the increasingly stringent legislation to protect the banking system. The Basel II and Basle III agreements may have led to a contraction in bank lending as a result of the need for banks to ensure the compliance with LCR and NSFR's rand capital requirements.

From a demand side point of view, the analysis will look at whether the reduction of bank-debt to corporations has been the result of a change in the needs of businesses. We will at first instance

investigate whether the contraction of financial debts has been more or less relative to short or long-term sources.

The economic crisis we witnessed has in fact led to a drop in corporate revenues with the possible effect of reducing the need for working capital. Usually, a reduction in revenues is accompanied by a reduction in receivables and a reduction in inventories. This contraction in the working capital may have produced a changed need for short-term bank credit and hence produced a short-term demand side and non-supply side deleverage.

With reference to long-term financing, on the other hand, the issue is different. A reduction in the revenues of businesses cannot have led to a reduction in corporate long-term assets (which are known to be viscous). The debt contracted to finance long-term investments may not have had the time to be properly served. The logical consequence of a contraction in revenues would therefore not be a reduction in long-term asset, but a problem of debt duration or repayment. Therefore, a contraction in long-term debt may have been determined by an enterprise's need to make compatible the ratio between EBITDA and debt-service. This need, in the case of a reduction in long-term debt, could only have been achieved through an equity increase.

In order to verify whether the contraction of the debt originates from a demand or supply side, the research will be completed through the creation of a regression model where the dependent variable will be the level of bank-debt and the independent variables will be representative of demand and supply aspects. With reference to the former, variables will be used, such as the change in revenues or the contraction of working capital or the change in equity, while with reference to supply variables, the typical variables that measure creditworthiness (z-score) will be utilized, to measure how the bank's vision, in terms of fundraiser reliability, may have caused a lower credit delivery.

With reference to the effects of deleveraging on performance, the main indicators of profitability and solidity will be analyzed.

The research will be carried out taking into account the cross-country differences and the size differences of the companies being analyzed.

Keywords: deleveraging, non-financial firms, demand, supply, performance

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Forecasting Housing Prices: Model Instability and Speculative Bubbles Early Detection

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ABSTRACT

The increasing complexity of the financial structures, the interconnections between the different economic agents over time can lead the economic and the financial system to greater instability. In this sense the uncertainty and the heterogeneity of market uncertainty on the economic system is a relevant known fact. On this framework one relevant source of instability of markets are the speculative bubbles.

There are many different examples on the financial history of speculative bubbles as the Dutch Tulip Mania and at the same time the "railways manias" in different countries as United Kingdom and United States. In this sense there are markets which shows a higher propensity to the growth of the speculative bubbles and also to the growth of instabilities due to the behaviour of the agents. Rationality in this sense it could be affected by the irrational expectations of the economic agents.

The economic bubbles are very important in economics but their nature is unclear and they are very difficult to be identified. At the same time there is no a clear reason in literature on why they appear or disappear over the time. The most known reason is the fact that the speculative bubbles depends on the irrational behaviour of the economic agents and their behaviour produces market instability endogenously.

In this sense the endemic instability of the economic systems and the irrationality of the agent behaviour need to be carefully considered on the statistical models in order to obtain better predictive results. In this sense it is important to consider also rolling approaches to statistical modelling in order to detect early the early signs of some relevant economic changes which can occur over the time. These procedures can be useful at the same time to anticipate the speculative bubbles.

Housing markets, for instance, are very instable and they are characterised by specifying speculative bubbles. Forecasting house prices it is very relevant for the economic implications of

the housing on the economic systems, so their relevance cannot be undervalued. In this sense the housing is directly linked to other relevant economic phenomena, then it is necessary to take into account the behaviour of the agents over time. So we consider an approach to detect changes on the time series models of the housing prices.

In this sense we consider a specific model structure and we predict the prices over time. The approach is based on Exponential Smoothing methods and allow for taking into account also internal structure of the time series considered. We assess and evaluate the different models and specifications in order to detect also a relevant loss to predictive performance due to not expected economic phenomena. When the there is uncertainty on the parameterizations, due for instance to the parameter drift, it is possible to consider an approach based on forecasts combining. The models are also compared with the performance of other hybrid forecasting approaches in which we model also the residuals of the entire model as well.

Finally, in order to detect the model instability at every observation we study the stability of the parameterizations, the predictions and their performance over time. In this way deviations from the initial model can be interpreted and investigated as early signs which can lead to a future more relevant speculative bubble or also economic instability.

Keywords: Housing Market, House Prices, Speculative Bubbles Forecasting, Rolling Windows, Forecasts Combining, Hybrid Forecasting

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Innovative Clusters – A Model for Rising International Competitiveness

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ABSTRACT

Nowadays, globalization is occurring on a daily basis. Advanced countries are already engaged deeply and comprehensively meanwhile developing countries are gaining speed to involve in global processes and less developed countries are not very lag behind. Despite the economic globalization and functioning of multinational corporations, world space unification, competitive advantages of different firms in international markets rest on national characteristics. Globalization of the economy leads the world towards universality and monotonous; but at the same time the same force gives national characteristics huge importance: in globalized world economy strong competitive advantages are relied and based on differences caused by national characteristics (Porter 1992).

Today countries have to integrate into the modern globalized world economy in such a way as to avoid or minimise harm the national interest, avoid the negative consequences of globalization and completely benefit from the openness of the national economy and hence, support the growth of domestic welfare. This new pattern changes the social and economic objectives of nations (Sutherlend & Sewell 1998).

These issues are high on the EU agenda as well. The EU Commission's Communication "Putting knowledge into practice: A broad-based innovation strategy for the EU" (Commission Communication, 2006) lists ten key programs for supporting innovations to foster the EU economic development at both European and National levels. Public policies are seen as essential factors for industry-led innovations aiming at growth and jobs creation.

Thus, creation of national competitive model is becoming the most significant factor for strategic development of any national economic model. According to one of the distinguished theories, named "Theory of Cluster Development", economic effectiveness is encouraged by cluster development that boost those factors, features and elements which most positively contribute country's welfare.

Each country has its own approach to cluster development strategy. Different countries' experience proves that cluster development strategy vary according countries. At the same time cluster approach is the foundation for dialogue between producers and the states. The clusters

significantly increase efficiency of relations among private sector, government, trade unions, scientific and education institutions. Public governance should facilitate innovations and create appropriate conditions and/or incentives for business actors to focus on innovative products and services. As technology, knowledge and innovations are the main pillars for raising the resource efficiency (Sepashvili, 2014), some kind of structural reforms are needed to obtain required results.

Generally the flow and expansion of Innovations and new technologies are enhanced due to closer geographic location, which eases personal relations and interaction of business actors. Thus, clusters encourage and facilitate innovations on local level via different values chains. As stated in OECD publication (OECD, 2001) Clusters they can be considered as reduced scale innovation systems.

Any Government economic policy has influence on country's competitiveness and in a certain degree on innovation developments that are the part of clusters. Thus, clusters maybe supported or harmed by government through different way. It can be support to general business environment, special programs aiming at specific industries, or education, or research in particular science meanwhile others have special goal to support clusters (and in many cases innovative clusters). Cluster supporting policies try to strengthen clusters interconnection, to facilitate interactions within clusters members and to boost internationalizing cluster development together with its (cluster's) promotion. Such kind of policies is not often named as cluster development policy. Often they regarded as regional policy, Innovative policy, SME policy educational policy, research policy, industrial or agricultural policy and ets. But they do affect cluster development to a certain degree and scope. Classical Cluster initiatives are defined as organized efforts to increase the growth and competitiveness of clusters within a region involving cluster firms, government, and/or the research community (European Commission, 2001). Nevertheless, it is impossible to fully define policy efforts that are needed to meet all objectives. As a rule, policy measures target regional or particular business development. Accordingly, different activities can be applied such as making information transparent and easily available, facilitate business-to-business and people-to-people contacts, establish special funds for granting innovative start-ups, support joint marketing activities like international exhibition or fairs, and est.

Keywords: *Foreign Trade, The EU, Eastern Partnership, Regional Integration*

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ISBN: 9788890824265
Book of Abstracts of the
5th Business Systems Laboratory
International Symposium
"Cocreating Responsible Futures in the Digital Age"

The Complexity of the Anomaly Detection in Finance

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ABSTRACT

Since 2007 the financial environment suffered the worse financial crisis ever whatever caused it, some sources say that could be lead to a potential fraud. Some topics could speak about that the interbank interest rate could have caused a potential fraud that lead to a crisis that had a deep consequences above all on the private sector, taking as an example most of the household. Frauds could be identified to anomalies given a specific time series of the data taken in consideration. On this work we consider some empirical approaches in order to detect anomalies in time series which can be due also to the falsification and fraud. These phenomena can determine the anomalies over time. The best goal that we can get after our research that we have made is to find a way to detect and prevent anomalies that could be referred to a fraud. Anomaly detection (see Chandola Banerjee Kumar 2009) is an approach to identify some unexpected values from a defined statistical pattern firstly identified. In this sense the arrival of the anomaly is unknown but also it is unknown the duration of the anomaly as well (Leng 2009). The deviations need to be interpreted and on their analysis it is possible to investigate on them as generated or not by fraud. Anomaly detection comes from data mining and more in particularly from temporal data mining. The data mining techniques can be used in order to identify the anomalies on the financial time series considered. Various different approaches are considered on this context we review the different methodologies proposed. We use the Anomaly Detection approach by Vallis, Hochenbaum and Kejariwal (2014). By considering the problem to use the approach on the financial context we consider the approach on similar data than the different authors. In particular this approach seems to be appropriated because exists some relevant structure on the underlying time series which can request for a similar approach. Anyway the problem is that financial markets and financial data tends to be unpredictable for their nature and so in that sense they are explicitly a complex system (Johnson,Jefferies Hui 2003).The agents tend over the time to reacts

intelligently (yet sometime irrationally) to the market moves. In this sense the system change evolving over the time, in a way which is unpredictable but organic (Arthur 1999). Moreover, is important to take in consideration even efficiency and inefficiency of the market that could involve changes in the behavior of agents.

So in this context the different agents tend to behave from the existent information on markets and they are very sensitive to "rumors" and can participate to speculative bubbles if there are some relevant determinants. In this sense it is necessary to consider at the same time some rolling windows in order to consider the anomalies on a dynamic point of view. In this sense can arise the need of an approach of anomaly detection based on rolling windows (see Zivot Wang 2003). Anyway the problems open relevant space for future research.

