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Business Systems Laboratory



e-BOOK OF ABSTRACTS

Business Systems Laboratory

Fourth International Symposium

Governing Business Systems. Theories and Challenges for Systems Thinking in Practice

Mykolas Romeris University, Vilnius, Lithuania

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**EDITOR:
DR. FRANCESCO CAPUTO**

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Business Systems



E-book Series

Governing Business Systems. Theories and Challenges for Systems Thinking in Practice

4th Business Systems Laboratory International Symposium

Mykolas Romeris University, Vilnius - August 24-26, 2016

BOOK OF ABSTRACTS

Editor: *Francesco Caputo*

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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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Social and Organisational Systemic Theories

Agent Based Modeling and Simulation as a Computational tool for the study of Viable Systems

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ABSTRACT

Introduction

The "viable system model" (VSM) is one of the main components of organizational cybernetics (Beer, 1972, 1979, 1985), its usefulness in the study and diagnosis of organizations has been proven in a significant number of scientific works (Schwaninger, 2006) (Espejo, Holten, & Rosenkranz, 2011) (Raul Espejo, 1989), however this model has not reached the diffusion that it deserves when compared with models like system dynamics, some authors say this is caused in part by absence of software tools supporting the use of VSM, there are few tools, one of the most notable is that proposed by (Pérez Rios, 2012).

Current tools remain purely theoretical approaches therefore in this article we propose a way to simulate the dynamics of a VSM. Our contribution lines up with the idea that software is a catalyst for the diffusion of VSM. The main proposal is to integrate computer science with agent-based modeling and simulation (ABMS) by way of a VSM approach. In simple words we are "programming one VSM". The first approach consists of a methodology that integrates both approaches VSM and ABMS in a complementary way. This is possible thanks to computer science and technological progress, today researchers can analyze large amounts of data that were previously impossible to manipulate, also currently computing models have matured a lot and are used in many research, examples of these models are data mining, neural networks, genetic algorithms, fuzzy logic and ABMS, this latter is addressed here.

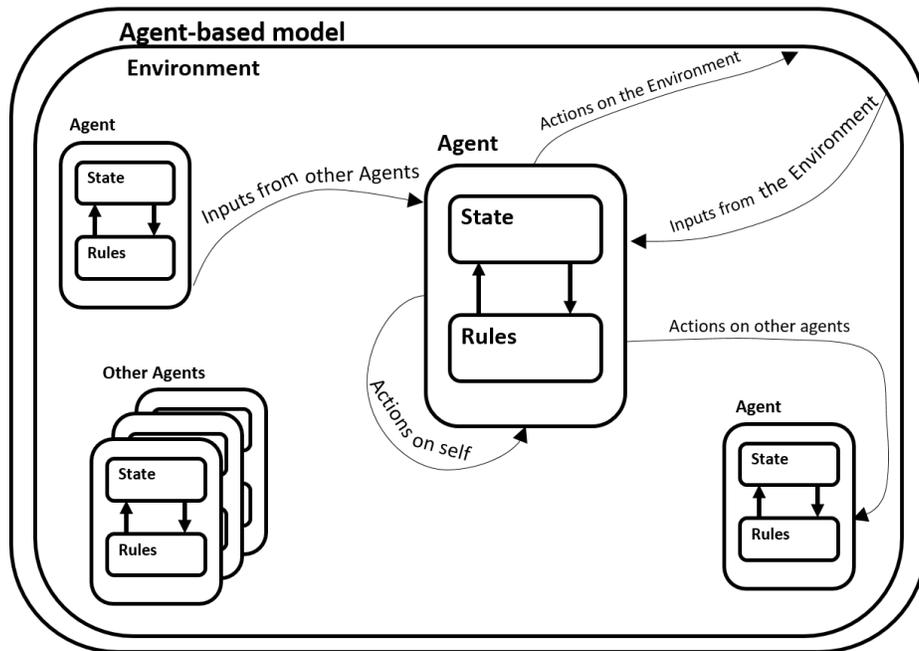
What is ABMS?

The agent-based modeling (ABMS) is a method or approach, which describes the interaction of "things" or "entities" rather than a particular thing or collection of things. Agent-based models are useful for describing the possible emergent properties from a bottom-up perspective (Deguchi, Igor, & Lukszo, 2010). ABMS were created as a response to the need of modeling Complex Systems (Taylor, 2014).

An ABMS typically contains four aspects. First, a set of autonomous agents: each agent has a set of attributes that describe the state of the agent and a set of specific behaviors; this defines how the agent behaves in response to changes in their environment, and how to implement actions to achieve their goals or objectives.

Second, a set of interactions, each defined as an agent interacts with other agents and their environment. Third, the agent's environment, this is the "world" in which the agent exists, it contains the set of "global" variables or structures that are needed to define how agents react to their environment. Fourth, the "system" that integrates the above aspects, this system is the set of agents, the environment and their relationships. Figure 1 shows a structure of a general ABMS, these models are commonly implemented in computer simulations (Bandini, Manzoni, & Vizzari, 2009).

Figure 1. Structure of ABM



Why ABMS is important for VSM?

The VSM has a wide variety of applications in different fields; however, this does not have a high level of diffusion like that of other models. An example is system dynamics which has a wide variety of applications and software tools. For the VSM there are a good number of applications but few software tools, the most relevant tool is Vsmod (Pérez Ríos, 2003), this tool allows you to create VSM models graphically and interactively. However, despite being an important approach, this only works as a software diagramming and does not allow simulate real

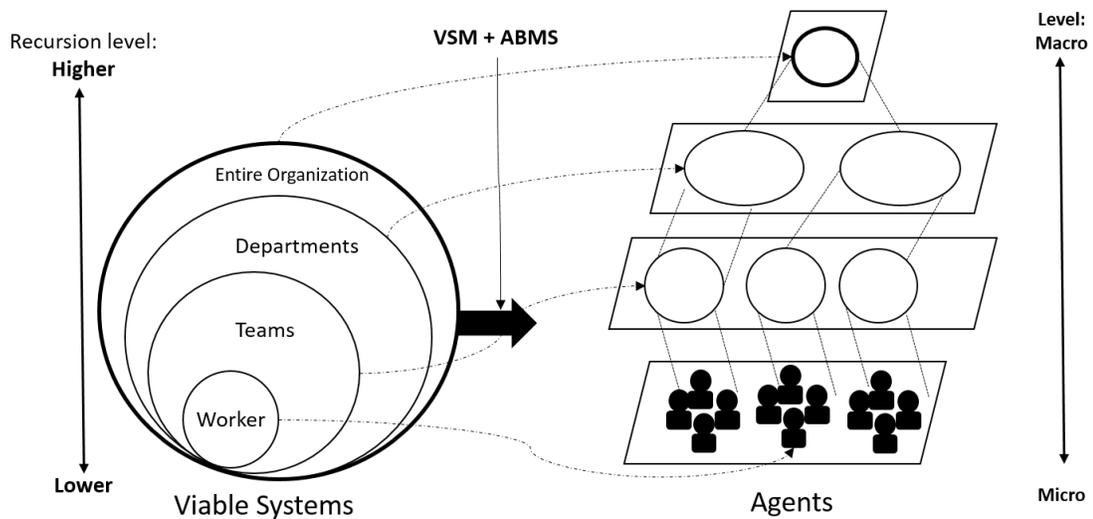
dynamics of a VSM.

Software tools are a means to popularize the VSM as was the case in some way with system dynamics. The path we propose in this article is to develop the idea of programming a VSM from a computational perspective to simulate the real dynamics of a VSM. Carrying out this idea today is made possible by advances in computational techniques such as ABMS, which is the paradigm proposed.

To (Pérez Rios, 2012) ABMS has become a new way for the study of complex systems which complements the traditional top-down approach with the bottom-up approach, ABMS considers aspects related to the behavior of agents based on their environment and set of rules that determine interaction agents. This puts the systems thinking to a new and promising challenge.

Another point about the importance of ABMS for VSM are the similarities they share, this can be seen broadly in Figure 2, the integration of both approaches is complementary.

Figure 2. Recursion Sphere in VSM and macro-micro level in ABMS

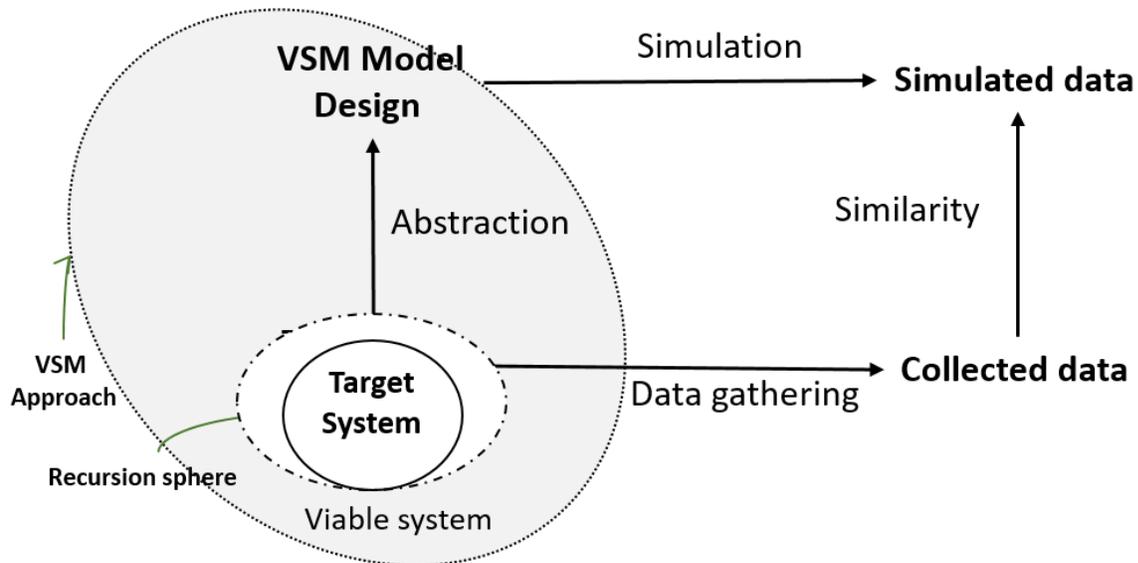


A way of programming VSM

In the present there are several computational tools able to help study complex phenomena. Since VSM has become an important tool for the design and diagnosis of organizations and ABMS is a widely used to study complex systems tool, our proposal aims to integrate ABMS and VSM approaches.

The first step proposed in our methodology is shown in Figure 3, as an extended methodology with the VSM of the proposal by (Gilbert & Troitzsch, 2005). It roughly consists of modeling the focus system of a recursion sphere; define system characteristics (agents), the environment, aspects of communication and interaction rules. The key point of the model is to describe the emergent behavior, some examples of emergent behaviors can be seen in (Alvarez-Molina, Martínez, Castañón-Puga, & Rodríguez-Díaz, 2015).

Figure 3. Methodology for ABMS-VSM simulations



For programming ABMS simulations there are a variety of platforms, the choice of platform depends largely on the scope of simulation and context, as well as technical issues, (Kravari & Bassiliades, 2015) describes some of the platforms most used.

Conclusions and future work

In our research we continue to develop the methodology as well as constructing a prototype simulation, by modeling a working team in a Mexican IT company. Our first goal is to ensure that the simulation is as close to reality as it could be following this methodology. As future work we are targeting to construct a development platform, user-friendly and intuitive; this platform will allow programming any VSM using ABMS components. This tool will have the potential to contribute to the widespread use of VSM helping researchers study organizations as complex systems.

Keywords: *Viable System Model, Agent Based Modeling and Simulation, VSM programming.*

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Using systems thinking to improve absorptive capacity and readiness for disruptive innovation

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ABSTRACT

A scalable methodology, grounded in Jackson's Creative Holism (2003) and supported by case-study, is presented that incorporates Ulrich's Critical Systems Heuristics alongside Allee's Value Network Analysis (2000) to provide a framework that appreciates disruption as an emergent phenomena. The proposed approach facilitates the targeted analysis of actors and value flows, and directs a subsequent and embedded organisational conversation process that is designed to improve absorptive capacity (Cohen and Levinthal) and thereby improve organisational readiness and preparedness for disruption.

The concept of disruption, coined by Clayton Christensen in 1995, has received wide ranging treatment; both positive and negative from a variety of academic and practitioner perspectives. However despite its detractors, firms and industries continue to be disrupted, and organisations continue to seek solutions to what Christensen has called "the innovators dilemma", namely revenue self-cannibalization or inevitable decline. Disruption is now a ubiquitous feature of the business landscape and in many cases a complex operational reality. Supporting his concept of "disruption", Christensen deployed two complementary notions, namely "value network" and the "job to be done". A value network describes the network that facilitates the supply and distribution of given products and services to clients, and following Levitt (1960), his "jobsto-be-done" model frames the motivational and intentional aspects of customer behaviour.

Because, as Levitt stated, "people don't want to buy a quarter-inch drill, they want a quarter-inch hole", understanding the what, why, and how of the customer's "job-to-be-done" within the network that delivers it, is the key to identifying innovation opportunities - and for our purposes, the missing piece to the disruption puzzle.

Consequently, and according to the theory, disruptive innovations emerge in non-mainstream markets either at the "low-end" where customers have lower and overlooked performance expectations or similarly at the over-looked "new market" end, where non-customers are characterised by non-consumption.

This pattern of emergence represents a strategic threat to incumbent businesses, who, because of their focus on serving the needs of, and retaining their high-value customers, are often strategically obscured or insufficiently agile to respond operationally.

To survive, firms need to improve their openness to, and readiness for, disruption.

In the language of systems thinking, a value network is simply a system that produces emergent phenomena and which is comprised of a diversity of elements in mutual interdependence; sensitive to path dependence and displaying a variety of non-deterministic behaviors.

Consequently, using systems thinking to understand disruption is a logical and long overdue exercise. Critically, the adoption of the systems view enables us to abandon the arbitrary, and quite often false dichotomy of internal and external domains and with it, the associated effects of the "boundary problem". The efficacy of the systems view is that not only does it promote holism, but in relation to disruptive innovation, it specifically enables us to directly capture both problem and opportunity sources.

Keywords: *Systems thinking, Absorptive capacity, Innovation readiness, Disruptive innovation, Creative Holism, Critical Systems Heuristics, Value Network Analysis, Knowledge management*

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Identification of economic risk factors in implementation of strategic decisions at enterprise

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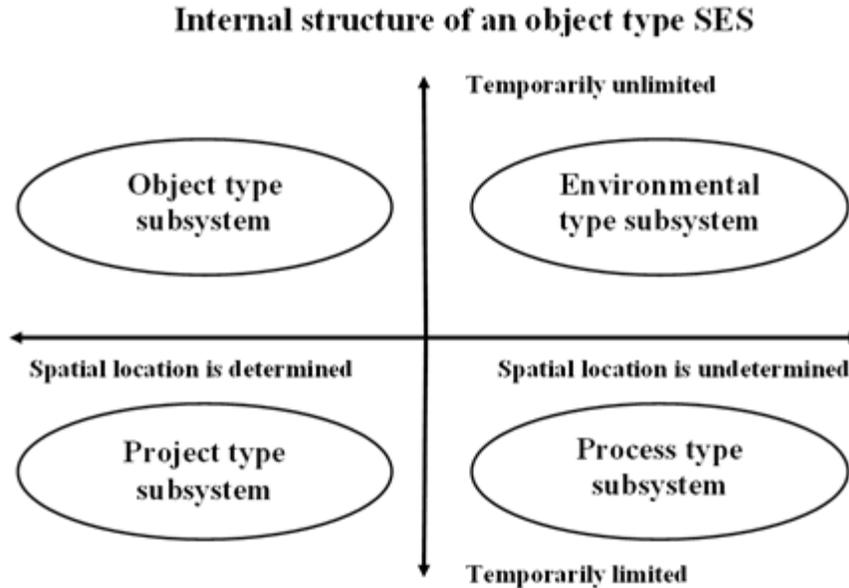
ABSTRACT

Article is devoted to the concept of structuring space economic risk factors (ERF) based on view of economic processes as the transformation processes of economic systems. To improve the quality of a socioeconomic system management one must detect changes within relevant ERF in due time. In this paper we propose a systematic method of detection and identification of the ERF in the implementation of selected strategic decision based on the Kleiner’s theory of economic systems.

Key words: economic risk factors, socioeconomic system, system economic theory

To improve the quality of managing a socioeconomic system one must react efficiently to external and internal impacts and detect changes within relevant economic risk factors (ERF) in due time. This research sponsored by Russian Humanitarian Science Foundation (project № 14-02-00333) relies on this theory and suggests both an instrumental base for unified structuring risk space of any level socioeconomic system and a systematic method of detecting and identifying ERF. System economic theory (Kleiner, Lankin, Arutunova, 2012, Kleiner, 2013) identifies four types of systems: object, project, process and environmental. According to this theory, production company is related to the socio-economic system of the object type. Following systematic structuring of economic space, to a lower level, it can be assumed that enterprise as an economic system, in its turn, contains four subsystems of the same four types: object, project, process and environmental. Graphically, this is shown in Figure:

Figure 1. Internal structure of an object type socio-economic system



Within the limits of “enterprise” economic system subsystem of object type can be identified and it appears to be quite natural, for instance, for both tangible and intangible assets of company to be involved in this subsystem. The restrictions of this subsystem in the space will be understood in two ways: as a real limitation of tangible assets in physical space, and as a limited one in virtual space for intangible assets. Restrictions of physical space is an area where physical assets of the enterprise are based: buildings and basic equipment. The restrictions in the virtual space will mean, for example, a legally-defined scope of intangible assets which are subject to protection of copyright and intellectual property rights, licenses, etc. It should be noted that the existence of the enterprise subsystem of object type is not limited in time, although some elements of tangible assets (buildings, machinery and equipment) are limited to the regulatory life cycle, and intangible assets are limited in time to validity of legal documents. The subsystem of object type within the enterprise can be a source of inherent and internal to the enterprise economic risk factors.

Process type subsystem for enterprise can comprise internal and external technology or business processes. It is stable, repeated many times an activity that converts resources (material, labor, information) in economic results (products, semi-finished products and services). The existence of process subsystem is to implement the processes of the company, dealing with the assets of the enterprise, ensuring the production of raw materials, components, materials and sale of finished products, etc. To describe process subsystems of companies one can use different methods of structural analysis, as well as description of the processes and functions performed by the company.

Next, let’s consider the role of project type subsystem, which according to the definition is a set of implemented various projects in enterprise, e.g. investments in capital equipment, construction of new buildings, re-engineering project of any unit or enterprise management system. The specific features of the design subsystems of the enterprise appears to be that that such a

subsystem is both limited in space of an enterprise and in time because it is supposed to end up with either a project goal achievement or the implementation of the planned structure performance.

Within “enterprise” environmental type subsystem can be considered as socio-economic and cultural conditions and traditions in which company operates, and staff and units interact. In particular, this subsystem consists of federal and local laws regulating the activities of production and sale of enterprise profile or provision of services; natural and ethnic characteristics of society and the territory in which the company is registered and operates, or characteristics of the region where products are sold or employees live. The structuring of economic space within the enterprise as an example of an object type considered here allows you to analyze, recharge, refine and flesh out the range of possible ERF for given operating conditions, not to miss the essential ERF, eliminate unnecessary or repetitive factors.

This systemic approach enables us to solve tasks to realize strategic decisions. Michael Porter (Porter, 1980) has identified three generic strategies: cost leadership, differentiation, and focusing.

The strategy of cost leadership implies that all actions and decisions of the enterprise are aimed at reducing the expenses. Other characteristics, such as product quality and associated services are secondary. When choosing this strategy, the main attention focuses on the subsystem of process type (of enterprise) and involves continuous monitoring the processes of planning, production and continuous identification of problems, which, if the problems solved, helps increased production, improved productivity and keep costs down (Deming, 2000). Also, for strategies of this type one should focus on the risk factors of object type subsystem of the enterprise like unpredictable increase in raw material costs in the absence of stock reserve. Product range growth when control over costs is lost can also be referred to serious threats to costs leader. Competitors may adopt methods to reduce costs – this is ERF of environmental type subsystem. Risk factors of the project type subsystem may be due to the emergence of fundamental technological changes in the market, which will devalue implemented, but not yet repaid projects (Kachalov, 2012). The fact of delayed recognition of new requirements of the market refers to the ERF of businesses of environmental type subsystem.

The need to convince the consumer that company's products differ from competitors' products and has unique properties, is the essence of differentiation strategy. Costs in this case, play a secondary role. Peculiarity of a product can be expressed not only in the product itself and in the way of selling it, but in the system of selling goods as well. It is possible to identify several risk factors of environmental type subsystem of an enterprise that has chosen the differentiation strategy. For example, a significant deviation in the price of a competing enterprise (cost leadership), can be so large that buyers' financial considerations will be more important than loyalty to the company's brand. A unique characteristic of the goods, which works as base for differentiation, may lose its value due to changes in the value system of the consumer. The emergence of competitors capable of producing products of similar quality reduces the benefits associated with differentiation.

Two parts can be allocated for the focusing strategy: reaching cost leadership at a concentration of one or more segments; providing a unique product either to a selected group of customers, or a geographically limited market. In choosing a focused strategy, a number of ERF of environmental type subsystem may be identified. For example, in working with a limited audience, company can have such high costs, that the difference in price on products of competitive enterprises (cost leadership) working on wholesale market can become so large that

it will outweigh the advantages of specialized products for this market segment in customers' view. The risk of convergence of needs of individual segment with wholesale market can be an undesirable scenario for strategic focusing. Further specialization of competitors in individual sub-segments within segment may also be identified as a risk factor for businesses of environmental type subsystem.

In this paper we propose a systematic method of detecting and identifying ERF in the implementation of selected strategic decision based on Kleiner's System economic theory.

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The holonic view of organizations and firms

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ABSTRACT

In the world of organizations, firms, management and control in general, a silent conceptual movement has been under way for less than fifty years now, beginning in 1967 when Arthur Koestler's, in his remarkable book *The Ghost in the Machine* (1967), formally introduced the concepts of holon and holarchy, which is conceived of as a hierarchical structure of holons (Mella, 2009). Thirty years later, Ken Wilber (1995) tried to generalize the holonic perspective.

According to Koestler and Ken Wilber, in observing the Universe surrounding us (at the physical and biological level and in the real or formal sense) we must take into account the whole/part relationship: any observable unit is at the same time a whole – composed of smaller parts – and part of a larger whole.

In other words, we must not only consider atoms, molecules, cells, individuals, systems, words or concepts as autonomous and independent units, but we must always be aware that each of these units is at the same time a whole – composed of smaller parts – and part of a larger whole. In fact, they are holons.

By systematically applying the whole/part conceptual relationship, or the equivalent one of container/contained, the Universe appears to us as a hierarchy of holons: that is, as a holarchy where, at each hierarchical level, the holons undergo the effects of the structural or operational variations of the subordinate holons and in turn produce variations in the behaviour of the superordinate ones. The entire machine of life evolves toward increasingly more complex states, as if a ghost were guiding the machine.

The concepts of holon and holarchy have since been used, especially in recent times, by a number of writers in a variety of disciplines and contexts, and these concepts are rapidly spreading to all sectors of research. Physics (Capra 1982), engineering (Babiceanu et al. 2005; Dani et al. 2004), robotics, biology (Shafaei & Aghaee, 2008), organizational studies, management science (Zhang et al. 2003; Ng et al. 1996), business administration and entrepreneurship (Chirn & McFarlane 2001), production and supply chain systems (McFarlane & Bussmann 2000; Akturk & Turkcan 2000; Amiri 2006). Connected to these ideas are those of holonic networks, holonic and virtual enterprises, virtual organizations, agile manufacturing networks, holonic manufacturing systems, fractal enterprise and bionic manufacturing.

After discussing the original meaning, this short theoretical essay, written from an economic-business point of view, has three objectives.

The first provides the reader with a brief but precise theoretical framework for understanding the meaning of the new terms that increasingly come up in organization and business literature and which refer directly or indirectly to the ideas of holon and holarchy. Starting from the definition of organizations as systems whose organs are composed of individuals or groups of individuals, I have attempted to demonstrate two interconnected aspects: on the one hand, that organizations are holons that derive from a holarchy of organs (from their functionalities), and on the other that organizations can be formed by other holon-organizations – which I have labeled orgons – that are connected in a holarchy that I have called an organization.