Keywords: Anomaly Detection, Fraud Detection, Financial Markets, Behavioral Finance, Market Efficiency Hypothesis, Market Inefficiencies, Rolling Windows

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Theoretical Aspects of Using Cost-Benefit Analysis in Implementation of Competition Policy

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ABSTRACT

Since Cost-Benefit analysis (CBA) measures the Net Social Benefit it can be used to identify whether exceptions from the prohibition of restrictive agreements contribute to economic development and guarantee a adequate increase in consumers' benefit and social welfare. Since Adam Smith in economic history prominent researchers are in search to answer the questions: what in fact does collective wealth mean? Is there any difference between wealth and welfare? These questions are answered in different ways across different social disciplines: Philosophy, Ethics, Political Science, Sociology, Economics and etc. Debates in economic sciences resulted into main ideas that wealth of a nation can be measured and measurement is consistent with theory that see connections between the well-being of individuals to welfare of a society. This ideas are linked with the broader concept of a Social Welfare Function. These ideas were discussed in the context of the 'Economics of welfare', as it was defined one century ago by Alfred Cecil Pigou (Pigou 1912). The concept of social welfare became very important to be introduced and discussed broadly not by economists but also among economic policy makers and governmental institutions. Georgian Law on Competition defines the conceptual bases that creates the possibilities of using Cost-Benefit Analysis in the process of competition policy implementation. CBA is the method of policy evaluation that measures in monetary terms the impacts of policy implementation on all members of the society. CBA is the normative instrument and it does not describe how politicians and bureaucrats take decisions. Since CBA does not take into consideration views of politicians and other interests groups, attempt to ignore it and put pressure on analysts to fit the analysis to wishes of different voters and interest groups is one of disadvantage of CBA. Nowadays CBA is used in different context for different purposes including implementation of competition policy.

Keywords: Cost-Benefit Analysis, Completion Policy, Net Social Benefit, Social Welfare.

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Tendencies and perspectives of internet-economic development in Georgia

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ABSTRACT

The work deals with the new methods and strategic plans of internet-economy development in Georgia. The basic problems of internet-economy introduction and development has been studded, the benefits of internet-economy are substantiated; its role in development of enterprise is expressed in social field, bank and finance sector, generally in developing of the country, in integration of Georgia in EU or world institutions.

The survey/study bases on the reports of international organizations, on the works of scientists working on this issue; Gordon (2000), Graham, et Al, (2017), Horton (2016) and others. The point of views of the researches working Georgia Todua et.al, (2008), Surmanidze (2016), Turashvili (2013), Jolia et al., (2014) are discussed. The conclusions reveal the results of the researches made by us.

The actuality of the problems is caused due to the fact that Georgia, as the country having the small economy, is actively involved in Globalization processes, in which the internet plays significant role. In order to make the economy strong and developed in Georgia, it is essential that the internet-economy to be developed. Concerning this, we studded position and indicators of Georgia according to the international evaluations.

There are several services accessible by the internet in Georgia: informational, touristic, and financial. The financial service is more dynamically developing from the internet service types, which includes the following fields: internet banking, internet-insurance and internet trading.

The technological platform used for the internet services today in Georgia is still considered as the greatly developing platform. On the one hand, our country is one of the regional leaders in electronic management development though, on the other hand there in Georgia still exists the so called "digital distance" which means accessibility development on the same level between cities and regions. According to the calculations of specialized agency of information and

communication, technology of UN and of international technological union (ITU) internet is accessible for about 45% of Georgian population.

According to the 2016-year annual report of the World Bank concerning economical increase of developing country, only 40% of the work in Georgia is computerized, whilst in the country it is possible to be 60% of the work computerized. By the conclusions of the report authors, the indicators of work computerization as well the usage of the information and communication technology by the employees are connected to the economical increase. According to 2016 annual report of global informational technology, which is prepared by the world economic forum on accessibility of Georgia to the new technology, in the world rating among 140 countries, Georgia is on 97 position, and according to the internet user, it is on 72th position (S. Baller, 2016).

Many things will be depended on internet economy development in Georgia. The country, which has limited material resource for economical grow and is not able compete the developed countries, by the internet economy can change the general economic picture. Internet economy can accelerate the social and economic development of the country, tourism development, strengthening of electronic commerce and open trade relationships, bank operations, possibility of education will face the country to other reality. For developing the internet-economy and for making the future economic forecasts, we evaluated the internet environment in Georgia; tendencies of internet development; existing problems and the affective ways for solution them.

The government should support development of internet-economy in Georgia, due to which list of measurements should be taken, as are improvement of infrastructure- installation of internet in whole Georgia, creation of safe internet area, growing of population education and etc.

The government tries to provide and create all the pre-conditions for wide scale Internetization and for massive accessibility to it.

We may discuss on essentiality of internet-economy development and the significance by the fact that, Georgian authority actively discuss strategy and activity plan of "Electronic Georgia" which is designated for four year from 2014 to 2018 year. There in the mentioned plan is developed the significance of existence of electronic commerce and electronic government, also it deals with the issue of electronic safety and infrastructure development.

The mission of "Electronic Georgia" is: to provide the safe and effective electronic service accessibility with the one window principle for the any citizen, for the representative of business field or the private sector, for their encouragement. The strategy also includes involvement of citizens in innovative projects, supporting of competitive business area and the main developing of such policy, which provides electronic safety- protection from Cyber-attacks.

Despite the fact that in recent years several measurements have been taken for improving the accessibility to internet, the indicator of using this means by the population is still not satisfactory.

In spite of powerful state institutions, there is no information in the country concerning the digital economy volume in the country, concerning internet-companies cash-flaw, volume of generated production and the quantity of the organizations using the internet services. In addition, there is no information concerning such a significant statistics, as electronic business share in GDP, the quantity of the people employed in internet-companies, revenues, the indicators of electronic business development.

In the conditions of the existing information vacuum, to make the exact forecast of the electronic business environment development in Georgia is too difficult. Accordingly, studding of the internet market is the significant way of filling the information deficit.

As the obstruction of internet usage in Georgia, we face the problems like technical (for example Broadband internet network distribution) as well social (financial) ones.

In September of 2016 year, we conducted the research, in which participated more than 200 people within Georgia. By the researchers conducted by us it became clear that, the category of the citizens who actively use the internet- about half of them 51.7% are of 20 and 30 years old, the share of 30-40 years old respondents' share is 36% and the remaining share comes to the citizens of older age.

To the question if what kind of internet service do you use- the answers of the respondents were distributed as follow: more than 77% use the internet for social networks, about 62% use internet for obtaining the information and job duties. 42% of the respondents use the internet banking; more than 15% for online games, 11% for online loans, 18% for studding, about 27% for online trading, more than 35% for online bookings/reservations (air tickets, hotel reservations, for purchasing the tickets of concerts and other events).

The main privilege that the internet has is the time saving, for example while carrying out bank operations or hotel reservations. More than 85% of the respondents note, that by using of internet saves time.

About 80% of the respondents consider that the internet in Georgia is well developed.

As it appeared, 37% of the respondents know about internet economy.

As it seems from the research, internet economy in Georgia develops dynamically, but there are still many problems for perfection its implementation, concerning which, sharing of the experience of the world's developed countries is essential and active support from the state.

Keywords: E-Economy, Internet, Technology, Online commerce, Digital Marketing, mobile banking.

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The Image of the Region and Marketing Strategies for its Formation

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ABSTRACT

Sustainable social and economic development of a region is a multifactorial and large-scale problem. Nowadays, on the background of uncertainty of the ways of solving the acute socio-economic problems in our country, the study of the theoretical and practical issues of developing innovative methods of managing the state, its central and local authorities is of high importance. Wide-scale introduction of marketing approaches is an effective mechanism for adjusting economic and social reforms, which is based on innovative methods and technologies. The consistent use of such approach allows individual regions to achieve decentralization of the management processes in the development of investment, financial, foreign and economic policies and their transfer at the local level.

In terms of current globalization, existence of intangible assets is becoming a more and more pressing issue for the whole country as well as for its separate regions. The image of the region that has significant influence on the formation of the international competitiveness of the region also belongs to intangible assets. Formation of the marketing potential of the region is related to the effective regional marketing. For that purpose, great attention is paid to the study of conceptual and practical issues while developing effective marketing strategies that determine achieving competitive advantage compared with other regions from the point of attracting tourists and investments. The positive image of the region is the factor, based on which both investment and tourism attractiveness of the country can be improved and as a result, it will become possible to improve living standards of the population, overcome social and economic problems in the region and satisfy the interests of the individuals and entities in the region as much as possible. As for the current state of the study of marketing strategies for the formation and improvement of the positive image of the region, regardless of its high importance, the role and significance of the region's image is less studied by Georgian researchers. The problems of the region's image are less studied or are not studied at all in economic literature. In the paper, it is concluded that social and economic growth and development of the region is impossible without development and practical implementation of effective regional marketing strategies.

The objective of the paper is to substantiate that the image of the region is the most important factor for social and economic growth of the region and to determine the marketing strategies for

further improvement of the image; to develop recommendations, which will promote improvement of marketing of the region's image and therefore, increase in investment and tourism activities in the region.

The paper provides the assessment of low investment activities in the regions of Georgia, socio-economic problems that are expressed in unemployment, social inequality and poverty and overcoming of which is becoming increasingly problematic. It is substantiated that solving the problems in the region should be fully based on the modern concept of regional marketing. There is a long experience of such concept in developed, democratic countries; however, in Georgia an undesirable tendency of the absence of interest in theoretical and methodological study of the marketing of the region's image is observed, let alone its practical realization. Specific recommendations and proposals are developed to ensure effective management of the region and raise its competitiveness in the modern global era.

The paper evaluates the irrelevance of approaches to managerial processes in the regions of Georgia with the market conditions. Due to this, despite their rich natural resources and capacities, the regions of Georgia still remain underdeveloped and unattractive for tourists and investors. The paper substantiates that regional marketing, which implies changing the approach to the region's governance is a powerful instrument for overcoming difficulties. Based on the comprehensive and systematic analysis of the region, it helps formation of an attractive image of the region to solve strategic and tactical goals and tasks. Raising competitiveness and investment attractiveness of the region is possible by using effective regional marketing.

Regional marketing complex of attractive image of a region and therefore, of attracting tourists and investment flows can be imagined as a set of changing factors of marketing under control, combination of which will be used by the governing bodies of the region to achieve the desired response from potential tourists and investors. Development of the marketing complex of the measures to be carried out implies influencing selected potential tourists and investors through marketing efforts. They are determined by strategic decisions to maintain and support the achieved position or to change (reposition) it.

Based on the study of the positive experience of regional policy in democratic, developed countries the author concludes that investment attractiveness of the region and solving one of the most important tasks for the region, such as attraction of foreign direct investments, as well as attraction of tourists in desired quantity is directly related to the formation of an attractive image of the region as an expression and outcome of implementation of effective regional marketing. Formation of the region's image is directly related to the prospective and important direction of regional marketing - marketing of the region's image. The latter implies formation and development of the strategically most beneficial public opinion for effective management of the region and solving the problem it faces, which encourages individuals and legal entities to cooperate with the region. The main purpose in this case is to inform the external entities about competitive advantage of the region and to demonstrate openness for possible relations. For the purpose of achieving this task, information marketing of the region is considered to be one of

most important directions for the management of the region as it ensures spread of positive information about the region and therefore, formation of a positive approach towards the region. Effective stimulation of the region can attract tourists and foreign investments and consequently, encourage rapid and sustainable development of the country. It is substantiated in the paper that marketing of the region's image should be implemented not separately, but in close coordination with other important directions of the region's marketing, such as marketing of sightseeing of the region, marketing of human resources of the region and marketing of infrastructure of the region.

Based on the circumstances that there are no structural marketing divisions in the governing structures of Georgian regions that would deal with the realization of the tasks and functions of regional marketing, the author concludes that, in fact, governing structures of the regions not only do not care to improve the image of the region, they even do not or cannot understand its role and importance for effective functioning of the region and increasing investment and tourism attractiveness of the region.

The paper substantiates the idea that for creating an attractive image of the region, it is essential to develop modern organizational and economic mechanism of managing aiming at creating an attractive image of the region. For this purpose, from our point of view, the first step should be establishment of a marketing service as a structural unit in the administration of the governor, including a separate department for managing the image of the region, which will ensure formation of an attractive image of the region. Such department will be able to create a positive image of the region through the development of effective marketing strategies, which will lead to attraction of investments and tourists and therefore, solving of socio-economic problems in the region.

Keywords: marketing, regional marketing, image of the region; region image marketing, investment and tourist attractiveness of the region

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Higher Education Marketing Development Prospects in Georgia

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ABSTRACT

In modern conditions, development of any country depends on the current situation in higher education, which can be considered as one of the main factors of social, economic and cultural processes. Currently, higher education system, like the entire education system in our country faces a number of difficulties in the areas such as financing, fairness in the process of gaining education, improving the quality of teaching and research, providing adequate educational programs, employment opportunities for the graduates, etc. One of the most important of these problems is inefficiency of management activities in higher education institutions - the actors of the higher education system, which is determined by a very low level of development of higher education marketing.

Nowadays, higher education, which has many centuries of experience, faces significant tasks. These tasks require fundamental changes in higher education system and the study of the higher education clearly demonstrated that inconsistent reforms and non-systematic approach are the main factors that have hindered its development. For this purpose, for further strategic development of the education sector, it is necessary to develop proposals and recommendations. For reforming the higher education system, it is essential to take into consideration the experience of advanced countries, the challenges in the sector of education and the most important changes, which should ensure employment, creation of jobs and formation of innovation-based economy. It is very important to create a long-term vision of development of education in the country, which will include all components in this sphere and will be entirely based on the principles and methods of higher education marketing.

The structure of the higher education system has changed and at the same time it has become necessary to change the organizational and economic mechanisms of management in higher education institutions. In modern conditions, it is widely recognized that improving the efficiency of the higher education institutions is only possible by using efficient marketing techniques and methods. Viability of higher education institutions directly depends on the reproduction of human

resources – the most important resources in the country. Therefore, the study of higher education marketing - the modern methodology of effective functioning of higher education institutions, as well as of concrete marketing methods and instruments for raising competitiveness of higher education institutions is one of the priority and key issues, interest to which in modern world is constantly increasing. The study of this very pressing field is the subject of study of the present research. In this regard, it should be noted that regardless of its importance and significance this sphere of research is not a subject of great interest in Georgian scientific community.

The objective of the research is to study the current situation in the development of higher education marketing in Georgia and identify the development prospects, develop methodological and practical recommendations, which will encourage effective application of marketing methods and principles in the management of higher education institutions in Georgia, which will result in the increase in international competitiveness of higher education institutions.

The research provides systematic study of higher education services market and systematic analysis of interdependence between labor market and the system of education; evaluates modern state and peculiarities of higher education development; identifies theoretical and practical, conceptual and organizational problems in the field of higher education and determines concrete ways to solve these problems. In addition, definite methodological recommendations are developed related to the development of effective marketing strategies (such as segmentation, positioning, product, pricing, and communication and distribution strategies) in higher education institutions, which will undoubtedly contribute to raising competitiveness of higher education institutions.

Keywords: marketing, educational service market, higher education marketing, competitiveness of higher education institutions.

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ISBN: 9788890824265
Book of Abstracts of the
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A contribution to the sustainable management of supply chain using fuzzy logic

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ABSTRACT

We are currently witnessing the increase of several challenges such as the environment, human rights, labor standards, and corruption. Companies play an important role in economic development, mainly by conducting their operations in a more sustainable manner. In this context, companies can be part of the solution through the sustainable management of its suppliers. The objective of this article is to address the sustainable management of the supply chain and to propose solutions based on fuzzy logic. To achieve this goal, we developed a conceptual study that evaluates the sustainability of a company's supply chain. The results demonstrate the usefulness of the algorithm used in decision making and for the sustainable development of companies. We believe that our contribution will serve to encourage future studies on the supply chain, the creation of shared value, and the application of algorithms to sustainability.

INTRODUCTION

According to "Brundtland Report" (WCED, 1987), the sustainable development must meet the current needs without compromising the future of the next generations. The need to promote the sustainable economic development is a challenge for private companies.

In recent years, the supply chain is one of the areas that are the most exposed to the stakeholders' awareness (Freeman et al. 2010; Porter and Kramer, 2011), especially in the way in which products and services are considered, and the social and environmental impacts of their activity. Companies are also aware of their responsibility for their chain of value creation (Hart and Milstein, 2003) and the importance of this in their responsible and sustainable behavior. They are extending the scope of application of their codes of conduct to their suppliers. The Stakeholder Theory posits that a firm's ability to generate sustainable wealth over time, and thus its long-term value, is determined by its relations with its stakeholders (Freeman, 1984).

For Porter and Kramer (2011), the creation of shared value is the policies and practices that strengthen the competitiveness of the company and improve the economic and social conditions of the communities in which they operate. According to the same authors, shared value is created through the redesign of products, redefinition of productivity in the value chain, and development of support policies for clusters. This sustainability strategy brings economic, social and environmental benefits, both for the company and for its stakeholders i.e., the suppliers and the community.

To create shared value, the company must evaluate its suppliers and integrate in this decision making the compliance with the appropriate sustainability requirements that exceed the applicable legal requirements. In this way, the company encourages its suppliers to adopt common values and encourages them to initiate a process of continuous improvement towards sustainability. On the other hand, "the sustainable management of suppliers leads to improve quality, competitiveness, cost reduction, technological advances, increase control over risk in the supply chain, and favor corporate reputation" (Barcellos de Paula and Rocha, 2017).

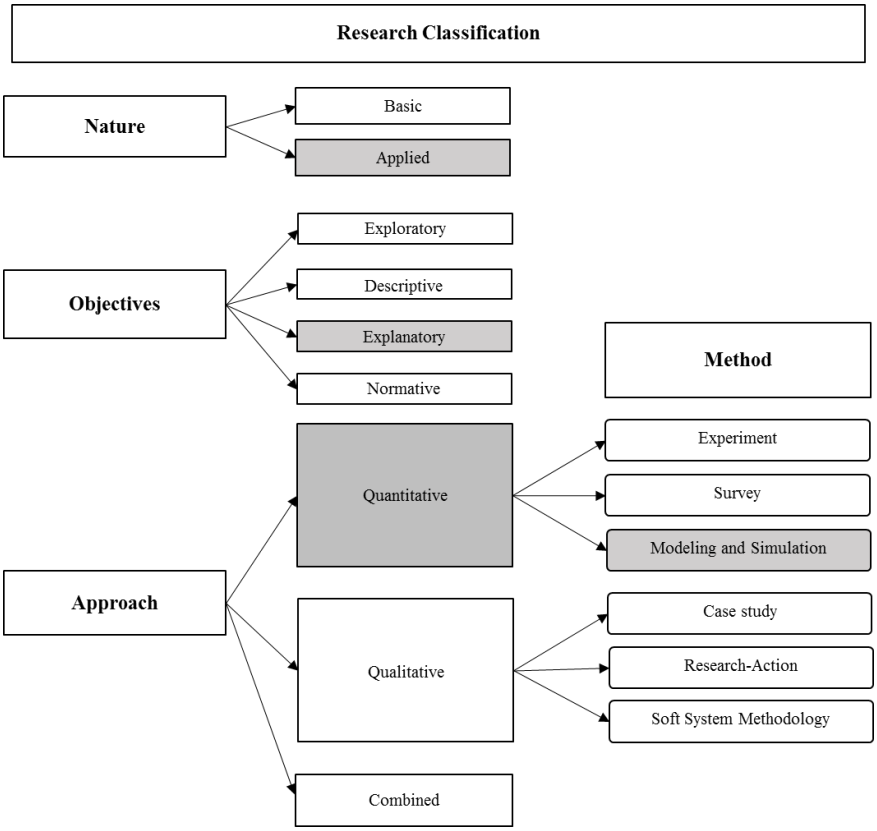
Several companies currently adopt the ten principles of the Global Compact (GC) by establishing the code of conduct for their suppliers. According to the GC (2017) "companies are asked to adopt, support and discuss, within their sphere of influence, a set of values within the areas of Human Rights, Labor Relations, Environment and Fight against Corruption".

For these reasons, this manuscript includes a useful tool to help decision makers to evaluate their suppliers based on the GC's principles. According to the results, the company will be able to know its main suppliers through a performance ranking and develop a supplier development plan. In this way, the company is expected to achieve a sustainable management of its supply chain.

We adopted the applied research method, with a quantitative approach through modelling and simulation as show in figure 1.

This paper is organized as follows. Section 2 presents the methodology of fuzzy logic that will be used in this paper. Section 3 applies model to evaluate supply chain and then it shows the results. Section 4 includes the conclusions of the study, the suggestions for its continuity, followed by the bibliographical references.

Fig. 1. Research classification (Own source based on Turrioni and Mello, 2012).



METHODOLOGY

In this paper, we used the Fuzzy Logic algorithm; some concepts are described in the sequence.

Hamming Distance (Kaufmann and Gil Aluja, 1987)

Definition 1. Firstly, we define a notion of distance between two points included in the segment

$$[0,1]: If\ \left[a_{1,}, a_2\right] \subset [0,1]\ and\ [b_1, b_2] \subset [0,1], let\ \mathcal{D}\ ([a_1, a_2], [b_1, b_2]) = \frac{1}{2}(|a_1 - b_1| + |a_2 - b_2|) \quad (1)$$

that defines an object or proposal $a_j, j = 1,2,..,m,$ through certain characteristics or elements $b_i, i = 1,2,..,n$

The use of $\frac{1}{2}$ before the addition of absolute values is intended only to maintain the distance between 0 and 1. As a result, we observe that:

$$0 \leq \mathcal{D}([a_1, a_2], [b_1, b_2]) \leq 1 \quad (2)$$

Definition 2. We can define the normalized Hamming distance between two subsets Φ - the same reference fuzzy finite:

$If\ \underset{\sim}{A}, \underset{\sim}{B} \subset E$ with a card $E = N\ finite$, we have

$$\delta\left(\underset{\sim}{A}, \underset{\sim}{B}\right) = \frac{1}{n}\sum_{i=1}^{N} \mathcal{D}(\mu_{\underset{\sim}{a}}(x), \mu_{\underset{\sim}{b}}(x)) \quad (3)$$

where μ is the associated weighting vector.