The second objective is to show how holons can be connected not only in the typical hierarchical structure – the holarchy – but, by stretching somewhat the original meaning, also in a reticular structure in order to form holonic networks in which the vertical ordering (above and below) is replaced by a horizontal one (before and after).

The third objective is to extend the notion of holon while respecting its original meaning, in order to apply it to organizations.

When we observe the functionality and the function of its organs we see that an organization can be thought of as a macro system whose purpose is the attainment of a macro objective. It immediately follows that it can be compared to an Autonomic Cognitive Computer (Shimizu, 1987); that is, to a holarchy of operators at different levels – each included in the other, so as to form parts of ever smaller size – each capable of pursuing part of the macro objective. Among the many types of holonic networks, I have chosen to examine the main sources of inspiration for those production systems referred to as the Holonic Manufacturing Systems, comparing these to those defined as Bionic and Fractal Manufacturing Systems. I have also considered the some forms of Inter-organizational Networks as well as the Holonic and Virtual Organizations.

Keywords: *Holon and Holarchy, Holonic Network, Holonic Organization, Holonic Manufacturing Systems, Bionic and Fractal Manufacturing Systems, Virtual Organizations.*

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Technical Thinking Systems and our Society

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ABSTRACT

From the very beginning, our Humanity has achieved well known success in the processes of mastering of material world with the use of their own hands, equipped with weapons and tools within limited zones of active manipulation with spherical radius equal to the lengths of any human hand, in areas as:

- power multipoint impact at material objects, -
- manipulate safely captured objects in 3D spaces.

Today, however, manipulation of objects outside of limited zones of active manipulation is still at the level of primitive society, where the use by ways of throwing stones, arrows, sticks, lasso, etc, supplemented by control of flying bullets, projectiles, motion of laser beam to influence distant of material objects.

At the result the active manipulation of distant reliably captured objects is still impossible due to physical laws of our planet.

The last years much attention is paid to Systems Thinking including international special conferences (Timofeev, 2012) which presented innovative papers on the theory and it's application – Technical Thinking Systems including also a variety of “smart” systems, for example, “smart” cities of future, “smart” homes, “smart” streets and “smart” apartments, “smart” eyes, and “intelligent” hands and so on, discussed the roles of these systems in natural and extreme conditions, computer science, pedagogy, the specific requirements for citizens of future smart cities, the problems of variety of simulations of Systems Thinking.

The main feature of the first example of the Thinking Systems is the presence of feedback by simulation of physical situations in the system “Brush-Object” (B-O) of manipulation robotics - as the result of simulation of spatial sense of touch of human hand at semantic level. The second example it is possible to see in -www.Cubicrobotics.ru.

Cardinal decision of actual and unsolved Problem of manipulation robotics – capture reliability of non-oriented complex shape objects – is based on application of semiotic structure of relations of contact points as symbiosis of informatiology, discovering geometrical multy-agent foreshortening of unknown initial physical situation, and semiotics, discovering semantic component of information (Timofeev, 2012).

Therefore, for the first time the transfer the main functions of human hand (unstressed scope, capture reliability) beyond the sphere in 3D with radius of brush provides the possibility of a new impetus to the development of our Society.

1. Terminology and some features of Thinking Systems

Last century Russian Academician A.N. Kolmogorov has considered (Timofeev & Dmitrieva, 2014) that simulation of methods of organization (as a set of information processes or actions, coming to expected results) of material systems (including biological) is to use other material elements (and useful algorithms of functioning and elements of structures) to create new systems with essentially the same organization (and their methods) like the original system. Therefore, to his opinion, the quite complete model of a living system should be called as a living system, and the quite complete model of a thinking system should be called as a thinking system.

In general, it is known that any smart system can use the principle of selection (by adopted criteria) the solution or need algorithm of limited actions from previously performed their list.

Decision taking procedure of Thinking Systems are implemented by another way.

First of all, some psychologists have considered that usually any normal man try to get ahead the semantics of his future actions (with expected the results) before realization of these actions, otherwise his life will be meaningless.

Therefore, Thinking Systems as the original systems of simulation of human informational processes of decision taking, cannot contain ahead the list of solutions with specific limited algorithms of actions, and so include the following features at autonomous level:

- determination of environment (situation) with it's simulation at semantic level,
- cognitive analysis of received information model of environment,
- estimation of received informational model by comparison with the model of expected purpose at parametric level,
- prognosis the results of virtual actions of taken solutions with possible application of self-organization processes,
- generation of adequate solutions and specific algorithms of actions.

So the ability of Thinking Systems to identify and represent the semantics of external environment adequately to semantics of solving tasks at parametric levels autonomously is a direct step from primitive level of thinking to professional level of thinking of Technical intellectual Systems.

2. One of actual and unsolved Problem of manipulation robotics

The long absence of decision of one of actual unsolved Problems of manipulation robotics and prosthetic devices – capture reliability of non - oriented complex shape objects – as the necessary stage of any object's manipulation in natural indeterminate surroundings has a negative impact on the expansion of using of manipulation robotics and prosthesis in Economy, Medicine, natural and extreme conditions for living.

The main reason for existence of this problem is connected with the absence of active force projections of weight of any object in the new multitude of contact points (at the stage before object's separation from the initial position), and obligatory appearance of these active forces later as well as appearance of other passive forces in these contact points later during at the stage of object's manipulation due to objective physical laws on our planet (physical problem).

This generates paradoxical situation when at first it is necessary to take decision (by any person or robot) on capture reliability in initial conditions (before separation of object) but then the realization of that decision takes place in another conditions

So the physical situations in the system “B-O” can take different uncontrolled force and moment equilibrium state (stable , unstable, etc.) because of lack of information support.

If adaptation to unknown complex forms (topological task) can be achieved by application any vision system and adaptive robotic gripper, now the problem of capture reliability (physical task) for mentioned reasons has not comprehensive solution in the World.

Therefore manipulation possibilities of any robotics connected with capture of object, can be realized successfully only in the shot frames of beforehand created or estimated by man determinate conditions.

This also deprives robotics the possibility of any autonomy in different natural situations.

At the present the condition of successful introduction of manipulation robotics in industry is the application of the principle “Forced ordered surroundings“ in the form of using of the accessories of orientation, storage and timely delivery of each object in the capture position.

If it is necessary to chance the articles of objects at that case the accessories and grippers of robotics can be the subjects for repair or compensation.

In extreme conditions (space, nuclear industry, oceans, dangerous situations, etc) the operators of manipulators with manual control, deprived of the possibility of using their own biological function of capture (including the spatial sense of touch hand) and so are forced to take decision on capture any object (as the physical task) by using their own view or limited information of force-sensed manipulators.

3.Cardinal solution of the problem

For the first time of whole historical period of evolution of our Civilization there is the exclusive chance to expend boundaries of mentioned spheres of manipulation by simulation of methods of organization and functional principles of human hand activities as unstressed scope, prognosis of capture reliability of non-oriented complex form objects with taking decision and it’s realization.

In other words, it is possible to increase mentioned radius of sphere in 3D space manipulation with transfer main functions of human brush, or overcoming geometric shackles of manipulation at the level of primitive society.

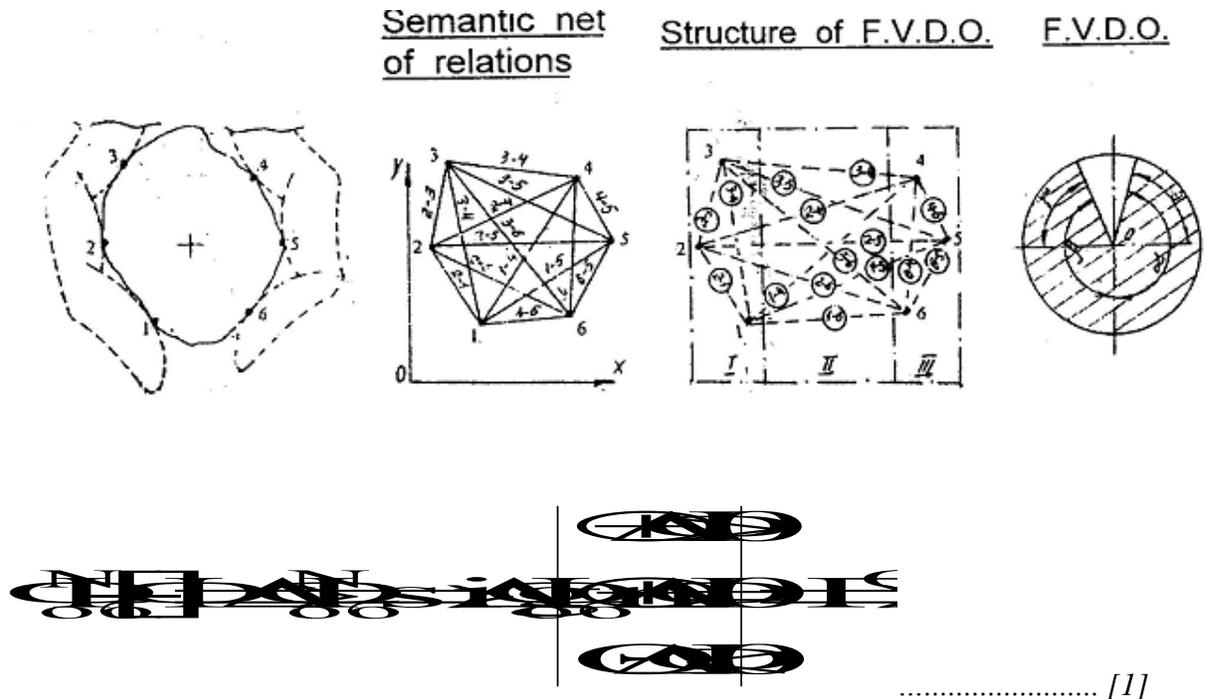
It is not difficult to evaluate mentioned chance as the phenomenon for future evolution of our Civilization in case of answer to the simple question: how would be changed domestic environment for any person if suddenly human brush has been set on elbow of his hand with geometrical radius of manipulation reduced by half, how would be changed his clothes, furniture of any person, his relationship and his lifestyle, etc in that case.

The project “Artificial Intelligent Hand” based on simulation of some methods of organization and functional principles of human hand provides the possibility of as cardinal solution of the Problem and so of increasing radius of sphere of active manipulation in twice and more in 3D space of mentioned boundaries.

Cardinal solution (Колгомов, 1964; Тимофеев, 2006; Timofeev & Dmitrieva, 2014) of mentioned Problem is based on simulation the only solution implemented by the Nature on human hand, and is associated with the use of purposefully formalized interdisciplinary knowledge and results of the experiment of revelation of functional principles of motor activity of human hands (Timofeev, 2014).

Quantitative and qualitative assessments of physical situations with prognosis of reliability of capture are the basis for making appropriate adequate solutions on capture reliability of non-oriented objects (before its separation from the initial position) can be seen at Fig1 and formula (Timofeev, 2012):

Figure 1. Necessary stages of bionic approach of simulation of organization methods for Thinking Systems (F.V.D.O. – the image of fixed virtual displacements of any object, 1-6-contact points with their relations)



..... [1]

- $\Phi_{0\delta}^N$ – Factual image F.V.D.O.,
- N --- Quantity of relations of contact points,
- $[\Phi]$ – Image F.V.D.O. with permissible parameters,
- PIP^O – Prognosis of capture reliability.

The use of internal image language (based on the semiotic structure of relations of contact points) for the purpose of intellectualization of information processes (receiving, processing, storage and transmission of information) in the system “Brush - Object” provides semantic expressiveness as these processes and so parameters of taken decisions with the ability to ensure their endo-physical properties.

Achieved the analogy of the structure of the “inner word” of internal image language with the structure of the “inner word” of human language is the basis of identity (towards biological prototype) of accepted method of organization of information processes as determination of physical situations in the system “B-O” and prognosis capture reliability of non-oriented objects with estimations of physical situations, decision taking and the ability to control physical situations (in case of negative results of prognosis) by using self-organization processes.

The additional difficulties of research of cardinal decision of mentioned problem are connected also with the fact that much of information processes of any human taking decision are on the subconscious level (psychological problem).

The solution contains the determination of physical situations in the system “B- O” with their simulation and cognitive analysis, as well as the geometrization of physical situations, with translation of original information from its “closed” status in “open” status for our consciousness.

Some functional principles of movement actions of human hand in indeterminate situations and unity of structures of words or informational units of image language of robot (RL) and natural human language (HL) are the objects of simulation methods of organization processes of human activities for cardinal decision of the problem and for thinking processes.

The adequacy of taken decision is evaluated by the results of prognosis of it's virtual actions.

In our case the simulation of methods of organization of human hand's activities as the set of informational processes is able to generate the organization of targeted relations between contact points as the components of structure of new created model (as a feedback of any physical situations in the system "B - O").

The heart of the methodology of creation of mentioned feedback is application of semiotic structure of relations of contact points as the symbiosis of informatiology discovering geometrical multi-agent perspective of any physical situations in the system "B - O" and of semiotics discovering it's semantics.

Above provides the semiosis as the sign informational process of formation of capture reliability prognosis with internal non-verbal image language and image F.V.D.O.

Mentioned above must be based on expedient functional principles of movement actions of human hand in indeterminate situations identified experimentally in the similar conditions of these activities.

The successful application of functional principles of human motor hand activities in our case has been taken as the criteria of achievement appropriate functional parity between technical and biological systems (within the boundaries of general class of solving tasks).

Solving of mentioned physical and psychological problems is based on using of following principles of creation of Technical Thinking Systems (in our case):

1. The principle of compatibility vectors, for example, of main active forces with vectors of variable stiffness of mechanism of brush of robotics to ensure unstressed adaptation the brushes of robotics to shapes and positions of non-oriented objects.
2. The principle of similarity of the structures of language s (of robot and person, for example) based on simulation of method of organization of human thinking processes for intellectualization.
3. The principle of prognosis the capture reliability of non-oriented objects as a steady state equilibrium of all forces and moments in the systems "B – O".
4. The principle of autonomy to ensure the determination of any physical situation in the system B-O and cognitive analysis of it at autonomous level.
5. The principle of self-organization at structural level of robotics to ensure the search for acceptable solutions in case of any negative prognosis of capture reliability.

Above represents the essence of technical functional analogues of human information processes in natural uncertain environment during the performing the same tasks.

4. Practical signification for Society

Practical signification of research are following:

- recommendations for design of adaptive capture devices of robotics and intellectual prosthesis for invalids,

- recommendations for application of adaptive capture devices of robotics and intellectual prosthesis in natural and extreme conditions of human habitation,
 - in Space - by creation of new special manipulators with capture reliability prognosis and variable lengths and lines of grippers for extra activities of astronauts in carrying out research, mechanical assembling, repair, rescue of constructions without changing the brushes,
 - in Oceans - by participation in technology of deep-see non-diving rescue strap works on sunken vessels based on using the deep micro-apparatuses such as types, for example, “Gnom”, “Falcon”, participation in clearance with shock-free capture mines and shells and putting them into the boxes,
 - in Medicine - with creation of intellectual brushes, new type of prostheses devices and smart gloves of exoskeletons for functional rehabilitation of invalids, including with paralyzed hands,
 - in Industry - by applications of automation and mechanization of technological processes in different small-scale and quick-skilled industries, for example, in aircraft, without changing the grippers, and so in machining, sheet metal stamping, casting, non-destructive inspection methods, including x-ray, and so on,
 - in Sport by organization of new form of competition for building and remote original constructions by using manipulators with manual control and equipped with adaptive grippers and changed tools,
 - in Domestic Sphere – by universal modules of household robotics, cleaning dishes and etc.
- At the result of the application of principles and methods of Technical Thinking Systems in manipulation robotics there is a real possibility of a large-scale invasion of manipulation robotics in an unknown and inaccessible earlier sphere of human activities as direct executors for manual and mechanized operations in domestic sphere, industry, agriculture, etc.

Conclusion

Since very beginning of own appearance on our planet Humanity has tried to perfect own relationship with external material world including manipulation with material objects in 3D space by human brush.

There are well-known eminent results in material and spiritual areas of mentioned human activities within geometrical sphere in 3D space limited by radius of human hand as in Arts, in Economy, in domestic sphere etc.

However outside mentioned limited areas where any human brushes are absence, there are only modest results of manipulation activities as results of flying stones, arrows, spears, bullets, shells, other objects by managed complex manipulation mechanisms.

The geometrical boundaries between mentioned manipulation areas are not changed during whole period of Humanity evolution. Therefore the situation with active manipulation for our Civilization remains constant at the level of primitive society.

For the first time of whole historical period of evolution of our Civilization there is the exclusive chance to expend mentioned boundaries of manipulation by simulation of human unstressed scope, prognosis of capture reliability of non-oriented complex form objects with taking decisions and it's realization.

It is not difficult to evaluate mentioned chance as phenomenon for future evolution of our Society in case of answer to the simple questions: how would be changed domestic environment for any person if suddenly human brush has been set on elbow of his hand with geometrical radius reduced by half, how would be changed clothes, furniture of any person, his relationship and lifestyle in that case.

The project “Artificial Intelligent Hand“ based on simulation of functional principles of human brain and methods of organizations provides the possibility of expensive in twice and more in 3D space of mentioned boundaries of areas of active manipulation.

Above can stimulate as a promising large-scale replacement of working persons by future manipulation robotics in natural non-determinate environments, and so the improvement of robotics in the field of intellectualization to increase limited zones of active manipulation, which in own turn generates the analogy with active role of a human hand in material and spiritual spheres of our society as the steps in evolutionary processes of our Civilization and of Humanity itself.

Keywords: *simulation, methods of organization, robotics, thinking systems.*

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The search for viability: a practitioner's view of how the viable systems model is helping transform english local government (and why it has passed unrecognised)

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ABSTRACT

Since 2010, local authorities in England have been subject to a dramatic reduction in revenue funding from the Conservative-led central government as part of the deficit reduction agenda. Over the five years to 2015 funding from the centre has decreased by 40%, and recent announcements have confirmed that all grant funding will be withdrawn by 2020, to be partly mitigated by changes to local business and household tax collection, and increased ability to generate capital receipts. Regardless of the political debate in England over the role and size of the state, all local authorities have faced an unprecedented reduction in their resourcing at a time when demands on services have risen substantially through social and demographic changes. The question of the viability and sustainability of a (growing) number of local authorities has been raised.

Faced with such environmental changes, the response of the majority of authorities has been firstly to simply reduce in size, but secondly to undertake internal transformation which seeks to change the organisation as a system, but also to alter the relationship with the external environment (principally the residents and businesses of the local area). These have clearly been attempts to create viable systems, delivering appropriate variety in relation to changing externalities. The author, in his work as consultant to local authorities (while undertaking an MSc in Systems Thinking in Practice), has collaborated in transformation interventions which have unconsciously (or where the author has consciously) used the principles of the VSM to improve business governance and therefore increase the potential for viability.

This paper outlines these interventions, which concern (i) the development of a commissioning process (to move away from direct delivery of services to their commissioning) by a county council, (ii) the remodelling of a central corporate services ('headquarters') by a county council, (iii) the whole system redesign of a complete authority and (iv) a corporate 'healthcheck' of a city council using the VSM as a diagnostic tool. These assessments demonstrate how these interventions have suggested changed end states which closely align to the autopoietic and holistic intents of the Viable Systems Model. More precisely, these case studies make evident the criticality of assessing the effective functioning and defining accountabilities of Systems 2-5 of the VSM. Performance management in English local government has traditionally concentrated

on the outputs of System 1 operations in an overridingly reductionist approach. The paper suggests how the governing business systems in councils exemplified by Systems 2-5 may be made all the more viable through greater understanding and application of systemic management. These empirical observations are validated against cybernetic concepts, notably principles of organisation (Beer, 1985), models of integrated management (Malik, 2010) and processes of control, inquiry and decision-making (Yolles, 1999) to suggest a general model of systemic and transformational organisational governance centred upon the VSM.

The paper lastly considers why, when such individual transformations have evidentially supported the viability of local authorities, such a general model has not yet been embraced by the sector and the professionals within it to improve the governing business systems. These considerations involve the non-prioritisation of praxis at a practitioner level, but equally the inability of theory to persuasively articulate the relevance of a systems approach to an increasingly beleaguered cohort of local government business systems leaders.

Keywords: *Transformation, local government, new public management, viable systems, general model of systemic transformation, organisational redesign*

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Feedback Mechanisms in Public Administration System: VSM Application and Institutional Factors

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ABSTRACT

The concept of feedback is obliged by its origin to cybernetics and systems approach. Have been entered by N. Wiener within the cybernetic model of system with negative feedback (Wiener, 1948), this concept has got a key role in L. von Bertalanffy's representation of a biological organism as an open system (von Bertalanffy, 1968). Principles of cybernetics and the first version of systems approach was similar because in the first case negative feedback allows technical system to approach the external goal for the sake of which it is created, and in the second it provides to an organism as whole (system) to operate the subsystems for the best adaptation to external environment and viability increases.

Specific feature of public administration systems is their social and organizational character. Similarity of the feedback mechanism structure in technical and organizational systems is both have “an administrative cycle”: identification of deviations from the goal, an assessment of their criticality, timely decision making for the correcting influences and their implementation. However, in organizational systems management in many cases practical correction (updating) of the goals in compliance with newly discovered circumstances is required. For this purpose, the feedback mechanism structure in organizational systems, unlike technical, has to include a communication of managing and operated systems.

The second important difference of organizational and technical cybernetics is the principle of two-channel (generally – multichannel) organization of feedback mechanism. For ensuring operability of such system the classical Wiener's model of the system with one negative feedback should be added with independent feedback (Wiener, 1948). Otherwise we will face all colors of bureaucratization problems in management.

The differences mentioned above are considered by organizational-cybernetic Viable System Model (VSM) (Beer, 1972) which borrows the principles of neurophysiologic management based on live systems research, and also communicative methods of joint decision making. Therefore, we state **the first hypothesis: VSM is a prototype for creating a model of public administration system with feedback mechanisms.**

The history of VSM model contains a set of cases of its practical application. A number of the consulting companies worked together with Beer at corporate level, and now they continue to work successfully: Syncho Ltd (Great Britain), Team Syntegrity Inc. (Canada), Malik

Management Zentrum, St. Galen (Switzerland). Several scientific centers are engaged in theoretical developments and applied aspects of VSM implementation. The CyberSyn project (Cybernetics+Synergy) which implementation has begun in 1971 in Chile by the invitation of President Salvador Allende was the largest and most known case of experiment to try use VSM at the state level. Within this project total reorganization of state regulation in economic policy has been offered. Unfortunately, the military coup of 1973 hasn't allowed to finish this experiment (Beer, 1972).

However, the CyberSyn project has been directed to improve management of the enterprises and branches of economy, but public administration processes weren't a subject of the main attention for S. Beer and his colleagues. So what are the conditions of VSM application in the sphere of public administration?

These conditions include the following assumptions:

- 1) public administration is considered from the traditional point of view as “rational bureaucracy”. It means that the government possesses rationally organized structure, functions and processes;
- 2) within this model we are focused on executive power and also assume that the mechanism of executive power is constructed hierarchically;
- 3) the local government is considered as executing first of all the state functions – that is as the municipal level of the state government.

Thus, considering the assumptions described above and the principle of recursiveness (cybernetic isomorphism), we treat the executive power system as the fractal structure having three organizational levels: federal, regional and municipal. According to the same principle of recursiveness we consider each of hierarchical levels as viable system which we also treat as the fractal structure consisting of the separate organizations: governments, ministries and departments (or city halls), and each of them – from divisions.

However above-mentioned assumptions are true only for classical Weberian model of the “rational bureaucracy” focused on accurate execution of procedures according to the legislation. During the last decades in literature on public administration the important place is taken by two alternative models: the New Public Management (focused on effect) and the New Governance (focused on participation and partnership) – see Table 1 (Checkland, 1981; Shchedrovitsky, 2002; Jackson, 2003; Maracha, 2014).

As there is not one, but three ideal-typical models of public administration system, we state **the second hypothesis: VSM has to be upgraded taking into account plurality of the public administration models generating “multimodality”**.