"The Hamming distance has provided very good results when ordering fuzzy sets, since we will determine which item is "closer" to the ideal. The model, if we give more weight to some characteristics or skills than to others, allows us to consider and pursue the same expression quoted above. For all cases, one should prefer the element that is the smallest distance from what is considered the ideal" (Kaufmann & Gil Aluja, 1987).

APPLICATION

This section shows the results of applying model of fuzzy logic to evaluate a supply chain of a company considering the ten principles of GC. First, the Hamming Distance will be used and the results will be subsequently shown.

First, the company indicates a list with the specific characteristics that the suppliers must have, as presented in Table 1.

Table 1. Specific characteristics (Source: adapted from CG, 2017)

C_1	Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights.
C_2	Principle 2: make sure that they are not complicit in human rights abuses
C_3	Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining.
C_4	Principle 4: the elimination of all forms of forced and compulsory labour.
C_5	Principle 5: the effective abolition of child labour.
C_6	Principle 6: the elimination of discrimination in respect of employment and occupation.
C_7	Principle 7: Businesses should support a precautionary approach to environmental challenges.
C_8	Principle 8: undertake initiatives to promote greater environmental responsibility.
C_9	Principle 9: encourage the development and diffusion of environmentally friendly technologies.
C_{10}	Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery.

With the experts' support, the fuzzy subset of thresholds was defined, denoted by $\underset{\sim}{P}^{*}$ which indicates the degree of significance of each characteristic, as shown in Table 2.

Table 2. Fuzzy Subset of Thresholds (Own source)

	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}
$\underset{\sim}{P}^{*}$ =	1	0.9	0.8	1	1	0.8	1	1	0.8	1

The experts then carried out an assessment of each supplier according to the criteria established above, and they specified their perceptions of the scale [0,1], whereby the closer the estimate is to 1, the better the adaptation to the company's requirements (Table 3). Where S_1 it means Supplier 1, S_2 = Supplier 2, S_3 = Supplier 3, S_4 = Supplier 4 and S_5 = Supplier 5.The items suggested are:

Table 3. Evaluation of five suppliers (Own source)

	S_1	S_2	S_3	S_4	S_5
C_1	0.8	0.7	0.7	0.7	0.9
C_2	0.9	0.8	0.5	0.7	0.9
C_3	0.7	0.8	0.7	0.8	0.8
C_4	0.8	0.9	0.9	0.9	0.7
C_5	1	0.5	0.9	0.8	1
C_6	1	0.9	1	0.8	1
C_7	0.9	1	1	1	0.9
C_8	0.7	1	0.9	1	0.7
C_9	0.6	0.9	0.8	0.9	0.8
C_{10}	0.7	0.9	0.7	0.9	1

This result allows us to obtain a fuzzy subset for each supplier, as presented in Table 4.

Table 4. Fuzzy Subset for each supplier (Own source)

	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}
S_1	0.8	0.9	0.7	0.8	1	1	0.9	0.7	0.6	0.7
S_2	0.7	0.8	0.8	0.9	0.5	0.9	1	1	0.9	0.9
S_3	0.7	0.5	0.7	0.9	0.9	1	1	0.9	0.8	0.7
S4	0.7	0.7	0.8	0.9	0.8	0.8	1	1	0.9	0.9
S5	0.9	0.9	0.8	0.7	1	1	0.9	0.7	0.8	1

It will show the results of each supplier based on their own merits with respect to the initial criteria according to a set of thresholds. To achieve this objective, the hamming distance will be calculated. In this case, it is assumed that the company determines a vector of weights (Table 5), depending on the current priorities at any given time:

Table 5. Vector of determined weights (Own source)

	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}
W=	0.09	0.07	0.07	0.1	0.1	0.05	0.1	0.1	0.05	0.09

From (3), the results following were obtained (Table 6):

Table 6. Results (Own source)

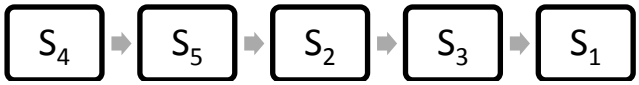
S_1	0.0132
S_2	0.0113
S_3	0.0129
S4	0.0085
S5	0.0089

The result shows that the supplier (S_4) has the best ranking. This supplier obtained the shortest distance, since conceptually it is closer to the subset of thresholds.

RESULTS

The company can establish a supplier ranking as presented in figure 2 and select the suppliers that will be included in its supply chain.

Fig. 2. Supplier Ranking (Own source)



On the other hand, with the results of the evaluation, the company can execute a supplier development plan based on this sustainability assessment. Then the company can propose consultancies for each supplier who wants to improve the weakest criteria and to strengthen the strongest ones. In this way, the company generates shared value in its supply chain and contributes positively to the sustainable development.

This algorithm can be applied to all types and sizes of companies. The flexibility of this tool allows adapting it to different selection criteria, number of suppliers, and weight of each criterion.

CONCLUSIONS

The study on sustainable management of supply chain shows that the importance of the suppliers for sustainable development and that the creation of shared value can be a corporate strategy to reduce risks, increase legitimacy, efficiency, and benefits.

In implementing the proposed model, we provide a tool based on the use of "Hamming Distance". The result allows establishing criteria in order to select suppliers, including sustainability in the supplier evaluation processes, reducing risks in the supply chain, identifying points of improvement in the supply chain, generating greater transparency for stakeholders and contributing to sustainable management since it uses the ten principles of the Global Compact as the supply chain evaluation criteria.

The study of sustainability supported by the application of fuzzy logic provides a new management model that can help entrepreneurs to make decisions by using a methodology based on the management of uncertainty.

Therefore, we consider that the conducted research is an innovation and a useful tool for scientific knowledge to advance in the study of sustainability based on the Theory of Uncertainty.

Keywords: *S*ustainable Management, Supply Chain, Shared Value, Fuzzy Logic, Decision-making.

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Book of Abstracts of the
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Possibilities of Improvement of Green Economy Policymaking

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ABSTRACT

The work aims to analyze the latest developments of the concept of "Green Economy" and to outline opportunities of improvement green economy policymaking by using modern geographical technologies. Based on the desk research methods the analysis has been implemented according to the relevant scientific papers and international organizations reports. Some maps are suggested as the samples of possible using of Geographic Information Systems (GIS) in the policymaking process.

Strong sustainability - the alternative model of sustainable development

Since the 1960s, natural and social scientists have highlighted a series of sustainable development issues and recommended integrated policy action and commensurate means of implementation, such as technology, finance, capacity building and trade. Trade-off between the *weak sustainability* and *strong sustainability* models (see figure 1 "a" and "b") are biased in favour strong sustainability and actively discussed currently.

Strong sustainability is an alternative model of sustainable development in which economy is embedded in society; society and economy are embedded in the ecological sphere. Society and economy are interdependent with ecology and cannot function without a healthy ecological sphere (Figure 1 "b"). In its content it is like the strong sustainability and reflects the similar dependence of the approach on the hierarchical model of sustainability, redrawn from Fischer, et al., (2007). See Figure 1 "c".

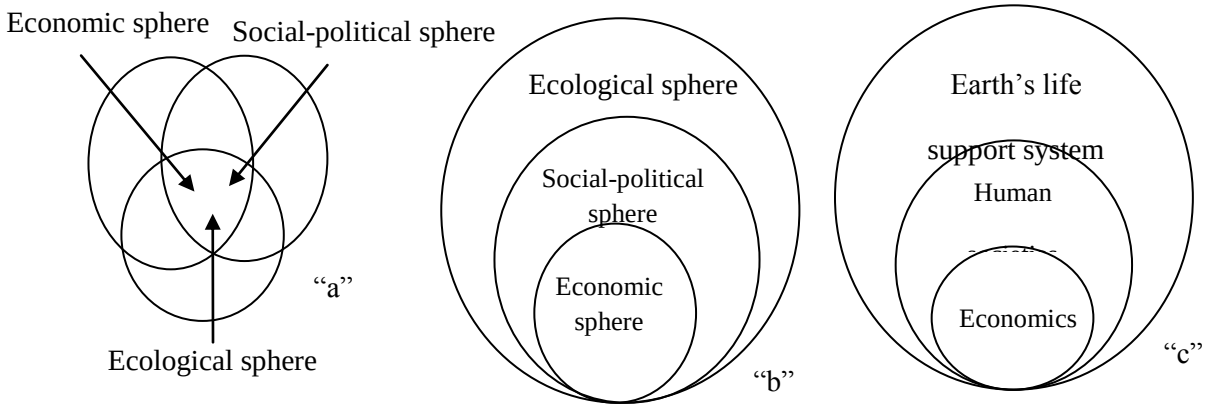

Figure 1. Weak sustainability ("a") and Strong sustainability ("b") and the Hierarchical model of sustainability redrawn from Fischer et al. (2007) ("c")

Source: 1. *Environment, Sustainable Development and the University in Africa, Modul 1,* http://www.unep.org/training/downloads/toolkit/4.0%20-%20Module%201.pdf.
2. Fischer, et al., (2007).

It's evident that achieving a strong sustainability in each country requires the elaboration of consistent and effective thought-out policy. This relates to great difficulties.

Green Economy in the contexts of Sustainable Development

There are some debates to determine the essence "Green Economy", as well as "greening" of sustainable development. According to the Sustainable Development Knowledge Platform there are not an internationally agreed definition or universal principles for green economy. UNEP defines a green economy as one that results in "improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities" (UNEP, 2010). In its simplest expression, a green economy is low-carbon, resource efficient, and socially inclusive (UNEP, 2011).

Concerns over sustainable development has been continuing despite the efforts of many governments and international organizations to implement strategies based on Rio Declaration and Agenda 21. Intensification of the issue needs new incentives.

Green economy (in its various forms) has been proposed as a means for catalyzing renewed national policy development and international cooperation and support for sustainable development. The concept has received significant international attention over the past few years as a tool to address the 2008 financial crisis as well as one of two themes for the 2012 UN Conference on Sustainable Development (Rio+20). Despite the growing international interest in green economy, negotiations between Member States on the concept in the lead up to Rio+20 were challenging (Sustainable Development Knowledge Platform).

Researchers examine the relationship and influence between the double crisis and the rise of "greening" as part of the solution (Bina, 2013); analyze the phenomenon of simultaneous functioning of the three "green" ideas – Green Growth, Green Economy and Sustainable Development – and present the GG-GE-SD model (Kasztelan, 2017); consider the issue in the regional focus - for instance, pay attention the sustainable development related to environmental protection and the creation of a green economy, with special reference to the global and European context for the development of an environmentally friendly goods and services market, taking into account the cases of Central and Eastern European countries (Wysokinska, 2013), etc. It should be noted, that some countries (for example, Germany) developed the green economy research agenda, which highlights the necessity to forge **links between scientific and economic communities,** NGOs and international partner organizations to drive forward the development of a Green Economy worldwide (Green Economy Research Agenda, 2014). UNEP indicates, that moving towards a green economy must become a strategic economic policy agenda and for achieving sustainable development green economy cannot be focused exclusively on eliminating environmental problems and scarcity (UNEP, 2011). Key message from international organizations with obstacles to greening growth is that there are political and behavioral inertia and a lack of financing instruments - not the cost of green policies as commonly thought (Inclusive Green Growth, 2012). We share the opinion, that traditional economic analysis of policies and projects can be complemented with a screening exercise that helps design policies that provide short-term economic benefits (Inclusive Green Growth, 2012).

GIS in implementation of green economy strategy.

Various approaches, methodologies and models are used for processing, reviewing and assessing green economy policy. Complicated and still in the process of forming measurement means of sustainable development stimulate the search for a different path for effective green economy policymaking. Each of them has special focus considering the concerns and needs of county. Helpful work is suggested by UNEP, which explores criteria primarily focus on tangible dimensions (UNEP, 2014).

Many green policies impose economic costs. Sometimes benefits of these costs are not clear, especially in the ling-run period. Usually policymakers make decisions on the base of information. In the case of green policymaking there are more threats of holding of asymmetric information and specific difficulties are linked with the existence of big data, complicated relationships and systemic perception of problems.

Top priority in the stages of green policymaking should be given to the spatial perception of the issue as a principle precondition for effective implementation of the policy. From this point of view, GIS offers unique opportunities.

GIS is a technological tool for comprehending geography and making intelligent decisions (GIS for Sustainable Development, 2007). GIS technologies can be used for complex analysis of the problem at the initial stage of the study as well as render assistance in following stages. Using of GIS model is compatible with other models, such as input-output, computable general

equilibrium, system dynamics etc. For example, GIS gives possibility to receive information about employment in sectors affecting or impacted by the environment, emissions and fuel/water requirements from/for power generation, economic growth, direct/indirect and induced socioeconomic impacts of environmental trends/policies (UNEP, 2014). Herewith, considering the funding sources, it's critical to make correct decisions the first time. GIS gives economic developers a framework for decision making, which helps minimize risk and maximize value; GIS provides a foundation for understanding all aspects of a place and how it can grow stronger and more attractive to people and businesses (Gurbax, 2017). The comprehensive work (GIS for sustainable development, 2006) presents GIS methods and techniques, which can be used to solve problems - addressed in sustainable development planning and decision-making. For example, communities are using GIS to identify local valuable landscapes, prioritize which to protect and plan connections within and beyond their boundaries (ESRI).

In view to illustrate the role of GIS in the green economy policymaking considering the important role of spatial perception of the issue, it is suggested the generated maps of industrial growth rates and the most polluted areas in the world (see, map 1, map 2). In our position, it evidently shows main issues and we believe that it would be useful for policy makers if they need to find out correlations between balanced industrial development and threats of pollution.

Conclusions and research findings:

There are not an internationally agreed definition or universal principles for green economy; Concept of "Green Economy" needs to define more accurately;

Green economy has been proposed as a means for catalyzing renewed national policy development and international cooperation and support for sustainable development, but lack of clarity of measurement possibilities causes difficulties in green economy policymaking;

Effectiveness of the Green Economy policy is depended on many factors. Policymaking in this sphere is complex and needs systemic approach. Growth the awareness of the problem is crucial for whole society, but firstly for policymakers, as main "channels" to plan and achieve strategic "green purposes".

Intensification of links between scientific and economic communities will increase awareness the challenge and possibilities to find effective ways to solve green growth problems;

Active use techniques and tools of modern geographical technologies will improve green economy policymaking, as it gives the opportunity of systemic perception; this model is compatibility to other models and output of using this means are more beneficial, than putting direct expenses for green growth. GIS can be used in integrated sustainable planning support systems.

The work would be useful for further development of the theoretical study of "Green Economy" concept developments and the established recommendations will render assistant to the policy

makers for development of the systemic perception of the issue and seeking the new ways of implementation of green economy policy, that really is at the junction of interconnected spheres.

Keywords: Weak sustainability, Strong sustainability, Green Economy, GIS.

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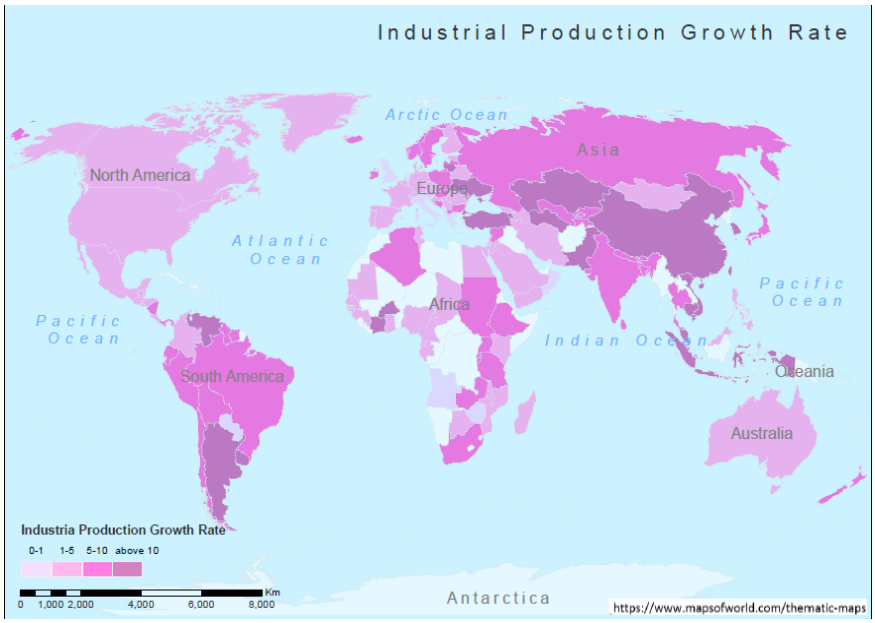
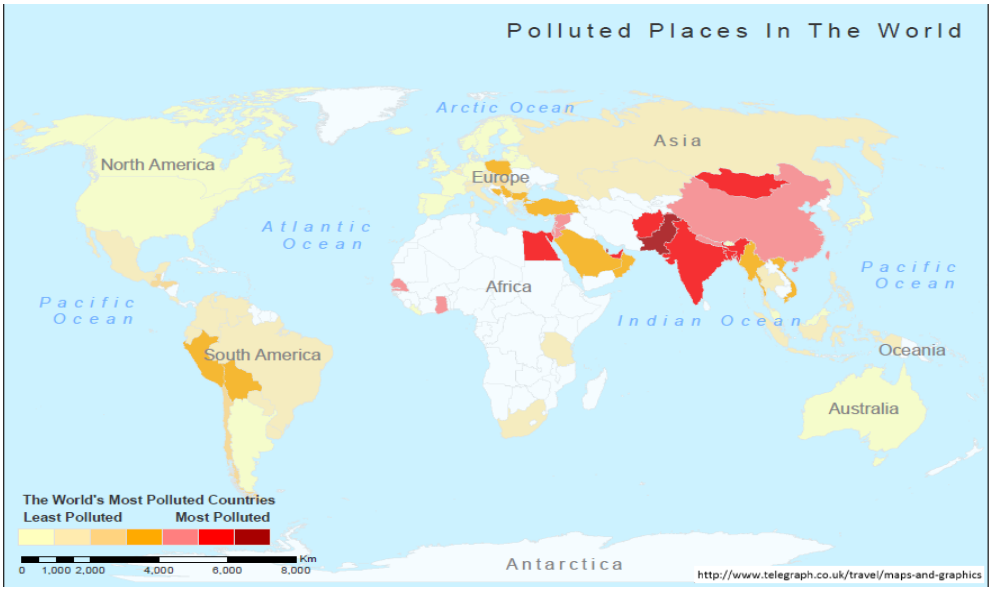
Map 1.


Industrial Production Growth Rate
Arctic Ocean
Asia
North America
Europe
Atlantic Ocean
Pacific Ocean
Africa
Pacific Ocean
Indian Ocean
South America
Oceania
Australia
Industria Production Growth Rate
0-1 1-5 5-10 above 10
0 1,000 2,000 4,000 6,000 8,000 Km
Antarctica
https://www.mapsofworld.com/thematic-maps

Map 2.


Polluted Places In The World
Arctic Ocean
Asia
North America
Europe
Atlantic Ocean
Pacific Ocean
Africa
Pacific Ocean
Indian Ocean
South America
Oceania
Australia
The World's Most Polluted Countries
Least Polluted
Most Polluted
0 1,000 2,000 4,000 6,000 8,000 Km
Antarctica
http://www.telegraph.co.uk/travel/maps-and-graphics

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ABSTRACT

"Life is not a highly improbable chance event, but almost inevitable", paraphrasing this S. Kauffmann's assumption we can say "AI evolution is not a highly improbable chance event, but almost inevitable". In the machine learning (i.e. Google's DeepMind*) has modelized the autopoietic behavior of structurally coupled AI's systems, the environment System is done by the rules of the teaching machine. The AI system evolves. The expression evolution does not imply any ethical suggestion but a simple transformation of the functional and/or the organic state, into a better answer (adjustment) to the environment system gave. In other terms, any system in a long-term of observation adapts itself by a continuous, smoothly, stochastic process to the exogen (or us stimulations). This process locally, in the same scale of time, does not violate the autopoiesis, but non locally, in a large scale of time, has the probabilities to give an alteration in the self-reproduction by stochastic "mutations". The process has been described by Kaufmann in the adjacent possible about the concept of systemic coevolution. If we look at the S. Kauffman models, which are random networks exhibiting a kind of self-organization that the terms "order for free", the complex systems best able to adapt are those poised on the border between chaos and disorder (former configuration). This "fourth law" within the Kauffman intuition in abduction concerns the idea of the adjacent possible, it just may be the case of expanding into the adjacent possible.

**Google's DeepMind achieves machine learning breakthroughs at a terrifying pace*

Keywords: Artificial Intelligence, Coevolution, Systemic, Autopoiesis, Machine Learning.

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Re-engineering engineering education for the digital age

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ABSTRACT

Preparing future engineers for the digital age goes beyond the preparation of competent discipline specific professionals who deal with complexity, uncertainty, evolving challenges and opportunities (Mills & Treaagust, 2003). At the School of Engineering at University of los Andes we have been involved in rethinking what we do as educators. This reflection entails what we do right and wrong and this has led us to obtain the ABET certification for all our academic undergraduate programs. We are convinced that we can improve our teaching practices by providing technology-based powerful and flexible learning environments. When these educational ecologies are promoted, it is possible to empower our students to become lifelong learners, as well as to foster their willingness and problem-solving abilities in collaboration with others. Achieving this goal implies reengineering the way we teach and learn.