We try to generalize VSM and our concept of feedback for the case of “multimodal” public administration according the following logic.

1. Both classical concept of feedback and VSM (based on it) are constructed within Hard Systems Thinking (or System-1) and assumes technical-cybernetic approach to governance (Control&Administration). Within this framework public administration is considered as the “rational bureaucracy” constructed on the hierarchical relations, i.e. according to Weberian model.
2. Within this “vertical” model the hierarchical relations are considered as including “direct” and “return” communications.
3. The “horizontal” relations within interdepartmental coordination and interaction with other branches of the power are also considered as including “direct” and “return” communications.

4. Both “vertical”/hierarchical, and the “horizontal” relations with “direct” and “return” communications include application of joint decision making based on communicative methods.
 5. Within multimodal public administration the “market” and “network” relations, including the relations with expert and civil communities, can be considered by analogy with items 3 and 4 above. In all cases the structure of “feedback mechanism” includes communication of managing and operated systems that gives the generalized concept of feedback and allows to upgrade VSM. Considering public administration systems as viable according to VSM, we recognize from the fact that each of five subsystems forming logical structure of this model carries out “an administrative cycle” with the feedback mechanism as it has been described for the social organizations: identification of deviations from the goal, an assessment of their criticality, timely decision making for the correcting influences and their implementation. So, for example, each of Subsystems 1 supports interdepartmental feedback by the means of monitoring of the processes in the field of its competence.

Table 1. Systems thinking, organizational structure and models of public administration: correlation of typologies

Type of Systems Methodology	Type of Organizational Structure	Type of Governance	Model of Public Administration	Focus of the Model
System-1: Hard/Unitary – strict dependence	Hierarchical	Control&Administration (technical-cybernetic)	Rational Bureaucracy	Procedure
System-2: Soft/Pluralist – independence	“Market”	Management (organizational-activity)	The New Public Management	Effect
System-3: Coercive – inter-dependence	Public-Network	Governance (political, institutional, reflective-communicative)	The New Governance	Participation and Partnership

At the same time the generalized concept of feedback means that the structure of “feedback mechanism” includes communication of the managing and operated systems. Thus, the Subsystem 2 supports horizontal feedback on the basis of interdepartmental coordination processes, and Subsystem 3 – vertical feedback between different hierarchical levels of public administration.

Subsystem 4, acting as “the Biggest Switch” between strong-willed management of the center and an autonomy of parts, supports feedback between the strategic level of management (Subsystem 5 as the top management and Subsystem 4 itself), tactical level (Subsystem 3 and 2) and operational level (Subsystems 1 which in case of “alert signal” could open direct access to the top management). Also the Subsystem 4 (together with Subsystem 5) realizes feedback with expert community.

And, at last, the Subsystem 5 as the top management supports coordination feedback with other institutes of the government, and also, realizing sovereignty of the people, – feedback with citizens and society.

Thus, using the VSM as a prototype for creation model of public administration system with feedback mechanisms, it is necessary to allocate 7 main types of the feedback mechanisms (or channels) providing effective implementation of the accepted policy (or its adjustment if it is necessary):

- 1) interdepartmental feedback by the means of monitoring of the processes in the field of department competence;
- 2) horizontal feedback by the means of interdepartmental coordination processes;
- 3) vertical feedback between different hierarchical levels of public administration system (in separate department, between departments and the Government, and also between federal, regional and municipal levels of governance);
- 4) feedback between strategic, tactical and operational levels of management;
- 5) feedback which source is interaction of executive power with expert community;
- 6) feedback which source is interaction of executive power with other branches of the power;
- 7) feedback which source is interaction of executive power with citizens.

By the means of this typological description and a set of sociological data we have carried out the analysis and create the typology of “failures” in implementation of feedback mechanisms in modern Russian practice of public administration. This analysis shows that systematic reproduction of these “failures” is in most cases caused by certain legislative and institutional factors.

As for legislative factors, negative impact of the problems described above amplifies imperfection of federal laws “On strategic planning”, “On the government” and some other regulations defining institutional and legal infrastructure of executive authorities activity. Developing government policy and monitoring of its implementation there is not enough attention paid to mechanisms of external expert examination as feedback channel, to communications with stakeholders, with expert community (professional expert examination) and civil communities (public expert examination).

It is also possible to allocate 9 major institutional factors promoting reproduction of the revealed “failures” of feedback mechanisms in public administration system. It allows to create the structured picture of defects in the institutional organization of the Russian government.

1. The institute of single (ad hoc) instructions is hypertrophied and doesn't assume feedback. This institute supports reproduction of the distorted motivation hierarchy (on the first place execution of the current instructions, on the second – routine functions, and only on the third – performance of strategic and program actions).
2. Institutes of independent and external monitoring are absent.
3. In public administration the principle of subsidiarity is poorly implemented. It distorts administrative processes and conducts to an escalation of horizontal feedback between performers to the higher levels of management, generates replacement of coordination with subordination, bureaucratization of interdepartmental interactions procedures.
4. The system of the inter-budget relations distorted towards “super-centralization”.
5. Government and municipal programs is transformed to a pseudo-institute which isn't corresponded to the essence of the program-target method of management.
6. Tactical, and especially strategic levels of public administration gain substantially declarative character.
7. Inefficient institutionalization of expert study and support of decision-making processes in government bodies.
8. The authorities division system is distorted.

9. Lack of effective (not imitating) system of public-government collaboration.

The carried-out analysis allows to determine and offer the main directions to improve feedback mechanisms and institutes supporting them “vertically”, “horizontally”, and also in interaction with stakeholders which are external to the executive power (other branches of the power, expert communities, citizens).

Keywords: *public administration system, feedback mechanisms, Viable System Model (VSM), multichannel organization of feedback, communication, institutional factors of “failures” reproduction.*

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Technological and organizational innovation: the enterprise in the era of the network of networks

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ABSTRACT

Purpose. The revolution of Information Communication Technology (ICT), in particular the Internet, and all the wake of economic and social changes that follow, is an irreversible process, and to which we must adapt. The decentralization of intelligence in the global communication networks and the centrality of ideas and knowledge are leading to the affirmation of a new paradigm: the economics of networking and collaboration mainly based on the open innovation. The mainframe's era of the 40s and 60s characterized by control and centralized management of information without the possibility of user access, it has gone to the era of stand-alone in the late 60s where every personal computer was equipped with its own information processing capacity, to reach today's era of network where each computer has the ability to connect with the rest of the world.

We are in the midst of a technological, economic and organizational transformation enabling us to renegotiate the conditions of freedom and productivity, and from which are emerging new social and economic practices. A development without the Internet would be like industrialization without electricity in the industrial era. This transformation provides opportunities and imposes challenges.

Internet, as a new platform of communication, in its continuous evolution has given rise to new patterns of social interaction leading to the birth of a true digital culture. To link together two nodes of the network means to relate them. Therefore, since the beginning the information network has been immediately characterized for its “social aspect”. Today, billions of interconnected individuals are able to participate in innovation, wealth creation and social development in ways that once could only imagine.

The interconnection logic, that makes all the nodes individuals of a single network, requires a rethinking of the role of ICT within the company: technology is no longer just a tool with which to effectively manage internal business processes and govern the internal complexity, it becomes a real strategic tool through which companies rethink radically the way they manage their business and pursue their own goals, rereading their value chain. Actually, the development and survival of organizations depends on the access to new technologies of the Internet. Access, however, is not just the acquisition of the technology itself. Access means above all developing managerial skills, management techniques, a structure and an organizational culture for their effective use.

The aim of this paper is to retrace the main stages of this process and to understand the real benefits of the introduction of new technologies, as well as the transformations, in organizational, cultural, and business terms, which necessarily have to be implemented by organizations in order to build and maintain competitive advantage. The reflection that comes out, in a historical period characterized by widespread de-structuring of organizations, is that it is better to cooperate than compete. In this context, in order to understand better the relations, interactions, and the relationship networks, this study relies on a systems thinking perspective, by defining the openness degree of the systems and the governance of communication flows that derive as a consequence.

Methodology. The methodological approach adopted, albeit of heuristic type, refers to the positive method in that, starting from the analysis of the historical descriptive literature and non-fiction, it is reached to formulate very precise research questions. The systemic interpretation, in the light of the constructivist paradigm allows us to subvert the traditional explanatory report “object-information-observer”, placing the observation function at the base of the explanatory chain: “observer-information-object”. The prospect’s change is relevant because every phenomenon in the eyes of the observer is a constructed reality or an invented one. The new paradigm offers us the opportunity of a window, a visionary window, from which recognize that the observer plays an important role in shaping the reality; so the views can be reconciled with science.

Findings. The work sheds light on the birth of a new production mode based on collaborative and decentralized models, referred to as “weapons of mass collaboration”. Based on these changes develops the Enterprise 2.0. The user-consumer, takes on a new look, acquires an active, fluid, and a growing power. This reveals that innovation can come, indeed is coming from below, from the same skilled users who increasingly thin the line between professionals and amateurs. Then the focus goes towards the future talking about the Web 3.0 or Semantic Web. This is nothing more than the further transformation of the WWW in an environment where the published documents are associated with information and data (metadata) that specify the semantic context in a format suitable for the question, the interpretation and, more generally, automatic processing.

Research limits. This is essentially a theoretical work. While providing a description of the experience of Procter & Gamble and the InnoCentive platform (a virtual intermediary that allows the exchange of information and technology), the current study does not provide an analysis of empirical data to support conceptualized ideas.

Practical implications. The organizations can reap significant benefits of the new economic

paradigm, leveraging the partnership to cut costs and accelerate the pace of innovation. Another influential implication on macro and micro-organizational structures is the transition from an economy of scale to one of flexibility and breadth. Finally, it is noted that the operating economic unit is no longer the company, but the economic project around which the network is formed between businesses and segments of companies and their subcontractors.

Originality of the study. The real novelty lies in recognizing that it makes little sense to study the framework of relations that mutually interconnect actions and reactions of the suprasystems and the enterprise system through causation relationships. It is not significant to search the reasons and responsibilities of a progressive decline of the systemic equilibrium in the action of the single component. The systemic approach makes it clear that the “chain” of causations is circulated. The illusion of having identified a principle or a cause, to which other causes must be associated linearly, must be considered only an epistemological “trick”. Breaking the circularity of the interaction has a value only in terms of static representations of the phenomena. As saying that in the confusion on what came first, the “chicken or the egg”, you decide, assuming to be the hens, to start from the hen. For years, adopting this epistemological premise, the macroeconomists have attributed the reasons of the evolutionary change to the socio-economic systems, as micro-economists to the behaviour of markets, as industrial economists to the dynamic sectors, and as business economists to the dynamics of business organizations. The viable systems vision eliminates any distinction; reading the context as “the” system of systems exceeds any reductionist prospective and leads to the unity of the behaviour of each single component/entity. In this perspective, the context can be thought of as a body of water, a lake or sea, in which interact water, fish, seaweed, sand, and thousands of other micro-components, and where any occurrence is not a matter of only one organism but a concern of the whole. Only a systems view makes it understandable that every possible behaviour of every possible component of the environment cannot and must not be listed as “good” or “bad” in absolute terms, but must be assessed in relation to the levels of consonance that manifest with the context. It is considered “good” if it increases or at least does not decrease levels of consonance, it should instead be considered “bad” if it reduces the consonance, tends to upset the “equilibrium” of the system, and introduces elements of complexity.

Keywords: *technological innovation, new economy, semantic web, social systems, observer*

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From theory to practice: applying systems thinking to Smart Cities

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ABSTRACT

Conceptual and theoretical background – Recent evolutions in socio-economic configurations, such as globalization, evolution of Information and Communication Technologies (ICT), improvement in the general knowledge of consumer, have changed rules and logics of markets in which companies, organizations and other social actors live (Klepper & Thompson, 2006; Barile et al., 2014). A new logic of interaction among producers/providers and consumers/users is emerging, suggesting to shift focus from the technical to the social level of analysis of business phenomena (Golinelli et al., 2012; Barile et al., 2013a; Christopher et al., 2013; Lusch & Vargo, 2014).

This changing scenario requires decision makers to search more appropriate ways to manage social and business organizations (Mair et al., 2012; Saviano & Caputo, 2013). In particular, traditional models based on a linear causality view appear not able to explain individual and social behaviours (Barile et al., 2013b; Maggioni et al., 2014).

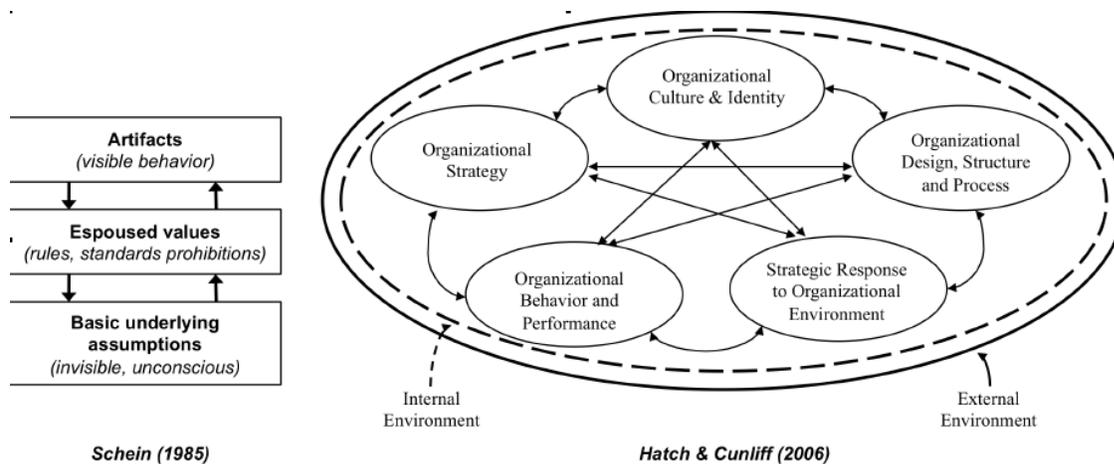
Several perspectives have been adopted to find more satisfactory explanations to behaviours of social and economic actors, ranging from psychological (Johnson et al., 2001), sociological (Peñaloza & Venkatesh, 2006), and economic (Nelson & Winter, 2002) ones. Common approaches, however, focus only on a few key dimensions of analysis of the investigated problem (those that appear mostly relevant in the perspective adopted) revealing a still dominant reductionist approach (Barile & Polese, 2010). This approach appears to be ever more inadequate to understand current emerging socio-economic configurations and their behaviours, in which

many causes, many actors and many dimensions interact simultaneously generating complexity (Di Nauta et al., 2015).

Within the field of business management, attention to the need of overcoming the limits of the traditional reductionist approach has led to re-explore the contribution of systems thinking to the governance and management of social and business organizations. In this context, a possible contribution is offered by the Viable Systems Approach (vSA) (Barile, 2009; Golinelli, 2010). A novel interpretation of businesses and social organizations as viable systems endowed with an information variety made up of information units, interpretation schemes and categorical values, is proposed in the vSa, which can shed a new light on the understanding of behaviours of social and business organizations as well as of individuals in complex organizations (Barile & Saviano, 2010). This novel proposal, rooted in the framework of the Viable System Model (Beer, 1981), essentially affirms the need of a change in perspective in the way decision makers look at social and economic phenomena (Espejo et al., 1996; Schwaninger, 2000; Espejo, 2004, 2015).

More specifically, studies on organization and culture theory build upon key concepts of cybernetic to develop possible models to represent the critical dimensions of systems thinking in business management (Schein, 1985; Hatch and Cunliff, 2006) (Fig. 1).

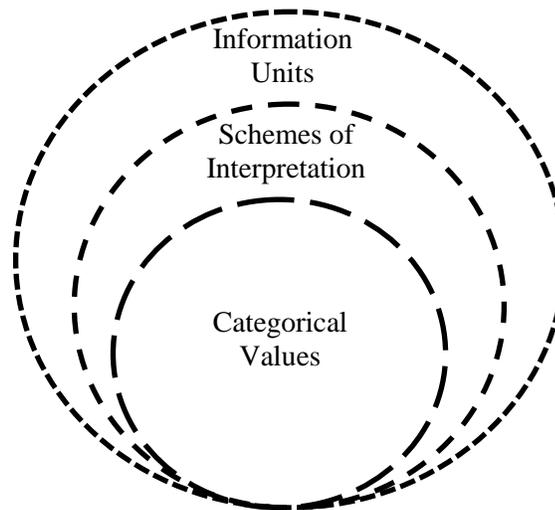
Figure 1. Models of organizations by Schein (1985) and Hatch & Cunliffe (2006)



Source: Organization Orientation Group (OOG), 2011: 3

These approaches identify key elements of analysis (Espejo & Reyes, 2011) to consider putting focus on the cognitive and emotional dimensions that influence them (Barile & Saviano, 2011; Barile et al., 2012). More specifically, the Information Variety Model suggests to consider as key dimensions of analysis not only the information units and flows, but also more structured interpretation schemes and, what is mostly relevant, the categorical values that ultimately direct the behaviours of viable systems (Barile, 2009). The integrated analysis of the three 'levels of observation' proposed by the vSA, offers new interpretation schemes directing towards a new approach to the understanding of behaviours of viable systems, i.e. any systemic entity that lives in the observed socio economic context and aims at survive in it (Beer, 1981; Espejo, 2004; Golinelli, 2010).

Figure 2. A possible representation of the Information Variety Model



Source: Barile, 2009: 95

Using this lens, it is possible to understand how different systems interact and how ‘elements’ that compose each system are related and generate different outcomes through interaction (Golinelli & Gatti, 2001; Barile & Saviano, 2013; Pels et al., 2014).

A significant literature has enriched the body of knowledge of the vSA. Less attention, however, has been put on the application of the methodology to the study of specific socio-economic configurations. An effort in the shift from theory to practice would enrich this body of knowledge of a relevant contribution.

Aim – In order to contribute to advance “theory and practice for governing business systems to address the present and future challenges in the global economic and social scenarios”¹, this work aims to re-explore the contribution of systems studies in business management by putting theory into practice through the adoption of the Viable Systems Approach (vSA).

As “implementation and deployment of information and communication technology infrastructures to support social and urban growth through improving the economy, citizens’ involvement and governmental efficiency” (Bakıcı et al., 2013: 138), we recognize Smart Cities as a field of enquiry of growing theoretical and practical interest for both the scientific and professional communities (Al-Hader et al., 2009; Chourabi et al., 2012; Lombardi et al., 2012; Jin et al., 2014; Kunzmann, 2014). More specifically, we recognize Smart Cities as examples of complex socio-technical systems (Trist, 1981) in which verify the interpretative potential of a systems thinking based approach of governance and management like the vSA.

Methodology – A brief review of systems thinking literature in management is proposed in order to identify main theories and models as well as fundamental concepts of a possible theoretical framework of reference for applying systems thinking in the management of complex social and business organizations. A parallel review of the literature on Smart Cities is then proposed in

¹ <http://bslab-symposium.net/4th-international-symposium-vilnius-2016/call-for-abstracts-2016/>

order to outline ‘the state of the art’ of the topic. Subsequently, an analysis of potential theoretical, conceptual and practical links and convergences between the two investigated domains is proposed. Finally, the discussion of several examples from real cases complete the work giving evidence of the unexploited potential of systems thinking in the management of Smart Cities.

Findings – By integrating key findings of our study at both theoretical and practical level, a framework of synthesis is developed to support the understanding of key mechanisms of governance and management of Smart Cities as complex socio-technical systems, by building upon the Schein’s three-levels of enquiry (see Figure 1) integrated with the interpretative contribution of the vSA perspective through the Information Variety Model (see Figure 2). Findings highlight the need for a change in the perspective and in the way to approach the management of complex social, technical and economic organizations like Smart Cities, in which key ‘hidden’ dimensions are often disregarded.

Practical and theoretical implications and limitations – Several implications derive from our study at both theoretical and practical level. They suggest to better and more deeply explore the contribution of systems thinking and its practical implementation. In the investigated case of Smart Cities, relevant dimensions of analysis are highlighted that suggest a rethinking of the dominant approach in the direction of a better integration of the social and technical elements and aspects.

Both the literature reviews and the real cases examples represent only a first exploration of the subject and require further theoretical and empirical study.

Originality/Value – The basis for a multidimensional and multidisciplinary approach to the study and management of Smart Cities through the vSA are proposed trying to address the key issues that characterize the functioning of such complex social, technical and economic organizations.

Keywords: *System thinking, Viable Systems Approach, Smart Cities, Socio-technical systems.*

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Dynamic Capabilities and T-Shaped Knowledge in Project Management. A Viable Systems perspective

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ABSTRACT

Project Management is recognized as an effective technique which supports decision making in complex contexts, by acting as a compass that orients and generates a ‘syntropy’ in the convergence toward shared goals (Saviano and Di Nauta, 2011). This paper proposes a systemic methodological framework for decision making in Project Management practices. The interpretation of organizations as viable systems, integrates several lines of thought within a systems thinking based framework. In this direction, an interesting research stream that appears strongly related to the knowledge of organizations and in particular to a competence-based perspective, has been recently developed within the research context of Service Science, discussing the need for the so called T-Shape professionals (Spohrer, Maglio, Bailey and Gruhl, 2007; Spohrer and Maglio, 2010). A T-Shape professional is endowed with competencies necessary to develop some kinds of innovation by leveraging not only on problem solving skills, but also and mainly on decision making capabilities (Barile and Saviano 2013)

An interesting research stream of the last years, which appears to be related to the knowledge view of organizations, and in particular to the competence-based perspective, has been recently developed and proposed by the Service Science research Community, discussing about the need for the so called “T-Shaped” professionals (Spohrer, Maglio, Bailey, and Gruhl, 2007; Spohrer, and Maglio, 2010). This framework qualifies professionals as “T-Shaped” when they are “deep problem solvers in their home discipline but also capable of interacting with and understanding specialists from a wide range of disciplines and functional areas” (IfM, and IBM, 2008:11).

According to Service Science researchers, individuals and social entities (groups, organizations, communities of practice and whatever combination of them in a network of social entities) are central to the definition of knowledge. In particular, they provide motivations and are targeted at the benefits deriving from the transition to a T-Shaped knowledge (Barile, Franco, Nota, and Saviano, 2012).

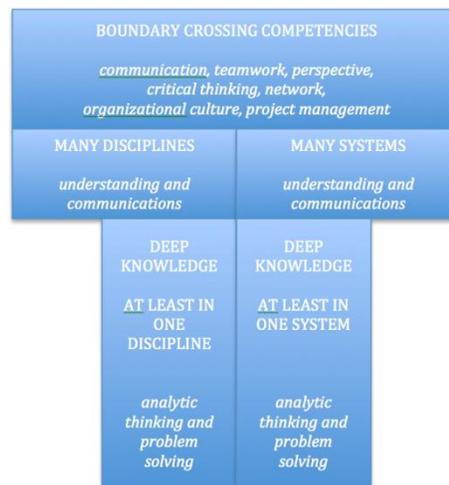
A T-Shaped professional is endowed with competencies necessary to develop some kinds of innovation by leveraging not only on problem solving skills but also and mainly on decision making capabilities. This endowment can represent a relevant source of competitive advantage, especially when organizations are expected to address conditions of high complexity (Barile, and Saviano, 2010).

The need for T-Shaped professionals has been widely recognized in the last decade (Hansen, and von Oetinger, 2001; Spohrer, Maglio, Bailey, and Gruhl, 2007; Spohrer, Golinelli, Piciocchi, and Bassano, 2010). Indeed, the “T-Shape” idea has been adopted also from a wider management perspective, discussing about a “T-Shaped management” approach that considers the T-Shaped Manager as a new kind of executive, who breaks out of the traditional corporate hierarchy to share knowledge across the organization while remaining committed to individual business unit performance (Hansen, and von Oetinger, 2001).

It appears then that the increasing need for T-Shaped professionals arises from the need to conjugate deep vertical and broad horizontal competencies enabling to effectively move across different disciplines and systems as suggested by the representation of the T-Shaped professionals proposed in Fig. 1. The representation is based upon a general notion of competencies essentially distinguishing between ‘horizontal’ ones (i.e. project management, organizational culture, communication, critical thinking, teamwork, networks, etc.) and ‘vertical’ ones (i.e. analytic thinking and problem solving in at least one discipline and system).