The REDINGE—Reengineering engineering teaching—project is in its second of two cycles. Pilot experiences were conducted with three key engineering courses implementing the Big-ideas approach (Castillo, 2017) (Galvis, 2017) (Reyes & Galvis, 2017). The lessons learned have left us with 14 new courses-to-be-redesigned. This reengineering endeavor involved active learning —mostly experiential and collaborative—, flipped pedagogy facilitated by the instructor, as well as authentic evaluation using case- problem- and/or project-based learning. After the first year of two, we have evidenced changes in the participating faculty members. These changes concern either their educational (pre)conceptions, individual or collective teaching practices or tools, initial and on-the-way assessments of teaching ideas (Uniandes - ConectaTE, 2017A) (Uniandes-ConectaTE, 2017B) (Uniandes-ConectaTE, 2017C) (Uniandes-ConectaTE, 2017D). The effects of reengineering the courses when keeping in mind the educational potential of digital technologies include several creative active-learning educational solutions, i.e. a growing trend to combine pre-class student-centered inquiry-based experiential learning activities with in-class highly interactive sessions, where both students and faculty reflect and share knowledge about behavior of organic learning objects. This presentation will share key ideas, good practices, lessons learned, as well as challenges-to-be solved deriving from this experience.

REDINGE is sponsored by the office of the dean, co-sponsored by the different academic units, and implemented in collaboration between the School of Engineering and the Center for Technology-based Educational Innovations from the University of Los Andes.

Keywords: engineering education, technology-based active learning, collaborative problem-based learning, flipped classroom, authentic performance.

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Small and Medium Enterprise Perspective in the Development of Digital Economy

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ABSTRACT

The work deals with the perspective of small and medium business development in borders of industry 4.0 development, there are characterized the trends of the creation of prerequisite for making new generation decisions in economic policy and entrepreneurial activity.

The creation of prerequisites of the digital economy and the economic policy of SME development in the small open economy are discussed on the basis of the "Quadruple Helix" Model.

The purpose of the work is to develop an effective model of economic policy for the formation of SME capabilities for participation in the DSM within the frameworks of DCFTA agreement with EU.

Comprehensive digitalization and creation of a network of entrepreneurial processes leads to fundamental changes and difficult adaptation in labor resources. The relationship of entrepreneurial and marketing processes with the relevant services requires systematic collection of current data, their digitization and transformation into Smart Data. Later, they will be still transferred to policy and the necessary precondition of new generation decisions in the entrepreneurial activity is an optimal organization of data collection (generation). The process of using the digitalization and cloud technologies in state institutions providing the economy policy in small open developing economies is very slow or absolutely not in progress which is mainly caused by a lack of motivation and will not be implemented without legislative amendments. (Tim, 2017).

We have the opposite situation in the banking sector where the changes are rapidly developing in the trends of digitalization. All of these in SMB enterprises of developing countries fails to be provided (such a situation may be in most developed countries too). At the same time, new opportunities for SME firms and handicraft production appear in the field of services and intellectual products. SME activities are expanding in such areas as supply and delivery of remote production (accompanying, related) products / services; maintenance service and repair of equipment, devices and details; interface development; working with clients through performance-marketing means; consulting and profession training.

In the developed countries of EU, there are created different as well as similar systems of support for SME. The development of a rational economic policy for SME development in the difficult period of DSM formation is particularly emphasized. For example, there were created four SME Support Agencies designed to operate in four main directions of electronic business in Germany

since the fall of 2015. These directions are: Cloud Technologies, E-commerce, Communications and Processes. The desired effects should be achieved on the basis of human capital economics.(http://eur-lex.europa.eu/legal-content/BG/ALL/?uri=celex%3A52015SC0100) The action in this direction (based on the development of network principles) has led to the fundamental change of understanding of the traditional hierarchical model of the main driving forces of the society. The famous triple helix model developed by Henry Etzkowitz and Loet Leydesdorff (1995) – University, Industry, Government – is transformed into Quadruple Helix with Industry 4.0 challenges: Labor Resources, Universities, Industry (Entrepreneurs) and Government. Each participant in this model assumes the tasks of other participants and creates completely new cluster-network systems with them. (Etzkowitz and Leydesdorff, 1997)

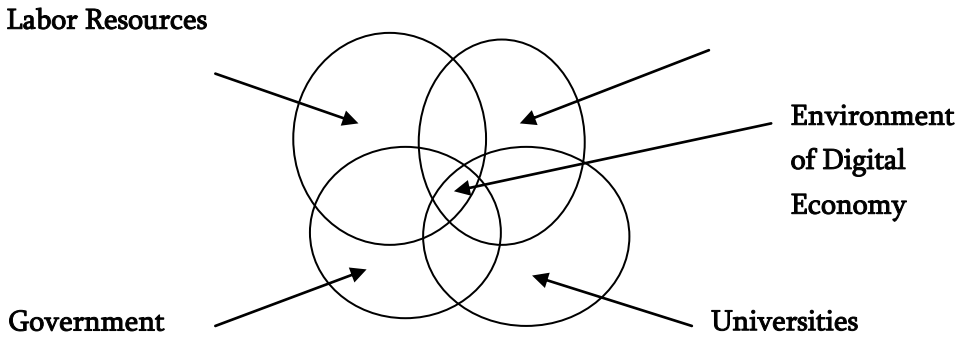

Figure 1. "Quadruple Helix" Model

Cluster-network systems are characterized by horizontal and vertical connections that form cooperation mechanism for innovative development of the national economy.

Universities and labor resources are the leading rings in this model, as they form business-incubation models and tools. At the same time, the content of business incubations significantly changes as the creative groups of students and professors not only create the models of new firms but also take orders for the adaptation of ideas and digitalization offered from SMEs.

This process will be the subject to periodization. For example, the scientific groups formed in universities are working on the latest software products (know-how) during the first period and transfer (considering the university's economic interests) them to SME firms. The university - scientific groups (students, professors and researchers groups) offer service for SME firms on the basis of using Cloud Technologies. At the same time, they should demonstrate the economic effects of practical application of software products and new technologies regarding optimization processes. In the following periods, they (scientific groups) will be able to test and improve the software products developed by SME based on the application of the latest technologies.

The Government's role in promoting SME in the initial period will be identified in the following directions: 1. The Government should finance (in whole or partly) the activities of scientific groups in universities based on the fulfillment of SMB orders; 2. The Government will provide the financial support for curricula changes of training programs and specialties; and 3. Scientific work in universities (relationships between clients and performers) should be provided based on the performance-marketing principles and the Government should monitor these processes.

Conclusion

Fourth industrial revolution fundamentally changes the content of entrepreneurship and establishes a new entrepreneurial structure. At the same time, it enhances the participation of labor resources in SME manufacturing processes in two directions: 1) labor will not be directly participating in production and 2) the demand for software product manufacturers, consumers and adapters increases;

Development of a rational economic policy for SME development should be based on a "Quadruple Helix" Model that means an effective digital interaction of the qualified labor resource universities and government services with business entities.

Fundamental changes should be made in the medium and higher education system that should be linked to the concept of SME and digital economy development of the country. The production of qualified labor resources requires fundamental changes in education systems. They should be implemented in the direction of enhanced learning of digital technologies and software products (programming);

Current changes based on industry 4.0 enhance individualization and specificity, which increases the importance and activities of SME

Keywords: Digitalization, Smart Data, SME, "Quadruple Helix" Model.

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A Conflict – Eternal and Inevitable Process of Society's Development

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ABSTRACT

Dynamic changes of globalization make theoretical and practical conflictology more significant day by day. A competition that characterizes market relationships creates different kinds of conflicts in parallel with societal progress. French sociologist AlenTuren doesn't consider the conflict as obstacle. In his opinion, the conflict is a form of society's regeneration. German-American sociologist and scientist Erich Fromon argues: "Human's most beautiful, as well as most degenerate inclinations aren't derivatives of fixed, biologically conditioned human nature. However, these inclinations are results of social process of personality's formation". Humanity's troubles, fears and desires are products of a culture, civilization's progress.

Society may become witness of changes at any moment. These changes penetrate organizations with different scale. Implementation of reforms becomes a part of daily agenda. Accompanied reorganization and restructurization creates disagreement and sometimes individuals and groups oppose each other. Every element of organization, as a part of social system, provokes changes and disorganization.

If we take into account that members of social system have different world views, psychologic types, physical or professional skills, not only social inequality, i.e. different availability and distribution of resources provokes conflicts, but also struggle for power and different attitudes towards prestige, control, motivation, democratic principles and tools for achieving goals. Degradation of society's moral principles, as well as growth of social tension, makes problems and practical ways of their solution more interesting. If a feedback of conflict has creative and not destructive nature, then it becomes an origin of constructive, productive solution. Such conflict supports progressive changes and makes development of social system more dynamic. Finally, we have cooperation based on rational compromise.

Every modern concept of conflict gives evidence that human's every activity (including conflict) is more or less related to social environment. The conflict, its reasons, forms of revelation and techniques of regulation are predictable, if we understand thoroughly laws of society's and especially human's social relationships.

A fundamental, basic task of conflictology is to understand human's essence, role and purpose. An idea of German-American sociologist Erich Fromon about laws of society's development and about laws of individual's life didn't lose their relevance. An opposition is central category of dialectics and of philosophical teaching about human's mind, as well as society's general categories and laws. The opposition is related to contact of different kinds of elements which belong to one, unified object. The opposition is a special relationship of these elements resulting from certain disagreement or incompatibility with unified structure.

Dialectics implies study of opposition in objects. Because there is no absolute compatibility in real subjects, the opposition, as well as conflict, has universal nature. The conflict may be represented as a tool of development of opposition. Therefore, the world is in the state of constant progress.

An adequate perception of social reality is only possible from certain distance. We can understand an essence of current events by means of experience or imagination. At this moment our consciousness becomes creative. A science doesn't represent the world, as a unity of logically connected elements, where everything obeys to the strict laws of consciousness. A real life never repeats the real design. However, a scientist must be distanced from everything irrelevant, random and deprived of significance. The foundation of his/her theory must be essential, necessary and significant events. It may be surprising, but if you want to observe the truth, you must forget everything superfluous. "Reasonable perception" means perception with mind and not with eyes. When we estimate a conflict, we must distance ourselves from "real conflict".

We can conclude that the conflict is a normal societal event. It is characteristic of every social system and becomes process and tool of humans' relationships. The human, as well as society, can't be absolutely perfect, ideal and deprived of conflict. Disharmony, opposition and conflict are eternal and inevitable components of societal development.

An active opposition and feedback differentiates the conflict from other forms of confrontation. For example, such confrontations may be disagreement about certain subjects, opposition of interests of different unities and individuals, collisions between moral and judicial norms, contest or strict competition.

What should parties do to solve dysfunctional conflict? What is necessary if level of conflict is too high and it is necessary to decrease it? Conflict management regulates these problems with corresponding techniques (Robbins et al, 2013). A conflict model begins with sources of conflict. We must understand that it is important to reveal episodes of conflict sources and in the case of necessity make correct steps to generate the conflict. The six basic sources of conflict are: incompatible goals; difference; interdependence; scarce resources; vague rules and bad relationships (Glinow et al, 2010). Conflict has characteristic to increase level of interdependence. It exists, when members of a group have common tools for achieving goals and need interaction to perform particular job or get certain results (such as awards) that are partially

dependent on others' work. High level of interdependence increases risk of conflict, because there is more probability that each party will intercept or destroy others' goals.

Scarcity of resources simply creates the conflict, because every person or production unity requires the same resource to achieve goals or perform a task (Glinow at all, 2010). We can conclude that the conflict is a normal societal event. It is characteristic of every social system and becomes process and tool of humans' relationships. The human, as well as society, can't be absolutely perfect, ideal and deprived of conflict. Disharmony, opposition and conflict are eternal and inevitable components of societal development.

It should be noted that constructive and destructive conflict may not be at opposite ends of a conflict continuum, as is commonly supposed, but instead may represent different concepts. It is essential to study the concept of the conflict. Destructive conflict may generate a greater quantity, quality, and diversity of ideas in early stages of the decision-making process and thus produce more radical solutions to customer problems and better concepts, designs, and products.

One of the main sources of conflict comes from workplace. Workplace conflict is thus endemic despite the best of management practices in organizations and manifests in various forms as an intrinsic and unavoidable feature of employment relationship. It is by nature an ever present process and more likely to occur in hierarchical organizations where people with divergent view, opinion and background interact. However, conflict in work-relations is not an aberration, since it creates or provides an opportunity for correction and reconciliation for the betterment of both the organization and the workers. It may be said that the formation of modern innovative economics in the developed countries has contributed much to the development of innovative production potential, efficient development and management of human capital and creative potential of the company employees. An efficient mechanism of management of the innovative activity is finding, keeping and encouraging the employees with relevant intellectual potential able to generate new ideas and realize them in life (Paresashvili N, Okruashvili N, 2017). The world constantly changes and the companies must change with it. The best companies never stop, but introduce innovations day after day so that the innovations become a part of their activities. However, it is commonly known that no organization with diversified labor can create an ideal working environment for its employees. Consequently, any wrong action of a manager or wrong perception of the organizational culture by an employee may result in a conflict, or may lead to the stressful environment. Even the organizations with excellent management are not secured against conflicts or stressful situations. In case of such problems, the right ways of regulation must be chosen. There are several methods to regulate conflicts, such as holding meetings between the conflicting parties, their isolation between the different departments, calling the employees together to consider the problems jointly, etc. Any organization wishes to achieve the level of the organizational ideology where the efforts, innovative skills and optimism of its employees are realized and achieve the balance both, between the different levels of the organizational culture and different elements of the same level of the organizational culture (Paresashvili N, 2016). According to Kazimoto (2013), workplace conflict is described as the

presence of discord that occurs when goals, interests or values of different individuals or groups are incompatible and frustrate each others' attempt to achieve objectives in an organization. It is communication process and an inevitable consequence of transactional relationship manifesting in disagreement and dissonance with and between individuals and groups in the work-environment (Olukayiode, 2015).

Small group conflict is a process (Thomas, 1992) that begins when at least one group member perceives a difference of opinion regarding something that is important (De Dreu & Weigart, 2003a). Although there are numerous theoretical formulations of the conflict process (Bell & Song, 2005; Deutsch, 1949; Smolek, Hoffman, & Morian, 1999; Tjosvold, 1985), there is a consistent distinction between conflict issues or types, which are cognitive perceptions of differences, and conflict behavioral actions or inactions aimed at intensifying or reducing the conflict issue (DeChurch et alle, 2007).

It is interesting what will be the answer on the question how leaders shape conflict cultures and their organizational-level consequences. Answer to this question cannot be found in the psychological literature on conflict, which has generally focused on conflict management styles at the individual and small group level. Although individuals have idiosyncratic preferences for different conflict management strategies, organizations provide strong contexts (Johns, 2006; O'Really & Chatman, 1996) that serve to define socially shared and normative ways to manage conflict – what we refer to as conflict cultures – which reduce individual variation in conflict management strategies. Norms typically develop around fundamental problems that need to be managed in any social system (Gelfand at all, 2012). The managers often have to make group decisions. This process has intrinsic complexities and most commonly, in the Georgian reality. When the business is successful, the group members tend to attribute the success to their efficiency, but as the business goes wrong, it is the simplest way to blame somebody else for this. The complexity of a group decision lies in the wish of every group member to make his idea win, show himself off and gain the desired success. As a result, all group members wish to hold their grounds, and making a consensus is often quite complicated. Sometimes, the group members fail to negotiate to reach an agreement. This is inter alia evidenced by the results of our study showing that most of the interviewed managers consider the group work either partially efficient or inefficient at all. Engagement of the employees is one of the most important components in the decision-making process. In order to make the best decision, the people with valuable information who can help the company to realize the reached decision must be engaged in the process (Paresashvili, 2017).

In conclusion it should be noted that organizational conflict nowadays is on the other stage because of the researches that have done around this issue. Generally there is no organization where is no other types and other scales conflicts, as the organizations have to follow and adopt all the dynamic processes which is going around its business environment. All the changes occurred in organizations which are connected to the changes of its goals, strategies and technologies often cause the new recruitment and development of new skills for further

cooperation between the working groups in the organization. Multicultural factors have some impact on the above-mentioned processes. Researches show that such processes are inevitable. Although, in the framework of effective management it is possible to change the direction of the conflict from the negative effect to the positive impact and make it the basis for the effective competition and for raising productivity.

Keywords: Society, Social system, Conflict, Conflict management, goals, regulate.

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Challenges and Problems of E-Customs in Developing Countries: the Case of Georgia

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ABSTRACT

In some countries, the reforms to shift to e-government took a surprisingly swift course, while they were quite slow and gradual in other countries. Some countries even failed to succeed due to the complex nature of the reforms. Our present work gives the analysis of the problems following the introduction of e-customs in the developing countries, thorough consideration of the operation of the existing e-customs in the Republic of Georgia and general review of the challenges and problems in the field.

In 1992, the European Union recognized Georgia's state independence and started an active cooperation with it. Since then, the country has faced more than one challenge. An issue of corruption was particularly severe. The customs system was in the mire of corruption. Virtually, all state services were available only in lieu of a bribe, and the appointments and promotions in the customs system were based on corruptive deals and nepotism. The wages in the public sector were less than the subsistence minimum giving an incentive to the officials to ask for and take bribes.

Georgia has been a member of the WTO since 2000. A governmental commission to promote the partnership and cooperation between Georgia and the EU was established in 2000. Among other things, the Commission was charged with supporting the harmonization of the legislation of Georgia with the EU legislation.

Since 2003, the government of Georgia has been engaged in radical and irreversible reforms. The economic reforms were realized in different directions, including the establishment and operation of an e-customs system. In 2004, a central database for the whole territory of the country was developed. At the same time, a series of trainings and seminars was organized both, for ordinary users and administration members. The country started to take measures to develop IT systems security policy, elaborate the portal functions and introduce a system of authentication. Automated workplaces were designed for employees by considering their occupations; the systems of tax-payers and taxes were elaborated; the databases were normalized and tasks to shift to the e-customs system were realized.

With the support of the World Bank, US government and EU, the computer network, network apparatus and software meeting the technical and system requirements of the new system were purchased.

The web-site of the Ministry of Finance (www.mof.ge) was elaborated and at present, the site gives detailed information and legislative materials to be used for the registration of the goods to cross the borders of Georgia, e-calculators to calculate various taxes for products, consultations, etc. At present, the Revenue Service web-portal (www.rs.ge) operates successfully saving tax-payers' time, efforts, finances and labor resources.

Recent years were marked by an intense course of substitution of the traditional relations in the customs system with the services based on internet relations. At present, these services are offered not only as the ones having alternative functions, but also as the only possible option suggesting the prospect to use distant operations as a substitution for their traditional current analogs, what determines the topicality of the given issue and accents its importance.

The introduction of the modern information systems to the Revenue Service in 2010 necessitated the establishment of a Financial-Analytical Service (www.fas.ge) occupying one of the leading positions in the information-communication market of the country and consequently, playing a great role in the establishment of the e-customs.

The Financial-Analytical Service not only served the operation of the Information System introduced to the customs systems, but it also played a major role in step-by-step designing, introducing and developing the new Information Systems in the course of development of the e-customs (e.g. eDocument - the records management automated system - a simple and efficient office e-product ensuring the exchange of office information without using a paper; eHRMS - an automated HR management system covering the Ministry of Finance and all of its structural units), which at present operate successfully at all structures of the Ministry of Finance. Furthermore, it renders service to relevant public employees by means of hotlines, on-site trainings and consultations and actively works to develop the web-resources of the system of the Ministry of Finance.

Legal Entity under Public Law Financial Analytical Service of the Revenue Service is an active participant of all reforms in the field of e-government and e-management, all arrangements and further development of innovative components, systems and services. In 2013, the international links of the Service were intensified and new contacts were established with the representatives of the donor and international organizations in Georgia. The professional cooperation, sharing knowledge and experience with the representatives of "similar" state authorities of different countries (e.g. Austria, Denmark, Germany, Turkey, Ukraine, Moldova, Tajikistan) was particularly useful and positive.

Various e-services were introduced to the customs system: e-declaration immediately from one's office location, advanced e-declaration (import), non-advanced declaration (import at the spot), e-signing up for the waiting list, e-pays of customs taxes, e-submission of applications and

documents and observing their status online and other e-relations with the importers and exporters accomplished through the www.rs.ge portal.

The total number of crimes identified through a recently introduced border control profile has increased a lot. The risk profile is elaborated and updated on a regular basis. The local risk profiles are designed for the customs checkpoint and active works regarding the bilateral exchange of information with foreign countries are accomplished. Besides, the practice and experience of similar services in foreign countries are considered to help establish flexible and more powerful risk management system and customs control based on it.

If earlier, the customs registration procedure took 2-10 days, at present, the duration to register a customs declaration takes up to 15 minutes, and this time has reduced to 1 hour for the Red Corridor. A vehicle stops once at the border; the documents are presented and passport control is done for a driver without leaving his vehicle cabin. Other developing countries have shown interest in sharing the experience of the Georgian customs system.

The PIRS of the Information System is updated regularly, where with the purpose to improve the quality of the border-immigration control, the prospects to identify the entities crossing the border by using the biometric data (fingerprints, face symmetry, etc.) is important; elaboration of the risks management system of the customs checkpoints and realization of the measures to develop it are of no less importance. It should be noted that the special equipment (stationery and mobile scan-devices, metal-detectors, other special equipment) needed for the border and customs control of the customs checkpoints was improved.

Besides, the attraction of funds from the relevant programs of strategic partners has been initiated (with the aim to realize BOMS (border operations management system) project by realizing a thorough e-control of land border and through the optimal use of the existing resources.

The system to place the information about the crimes identified in respect of Georgian customs border on CEN (The Customs Enforcement Network) with the member states of the World Customs Organization and learning about and analyzing the crimes of other countries was launched.

We used general and concrete methods of study in our work, in particular, analysis, synthesis, induction, deduction, scientific comparison, statistical methods and expert evaluation. The regularities between the analytical and statistical assessments were established by using Georgia's export-import database published recently by the National Statistics Office of Georgia; based on the listed methods, we considered the role of the e-government and analyzed the role of the e-customs in the sustainable development and improvement of well-being in the country and underlined the importance of the problems facing the successful operation of the e-customs. In the article, we used the econometric models to obtain grounded conclusions through the quantitative analysis. The statistical data to calculate were mainly obtained from official information sources. We gained the conclusions through analyzing concrete calculations. The

work ends with conclusions and recommendations regarding the solution of the challenges and problems associated with e-customs system.