The situation illustrated in Fig. 1 seems to be applicable to a typical project management ongoing process and framework. That is what the proposed paper would deal with.

Figure 1. “T-Shaped” professionals



Source: Adaptation from Spohrer (2010)

Keywords: *Project Management, T-Shaped, Capacities, Competencies, Decision Making, Viable Systems.*

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Paradigm change from the systemic view to systems science

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ABSTRACT

Problematic state of affairs

Although the structure of concrete, abstract, symbolic and imaginary things is just as observable as their qualitative and quantitative properties, the development by and large of the 'systemic or structural view' of parts of the world as opposed to 'conventional science of physics' has not gone along the path of empirical research : There has not been a systematic inquiry into searching for general principles and methods for their testing against experience (Magee, 1985). It has taken the path of :

1. Using the term 'system' as a means to refer to a :

Static phenomenon when it appears complex and consisting of a number of related parts, or
Dynamic phenomenon consisting of a number of interacting parts engaged in some kind of activity.

2. Generating a vast variety of largely speculative views without much thought to their expansion to investigate their relationship to experience. This trend started with the founders of the 'systemic view' (Bertalanffy, 1950) and has continued up to the present day supplemented by a variety of modelling techniques and diverging into philosophical issues. The trend rejected conventional science in its entirety which, with hindsight, was a mistake.

3. Developing control theory in the technical field following the theories of signal transmission before the 2nd WW to aid construction of control systems for control of anti-aircraft guns and similar applications (Nyquist, 1924, Hazen, 1934).

The results of this vast intellectual development may be summarised as follows :

Indiscriminate and speculative use of the term 'system' has caused confusion and fragmentation into information systems, service systems, living systems and so on.

Teaching 'systems' is difficult, not much to learn, and currently restricted to university level.

The influence of the 'structural or systemic view' on society has been negligible.

Few attempts have been made at integration of the 'systemic view' with disciplines like biology, chemistry, nuclear physics, social science etc.

The 'structural or systems view' has no firm foundation in the accepted branches of knowledge and it is out of context with human intellectual endeavour. A diagrammatic representation of the latter situation is attempted in Fig.1.

Suggested alleviation of the problem

This is seen as introduction of a 'systems science' through a paradigm change to supplement current developments in the 'structural or systemic view' (Korn, 2015). 'Systems science' is to follow the methodology of the highly successful and influential 'conventional science' but with

systemic content. In other words, 'systems science' or the 'science of structures' is to consist of = 'A set of principles regarded as basic and a symbolism of models capable of exposing them to at least thought experiments' which is exemplified by Newton's 1st and 2nd law respectively.

In addition the proposed 'systems science' must be capable of :

Application to scenarios with living, in particular human, components with will, ambitions, intellectual and emotional mental states as well as physical states specified by qualitative or quantitative properties at the object level.

Aiding the design part of problem solving which leads to systems engineering including and beyond the technical sense of the term.

Integrating 'conventional science' into 'systems science' resulting in the three cultures of arts, systems science and systems engineering (Lewin, 1981).

Making use of computers through its particular models.

The objective of current work is to deliver 'systems science' as outlined for debate and review and, if passed, to further develop for use in analysis, design and teaching complex scenarios in static and dynamic states (Korn, 2009, 2012, 2013, 2016).

Outline of systems science

This is summarised as principles including the basis of linguistic modelling developed from stories or narratives in natural language, the primary means for modelling scenarios.

1. Principle of identity

The 1st principle asserts that any theoretical object can be identified by its structure including living, chemical, nuclear, galactic modulated by quantitative/qualitative properties of its selected aspects. This leads to belief that the 'structural or systemic view' of parts of the world as indicated in Fig.1. is pervasive, indivisible and empirical and has a single domain as opposed to 'conventional science' which is domain dependent. Quantitative/qualitative properties are incidental or situation dependent.

2. Principle of analysis

The 2nd principle provides the means of analysis or converting selected parts of the world into 'static' or 'dynamic' models expressed by the symbolism of linguistic modelling or network analysis of engineering systems (Korn, 2012, 2016).

Development of the symbolism begins with constructing a story or narrative describing a scenario in natural language leading into homogeneous language of 'one – and two – place sentences' called elementary constituents, of which variety of complex scenarios can be constructed. 'Bricks' in building construction play similar part.

On this basis : Qualified theoretical objects are connected into -- Static structures of 'linguistic network' of ordered pairs, or Dynamic structures of 'semantic diagram' of predicate logic statements as shown in Fig.2.

The elements of symbolism or 'invariants' which regularly recur are :

I. Classes of theoretical objects or elementary properties like length

II. Relations producing static states recognised by stative verbs

III. Interactions producing dynamic states and recognised by dynamic verbs designating physical power (carrying energy) or influence (carrying information, use, money or meaning)

IV. Qualifiers (adjectives (properties), adverbs) for specifying individuals from a class which all together constitute the elements of linguistic modelling.

3. Principle of change of state

The 3rd principle introduces the structure of change, both in accordance with purpose and by chance in the natural, technical and living (individual and social) spheres.

4. Principle of hierarchy

The 4th principle outlines how hierarchy can be understood and modelled showing how complexity is related to new, emergent properties of aggregates.

5. Principle of synthesis or design as part of problem solving

The 5th principle suggests the idea of universality of problem solving activity in the living sphere as gravity is in the material sphere. 'Systems science' acts as knowledge base in design aiding development of 'models of prototypes' of 'products and systems'.

6. Principle of ideas

The 6th principle asserts the role of ideas in generating policies, desires, inventions, intentions which may serve as objectives for the activity of 'purposive systems'. This principle has been included as the '5th cause of Aristotle' (Korn, 2016) which with the other four comprise the basis of the three cultures (Lewin, 1981).

Logic of systems science

According to the 1st principle : The 'structural or systemic view' is universal. Hence,

1. It has a single domain of the inanimate natural, living and artificial spheres and it is indivisible and empirical,
2. This is followed by a single scheme for describing activities :

(Management)/PRODUCER – PRODUCT – USER/Consumer 1.

which is the subject of analysis as in Fig.2. or the object of design (model of prototype) and in which 'Management' in brackets becomes null in case of inanimate, non purposive structures/systems,

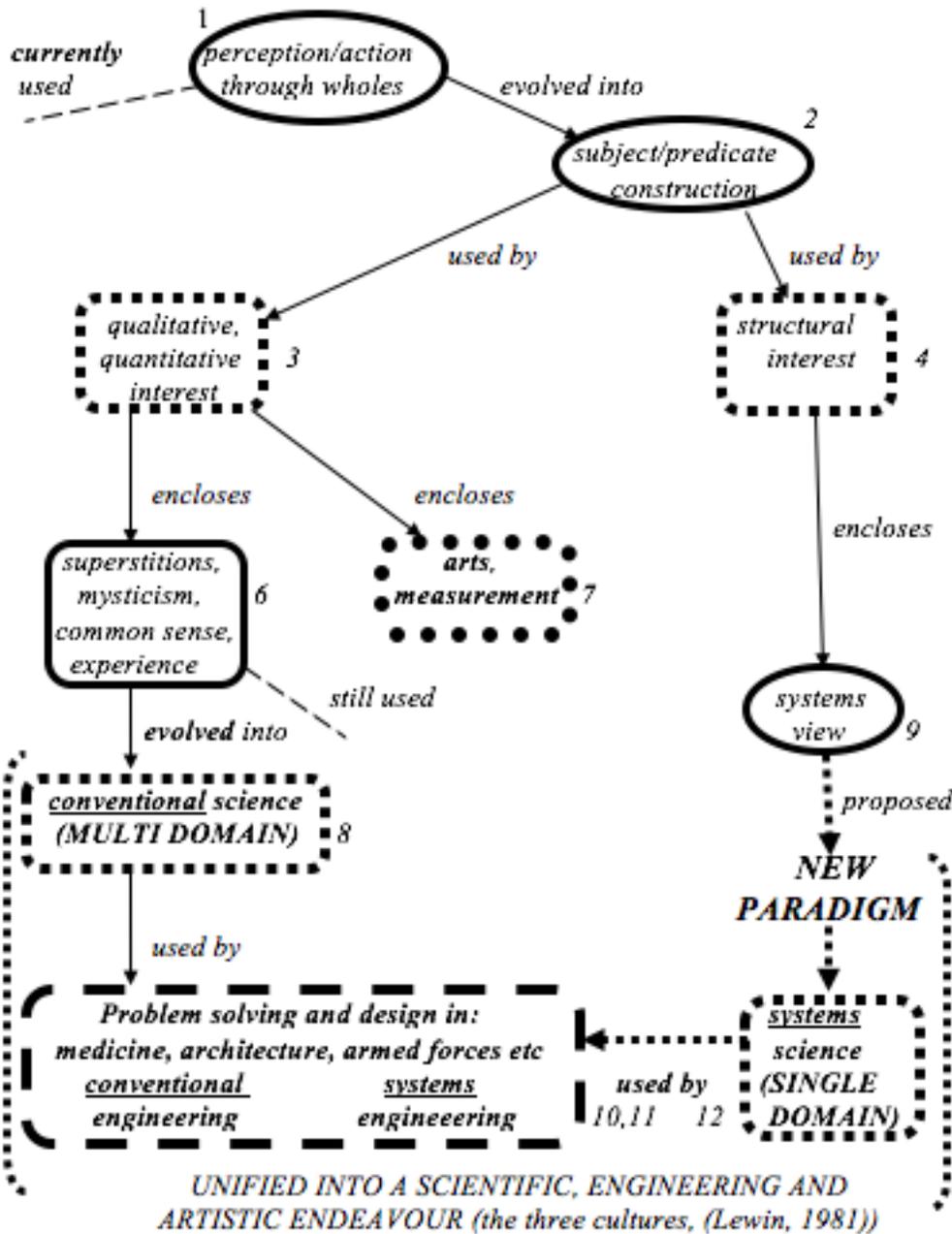
3. And is modelled by a single model of linguistic modelling of elementary constituents so as to MATCH, or not, the PRODUCT to USER/Consumer in accordance with 'requisite variety' (Korn, 2016), which suggests the notion of a General Systems Theory.

Conclusions

We have introduced an outline proposal for 'systems science' to supplement the current trends prevailing in the 'systemic view' and to offer it for debate. The methodology of 'systems science' has the characteristics of 'science'. It operates in concrete, symbolic terms, it is suitable for analysis of human activity scenarios and aids design unlike 'conventional science'. It has its roots in branches of knowledge, it is part of human intellectual endeavour as in Fig.1. and it is highly amenable to teaching. With computer aid (not yet available), the effect of variation of characteristics of constituent objects on the kind and acceptability of outcome can be explored repeatedly.

'Systems science' can influence society through its aspect of problem solving. It can have high informatic content (precision) and cognitive value (knowledge of parts of the world) and suitable for application of computers.

Figure 1. Diagram of constituents of human intellectual endeavour



An example: The following story describes a scenario 'John was fed up with his job so he wrote a letter to his boss saying that he, a high wages man, resigns unwillingly from the company with good working conditions. He then sent the letter to the boss'. The procedure set by 'linguistic modelling' is followed:

Homogeneous language of context free sentences ---

John wrote a letter

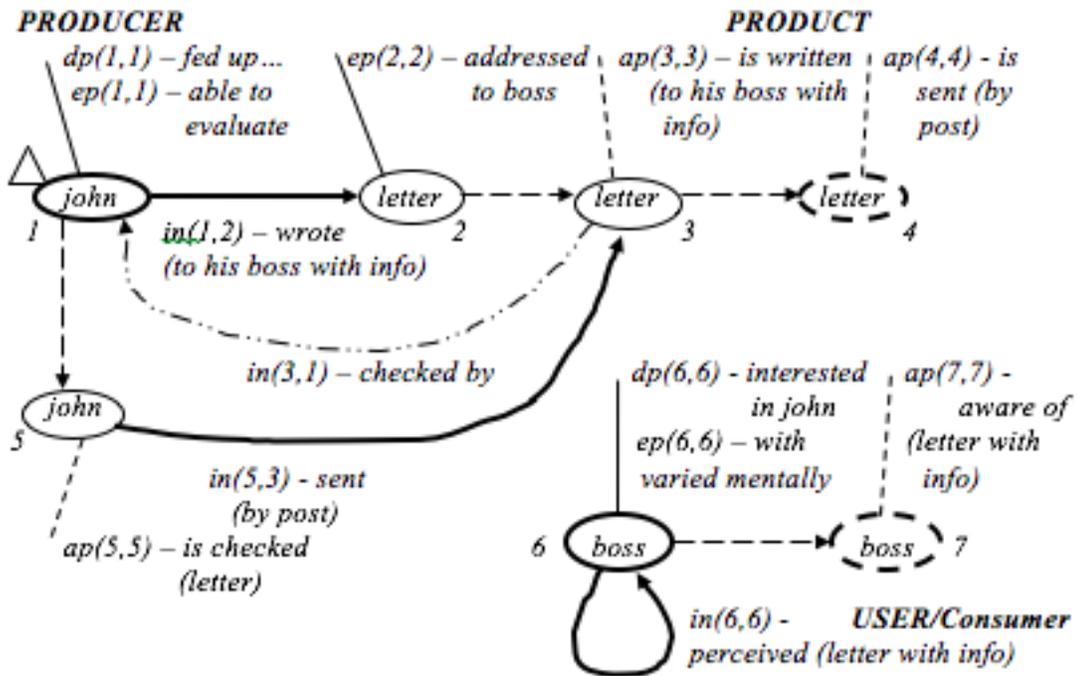
John sent the letter

which are obtained from 'linguistic analysis' of the story.

Semantic diagram ---

Shown in Fig.2., and so on to follow the procedure (Korn, 2009, 2016)

Figure 2. Semantic diagram of information system of john scenario



Triangle at contour 1 indicates decision point due to feedback link 'in(3,1)'.

leading to the 'ordered pair', 'n_{7,12}' at object 7, the 'boss' with outcome or output, if any:

At ap(7,7)

n_{7,12} = (with varied mentality) boss (aware of) letter (with information)

from which

output = state (boss with varied mentality) times input (boss (aware of) letter (with info))

which says that 'boss with varied mentality (helpful, resentful...)' and 'he/she is aware of the letter with information' so for an output to exist or for the 'boss' to respond the relation between 'state' and 'information input' needs to be examined and debated. A treatment and details of 'information' is given in (Korn, 2013, 2016).

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Systems thinking applications for markets and firms

Implementation effects in the relationship between CRM and its performance

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ABSTRACT

Customer relationship management (CRM) is one of the most frequently adopted management tools and has received much attention in the literature. This study advances research on CRM by investigating the impact of the relative time according to which interventions are implemented in different areas (customer management, CRM technology, organizational alignment, and CRM strategy) on CRM performance. This empirical study, based on 142 responses from Europe and 208 responses from the US, with a good balance between small and larger companies, contributes to the understanding of CRM projects' failure rates by taking the distinct CRM dimensions and their relative time of implementation into account. More precisely, this paper intends to advance knowledge in the CRM field by investigating whether (1) the relative time of the four CRM dimensions' implementation matters in the performance enhancement process, and whether (2) a delay in the organizational alignment activities' implementation has a negative impact on CRM performances. We recognize these activities as more critical and in need of priority in a CRM process. To the best of our knowledge, this is the first empirical study to shed light on the CRM-performance link by taking the relative time of CRM activities' implementation into account.

Keywords: *Customer Relationship Management, Performance, Time of Implementation, Service-profit Chain, Loyalty.*

Future Proof Strategies and Concepts for Business Systems based on Systems Thinking and Sensitivity Analysis

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ABSTRACT

Exponential global interconnection, population growth, climate change, migration crisis, military conflicts, but also digitalization and disruptive innovations in many fields are impacting strongly all businesses, societies and nature, overcoming all geographic constraints through high speed communication. As a consequence, in the past 25 years, huge and highly complex, interdependent and crosslinked systems have developed and surprise with their systemic behaviour.

But due to usual linear and unsystemic approaches, through usual isolated government, management and education, it seems that the worldwide situation is widely changing for the worse, despite of the auspicious promises of digitalization.

Most decision makers are not really aware about the systemic and cybernetic laws, which would help to understand and to govern these systems.

From the view of experienced systems researchers and practitioners, only the consequent use and application of systems thinking, of system oriented government approaches, methods and tools would support the development of better, of future proof and of really sustainable strategies and solutions.

The authors experience is based on long years co-development, research, practical application and implementation of the methods and tools of two pioneers of system-oriented planning and management: the German biocybernetician, systems researcher and environmentalist Prof. Frederic Vester and the Austrian-Swiss management cybernetician Prof. Fredmund Malik. Vester introduced the term “interconnected thinking” to a wide public in the 80ies and 90ies, developing the computerized tools of his “Sensitivity Model” and his environmental computer simulation game “ecopolicy”. F. Malik, focussing on the work of management cyberneticians like Stafford Beer and Ross Asbhy, developed his “Holistic Malik General Management Systems, thus offering various tools and approaches for a profound application in the business context.

In hundreds of projects their approach was implied and continuously further developed, very often combined in different steps: a playful introduction into the systemic approach with ecopolicy®, interactive modelling of the systemic interconnections and behaviour with a Sensitivity Model, including participatory processes. With the Syntegration as an effective and efficient group process of interconnection of information the development of decisions and measures, of systemic prioritization and implementation, surrounded by system based management education and models gives a full tool box for the practitioner in business and politics.

Three published projects on different levels shall be introduced:

System Analysis “Renewable Energies”. Deriving a Strategy for Dynamic New Heat Markets in Germany. BEE e.V, German Association of Renewable Energies, Berlin 2015

Regional model for viability of 52 communities: development of a regional model and of development strategies for 52 mountain communities in the Swiss Kanton Wallis, 2011.

Future Forest Sensitivity Modelling: in the frame Interreg-Project FUTUREforest, experts from the forestry business of seven European Countries developed in a series of workshops from 2009 to 2012, system based measures for the European Forestry Industry in order to cope with Climate Change.

Sensitivity Analysis has recently been applied in Urban Development Projects like the Morgenstadt project “Smart Cities of Fraunhofer to huge projects in China. Syntegrations helped insolvent cities to develop and implement measures to maintain their public services or gave a valid basis for decision making and development of new business models A Sensitivity Model which has been worked out interactively by the relevant parties of a business system, will help the responsible players to understand their system as a kind of Knowledge Management. They will understand the relevant influence factors, will evaluate their effects and will identify and to use the real levers to initiate the necessary transformation. If-When scenarios and a transparent simulation show the consequences of decisions and paths of developments, a biocybernetic evaluation will secure the viability and sustainability. With that model, a commonly understandable “map” is available in order to navigate and adapt in the permanently changing world. It will follow the need of applied systems thinking in business, politics and education and will enable the participants in short time to develop and implement future proof solutions.

Keywords: *Systems Thinking, Sensitivity Model, Biocybernetics, Sustainability, Viability*

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In Search for Radical Inspiration – Using Cognitive Systems Thinking to Introduce a Framework Fostering the Creation of Innovations

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ABSTRACT

Introduction

Innovation and the creation of new knowledge are key drivers for the success of organizations (Ilinitich, 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).

In this paper, we will take a systems approach on the cognitive foundations, which could lead to the creation of radical innovations. So far, systems thinking has been applied to knowledge management in general (Rubenstein-Montano, 2001); however it has not been used in the context of knowledge creation. We want to close this gap and argue that radical innovations may be triggered by what seems to be a failure of a cognitive system as they are new and unexpected and disrupt the homeostatic state between the environment and cognitive processes. We want provide a framework suggesting concrete strategies and techniques to foster such failures.

Systems Thinking in the Context of Cognition

Since its emergence in the 1950s, the field of cognitive science has gone through various paradigm shifts (Kuhn, 1970) for approaching the phenomenon of cognition. After a phase that was inspired by cybernetics, the first paradigm conceived of cognition as computational

processes that are realized as (syntactic) manipulation of symbols (compare Newell and Simon's (1976) Physical Symbol Systems Hypothesis). Gradually, researchers acknowledged that a purely logic-based approach to cognition was not adequate and started to focus on the neuroscientific foundations and the processes of knowledge construction/learning in the brain (i.e., connectionism; e.g., Bechtel and Abrahamsen, 2002). A more recent paradigm in cognitive science takes an approach that is partly based on a dynamical systems perspective: cognition is understood as embodied, embedded in the cognitive system's environment, enactive, and extended (e.g., Clark, 2008; Menary, 2010). One of the central (epistemological) points of this approach is that a cognitive system is embedded in its environment, which it has to make sense of in order to successfully interact with it (Maturana & Varela, 1980; Glasersfeld, 1982). The dynamical perspective on cognition is inherently based on a systems approach: through interaction, a cognitive system incorporates features of the environment to create equilibrium and to maintain its homeostatic state. Thereby, it learns to know, expect, and predict (Glasersfeld, 1982; Piaget & Inhelder, 1971).

Recent developments in cognitive science and neuroscience claim that cognitive systems interact with the world by testing hypotheses about the world and by applying cognitive schemata that have proven successful in the past (i.e., the predictive mind hypothesis; e.g., Hohwy, 2013). Over time, our thinking becomes entrenched by a set of causal beliefs, which navigate thinking, perception and behaviour; they underlie most of our assumptions, opinions and premises (Klein & Baxter, 2009; Riegler, 2012). These predictive schemata are exactly the opposite of what is necessary for (radical) innovations, as they are top-down projections from our past experiences rather than perceptions of unknown future possibilities. In fact, they can be considered as key obstacles and it is necessary to leave them behind, if we want to create radical innovations.

Research Gap and Question

Radical innovations entail features, which are new and (yet) unknown. In order to create them, we need both an unbiased look at the world and radical inspiration. In other words, we need triggers that challenge and disrupt the way we think about and look at the world (Scharmer, 2007). Only then we will be able to discover the potentials and opportunities that are hidden behind the patterns of our own cognitive projections.

How can we find and develop such triggers? The problem goes beyond the mere existence of cognitive schemata. Rather it is about epistemic skills and attitudes, such as openness, being able and prepared to reflect on one's assumptions and schemata, understanding one's patterns of perception and thinking, etc. To a great extent, these schemata are deeply rooted in our conscious and unconscious thinking. Top-down processes in the human brain affect what we see, hear, and feel (Mesulam, 1998). We cannot simply decide to drop these schemata and take a "fresh" look at the world. Rather, we stick to holding on to them as they provide security, stability, and regularity (McWilliams, 2010).

When we perceive the world we do not continuously scan the environment in an open and unbiased manner; rather perceptual mechanisms only occasionally check whether the sensory information corresponds to our expectations, underlying assumptions, and experiences (Hohwy, 2013; Riegler, 2012). What happens, if the expected sensory information does not fit the actual stimulus in the environment? This situation is central for our issue concerning the creation of new knowledge and (radical) innovations. From a predictive mind and constructivist perspective, such

triggers for (radical) innovations are seen as “perturbations” (Maturana & Varela, 1980) or failures in the cognitive system (in the sense of inappropriate predictions) – as they are new and unpredictable, they disrupt the modus operandi of our thinking. Hence, such “failures” can act as triggers for radical innovations, since they force us to leave behind the patterns and paths of our ordinary thinking (compare also with the concept of a paradigm shift in science; Kuhn, 1970; Lakatos, 1976).

In this article, we are going to investigate how we can actively bring about such failures and irritations. It will be shown that it is possible to prepare and shape/train our cognitive processes as well as epistemic attitudes in such a way that they get more responsive to discrepancies between expected and actual environmental stimuli. Our research question:

What are possible strategies for irritating and perturbing the epistemic equilibrium between our cognitive processes and the environment to trigger the creation of (radical) new knowledge?