Keywords: E-customs, Challenges, Developing Countries, Information System.

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ISBN: 9788890824265
Book of Abstracts of the
5th Business Systems Laboratory
International Symposium
"Cocreating Responsible Futures in the Digital Age"

High tech networked SMEs: a matter of performance

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ABSTRACT

In year 2009 the Italian Government introduced a formal agreement between firms, namely the "contratto di rete" (business network contract, BNC), aimed at improving firms' competitiveness and their innovative attitudes. BNC is a medium-term agreement among firms and can be signed between firms located in different areas of the country. The characteristics and structure of BNC should improve and intensify interaction between the firms signing it. In particular, BNC have to include specific contents, like the definition of their strategic and operative program, the specification of the governance of the network and the definition of some performance measures aimed to verify the ability in achieving network objectives.

Network contracts seem to be perceived by firms as a winning instrument. BNCs widespread rapidly in Italy, with more than 3.985 contracts signed between 2010 and September 2017, involving more than 20.100 firms. Nevertheless, there is few empirical analysis devoted to investigate the driving factors of the - increasing - performance of the firms involved in BNC.

The focus of the present paper is to explore if medium and high tech manufacturing SME firms participating on BNCs have improved their performance - measured through the ROI - and how some key economic variables like tangible and intangible assets, value created and revenues and some non-economic variables as sector, geographic area, spatial proximity of the firms, are significant in explaining it.

The attention on small medium-high technology firms is of particular interest for researcher and policy makers, because of their potential innovative dynamic, that can regenerate the Italian industrial gap. According to Pavitt classification, we considered as medium-high tech firms those included in electronical, optical, chemical, pharmaceutical and mechanical sectors.

Data were collected from AIDA database and the "Firms Register" of the Chambers of Commerce.

With respect to previous literature (Hanna and Walsh 2008, Tunisini et al, 2013, Ciambotti et al. 2013, Massari et al. 2015), our paper focuses on a more recent period and the analysis is performed over all the last three years, applying a model-based approach, after showing some basic descriptive results that help to understand more extensively the phenomenon under investigation. In this way, we are able to capture more properly the effects of the participation on BNC on the firm's performance and to identify its driving variables. Moreover, through our empirical analysis, we can verify if and how geographical proximity enters in the network configuration (Romijn and Albu, 2002).

The analysis is performed over 149 firms and covers the post-economic crisis period 2012-2015. Firstly, we estimate a balanced panel regression model to explain the performance (defined through the ROI variable) of BNC firms, after getting into the contract, as a function of investments (intangible and tangible), productivity and some financial variables.

In a second regression, we analyse how the productivity of the observed BNC firms, is influenced by some specific characteristics of the firms itself: size, spatial distance, mono-multi sectorial and global investments.

The key findings of the panel regression show that ROI (therefore the performance) is influenced by value added per capita, tangible and intangible assets.

1. Value added per capita positively affects ROI after getting in the NC (2012-2015).

This result confirms the assumption that strategic or stable alliances are able to produce "network capital". Network capital allows a higher productivity, measured by value added per capita, in coherence with the "knowledge based view".

2. Tangible and Intangible assets positively affect ROI.

This result corroborates the importance of the resources for firm development. Nevertheless, the analyzed firms increase their performance also in absence of a significant increase of total assets. As a consequence, the "Knowledge" factors seem to prevail, in terms of a better performance.

3. ROI is not influenced by financial factors and Debt /Equity ratio and liquidity.

In our analysed BNC firms the financial structure doesn't influence the performance. Nevertheless, many banks are evaluating the introduction of new rating methods for BNC that in the long run could ensure better financial conditions to BNC firms.

The key findings of the second regression show a statistically significant relationship between value added per capita and the following variables:

1. Spatial distance. BNCs between firms located in different regions ensure a higher value added than co-located firms.

This result supports theories advocating "being co-located is not enough" and confirms that aggregation is determined by reasons different from spatial proximity or homogenous social community, and is based more on evident common objectives between involved firms.

2. Network size. Although this variable is not significant, it is positively correlated with the distance. This means that the larger the networks, the farther the firms are.

In coherence with Huggins (2001), this means that firm size plays an important role for the knowledge networks pattern and network dynamism is an important source of innovation and better performance.

3. Mono-multi sectors. Networks made by firms from different sectors have a higher productivity, in terms of value added.

According to literature, decentralized networks (where information and knowledge are horizontally distributed) ensure better productivity.

4. Value added per capita is positively influenced by new investments.

This evidence is coherent with the resource based view, although in our case on average investments in 2012-2015 are lower than in 2008-2011.

Although in 2012-2015 we observe a positive trend in the investments, the performance seems to be better explained by "knowledge" factors.

From our empirical analysis we can conclude that network contracts are an important instrument to increase the value added trough "knowledge sharing", in particular for High – Tech, multi-sectors networks. Therefore, industrial policy should encourage and stimulate the participation of SMEs into multi-sector BNCs, intentionally construct with clear common firms' objectives, to improve firms' competitiveness.

Keywords: business network contracts, medium-high tech sectors, ROI, SMEs.

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ISBN: 9788890824265
Book of Abstracts of the
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Firms insolvency and recession: a spatial analysis of effects on Italian manufacturing firms

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ABSTRACT

In recent years the prediction of corporate bankruptcy has been of considerable interest to researchers and business academics, mostly after the crisis that affected financial markets in 2008. Italian manufacturing companies have quickly worsened their economic and financial conditions after 2008 and corporate crises became more frequently (Ferretti et al., 2016). The recession sharpened the pre-existing financial economics imbalances of many firms (Bonaccorsi di Patti et al., 2015, Molina, 2005). Firms with high level of financial debts at the beginning of the recession had higher probability to deteriorate their credit quality and therefore, leverage was a powerful amplifier of macroeconomic shocks.

Many factors such as wrong investment decisions, financial fragility, macroeconomic shocks, poor investment environment, poor decision making or lack of planning can cause corporate financial distress. However, finance fragility is one of the primary challenges that small and medium businesses have to face to. Bankruptcy firms' is one of the most investigated topics in economics and finance and the empirical approach to failures prediction has recently captured more attention from financial and academic institutions, mainly due to the increasing availability of firm level (micro) data.

The aim of the present paper is to better understand the phenomenon that leads to bankrupt and to obtain more accurate forecasts of corporate bankruptcy, providing useful information and instruments to all stakeholders, such as bankers, managers, creditors, investors, regulators and even the general public.

Early essays to predict corporate insolvency in a univariate context used the financial ratio (Beaver, 1966), that was later extended by Altman (1968) to the multivariate approach based on

discriminant analysis. More recently, in addition to the multivariate discriminant analysis, different statistical approaches have been applied, such as logit or probit models (Ohlson, 1980; Jones et al., 2017) and classification trees (Wilson and Sharda, 1994; Cashin and Dattagupta, 2008; Zhang and Singer, 2010) and currently, the methods to predict corporate failure are consistently improving.

However, potential contagion effects on interconnected firms, generated for example by chain reactions, are often neglected in literature and liquidity tensions and internal imbalances that are expected to have a positive spatial effect on neighbour firms, are not properly explained by standard models. While an extensive literature on distressed firms has emerged in the recent years (Brunello and Langella, 2016; Jacobson and von Schedvin, 2015; Jones et al., 2017), spatial modeling techniques to predict risk of default has been rarely applied.

The main goal of this paper is, therefore, to find a better empirical forecasting model to understand why firms become insolvent, especially during a recessionary phase, when liquidity tensions arise, by analyzing the spatial contagion effects between firms. The spatial dimension is a necessary element of our analysis, because we are interested in spatial patterns and spatial effects (Anselin, 1988).

In the present paper we apply the proposed bankruptcy spatial models (autologistic regression and logistic regression trees) on the manufacturing firms in the Labour Market Areas (LMA) of Marche (Italy) region, to identify the probability of the firms to survive or to fail and exit from the market in two different periods: 2008-2012 and 2013-2016. In this way we are able to better understand the bankruptcy phenomenon during recession and after-recession periods.

The sample is composed by 1900 manufacturing companies localized in the Local Market Areas of the Marche (Italy) region and divided in two groups: bankrupted and solvent firms. The insolvency event is classified as a binary outcome dependent variable, with "0" for a firm that is insolvent and "1" for non-failed firms.

For both, insolvent and non failed firms, we examined some financial variables in the three years prior of bankruptcy, namely when the firms were "healthy" (Ferretti et al., 2016; Jones et al., 2017). Consistent with many empirical studies (Beaver, 1966; Altman, 1968; Lau 1987; Jones et al. 2017), we consider the following financial variables: the index of profitability ROA (Return On Assets), the index of liquidity, i.e. current ratio, and the index of debt. The use of accounting-based measures has been shown to have predictive power in business insolvency (Jones et al, 2017, p. 10).

The autologistic model is a generalization to spatial data of the standard logistic model for independent binary data. Ordinary logistic regression models are commonly used to select the driving factors of bankrupt insolvency. It assumes that the data are statistically independent and identically distributed, namely it is assumed that observations made in one region are independent of observations in other regions. This assumption does not take into account of the spatial autocorrelation existing in the spatial process of corporate bankruptcy. However, the corporate bankrupt and localization firms have the tendency to be spatial dependent. According to Tobler's First Law of Geography, in geographically referenced data, all units of analysis are interrelated "but near things are more related than distant things" (Tobler 1970, p. 236). With spatial autocorrelation being ignored, the importance of explanatory variables might be overestimated (Overmars et al., 2003). The autologistic model proposed by Besag (1974)

incorporating the spatial autocorrelation factor into the ordinary logistic model could solve the problem of the spatial autocorrelation in case of geographical observations.

In order to detect more properly the complex nature of spatial variation we need also to consider spatial heterogeneity (Getis and Ord, 1992; Anselin, 1995). Spatial heterogeneity implies that model varies with location, namely functional forms and parameters are not homogeneous throughout the data set (Fotheringham et al., 2002). To analyse spatial heterogeneity, we introduce a new algorithm that combines logistic standard regression and tree decision methods (Rusch et al, 2013).

The main findings of our application confirm the presence of spatial dependence in bankruptcy analysis and its inclusion will improve the goodness of fit of the logistic regression model and avoid misspecification problems, in both analysed periods. The presence of spatial dependence confirms the transmission effects of corporate bankruptcy within the LMA of Marche region. According to estimation results, the corporate bankruptcy is affected by the liquidity and debt ratio of the firms and by spatial neighborhood effects. The parameter that measures the spatial dependence can be interpreted in favour of a positive contagion effect between the firms, namely the spatial shock propagation is statistically significant.

Moreover, the outcomes clearly confirm that heterogeneity must be always taken into account. The different local homogenous clusters seem to appear more reasonable in explaining the bankruptcy-solvency probability of our analysed firms in the Marche area.

Keywords: bankrupt, financial crisis, local market areas, spatial dependence, heterogeneity.

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