Preliminary Findings and Outlook

We will provide a systematic framework along with concrete tools, which can be used in the realm of business and management to support practitioners and decision-makers to extend the boundaries of their thinking. In order to reduce top-down processes and overcome our cognitive rigidity, we suggest two possible strategies for irritating and perturbing the (epistemic) equilibrium between our cognitive structures and the environment in order to trigger radical inspiration:

- A. We can modify our knowledge structures embodying beliefs, assumptions, and expectations about our environment. Our findings suggest that there are three strategies to do so: (i) We can make knowledge explicit in order to identify and change our patterns of thought (Akguen et al., 2007). (ii) We can prevent future knowledge from being straight-forward projections from the past or current knowledge (Seligman et al., 2013). (iii) We can follow vague hunches or intuitive – but unjustified – thoughts and make them viable, i.e. bring them to life (Bettoni & Eggs, 2010).
- B. We can transform our perception of the world. We identified three strategies: (i) We can sense and cultivate mismatching experiences and use them in order to restructure our thinking (Piaget & Inhelder, 1971). (ii) We can use techniques in order to reframe our perspective on the environment (Shurick et al., 2012). (iii) We can seek other’s perspectives to couple our cognitive structures with their experiential realities (Maturana, 1999).

We will use various fields such as design thinking, psychology and cognitive science in order to provide concrete tools that allow for pursuing these strategies.

Keywords: *cognitive systems thinking, radical innovation, knowledge creation, inspiration, cognitive science*

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From Innovation To Business To Value By Sharing Data

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ABSTRACT

The dairy industry in the Netherlands, the fourth largest supplier of dairy products in the world, is subject to a number of dynamics recently. A period of 30 years of production quota, stable milk prices and limited competition has come to an end. Phosphate restrictions become effective and the sector is being confronted with an increased societal interest with respect to food safety and animal wellbeing. Furthermore, the sector has observed the growing importance of big data and internet of things applications, exemplified by entrance of numerous start-ups and accumulating to strong positions of industry players such as John Deere and Monsanto in the sector.

Three large cooperatives in dairy production, animal foods and breeding have joined forces and acknowledged the potential of animal specific precision farming by means of data services. Together with industry players and academia a platform to publish and share (but not store) data to models and data services has been developed as a key enabler for developing models and services that substantially increase individual dairy cow wellbeing and productivity. The challenge the Smart Dairy Farming collaborative innovation is facing is the shift from an innovation ecosystem into the business ecosystem.

Although most players endorse the potential for the sector that these precision models based shared sensor data has, it is not clear exactly who's taking which role. Currently the businesses of these cooperatives are rather well separated. However, soon they will all enter the business of data-driven services. As have milking-robotics vendors and other cowshed equipment vendors. The farmers, who are both at the origin as well as the end-user of data-driven services are not too keen on buying back their own data. These new business models have to be clear, if these players are to continue. Similar challenges are present in many more data driven collaborative innovations, such as can be found for instance in other Smart Industry field labs in the Netherlands or in Industrie 4.0 in Germany. In order to stimulate progress, we asked the research question how ecosystem thinking is useful in orchestrating innovations.

However, despite the streams on literature on both ‘business ecosystem’ and ‘innovation ecosystem’, we found no theory to neither describe nor provide guidance to managing this challenge. The field of ecosystem theory is fragmented (Fransman, 2014; Letaifa et. al., 2013). From among the works of Adner & Kapoor (2014), Autio & Thomas (2013), Adner (2012), Iansiti & Levien (2004), and Moore (1993) we linked these two concepts to each other by

positioning the innovation ecosystem as a sub set of the business ecosystem. The innovation ecosystem elements work to develop a new collaborative value proposition that challenges the existing business ecosystem structure. The extent to which incumbent elements and relationships are challenged depends on the disruptive or sustained character of the innovation ecosystem. In order to assess a disruptive or sustained character of innovation ecosystems we introduced properties based on how innovations emerge in ecosystem for each lever of value creation (Amit & Zott, 2001). Guidance thus should be based on drivers that stimulate or hinder the growth of innovation ecosystems, by examining how opportunities or bottlenecks emerge that hinder the expansion of an innovation ecosystem and by looking at business ecosystem players' explorative or exploitative perception towards the innovation ecosystems' new value proposition.

We have adapted the MOBENA methodology of Battistella et. al. (2013), which is originally focused on overall industry as a level of analysis and uses network analysis tools, into a qualitative methodology, focused on the innovation ecosystem level (project level) by studying individual behaviour characteristics of firms. In order to link project level findings with macro level developments, we introduced a fifth step for the MOBENA methodology in which we aim to form a link between explorative and exploitative properties at the project level with the formation of opportunities and bottlenecks. The steps in the methodology are identification of players; model delivery of the new innovation; analysis of the economic structure; development of innovation ecosystem evolution scenarios and formulation of an action plan to overcome identified bottlenecks and utilizing opportunities.

We have tested our defined concepts via an empirical study into the innovation project of Smart Dairy Farming (SDF). We have deployed mixed data sources: project document analysis, interviews with stakeholder from both within and outside the innovation project and personal observations. The interviews were semi-structured following the structure of adapted MOBENA methodology and these were labelled using QDA mining software. Furthermore, stakeholders were invited to chart their perception of the likely and desirable evolution of the ecosystem.

Identified bottlenecks are standardization issues around data quality, sensor design specifications. Also no new market is created, so existing industry structures can hinder the roll out of new services based on the Smart Dairy Farming Infobroker. Furthermore, it is not yet clear who should manage the Infobroker and under what conditions and controls. Opportunities observed were new value creation possibilities in collaboration with other ecosystem players and the reinforcement of existing firm activities via participation in the Smart Dairy Farming project. These results show that the value chain configuration offers new business development opportunities for all involved players, but that the struggle for dominance between large players is hindering consensus on the data hub design specifications and appropriate business models. Furthermore, the third of the ecosystem control points 'data generation', 'storage & authorization', and 'services & terminals' is currently not addressed in the project.

The application of the adapted methodology shows that the concepts of innovation and business ecosystem can be linked and that this provides concrete input to manage the shift from a collaborative innovation into the business ecosystem. Using the ecosystem concepts of business ecosystem and innovation ecosystem helps us understand how innovation emerges and what dynamics surround their successful implementation. The implication for managers is: the focus on the innovation ecosystem level helps to identify tangible control points and elements (firms, institutions, technologies etc.) and to reduce complexity of the research scope. The implication for policy makers is: orchestrating innovation ecosystems (projects at the micro level) will lead to

transitions in society at the macro level. Therefore, policy should create a vision for business ecosystems (industries) to help them orchestrate into a certain direction.

Keywords: *business ecosystem, innovation ecosystem, data-driven innovation, precision farming, control points*

Synergy effect due to the common milieu for Facilities Management and Human Resources - way to the better competitiveness and effectiveness

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Understanding the Innovation Management Skills of the Agricultural Producer: A Systems Thinking Approach

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ABSTRACT

Introduction

The literature has emphasized the growing importance of examining the process of low to medium technological (LMT) innovation in many non-technological sectors (Grunert et al., 2008). The agricultural production sector offers an interesting context to study the process of non-technological or LMT content product innovation, given owner-managers of agricultural SMEs have a specific innovation culture. For example, it has been shown that agricultural owner-managers can create and develop competences to innovate to ensure the economic viability of their businesses (De Wolf et al., 2007). In addition, given the LMT product innovation content at the farm level, there are intrinsic limits on the extent of possible outcomes. However, many have also insisted that policy makers should give a higher priority to the role of knowledge creation and innovation development as a source of competitive advantage in LMT sectors such as production agriculture (Evers, 2011; Damanpour & Aravind, 2012).

Thus, the objective of this presentation is to contribute to a deeper understanding of emerging issues regarding the competencies and capabilities agricultural production owner-managers can incorporate into the management aspect of the entrepreneurial business development to innovate with LMT content products. Beyond identifying, antecedents, mediators, and outputs, it remains important as part of an exploratory case study research, to also identify the LMT processes involved. In particular, the approach taken in this presentation makes use of the qualitative principles of system dynamics (SD) (Luna-Reyes & Andersen, 2003) to represent the feedback loops involved in competence development by agricultural production owner-managers regarding how they manage LMT content in agricultural product innovation. The syntax of the SD approach to depict reinforcing or balancing feedback loop representations (Senge, 1990), is applied as a system thinking (ST) research method in this work. The outcome from the proposed representation can be viewed as a dynamic hypothesis (DH) (Sterman, 2000) which allows for the examination and interpretation of the complex system of knowledge management in LMT content in product innovation.

Theoretical Background

Salvato and Rerup (2011) indicate that skills and competences relate specifically to the individual, to the person, while the notion of capabilities refers to aggregates such as business units. The owner-manager management of SMEs is characterized by decision processes which are imbricated with personal goals; such that for both short and long-term perspectives, and implicitly, they are difficult to be dissociated from “the company’s” (Filion, 2007; Evers, 2011; Nakara et al., 2012). The specificities of their management practice come from: personal knowledge, talents, motivations, beliefs, values, personal interests and decision-making skills (Nonaka, 1991; Spiegler, 2000; Aguinis, 2009). Also, their senses enable them to efficiently capture information as levers for decision-making management through the proximity of the business unit (Shapero & Sokol, 1982; Kor et al., 2007; Torrès, 2007). In short, this literature indicates that owner-managers of SMEs make innovation decisions to meet the demand and remain profitable.

Popadiuk and Choo (2006) became interested in the relationship between the concepts of innovation and the generation of knowledge. On this matter, knowledge sharing is essential to determine how the resulting innovation is tailored to realize its potential, in terms of effective action and providing added value for the venture. Trienekens et al. (2008) have identified the critical success factors (CSFs) of an innovation. The CSFs that determine if there is product innovation are: "any change" or "new way" of doing. Such indicators of innovation can take the form of: new knowledge about a product or its design, decision-making knowledge or competences of producers, or knowledge about the market and the environment of the production unit. However, the tacit knowledge that encourages the germination of ideas for innovations and competitive advantage stems from the explicit knowledge of the market needs (Tuomi, 1999; Popadiuk & Choo, 2006; Jamrog et al., 2007).

The decision-making process based on the skills of the owner-manager, is part of knowledge management which, in turn, promotes the dynamic interactions of tacit and explicit knowledge. Under certain conditions, these dynamic interactions will stimulate and encourage innovative ideas. The stock of tacit knowledge, decision-making skills and the intensity of knowledge sharing often compensates for the lack of resources (Torrès, 2007; Evers, 2011) which could be dedicated to R&D.

More often than not, agricultural managers’ environments are bound by competitive markets, the unique set of rules and regulation, and institutions, which affect its value-creation proposition, as well as its natural environment (climate conditions, etc.) (Bijman & Tait, 2002; Sumberg & Reece, 2004; Evers, 2011; Bansal & Knox-Hayes, 2013). The competitive market and institutional agricultural environment generate a flow of information and innovation in new product variety, new technological processes and production processes (Brewin et al., 2009; Ryan, 2010; Van der Veen, 2010).

Grunert et al. (2008) emphasize the importance of establishing a network of relationships with customers, suppliers, research institutions, in order to increase the innovation success. The interactions with the network generate new knowledge and improve management skills. Thus, the management skills are all decisions and actions taken deliberately or spontaneously to interact with the reality of the environment (natural, institutional and business) to achieve the desired market value proposition.

Methodological Framework: The Qualitative Principles of System Dynamics

SD is a method used to enhance learning within complex systems (Senge, 1990). Managers have a bounded rationality (Simon, 1959). When management problems occur, the manager sees only the tip of the iceberg, and less often than not, they are not realizing the complexity of problems they faced (Senge, 1990; Miling, 1996; Sterman, 2000). In management, the school of soft systems thought includes several notable experts who have used such modeling principles in research (Le Moigne, 1984; Senge, 1990; Yolles, 1999; Jackson, 2000; Bausch, 2001). More specifically, the SD approach, introduced by Forrester (1958), and later on refined for qualitative or softer use in organizational contexts, was used to study the influence of agricultural reform policies to adapt to globalization issues (Weber & Schwaninger, 2002; Ghaffarzadegan et al., 2011; Lu et al., 2012). The SD approach is also used in research in the agricultural sector (Weber & Schwaninger, 2002; Declerck & Cloutier, 2010; Thomassin & Cloutier, 2001). Using SD, it is possible to better understand the impact of decisions on the endogenous structure of the system under study. In addition, this approach allows researchers and managers to better understand how the performance of SMEs is closely related to their internal structure and strategies. The SD approach can help understand the innovation process involved due to the complex structure of feedback loop representations (Miling, 1996; Maier, 1998).

Based on the principles of SD, a qualitative dynamic hypothesis (DH) can be represented by an influence diagram (ID) to describe the structure of the interactions between the variables based on its observed behavior (Thiel et al., 2004). The development of a DH helps to highlight the managerial decisions which make possible to seize a business opportunity from LMT content product innovation ideas. More particularly, it helps the owner-manager to select ideas with added value (research) to meet its product development goal. The question on how it proceeds to strategically position itself in its environment is paramount.

This research makes use of Eisenhardt's (1989) approach to case study research. To achieve a theorization using a DH, the SD method also incorporates the early steps to SD model development as outlined by Sterman (2000) which are well-suited for qualitative studies (Luna-Reyes & Andersen, 2003). The approach used was introduced by Lu et al. (2012), which elements correspond to each of the stages of the innovation process, the purpose being to highlight the causal links and suggest a theorization (Eisenhardt, 1989). This DH articulates the results from the case study research analyses conducted with eleven agricultural SMEs. The data collection and methods from the cases examined support conclusions based on the criteria of external validity and transferability (Langley, 1999; Miles & Huberman, 2003). The resulting DH was developed in support of the analysis conducted using the SD qualitative method using the common variables emerging from the intracase and intercase study results, and the accumulation of the cases presented in the synthesis matrix of the innovation process (Miles & Huberman, 2003).

Results

Following the analysis, the results have highlighted three phases. Phase 1 describes the window of opportunity, from which emerge the innovation idea. The results of the analysis show that producers' business opportunities arose from their business environments and their knowledge (tacit and explicit) of the basic market conditions.

In phase 2, the intercase analysis revealed that producers carefully analyze the basic conditions of supply and demand of the market to determine how they could respond to market needs. The sharing of tacit and explicit knowledge encourages the emergence of a primary LMT innovation

idea. The justification for the concept of the product innovation idea by sharing knowledge within their network shows the importance of tacit knowledge sharing with the business environments given the natural environment constraints strengthen the differentiation of the innovation idea. As for phase 3 of the LMT innovation process, the intercase analyses have established that producers share their explicit knowledge with their network (family, peers, experts or groups, etc.) (Julien et al., 2004). This helps them to further develop the knowledge and “test” the profitability of the innovation before going forward. The preparation of a business model or a business plan increases the chances of the owner-managers’ product innovation success as suggested by the literature (Jamrog et al., 2007; Teece, 2007; 2010). The importance of communications and exchanges within the network for the development of knowledge was emphasized in relation to consumer needs. The knowledge sharing allows for its evolution; thus, stimulating R&D innovation by the owner-manager which compensates for the limited resources availability (financial and human resources).

Discussion and Conclusion

The resulting feedback loops highlighted in this research suggest that the owner-manager of a LMT SME is interested, involved, informed, and in fact carries out research on basic supply and demand requirements. The reinforcing feedback loop structure identifies indicates that knowledge sharing with a network of collaborators, suppliers, and customers can compensate for the on-farm level limited resources and help generate new innovation ideas. The owner-managers can identify the characteristics of other products and generate added value through new product differentiation in order to strategically position their product offer. The creation of innovation, its justification, as well as the development of a prototype is achievable through a network of relationships and the development of expertise. Based on the analysis depicted in the ID, to accelerate the success of the product innovation, from the first phase of the innovation process, it is essential to develop a business model or plan (Jamrog et al., 2007; Teece, 2007; 2010). The feedback loops reveal the importance of knowledge sharing to foster the generation of new knowledge when positioning and commercializing the innovation, to adapt adequately to the demand and provide the opportunity for the owner-manager to generate a rent.

The results show the importance of the mobilization of networks, since the owners-managers share their knowledge to conduct R&D activities to compensate for their limited resources and ensure the success of their innovation (Evers, 2011). Like shown by Schmitt and Janssen (2012) the results indicate that 'social capital' (sustainable relationship network) opens doors, reduces information and resource costs, providing a form of innovation risk insurance in case of disturbance. Jamrog et al. (2007) and Teece (2010) suggest that economic development organizations should accompany and support the owners-managers to achieve a business plan as soon as they identify an opportunity.

The ID helped illustrate the complex system of the generation of knowledge for the development of the innovative skills for the owner-managers. Finally, this presentation has illustrated how the innovation process can be applied to LMT content businesses (Evers, 2011; Damanpour & Aravind, 2012).

This research emphasizes the importance of ST in the management of innovation skills of the owner-manager of small agricultural business. The results contribute to the literature in innovation management by illustrating the process of creating an LMT innovation using SD. ST allows for the examination of the system’s levers and the sources of resistance or strengthening.

These levers underscore the value of realizing new learning on the management of agricultural decision-making and innovation skills for the SME owner-managers.

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Analysis of FABRIC Dynamic Actors Network Analysis model in different scenarios

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ABSTRACT

On the pathway towards an environmentally sustainable transport system, Electric Vehicle (EV) is perceived as a potential solution. However, extensions of EV implementation are constrained limitations of current energy technologies such as battery capacity. Dynamic on-road charging solutions, popularly known as Electric Road Systems (ERS), which supplies electricity while EV driving on the road can help EV users to overcome the battery capacity bottleneck. Some countries already have small-scale ERS test cases, but the impact of large-scale implementation of ERS in a real transport system is still a question mark. Although the technology is already being tested, there is still a question before ERS comes to the actual market: What will be the impacts of ERS on ERS stakeholders?

In this paper, in order to show the influence of stakeholders, Dynamic Actors Network Analysis (DANA) software is used to show under certain scenarios assumptions, what will be potential factors that will influence stakeholders and the goals in ERS. DANA is a graph-based method, which aims not only show the relations of a system but also analyze a context in a system by modeling how actors view an issue or action.

The data are collected from literature reviews and interviews with stakeholders of FABRIC project before using DANA to formulate the cases. Then the goals, positions, factors and relations of potential stakeholders are mapped. FABRIC project is a feasibility analysis project focus on ERS in long-term range. All factors like charging technologies, infrastructures, ICT technologies, safety and social factors will be considered in FABRIC project and try to foresight the future opportunities and challenges in ERS. In this paper, DANA model will be assessed and changed to reach potential stakeholders expectation. Actor analysis method is almost exclusively used in policy analysis domain. Policy makers need a method to assist with defining the content of policy problems and on designing and evaluating alternative solutions (Hermans & Thissen, 2008). In this paper, actor analysis methods are applied to analyze the stakeholder graph and possible influencing factors both internally and externally. The result of this paper is the stakeholder network perception graph under different scenarios. Combined with this graph, the potential ERS decision makers can have a foresight of the impacts of future ERS. Potential ERS stakeholders might also be interested in considering this to uncover what will be the influence affecting them from ERS. This study contributes to exploring the potential impact of ERS from the stakeholders' point of view and engages the potential stakeholders.

Investigating Consumer Confusion Proneness Cross-Culturally: Empirical Evidence from the United States, Germany, and Thailand

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ABSTRACT

Introduction and Background

Walsh, Hennig-Thurau and Mitchell (2007) contend that confusion is an uncomfortable psychological state that pervades almost every decision that consumers make and incidences of consumer confusion have been reported in many different countries and in a host of markets such as; consumer electronics (Chen and Chang 2013), watches (Mitchell and Papavassiliou 1997), telecommunications (e.g., Kasper et al. 2010), online tourism (Lu and Gursoy 2015) and own-label brands (Balabanis and Craven 1997). However, incidences of consumer confusion have been predominately reported in western societies, such as the UK (e.g., Mitchell and Bates 1998) or the Netherlands (Kasper et al. 2010; Poiesz and Verhallen 1989). In contrast, consumer confusion, with few exceptions (e.g., Chen and Chang 2013), has received almost no attention in Eastern collectivist countries, such as Thailand. Moreover, despite garnering interest among marketing researchers and practitioners, the consumer confusion proneness construct (Walsh et al. 2007) suffers from slow uptake. This slow diffusion might occur because the original scale development took place in a German market context, which differs from other Western contexts with regard to product variety, advertising intensity, and consumer education (Walsh et al. 2001). The pertinent literature suggests that consumer behavior and vulnerability differ across cultures. Thus, scholars might be reluctant to adopt the scale to measure consumer confusion proneness in other countries.

The field therefore needs a thorough reexamination of the confusion scale and its measurement properties in other cultural contexts. This observation is supported by Triandis's (1982) observation that virtually all psychological related theories have been derived in the U.S. and in Europe, and that few of these theories have been subjected to validation outside of Western cultures (Wong, Rindfleisch, and Burroughs 2003). In effect, consumer confusion research to date stands guilty of being highly western-centric. This study, therefore, aims to address this criticism by exploring consumer confusion in three countries—the U.S., Germany (representing Western individualistic countries), and Thailand (representing an Eastern collectivistic country). A review of the literature (e.g., Mitchell, Walsh, and Yamin 2005; Walsh et al. 2010) reveals that the concept of consumer confusion can be traced back to three different areas: (1) brand similarity, (2) information overload, and (3) information ambiguity. Accordingly, Mitchell et al. (2005) conceptualize consumer confusion proneness as a three dimensional construct, briefly discussed within the context of a conceptual background.

Similarity Confusion Proneness. Similarity confusion proneness is defined as a consumers' propensity to think that different products in a product category are visually and functionally similar (Walsh, Mitchell, Kilian, and Miller 2010). This results in consumers potentially altering their choice because of the perceived physical similarity of products. The implicit assumption is that consumers rely on visual cues to locate and distinguish brands and when presented with similar brands, can buy a fake or a retailer own-label brand thinking it is the original. Similarity in advertisements and commercial messages may also stimulate similarity confusion proneness (e.g., Brengman, Geuens, and De Pelsmacker 2001; Poiesz and Verhallen 1989).

Overload Confusion Proneness. Walsh et al. (2007) define overload confusion proneness as the consumers' difficulty in product decision-making when confronted with more alternatives and information than they can process. This results in consumers having difficulty to get to know, to compare and to comprehend alternatives.

Ambiguity Confusion Proneness. Ambiguity confusion proneness is defined as consumers' tolerance for processing unclear, misleading, or ambiguous, product-related information (Turnbull et al. 2000; Wang and Shukla 2013). Other researchers have stressed different aspects, such as; product complexity, ambiguous information or false product claims (e.g., Chryssochoidis 2000) or non-transparent pricing (e.g., Berry and Yadav 1996), all of which cause problems of understanding on part of the consumer.

Method

After conducting a pretest of the questionnaire in the U.S., Germany, and Thailand, self-administered questionnaires were distributed to students and non-students in these countries. The U.S. and Thai groups consisted mainly of students enrolled in marketing/business classes at large universities in the U.S. and Thailand. The German group consisted of members of the general public. In this research, samples of 355 German, 434 U.S., and 202 Thai respondents were interviewed.

The questionnaire was pre-tested amongst participants from all three countries to achieve conceptual and instrument equivalence criterion. Confirmatory factor analysis (CFA) was performed to test the appropriateness of the original factor structure (Walsh et al. 2007) in the three countries. Three separate CFA were performed using AMOS with the maximum likelihood technique being used as an estimator due to its general superiority to other estimation procedures. The results are presented in Table 1.

Table 1. Confusion Measurement Model Results

	<i>U.S.</i>	<i>Germany</i>	<i>Thailand</i>
<i>GFI</i>	0.91	0.96	0.92
<i>AGFI</i>	0.88	0.93	0.89
<i>RMR</i>	0.079	0.087	0.063
<i>RMSEA</i>	0.073	0.091	0.042
<i>CFI</i>	0.93	0.94	0.88
	<i>Coefficients of Determination / AVE</i>	<i>Coefficients of Determination / AVE</i>	<i>Coefficients of Determination / AVE</i>
<i>Stimulus Similarity Proneness</i>	0.31; 0.42; 0.46; 0.14; 0.29; 0.29; 0.40 / 0.33	0.46; 1.00* / 0.74	0.16; 0.25; 0.59; 0.11; 0.13; 0.19 / 0.24
<i>Stimulus Overload Proneness</i>	0.24; 0.19; 0.11 / 0.21	0.39; 0.64; 0.46 / 0.51	0.17; 0.13; 0.47; 0.11; 0.38 / 0.25
<i>Stimulus Ambiguity Proneness</i>	0.12; 0.12; 0.10; 0.33; 0.56 / 0.25	0.61; 0.25; 0.47; 0.56 / 0.48	0.21; 0.30; 0.50; 0.22; 0.34; 0.25 / 0.23

*Parameter fixed to 1

For the German data, the removal of two items ensured global fit indices that suggested the model adequately represented the input data. The local fit of the model was also acceptable, with average variances explained (AVA) of .74 (for similarity), .51 (overload), and .48 (ambiguity). For all but one indicator (ambiguity), the coefficient of determination was higher than .35 (Bagozzi and Yi 1988).

The U.S. data provided no identification with the original consumer confusion model although the global fit measures were good the local fit indices (i.e., coefficients of determination, AVE) were poor. The model hence had to be rejected disconfirming the adequacy of the factor structure for the U.S. data.

The Thai data showed no identification with the original consumer confusion model, although the global goodness-of-fit indices were acceptable too many items had coefficients of determination below the threshold of 0.4 and the model was, therefore, rejected. As model identification is a necessary condition for model fit and interpretation, this result clearly disconfirms the adequacy of the factor structure suggested by Walsh et al. (2007) for the Thai data.

Following disconfirmation of the original model structure in the U.S. and Thailand, exploratory factor analysis (principal component method with varimax rotation) was performed to develop a model of consumer confusion that fitted the U.S. and Thai data better and to obtain a more meaningful factor structure. For consistency, it was decided that factor loadings should not be below 0.4.

U.S. data. The measure of sampling adequacy of 0.85 ('meritorious') was computed. The analysis of the 12 items produced a three-factor solution with 39% of the total variance explained. The alpha coefficients for all three subscales were below the recommended threshold of 0.60 for exploratory research.

Thai data. The measure of sampling adequacy of 0.70 was computed, indicating a 'middling' score. The analysis of the 12 items produced a three-factor solution. One item was dropped due to low inter-item correlations. The final extracted solution accounted for 51% of the total variance explained.

The alpha coefficients for two of the three subscales were below the recommended threshold of 0.60 for exploratory research, however it was acceptable for the 11-item scale ($\alpha = .76$). It appears that the construct of consumer confusion proneness is more homogeneous in Thailand when treated as one overall phenomenon than when broken down into three individual dimensions. The factors found in this study are summarized in Table 2. The order of factors is

based on the amount of variance explained. Our findings suggest that the consumer confusion construct is different in Eastern countries such as Thailand. It seems that Thai consumers are more prone to perceive confusion than German and U.S. consumers (mean_{Thai} = 3.45, SD = .81; mean_{U.S.} = 2.98, SD = .57; mean_{German} = 3.12, SD = .94).

Table 2. Factors Found for Thai and German Consumer Confusion Proneness

Items	Factor Loadings	Mean
GERMANY	^a COD (from CFA)	
Factor 1: Similarity confusion	^c $\alpha = 0.65$	
Due to the great similarity of many products it is often difficult to detect new products.	0.61	3.44
Some brands look so similar that it is uncertain whether they are made by the same manufacturer or not.	1.00	3.36
Sometimes I want to buy a product seen in an advertisement, but cannot identify it clearly between scores of similar products.		3.09
Factor 2: Overload confusion	$\alpha = .70$	
I do not always know exactly which products meet my needs best.	0.59	2.94
There are so many brands to choose from that I sometime feel confused. ¹	0.64	2.68
Due to the host of stores it is sometimes difficult to decide where to shop ¹	0.46	2.47
Most brands are very similar and are therefore hard to distinguish.		3.02
Factor 3: Ambiguity confusion	$\alpha = 0.75$	
Products such as MP2/CD players or VCRs/DVD players often have so many features that a comparison of different brands is barely possible.	0.61	3.41
The information I get from advertising often are so vague that it is hard to know what a product can actually perform.	0.53	3.46
When buying a product I rarely feel sufficiently informed.	0.51	3.16
When purchasing certain products, such as a computer or hifi, I feel uncertain as to product features that are particularly important for me.	0.56	3.27
When purchasing certain products, I need the help of sales personnel to understand differences between products.		3.11
U.S.		
Factor 1: Similarity confusion	^b $\gamma = 4.90$ $\alpha = .80$	
Most brands are very similar, making it difficult to distinguish them.	.720	2.99
Due to the great similarity of brands, it is often difficult to detect new products.	.68	3.00
The information I get from commercials is often so unclear that it is hard to know what a product can actually do.	.60	2.58
Some brands look so similar that I do not know whether they are different in quality.	.59	2.53
Due to the great similarity of many products it is often difficult to discover new products	.57	2.89
Some brands look so similar that I don't know if they are made by the same manufacturer.	.57	2.78
After watching a series of commercials on TV, it often happens that I cannot remember the brand but only the product.	.49	3.16
There are so many brands to choose from that I sometimes feel confused.	.45	2.97
When going shopping, I feel I have to deal with too much information.	.42	3.25
Factor 2: Ambiguity confusion	$\gamma = 1.46$ $\alpha = .66$	
When planning to buy a product, such as a laptop computer, sometimes different opinions on products by family members or friends confuse me and	.84	3.05

<i>I do not know what features are important to me.</i>		
<i>When buying certain products, such as a computer, I feel I do not know what product features are particularly important to me.</i>	.83	3.21
<i>Products such as MP3/CD players or cell phones often have so many features that a comparison of different brands is almost not possible.</i>	.44	3.09
<i>When buying certain products, I need the help of sales personnel to understand differences between products.</i>	.42	3.81
Factor 3: Perceived distinctness of products	$\gamma = 1.34$ $\alpha = .60$	
<i>Most brands are distinct (i.e., not very similar) and are therefore easy to distinguish.</i>	.620	3.18
<i>Inside a store I immediately recognize my favorite brands.</i>	.59	2.20
<i>Sometimes I have problems seeing the difference between a real brand and a generic product.</i>	-.50	2.99
<i>Despite the large number of stores (also E-stores) it is never difficult to decide where to shop.</i>	.45	2.99
THAILAND		
Factor 1: Difficulty in decision-making with regard to technical products	$\gamma = 2.63$ $\alpha = 0.61$	3.47
<i>When planning to buy a product, such as a laptop computer, sometimes different opinions on products of my family members or my friends confuse me and I do not know what features are important for me.</i>	0.71	3.46
<i>Products such as MP3/CD players or mobile phones often have so many features that a comparison of different brands is almost not possible.</i>	0.65	3.48
<i>Sometimes I have problems to see the difference between a real brand and a copy.</i>	0.56	3.46
<i>When going shopping, I feel I have to deal with too much information.</i>	0.53	3.57
<i>There are so many brands to choose from that I sometimes feel confused.</i>	0.40	
Factor 2: Product and feature uncertainty	$\gamma = 1.26$ $\alpha = 0.56$	3.17
<i>When buying certain products, such as a laptop computer or hi-fi, I feel I do not know how product features are particularly important for me.</i>	0.74	3.26
<i>When buying certain products I usually do not feel enough informed.</i>	0.61	3.40
<i>I do not always know exactly which products meet my needs best.</i>	0.60	3.41
<i>Due to the great similarity of many products it is often difficult to discover new products.</i>	0.42	
Factor 3: Perceived similarity of products	$\gamma = 1.13$ $\alpha = 0.51$	3.61
<i>Some brands look so similar that I do not know whether they are different in quality.</i>	0.74	3.60
<i>Some brands look so similar that I am not completely sure whether they are made by the same manufacturer or not.</i>	0.70	3.47
^a COD = Coefficient of Determination from confirmatory factor analysis (CFA); ^b = eigenvalue; ^c = Cronbach alpha Note: German items in italics were not included in the final CFA and U.S. items in italics were not included when calculating the Cronbach alpha		

Discussion

Our examination of consumer confusion proneness in differing countries suggests that consumers from Eastern collectivistic countries are more prone to confusion. Essentially, there are two alternative explanations for this difference. The first would be that there are real confusion-relevant differences between the U.S., Germany, and Thailand. For example, German consumers may have learned how to cope with confusing stimuli or Thai consumers are more likely to face confusing stimuli owing to more liberal regulations in terms of brand emulations and competitive

advertising. An alternative explanation could be that 'Western' scales perform acceptably in the societal context they are developed in but may be problematic elsewhere (Wong et al. 2003). The exploratory factor analysis on the Thai data showed that some elements of stimulus ambiguity and stimulus similarity did exist in the three new Thai consumer confusion factors, suggesting a commonality to some extent across different populations. The results may also be partly attributed to cultural differences, particularly regarding the role of the family and individual identity. The inability of the U.S. and Thai data to conform to the original German factor groups from the questionnaire does not necessarily suggest the questionnaire is inherently unreliable but underlying societal differences may exist. Thai culture can be identified as highly collectivist with a high regard for the family, culminating in the individual have a sense of identity bestowed from other family members. Although not previously identified from research, it would appear that Thai family links and associations with a potential need for family decision-making might explain Factor 1 'Difficulty in decision-making with regard to technical products'. The empirical results have implications for marketing research and management as well as consumer education in the three countries; but the sample limitations of the research means that these implications must be treated as indicative and not definitive. In terms of marketing practice, one general implication is that marketers need to understand what causes consumer confusion and how it can be avoided for their brands. The three-dimensional model gives them guidance on what to look for and the areas where attention may be required.

Relationships management and value creation: a study on the role of the organizational culture in the wine industry of Basilicata

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ABSTRACT

The paper aims at analysing the importance of the organizational culture for problem solving and transfer abilities within a buyer-supplier relationship. We focus on the buyer access to supplier’s knowledge. For this purpose an explorative study has been carried out in the wine supply chain of Basilicata region (southern Italy). A Pearson’s Correlation analysis has been employed in order to verify the research hypothesis. Data have been collected by interviewing the whole population of wineries and grape growers of the above-mentioned area.

Literature review

The analysis moves from the viable system and relational approach: the winery develops its competitiveness and systemic consonance with its environment (Barile, 2009; Barile & Saviano, 2011) within a network system of relationships with several actors, such as the grape growers, which allow the firm to attract and to share the resources needed to survive (Fiocca, 2014).

The enhancement of grape’s biodiversity, interpreted according to the systemic relational perspective, can be realized in the last phase of value creation process, by selling a certified high quality wine: the grape’s biodiversity gives added value to the consumer in sensorial and hedonistic terms, thus generating competitive advantage for the wineries of a specific area. The value creating based on biodiversity is a phased process in which knowledge circulates and is filtered and transferred by different actors of the network (winery, grape grower, research laboratories, etc.) through the exchange of resources and competencies. The starting point of this

process lies in the relationship management between the upstream supply chain firms (wineries, grape growers, research institutes, other suppliers): the wineries' marketing strategies chances to achieve the consumer trust are enclosed in the ability of developing relationships in order to create the conditions to access to intangible resources of the other players in the network, to combine them harmoniously with their own, to occupy the most convenient location within the network, thus meant as source of competitive advantage. Resources are improved with the dynamic capabilities and, in turn, are the basis of the distinctive skills that are developed and activated with the relationships within the network (Fiocca, 2014).

From the relational point of view, any market structure is the result of a continuous flow of interaction and mutual adaptation between the actors which generates a complex network made up of actors and interdependencies between these resources and their activities.

Some authors (Cantù et al., 2013) consider the economic relations between the actors in the network, not only in terms of competition, but also in terms of "business networking" in which companies compete in changing the structure of the network through a continuous interactive process.

The relationships within the networks have been developed to create a market differential (a concept that goes beyond the concepts of competitive advantage and key success factors), through the use of the resources of a business, that affect its location into a network.

Every business relationship has both elements of competition than cooperation. The competitive advantage can result from the cooperation with suppliers, customers and other stakeholders, and cooperation can be a means of strengthening the position of an enterprise network, also gaining a higher position than its competitors (Cantù et al., 2013).

So we can suppose that the quality of wineries offer can depend on the transfer abilities (each other buyer-supplier) at the research and development stage and on the problem solving abilities of suppliers in transforming those requirements into solution proposals.

By the literature review it emerges a research question: how the organizational culture influences the knowledge transfer between them? Furthermore, does the role of purchasing and customer relationship approach affect the problem solving and transfer abilities?

There is a wide and intense academic debate on the organizational culture topic as it is considered highly significant both for operational and strategic activities (Wilkins & Ouchi, 1983).

In strategic terms it is considered as drivers of competitive advantage (Fiol, 1991; Xiaoming & Junchen, 2012) since it affects the endogenous organizational development (Denison & Spreitzer, 1991), the effectiveness of the operational structure (Gregory, Harris, Armenakis, & Shook, 2009; Zheng, Yang, & McLean, 2010), financial performance (Barney, 1986).

The organizational culture can also become a driver of competitive advantage even in inter-organizational cooperation. (Noorderhaven, Koen, & Beugelsdijk, 2002; Wang & Li, 2007; Xiao & Tsui, 2007).

An organizational culture that promotes and facilitates the cooperation is important to establish inter-organizational relationships long-term: the cultural elements are relevant in the process of cooperation and co-creation of value. (Kanter, 1994; Laskowska-Rutkowska, 2009; Murray & Siehl, 1989).

No previous research on the organizational culture influence on problem solving and transfer abilities within a buyer-supplier business relationship have been found.

According to the Competing Values Framework, there are different models of organizational culture based on two independent dimensions: the structure and strategic focus (Gregory et al., 2009).

The differences between the models can be identified by these two dimensions and identified according to the following cultural characteristics: strategy, flexibility/technology, organization, management style (Morgan, 2007). Depending on the pre-eminence of cultural characteristics, organizations show different organizational culture models.

Methodology

This study is an exploratory research as it seeks to provide evidence in the wine supply network about the influence of the organizational culture on the dyadic relationship buyer-supplier (winery-grape grower) concerning the problem solving and transfer abilities.

We analysed the wine supply network of the Basilicata region (in south eastern Italy): this case study is part of the wider research project named “Salbiovit”, funded by Measure 124 of the RDP (Rural Development Program) Basilicata Region 2007-2013. The research project is related to the improvement of grape variety’s genetic variability in the wine supply chain of Basilicata.

Data have been collected, during the period Jan-June 2015, by interviewing the complete population of wine makers and grape growers located in Basilicata region.

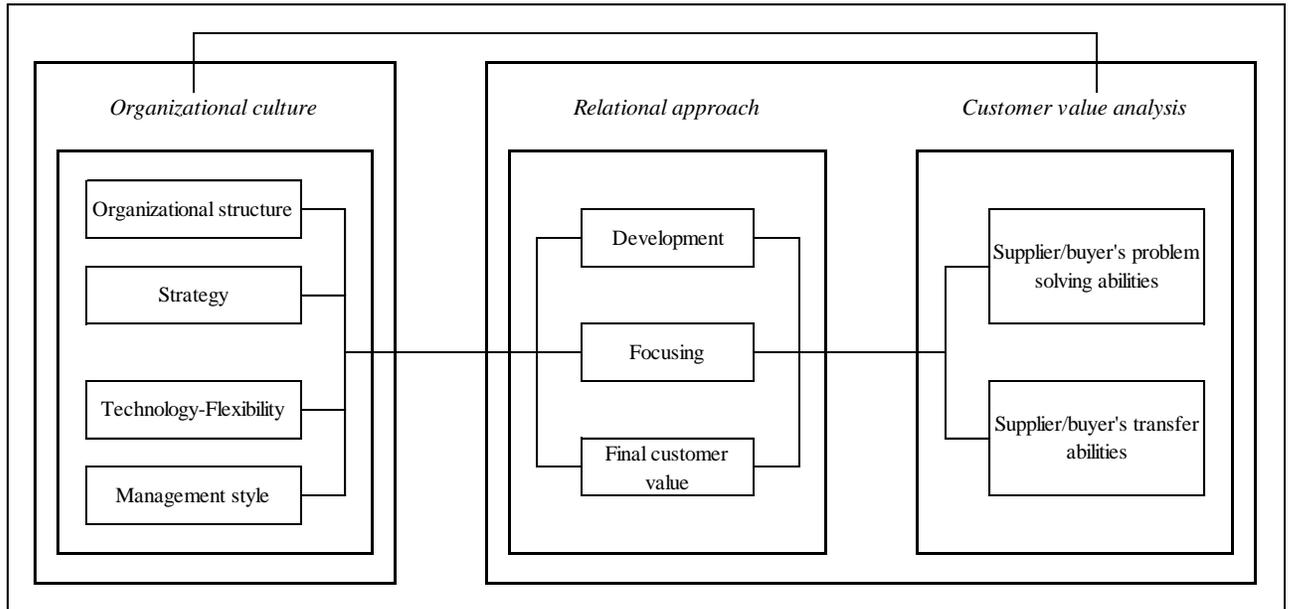
The interview was structured with questions both built with binary options and scaling responses; for these latter questions seven Likert Scales items have been adopted (Not a priority; Low priority; Somewhat priority; Neutral; Moderate Priority; High priority; Essential priority), following Allen and Seaman (2007).

In order to study the research questions above mentioned, we analysed the following variables:

- the organizational features (Lawrence & Lorsch, 1986; Morgan, 2007)
 - o organizational structure (OrgStru);
 - o strategy (Strat);
 - o technology-flexibility (TechFlex);
 - o management style (ManagStyl);
- the relational approach (Anderson et al., 2009)
 - o to development (Devel);
 - o to the market positioning focus (Focus);
 - o to the value for consumer (CustVal);
- the customer value analysis (Håkansson & Ford, 2002)
 - o problem solving abilities (ProblSolv);
 - o transfer abilities (TrasfAbil)

Within this research framework, it is hypothesized that the relational approach (to the development, to the market positioning focus, to the value for consumer) has an influence on the problem solving and transfer abilities and, in its turn, the organizational culture has an influence on the problem solving and transfer abilities. Figure 1 describes research questions and general methodological structure of the work.

Figure 1. Research design and selected variables



Source: Authors' elaboration

Data analysis has been performed by using R software (also called GNU S). A correlation analysis was performed in order to highlight significant relationships between the variables selected, in considering of the research framework, and to prove or reject our hypotheses.

Results

Regarding the significance of the research design, findings confirm the main hypotheses on which this study was based upon. The correlation matrix in Table 1 shows Pearson's Correlation values among different variables selected for testing the research questions.

Discussion and conclusion

Results shows there is correlation between the organizational culture of the observed firms and the knowledge transfer between them: the organizational structure (employees commitment and decision making power, cooperative atmosphere) and the strategy (oriented to competitors/ to customers) are strongly correlated with grape growers transfer abilities. Moreover the flexibility is correlated with suppliers problem solving abilities. These insights could suggest that when there is inter-firm consonance in the business interaction, in terms of strategy and of organizational structure, then the suppliers transfer abilities can improve; on the other hand, if the value creating process is flexible, then the supplier problem solving abilities can improve.

It emerges also that wineries' organizational structure affect their relational approach in the interaction with grape grower suppliers, in particular regarding the relational abilities of wineries aimed at developing the existing expertise and at the accessing to grape grower technological skills in order to improve the wine's customer value.

Conversely, technology and flexibility, as well as the management style of wineries negatively boost the development and the focusing of skills. Furthermore, transfer abilities of grape grower staff are positively correlated to their customer (wineries) relational approach focused to the

market positioning, while staff problem solving abilities are significantly uncorrelated to development and focusing of existing expertise.

Table 1. Pearson's Correlazion Matrix

		RELATIONAL APPROACH			CUSTOMER VALUE ANALYSIS	
		<i>Devel</i>	<i>Focus</i>	<i>CustVal</i>	<i>ProblSolv</i>	<i>TransfAbil</i>
ORGANIZATIONAL CULTURE	<i>OrgStru</i>	0,302 *	0,236	0,668 ***	-0,007	0,476 ***
	<i>Strat</i>	0,046	0,104	0,335 *	0,011	0,508 ***
	<i>TechFlex</i>	-0,547 ***	-0,578 ***	-0,034	0,421 **	-0,292 *
	<i>ManagStyl</i>	-0,398 **	-0,234	-0,125	0,036	0,263 *
CUSTOMER VALUE ANALYSIS	<i>Probl Solv</i>	-0,269 *	-0,371 **	-0,043	1	-0,175
	<i>TransfAbil</i>	0,311 *	0,484 ***	0,245 *	-0,175	1

***significant at 99%; **significant at 95%; *significant at 90%

Source: Authors' calculation

Keywords: *Organizational culture, Knowledge transfer, Customer value, Wine supply network, Relationship management*

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Global Trade Order: The lessons from Doha Round

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ABSTRACT

The paper discusses the peculiarities of modern international trade system taking into account lessons from Doha Round. The main objective of the work is to identify some new contours of Global Trade Order. International organizations (mainly, WTO) reports, the estimates of the Guardian and the Financial Times and international trade researchers (Baldwin R., Froman M., **Kent J.**, Evenett S., Stiglitz J. etc.) papers are analyzed and synthesized on the background of desk research. There is proposed idea (and is the attempt) to define the shape of modern global trade system on the basis of the process-tracing method experienced in the political theory researches as well.

By tracing the development of the Doha round step by step (see www.wto.org, also, Allen, 2015) is possible shaping the peculiarities of modern World Trade order (Checkel, 2005; also, Process-Tracing).

One of the most important question in the determining the shape of modern World Trade Order refers to the role of WTO. The analytical papers reviews the current WTO negotiating agenda and the Nairobi outcomes, discusses possibilities for new directions, and makes suggestions for the WTO going forward.

Opinions vary on how much was achieved, and, perhaps more importantly, where the WTO goes from here. The United States and the European Union have emphasized that "new" issues and approaches should guide WTO negotiations in the future. But it is not clear what that means, and how it relates to the "old" issues and approaches. And with the rise of mega-regional trade negotiations, such as the Trans Pacific Partnership (TPP) and the Transatlantic Trade and Investment Partnership (TTIP), there are serious questions about the WTO's role as a negotiating forum for trade liberalization (Lester, 2016). By the Financial Tims, the World Trade Organisation is facing the biggest shake-up of its agenda in a generation after its members in effect abandoned the long-stalled Doha round. For the first time since the round was launched amid great fanfare in 2001, the WTO's 164 members, ending a conference in Nairobi at the weekend, declined to "reaffirm" Doha's mandate (Shawn, 2015).

There are expressed opinions about erosion of WTO centrality by a number of scientists, they indicate about necessity of reshaping of the WTO, as the main determining of World Trade Order:

The world of international commerce has changed radically over the past years due to the rise of supply-chain trade... WTO has not kept up with the need for new rules governing the intertwining of trade, investment, intellectual property, and service. Bring these rules to the multilateral level

will require the establishment of a new international organization – a "WTO 2.0"... WTO centrality in global trade governance is eroding and will continue to erode. On current trajectory, multilateralism will continue to reign for traditional trade, but fragmentation and exclusion are the most likely outcomes when it comes to the most dynamic segment of international commerce – supply-chain trade (**Baldwin, 2012**).

Scientist Kent suggests the analysis of the role of supranational trade institute according to the institutional approach and emphasizes, that success in expanding global trade will depend on major trading countries' willingness to seek new institutional paths to multilateral agreements, through new negotiating modalities, openness to the expansion of regional agreements to new members, and flexibility in structuring linkages across sectors, in setting red lines on policy space, and in establishing reciprocity expectations for members according to their development status. These changes may then re-establish a collective intentionality that allows WTO members to find new common ground for multilateral trade agreements (Kent, 2015).

The famous scientist Stiglitz gives radical estimate to the controversial geo-economic decisions concerned trade: Almost unnoticed after years of desultory talks, the World Trade Organization's Doha Development Round – initiated to redress imbalances in previous trade agreements that favored developed countries – was given a quiet burial. America's hypocrisy – advocating free trade but refusing to abandon subsidies on cotton and other agricultural commodities – had posed an insurmountable obstacle to the Doha negotiations. In place of global trade talks, the US and Europe have mounted a divide-and-conquer strategy, based on overlapping trade blocs and agreements. As a result, what was intended to be a global free trade regime has given way to a discordant managed trade regime. Trade for much of the Pacific and Atlantic regions will be governed by agreements, thousands of pages in length and replete with complex rules of origin that contradict basic principles of efficiency and the free flow of goods (Stiglitz, 2016).

The famous researcher of neoprotectionism Evenett emphasizes about "weaknesses" in account protectionist measures by the WTO and indicate about world trade disorder: The WTO's reports on protectionism substantially underestimate the G20's resort to trade barriers. On the cleanest like-for-like comparison, Global Trade Alert (GTA) finds 44% more instances of G20 protectionism. Widely reported WTO totals of crisis-era protectionism are now only a third of the worldwide total found by Global Trade Alert. Neither the G20 nor the WTO has got to grips with protectionism. The

fragmentation of global markets along national lines is much worse than previously reported. Until G20 leaders realise what matters are actions not words, then there is little stopping the slide towards global trade disorder, in which competition on the merits gives way to a debased form of globalisation (Evenett, 2014).

There are certain opinion shared amongst the scientist, that world trade system will be quite different to today's system. The global financial-economic crisis, the development of the integration blocs, appearance of emerging economies on the world stage, changed the reality of the world trade system. As Lester summarized in the analytical article, World trade governance in 2020 will be quite different to today's system. The old idea that the GATT/WTO is the central pillar of global trade governance will either be replaced by a multipolar system, or the WTO itself will be transformed (Lester, 2016).

The majority of researchers, particularly from developing countries, pointing to the unequal benefits of liberalization and power asymmetric distribution of power in negotiations (Example of India see Nairobi outcomes etc).

Main findings of the research are:

Using of process-tracing method for the father outlining of new shape of Global Trade Order will be helpful;

Reshape of World Trade Order is expected beyond the only pillar WTO;

It is expected that the development of world trading system is preferred to block, asymmetric way, that is caused by path-dependent development, which in turn is based on the preconditions of inequality power distribution in the world economy.

Overcoming of negotiations failures among actors of international trade is the crucial for successful development of multilateral trading system. It depends on major trading countries' willingness to negotiate and seek new ways for multilateral agreements.

Keywords: *Global Trade Order, Doha Round*

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- The WTO's 10th Ministerial Conference was held in Nairobi, Kenya, from 15 to 19 December 2015
https://www.wto.org/english/thewto_e/minist_e/mc10_e/mc10_e.htm
- Nairobi outcomes favour rich countries and effectively end Doha Round
<http://www.thehindu.com/business/Industry/wto-nairobi-meeting-government-to-respond-to-wtos-nairobi-package-in-parliament/article8011127.ece?ref=relatedNews>

System Dynamics

The Analytic-driven Business Competition Dynamic Model through Innovation and Pricing Scheme Simulation

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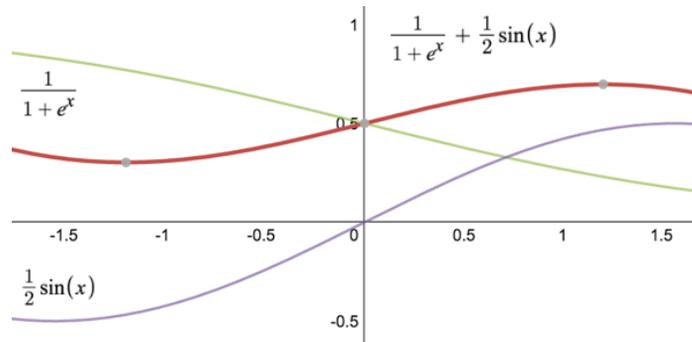
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ABSTRACT

Applying the differentiation strategy against the rivals is a common approach for business competition. The firm continuously provisions the capability of innovation and manipulates the prices of the deliverables during the competition to maintain the prevailing or to overcome the downturn market position. It is inevitable that the copycats always exist in the market to imitate the advantage of the targeted innovator. This paper elaborately schemes the nonlinear curves of the innovation and the pricing effect based on the literatures to argue the theoretical model as close as the real world competition. By examining the results of the model simulation, it discloses the managerial measures according to the scenarios to gain competitiveness. In the empirical case, this paper applied the proposed model to compare the competitiveness strategies of the major players in the smartphone market, the result shows that the market leaders gain competitiveness through both the innovation and the pricing scheme as well.

Nowadays, the common approach to improve the business competitiveness against the rivals is through innovation—such as enhance the product features and the service model to the customers (Cavaco & Machado, 2015)—and pricing strategy—such as adopting the seasonal and conditional sale promoting the goods and the services (Hofer, Niehoff, & Wuehrer, 2015). The innovation is a continuous non-linear and damping process (Millson, 2015)—caused by the technical barrier breakthroughs and the imitation from the rivals, such a process can be mathematically described in the form of the sinusoidal curve which is widely used in the dynamic system modeling in the engineering (Kluever & Kluever, 2015). The price of goods or services always depreciates in the competitive market in an S-curve (Bahmani-Oskooee, Kutan, & Ratha, 2008) affected by the maturity of the market and the rivals’ counter-actions. The **Figure 1** illustrates an ideal combined effect of the S-curved innovation—setting the critical point as the initial value—and the sinusoidal pricing strategy—setting no pricing effect as the initial phase. Usually the innovation sinusoidal curve attenuates in the competitive market as shown in **Formula 1**, a general damping wave form, because of the technology or the service gradually being mature. The red curve represents the combined effect with equal-weighted on the both factors.

Figure 1. An Ideal Combined Effect of Innovation and Pricing Scheme



The firm promotes the competitiveness is arguably through such as a cumulative combined effect which has the general form as shown in **Formula 2** with the corresponding weights (τ, α, β) and H is the harmonic average.

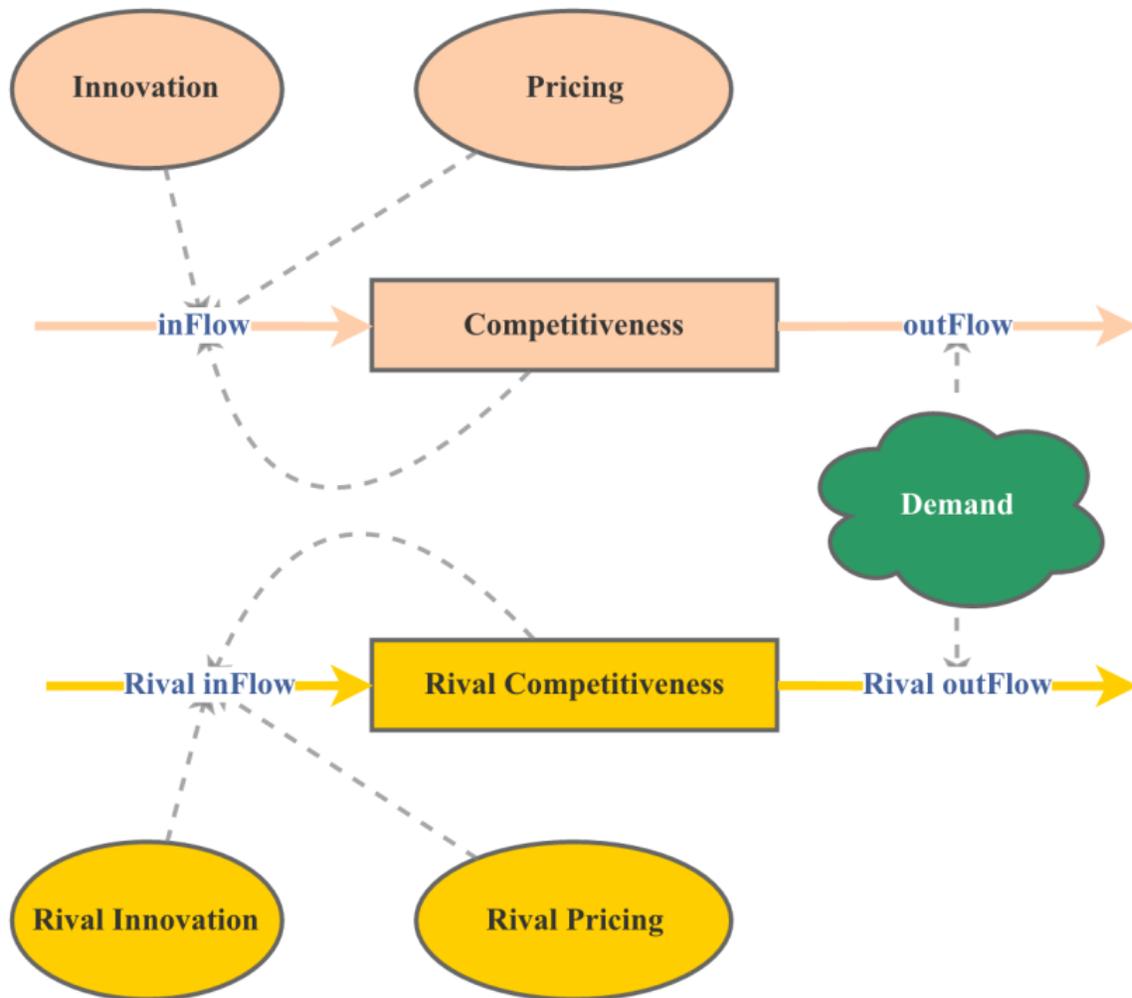
$$Innovation(t) = \frac{Sin(\pi t)}{e^t} \quad (1)$$

$$\frac{dEffect}{dt} = \tau Competitiveness + H \quad (2)$$

$$H = \frac{2 * \alpha \frac{dInnovation}{dt} * \beta \frac{dPricing}{dt}}{\alpha \frac{dInnovation}{dt} + \beta \frac{dPricing}{dt}}, \tau + \alpha + \beta = 1$$

The rivals apply the imitating strategy promoting the goods and the services with similar features; such imitation takes time to mitigate the innovation gap, therefore, the sinusoidal curve shifts forward than the original innovator. The market demand appreciates and consumes the competitiveness against all vendors, it shares the same S-curved behavior as the competitiveness has. The **Figure 2** illustrates the holistic dynamic model of business competition.

Figure 2. Business Competition Dynamic Model

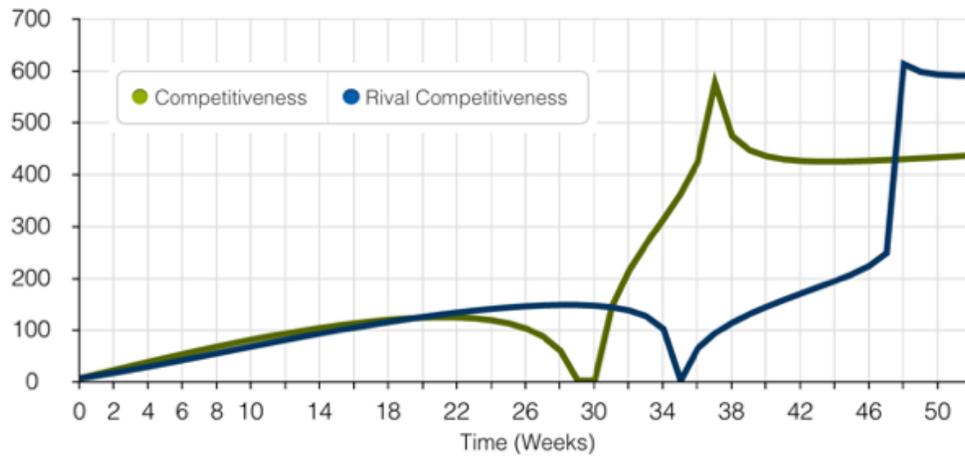


Model Simulations

The simulation period was set to 52 weeks and the product life cycle was set to 26 weeks. The following tables are the competition scenarios illustrating the simulation results, the associated parameters, and the implications. The copycat scenario assumes that two firms having the same competitiveness capability. The rival imitates the advantage of the innovator; and the innovator leads the innovation for 8 weeks. The result shown in **Figure 3** implies: (1) there is no significant dominance of the innovator before the product life cycle ends; (2) both firms will lose their competitiveness after the product life cycle; (3) the

innovator gains the dominance when the rival loses the competitiveness; (4) the innovator will keep maintaining the competitiveness in a steady way after the dominance peak; (5) the rival will eventually regain the dominance; and (6) the innovator has more accumulative competitiveness—the areas below the curves—than the rival.

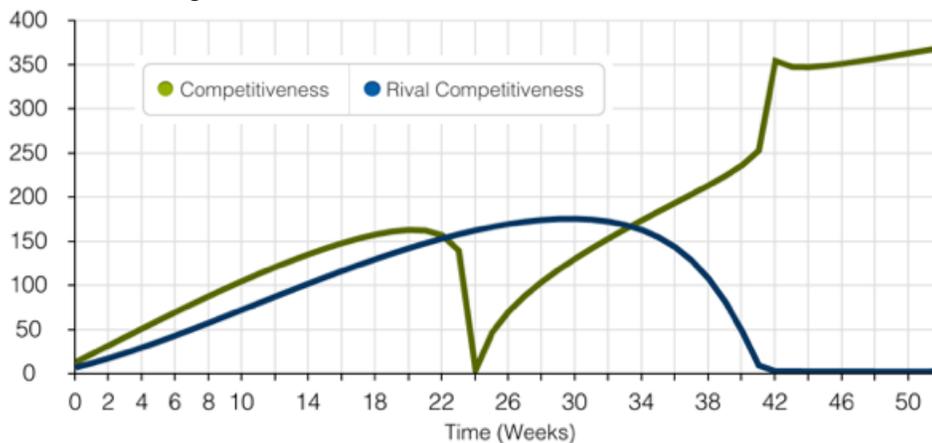
Figure 3. Copycat Scenario Simulation



Factor	Parameter	Innovator	Rival
Innovation	Investment	5	5
	Leading Weeks	8	Copycat
	Weight	2	1
Pricing	Price	5	5
	Weight	2	1
Competitiveness	Initial Value	6	6
Demand	Market Accepted	5	5

In the real world, the driver behind the copycat strategy is that the rival has less competitiveness than the innovator, but plans to gain the dominance through manipulating the pricing scheme. Comparing with the former model, changing three parameters, the initial value of the innovator’s competitiveness, the innovator’s investment scale, and the rival’s pricing performance. The rest parameters remain the same. The result shown in **Figure 4** implies: (1) the innovator takes the lead before the product life cycle ends; (2) there is a drastic competitiveness drop of the innovator, the rival’s pricing performance prevails; (3) when a new round of innovation begins, the innovator regains the dominance; (4) the innovator will eventually maintain the dominance and the rival competitiveness will drop to irrelevant market position; and (5) the innovator has more accumulative competitiveness—the areas below the curves—than the rival.

Figure 4. Innovation Leader Scenario Simulation



<i>Factor</i>	<i>Parameter</i>	<i>Innovator</i>	<i>Rival</i>
<i>Innovation</i>	<i>Investment</i>	10	5
	<i>Leading Weeks</i>	8	<i>Copycat</i>
	<i>Weight</i>	2	1
<i>Pricing</i>	<i>Price</i>	5	8
	<i>Weight</i>	2	1
<i>Competitiveness</i>	<i>Initial Value</i>	12	6
<i>Demand</i>	<i>Market Accepted</i>	5	5

Based on the finding against the aforementioned simulation results, under the assumption of that the innovation and the pricing scheme has the influence on the competitiveness, this paper concludes that the innovator will gain the competitiveness in the competition market. If the competitiveness cannot be through innovation, then the pricing scheme will determine the dominance which coincides the rules of economics.

Keywords: *Business Analytics, Strategy Planning, Business Simulation, System Dynamics*

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Outlook for Price Dynamics in Europe: Inflation or Deflation?

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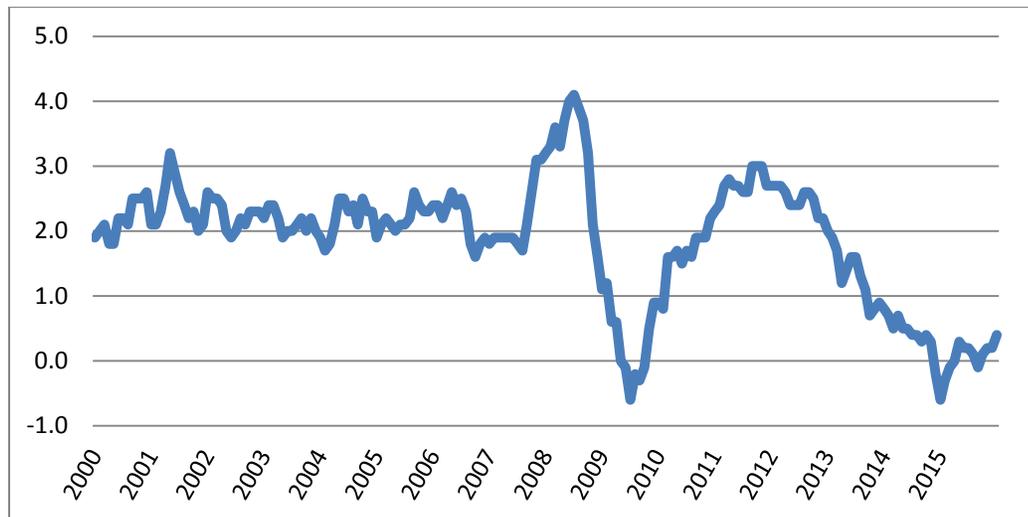
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ABSTRACT

This paper discusses the structure and behavior of our dynamic model of inflation and deflation in the Euro Area, and the model-based implications for ECB monetary policy. As Figure 1 illustrates, the period from the onset to the lingering aftershock of the global recession—from 2007 to the present day—is one of roller-coaster price dynamics in Europe, in contrast to relatively constant and mild inflation in the early years of the new century. Within a year after the consumer price bubble burst in 2008, accelerating inflation collapsed into deflation when the price index dipped below zero in 2009. Although inflation regained steam, it peaked in 2012 and deflation recurred in late 2015. Consumer prices in recent months have been stable, with inflation near zero. What is the outlook for price dynamics in Europe—stability or wild rides? Should Europe expect a return to sustainable inflation at a moderate 2 percent, or another period of accelerating prices? And what about the chances of recurring deflation? Until recently, questions about stagnant prices and deflation were usually raised in reference to Japan's struggling economy; now they are heard in Europe (Illing 2014; Bean et al. 2015). The consensus view in the latest ECB Survey of Professional Forecasters (2016) is that consumer price inflation will increase slowly but remain below ECB's 2 per cent target five years from now. The latest ECB policy announcement (March 2016) reduced the deposit facility interest rate again (and it was already negative), reflecting the official view that price pressures will remain well below the target range in the coming months.

Figure 1. Annual Percentage Change, Harmonized Index of Consumer Prices in Euro Area (Eurostat)



At the 2016 Business Systems Laboratory International Symposium in Vilnius, we will address these questions with our model-based analysis. Moreover, each of these diverse scenarios has different implications for the stance of ECB monetary policy, and our analysis will include simulation experiments with both conventional and unconventional policy options.

Building on previous work (Wheat and Pawluczuk 2014), we are extending the integration of two approaches to economic modeling—input-output tables and system dynamics—to develop a multi-industry model of price dynamics within the area of the nineteen nations that have adopted the euro. The original model's structure has been modified to achieve a more robust representation of production constraints originating in inter-industry supply chains and international labor markets. Integration of the two modeling methods extends the applicability and value of input-output analysis by eliminating static assumptions of fixed technology, fixed combinations of labor and capital, fixed prices, and infinite supplies of factors of production. Moreover, integration provides a disciplined way to disaggregate system dynamics models to the level of inter-industry detail necessary for investigating price pressures—or the lack thereof—related to intermediate demand for goods and services in addition to pressures associated with final demand. Finally, in light of age-structure effects on aggregate demand and price pressures, the interaction between the model's demographic and economic sectors captures circular and cumulative causation effects that have been important in Japan's aging society and may be equally important in an aging Europe.

Keywords: *inflation, deflation, Europe, system dynamics, input-output, monetary policy*

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Terrorism and tourism dynamics

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ABSTRACT

The globalization of the tourism industry has led to a rapid expansion of tourism businesses on an international scale, in order to exploit the possibilities of an interconnected world to expand market share and profitability (Ritchie, 2004). However, this process has opened the tourism industry up to a wider set of global risks. One of those risks is terrorism.

In recent years, tourism destinations and tourists have become targets for terrorist activities. Especially after 9/11 there have been reported at least 20 terrorism incidents aimed at tourism targets. The reasons are multiple: tourism destinations are easy to access, an incident can have massive impacts on a global scale and the guaranteed international media coverage offers to terrorists a platform to disseminate their ideological message (Paraskevas & Arendell, 2007). As a result, the impact of terrorism on tourism decisions has been a growing area of research (Arana & Leon, 2008).

From a decision-making perspective, a terrorist attack calls for complex decisions: immediate problems have to be managed while at the same time a look in the future is mandatory, focusing on restoring positive images and visitor confidence to mitigate the negative effects on the tourism industry (Henderson, 2003).

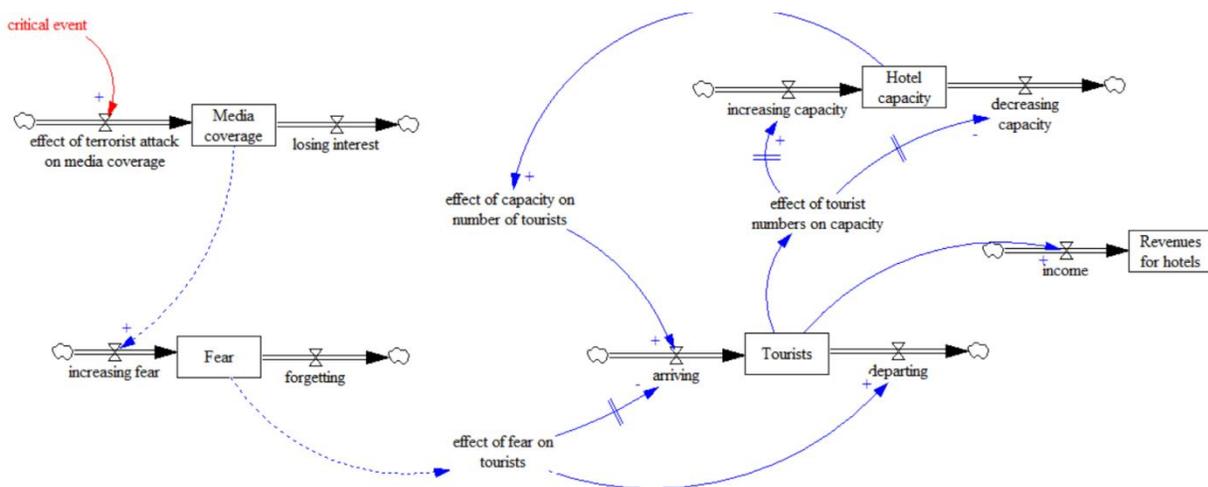
The purpose of this paper is to investigate the effects of a terrorist attack on the tourism industry and test policies that could mitigate those effects.

The present paper arose in the context of the ATTACS project (Armenia, et al., A Systems Thinking approach to the analysis of economic impacts related to transportation shutdowns: the ATTACS project, 2015), whose purpose is to investigate the economic consequences in an urban environment when its transportation network is hit by an act of terrorism. However, the structure of the simulation model that was developed, allowed the experimentation of the effects on the tourism industry. The city of Rome was used as a reference case.

The chosen methodology for the development of the simulation model is System Dynamics (Sterman, 2000). Its inherent elements of feedback loops and delays, allows System Dynamics to capture the underlying dynamics, inherent in complex socio-economic systems. Moreover, it allows for “what-if” analysis, the inclusion in the model of aspects of human behavior that are not easily quantifiable and the design and experimentation with policies in a consequence-free environment (Armenia, Tsaples, & Carlini, 2015).

The structure of the model is focused on two generic sub-models. The first one explores the tourism industry and more specifically the dynamics of hotel management, and the second on psychological factors that affect the behavior of tourists. The figure below shows a generic representation of the model.

Figure 1. Generic structure of the model



When the number of tourists increases, the hotels are forced to increase their capacity-if it does not meet the demand. In turn, the increased capacity acts as a factor that increases the attractiveness of the specific area. Moreover, an increased number of tourists means that more revenues will be generated for the industry.

At the same time, if an attack occurs (variable in red) it will instantly increase the media coverage on the issue. The level of the increase depends on a number of factors, such as the magnitude of the event or the experience of the area concerning terrorism. As the media coverage increases, so does fear. This variable is qualitative by nature. However, System Dynamics allows the inclusion of such variables in the models, allowing the incorporation of aspects of human behavior that cannot be easily quantified. The increased fear has two effects: an immediate effect is that tourists might be more inclined to shorten their vacations and leave sooner. The long-term effect is that the public image of the area and the visitor confidence will be decreased, thus reducing the number of tourists that might visit in the future.

This generic structure allows the experimentation with the variables that are uncertain such as effect of fear on the stock of tourists. A large ensemble of scenarios will be generated, accounting for different levels of those variables. Moreover, policies will be designed and tested against the ensemble of different scenarios in order to find those policies that appear to be more robust for most plausible futures/scenarios.

A full array of results and discussions about the policies and their implications will be presented in the final version of the paper.

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System dynamics models to teach occupational safety and health

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ABSTRACT

We present a system dynamics model, based on a judicial decision concerning a fatal accident at work, and an experiment performed using it.

With a preventional view, our aim is to go beyond the criminal liability and to address the matter of safe behavior and safety culture.

Our working group deals with occupational safety and health within the Italian Workers' Compensation Authority and creates researches and tools in order to help companies implementing prevention and to facilitate training. Our ultimate objective is the prevention of accidents.

The model also investigates behaviors, since the court process we refer to is focused on it as well as on criminal responsibility, and it's a didactical tool.

In the courses we have been organizing for some time now, some case studies on processes and court decisions are discussed. This kind of training often has the primary goal to teach the duties, the responsibilities and the possible sanctions provided by law. However, it should also promote safe behavior and independent risk assessments.

As a consequence, we presently introduce a business game built on our model that handles the “tale” of the relevant facts, the responsibility and the logical path that led to the judgment, but that also tries to identify the main mechanisms that can lead to the occurrence of incidents and

accidents in situations similar to those given in the specific court proceedings. Considering the goals, we have followed closely the prescription to model a single issue, in the simplest possible way; moreover, the model does not analyze the economic aspects and the cause-effect relationships that affect them. In contrast, one of our previous products highlighted the potential economic benefits for individual companies of its interventions regarding safety at work.

In fact, we wanted to highlight two factors clearly emerging from the sentence we refer to: the behavior of the workers and the communication flows. On top of them, there are also other factors such as the status of the plants, the level of safety and, more generally, the culture of safety.

We therefore focused on these aspects and considered the situation in which a micro enterprise provides a maintenance service to a small business, generalizing the circumstances reported by the court judgement; in such cases the corporate structure is minimized and many elements that would be useful to consider for large companies lose their importance.

We considered incidents and accidents from a probabilistic point of view: the factors we have contemplated act on the likelihood of such events or (once they occur) on their severity. This does not mean that we carried out stochastic simulations, but that two variables of the model are respectively constituted by the likelihood of incidents and the risk of accidents, while remaining within the framework of a deterministic simulations.

For the measurements of variables, we used the literature that deals with occupational safety and health. For example, the safety culture of a company is calculated from the answers that workers and managers give to the questions provided in some questionnaires. After making the necessary tests on the simulations, we implemented a basic business game; we built a rudimentary game dashboard and an elementary graphical interface with the Vensim® software and made the simulation “playable”, in order to perform an experiment on the educational use of the model. The experiment was implemented with the cooperation of privileged observers and colleagues who have voluntarily acted as teachers. It consisted of a meeting with a dual purpose: to verify the teaching effectiveness of the model and to observe the behavior and interaction between teachers and other participants. Several aspects to be considered arose. The contemporary transmission of system thinking and prevention of accidents and incidents in workplaces is difficult, but this task is simplified through the use of a tool realized for the purpose. In our case, it has been found out that the business game itself has made possible understand how the systemic vision can be applied to the matter of health and safety: beginning a teaching session with a theoretical approach has proved to be scarcely useful for training. We realized that the problem-solving kind of approach that the business game offers does not need to be preceded by theoretical teachings which, instead, must be provided during the session.

The experiment showed that the model gives the chance to teach how to observe, with a global vision, the problems and the aspects related to the occupational safety and health and to associate many thematics which are often considered singularly. Courses that contemplate the use of our business game have already been scheduled (for which a graphical interface improvement is planned); in such courses other court judgments will be analyzed using the same model. Future developments also plan to implement other models from other judgments and to include in them information from existing databases in the field of health and safety at work.

Keywords: *training, occupational safety and health, osh, system dynamics, simulation, occupational health and safety, ohs.*

ICT and Knowledge Management

Suggestions for Knowledge Management based on Complex Network Analysis

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ABSTRACT

Introduction

This theoretical paper presents a framework based on complex systems theory for enhancing knowledge management, as well as possible method how to apply this approach in a practical and quantifiable way using complex network analysis of communication patterns in organization.

It is understood that knowledge is an important and highly valuable asset of any organization, therefore organizations invest significant effort to store and disseminate the knowledge across the employees. Being able to success on market and to be competitive is the main source for the need for information management. Literature confirms the existence of a mutual dependence between organization size a complexity – the bigger the company, the increased the need for more sophisticated and integrated solution for management and administration, e.g. Enterprise Resource Planning (ERP) systems (G. Buonanno, et al. 2005).

Managing knowledge in organization is only a part of what is, in a broader sense, called a business intelligence. This concept refers to the cognitive capacity of organization to synergetically combine both human resources and information systems, i.e. it combines both declarative and procedural knowledge as well as meta-processes allowing to collect data from the operation. From the business intelligence point of view, these meta-processes are those that are important, as main components of the business intelligence, as identified by Erçetin, et. al. (2013), include speed of action and reaction, ability to adapt, flexibility and sensitivity. All these properties are based on the ability to combine both top-down and bottom-up feedback within the organization, i.e. to be able to collect relevant data and, subsequently, to make relevant decisions in order to adapt to changing conditions.

This paper is presenting an approach utilizing complex network analysis as one of the methods that can be used for gathering data from meta-processes in order to support decision making related to knowledge management and business intelligence.

Complex systems theory framework

Most of the real world systems are based on interaction. There are no living systems that are individual and separate – essence of life and evolution lies in exchange of energy and information, and separated organisms sooner or later perish. There seem to be universal laws of all natural system’s behavior that are influencing both the way how units of the system interact in space, i.e. how they create structure, and in time, i.e. how they synchronize their activity (Barabási, 2010). Description, understanding and prediction of behavior of these natural systems is the area of complex systems theory.

Human communication, creation and application of knowledge is also fundamentally interactive – without interaction, there would be no transfer of information and knowledge (Stacey, 2001).

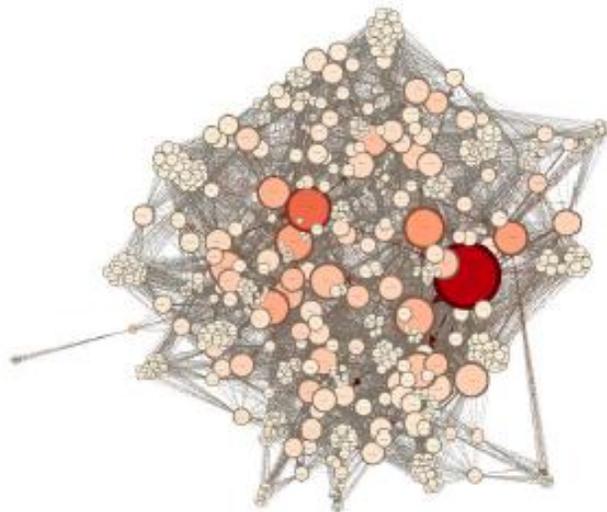
Therefore, communication patterns within the organization can be analyzed and visualized as other complex systems which allows us to get deeper insight into the structure and dynamic processes of the organization, and use this insight for better decision making related to knowledge management and business intelligence.

Complex Network Analysis

Complex network analysis is a quantitative method mathematically grounded in graph theory that is used to describe and analyze complex systems. Network consists of two basic elements – nodes, representing a unit of the system (e.g. employee), and links, representing a particular interaction (e.g. co-authorship or interchange of communication). Whenever there is an interaction between two nodes, the link is created. Properties of both nodes and links are acquired through an analysis and refer to the position and importance of a particular node in a network, e.g. degree, closeness or betweenness.

There are certain properties of a network that are related to multiple nodes or the network as a whole, and are referring to the structure, size, diameter or density of the network, e.g. clustering coefficient, average degree, average shortest path, etc. Beside from calculating network centralities, an important part of the analysis is also the visualization that can reveal the overall structure, identify the core and peripheral parts, loosely connected or segregated parts, etc. An example of how such visualization may look like is portrayed on Figure 1 below, where size of the node refer to its degree and hue refer to its betweenness centrality

Figure 1. Example of network visualization



Given that the visualization of the interaction network on Figure 1 was based on communication data from an organization, the analysis gives us a deeper insight about the structure of the communication patterns as well as position of every employee within the network. Combined with knowledge from complex systems theory, we can use this insight for decision making related to knowledge management and business intelligence.

Network construction and analysis

The flow of knowledge in organization is created either by personal interaction or via electronic channels – email, instant messaging, intranet, etc. There are limited possibilities how to gather information about face to face communication, therefore we mainly focus on analyzing data available through electronic channels. Whenever a person i contacts person j , there is a link

created between these two nodes in the network. Additionally, if we can collect information regarding the time of the interaction, there would be a time stamp attached to the link created between these two nodes. Time

stamped link allows us to reconstruct a temporal network that visualizes the evolution of the network as well as different states of the network at discrete time intervals.

A non-trivial amount of information is also transferred through informal communication which is hard to track, however we can supply electronic gathering of data with questionnaires aimed on specific aspects of employee communication, e.g. how they obtain new information, from who they receive important information, to who they send the information forward, etc.

Once we have data collected either electronically or via questionnaires, we need to analyze them. There are numerous tools, either commercial or free to use, that can be used for analyzing and visualizing complex networks, e.g. Gephi, UCINET or NetworX. After importing data, these tools are able to calculate network centralities, to detect communities, filter out nodes or links according to given properties, use various network layout algorithms or to work with temporal data.

Suggestions for knowledge management based on complex network analysis

- Network centrality and knowledge capital

Individuals with higher measures of network centralities usually have more substantial knowledge capital as they have access to various parts of the network and higher level of knowledge flow (Chang-ling, Xue-mei & Hai-yun, 2009).

Usually, individuals with high network centralities already occupy important positions in formal organization structure. However, in certain cases, employees working on positions that are not vital for operation of the company may have surprisingly high measures of centrality – e.g. an assistant, post man, maintenance, etc. Because of their high network centrality, it might be useful to include these employees into a) strategies of novel knowledge diffusion or b) for collecting feedback from everyday business.

Whenever novel information is to be diffused throughout the organization, targeting central employees could be the most effective way how to support adoption of new knowledge and practices.

- Access to novel information

Densely connected social communities that have more connection within the community than to the rest of the network usually share same social or spatial environment. Consequently, they have access to similar everyday experience and information. The denser is the community, the higher is the probability of sharing the same information and the lower is the probability of unique knowledge flow within the community (Singh, 2005).

However, knowledge or information that is common within a particular community may be valuable to other communities or distant parts of the network. Therefore, in order to increase knowledge flow, we may want target specific communities and support communication between them through both formal and informal channels.

- Managing compactness of the network

When analyzing network, we can measure average path length, i.e. how long is a path between two randomly selected nodes in a network – the longer the average path, the more steps through intermediary nodes does it take for a piece of information to travel from one employee to another.

Longer average path can be connected with slower rate of information diffusion, higher level of information noise (as portion of information is lost when transferring through information channels) and higher costs for knowledge management (Chang-ling, Xue-mei & Hai-yun, 2009). Therefore, it is advisable to foster communication and increase overall connectivity of the network.

However, Cowan & Jonard (2003) point out, that creating new links within organization may not always improve performance. What is important is the architecture of links, i.e. communication has to be supported between nodes or communities where it makes sense, not randomly or collectively.

- **Managing centralization**

Experience, knowledge and skills are not equally distributed within an organization. Certain employees may have unique skills and perform very well at certain processes and significantly contribute to overall company performance. It has been reported by Ehrlich & Cataldo (2012) that high centrality as well as embeddedness of an employee within the community is related to better performance at their tasks.

On the other hand, when certain employee centralizes most of the responsibility for certain process, it may lead into increased performance of the whole network, but at the same time it represents a threat for a project or functioning of the company in case that this person would leave the project (Zanetti, Scholtes, Tessone & Schweitzer, 2013) due to personal dissatisfaction or work overload. Departure of highly central and experienced employee is an unwanted phenomenon as he or she will not participate on knowledge diffusion processes.

As Goerner (1995) points out, in complex systems, high level of activity must be accompanied with growth and increasing complexity, otherwise it leads into collapse. Following this law, it is advisable to monitor workload and measures of centralities and consider implementing steps including e.g. division of labour (adding structural relationships – increasing complexity) when highly central employees are overloaded for long periods of time.

Conclusion

This theoretical paper presents suggestions for knowledge management based on complex network analysis performed on data acquired from communication channels in organizations. Analyzing structure and dynamics of interaction patterns might be useful for both enhancing knowledge diffusion and for decision making related to what is in broader sense called as business intelligence.

Keywords: *complex networks, network science, knowledge diffusion, knowledge management, business intelligence*

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Service Dominant Logic and Open Innovation Intermediaries: a possible meeting?

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ABSTRACT

The service concept, understood as “the application of resource for the benefit of another” (Vargo & Lusch, 2006), go through an intensive conceptual revolution in the 21st century. The specific activities of services are applied in the wider business sectors, in which there are technology, medical, industrial, commercial, tourism, etc. Many, between these activities of service, normally called service system, are based also on intangible that in recent time is determinant to achieve sustainable competitive advantage: the information.

According with Spohrer et al. (2007) this service system can be defined as a “collection of resources that can create value with other service system through shared information”. The basic assumption in such service system is the interaction for the co-creation of value (Maglio et al., 2009) and the information exchanged is an important condition to achieve this purpose. After overcoming transnational enterprise, attention has increasingly focused on services. Academics and researchers have proposed, in this way, new theoretical paradigms that concern both the marketing and management fields. These new and wider approaches, such as the Service-Dominant logic (S-D logic) in the marketing context and Open Innovation Intermediaries (OII) in the management perspective, have been developed to explain emerging phenomena that necessarily could be observed with new lenses.

The S-D logic has been enriched by several authors and different perspectives, adapting to specific contexts and relating to different approaches in order to signal its usefulness in understanding the essence of exchange processes. S-D Logic is “[...] an alternative to the current (goods-) dominant logic”, “[...] a lens, mind-set, through which phenomena can be viewed” (Vargo, 2007, p. 105); is focused on the process of serving other heterogeneous parties (i.e., firms, customers, network partners), where each one’s skills, competences and capabilities

interact with the others to co-create value and several benefit for all of them (Vargo, Maglio & Akaka, 2008). This wider marketing (but not only) conceptual framework determines the passage of an evolutionary logic from goods to services, as well as from produce to consumer (Vargo, 2008). The critical step in the evolutionary concept from a good dominant logic to a service dominant logic can be identified “[...] in how the business process is informed between understanding the purpose as selling things to people and understanding it to be serving the exchange partner’s need” (Lusch & Vargo, 2014, p. 11).

With this in mind, the purpose of this study is twofold. Firstly, it is designed to emphasize that the role of customers (firms) into professional relationships with intermediaries is increasingly relevant in the innovation processes because they are becoming more and more as co-creators of value. Within the useful web-based platforms, innovation intermediaries stimulate, facilitate and support ongoing interactions and collaborations oriented to value co-creation activities, offering a wide range of services to enhance active participation, to develop ideas/products/solutions to problems in interdisciplinary fields and, finally, to answer firm’s needs or market opportunities. Therefore, they represent an alternative way to start and to sustain activities of co-creation by organizations that intend to engage and to collaborate with complementary resources and competencies. Secondly, it is designed to illustrate that the unique domain which the four axioms of S-D Logic occupy within academic innovation capabilities and the relationship between firms and innovation intermediaries, more oriented to.

The study examines literature contributions focused on Service-Dominant logic, Open Innovation Intermediaries and firm dynamic capabilities to develop a conceptual framework.

In an attempt to place Service-Dominant Logic (S-D logic) and the relationships between firms and Open Innovation Intermediaries (OII) more centrally into the context of innovative capabilities and knowledge development, this study outlines the beginning of a new intellectual framework as a potential synergy between these different theories.

S-D Logic is mainly founded on ten fundamental premises (FPs) that provide a useful mind-set to re-define what is exchanged, what is specifically offered and how interaction between different entities should work in an efficient manner (Vargo & Lusch, 2004; Vargo, Maglio & Akaka, 2008).

The Open Innovation paradigm proposes opening up firm innovation processes enhancing and sustaining appropriate collaboration with different external players to create, develop, distribute and commercialize innovations, keeping ahead of the competitive global game and getting new products/services to market before other firms (Chesbrough, 2003; Gassmann, 2006; Chesbrough et al., 2006; Dahlander & Gann, 2010; Vanhaverbeke & Du, 2010; Huizingh, 2011). This new paradigm drastically changes the concept that innovation is a single and linear process of internal firm R&D, but can be seen as an interactive process of discovery, development and exploitation of new ideas between firms’ internal resources and external partners (Blazevic & Lievens 2008; Brown & Eisenhardt 1995; Chesbrough 2003). These external partners can include: customers, suppliers, experts, universities, private/public R&D institutions, competitors, and the general community as a whole. In so doing, they can benefit from numerous opportunities (Boudreau & Lakhani, 2009): to acquire complementary resources and competencies to better identify innovative solutions to meet market needs (West & Gallagher, 2006); to spread risks, to extend social networks and alliances (Enkel, 2010); to reduce costs and improve both efficiency and effectiveness (Hoffman & Scholesser, 2001).

OII provide different services that can be classified as follows (Aquilani & Abbate, 2013): (i) support services mainly oriented to sustain all phases of innovation processes (i.e., text definition

and revision of post by seekers, preventive analysis of idea/request/problem); (ii) communication services through a wide set of tools (i.e., email, phone, personal contact); (iii) support services on complex technical aspects requiring specialized competencies (i.e., new product design, product launch activities); (iv) consultant services concerning different related topics, such as financial, market, technology; (v) services oriented mainly to discover and/or generate useful innovation opportunities (i.e. training and coaching services, collaboration within big projects related to questions of relevant global interest).

These services are provided within the web-based platforms, which facilitate meeting, collaboration and exchange of innovation seekers, with specific needs, with solvers offering solutions, becoming the most relevant locus for the generation of new ideas (Bakici et al., 2012). Through the use of advanced instruments, which tend to differentiate platforms, OII are able to coordinate and manage the demands of the various actors, whilst presiding over all the innovative phases (i.e., Innocentive) (Verona et al., 2006).

Effectively innovation intermediaries however must be able to harmonize different competencies to activate and manage knowledge combination processes (Verona et al., 2006): (1) positioning capability, as ability to act as “bridge” within the knowledge market, reducing informative asymmetry between demand and offer; (2) ability to absorb the knowledge of one of the contacted resources; (3) ability to transform, as ability to identify efficient means for the commercialization of the obtained results; (4) ability to transfer knowledge in the innovation process between resources; 5) ability to create relationships between involved actors with different skills, competencies, professional experiences

A more global and dynamic business environment has provided not only the perfect scenario for internal and external innovative possibilities for firms of all size and location to have access to knowledge, but also it has created a strong necessity for those firms to develop particular internal capacities in order to identify and to use that knowledge efficiently and effectively. It has been argued that internal knowledge can be used as a platform to better facilitate the absorption of “external knowledge” also referred to as “inbound knowledge”. Innovative capacities have been described as a set of dynamic capabilities necessary for a firm to guarantee that knowledge is accessed, managed and mobilised whenever and wherever the manager require it crucial for the successful attainment of their organizational goals (Robertson, Casali & Jacobson 2012). Innovative capacities have been described as a set of dynamic capabilities necessary for a firm to guarantee that knowledge is accessed, managed and mobilised whenever and wherever the manager require it crucial for the successful attainment of their organizational goals (Robertson, Casali & Jacobson 2012). In the literature there is a strong agreement about the existence of two levels of capacities which can be referred to as first-order dynamic capabilities and second-order or master capacities (Ambrosini, Bowman, & Collier 2009, Easterby-Smith et al. 2009, Easterby-Smith & Prieto 2008; Robertson, Casali & Jacobson 2012). The first-order capacities in general are those dynamic capabilities that reconfigure the organizational resource base (Schilke, 2013) where the second-order capabilities manage the first-order ones. In the specific area of innovation, a master capability is called innovative management capacity and three types of first-order capabilities have been identified and they are (Robertson, Casali & Jacobson 2012): Accessive Capacity, Adaptive Capacity and Integrative Capacity.

The main objective of this work is to investigate the relationship between firms and intermediaries. These are based on the principle of exchange in which the customer (the firm) has an impact on the co-creation of value (innovation capabilities development) by working directly with a chosen intermediary, but also there are indirect benefits of such relationship that goes

behind those directly involved and the recently created value could also benefit both the firms and/or the intermediaries communities (networks) at large. The research will be organized as follows. Firstly, it deepens the four axioms of S-D logic, the Open Innovation Intermediary role, principal functions and services offered within their web-based platforms and firm innovative capabilities, necessary to acquire knowledge and competences by external sources globally distributed. It will build a proposal of conceptual framework, developed in order to both visually and theoretically show the role of each of the different theories. This framework will allow a better comprehension of relationship between firms and intermediaries and it will also open opportunities for practical future research.

Keywords: *Behavioral Relationships; Innovative Capabilities; Open Innovation Intermediaries; Service-Dominant Logic; Value Co-creation; Web-Based Platforms*

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Towards Discovering the Limits of Smart Grid AMM Communication Infrastructure

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ABSTRACT

Introduction

Power distribution grids have been forming foundations of the world economy since the second industrial revolution. Its current transformations towards the so-called smart grid approach promise major enhancements in terms of grid stability, energy savings, user engagement and more. With the upcoming changes, power distributors are facing long-term investment dilemmas. Wide range of suppliers are offering their advanced metering and monitoring (AMM) solutions – from metering and sensor hardware, data harvesting and processing systems to supportive communication infrastructures. Setting up a set of requirements posed onto each of these components and comprehending the behavior of individual technologies in large-scale setup is a vital part of the smart grid design process and cannot be simply copied from an existing solution. On-field experiments (Madueno et al., 2013; Kouhdaragh et al., 2015; Open meter: Report on final test results and recommendations, 2015) show that communication forms a great bottleneck in many smart metering installations. Since stable and fast optical fibers are rather expensive to install everywhere and hard to maintain, two main approaches involve wireless cellular networks and power-line communication (PLC). Cellular networks can be easily overloaded by multiple simultaneous connections to the same cell (Madueno et al., 2013), moreover, solutions from public operators, often without dedicated Quality of Service (QoS), suffer from lower stability caused by other participants. Quality of PLC, on the other hand, is very dependent on the grid topology, power line load, power line type, number of repeater “hops” and external disturbances

(Wolkerstorfer et al., 2016). Generally speaking, theoretical speeds achievable in laboratory conditions hardly ever meet the reality.

Here, we present an approach to analyze the limits of communication infrastructures used in large-scale smart grid applications. Unlike most approaches, we focus on end-to-end data delivery and data-collection process performance indicators (PIs). The paper is structured as follows: In the Background section, we describe existing approaches modeling and simulating AMM communications. Then, we sketch the scope of simulation models and present the status of on-going work in real projects. We conclude by presenting our visions and future directions in the field of AMM communication simulation.

Background

Common approach to smart grid communication infrastructures divides data transmissions into three areas. Home area network (HaN), communication platform used by smart meters, smart appliances, household production and power storage facilities. Neighborhood area network (NaN) supports data exchange between local smart meters and intelligent agents, enabling the incorporation of distributed intelligence into the grid. Localities are often delimited as areas fed by a single secondary substation. Distributors' agents in the localities are referred-to as gateways or data concentrators (Gungor, 2011; Krejčí, 2014), often placed on the secondary substations and primarily designed to pass measured data to distributors' central systems (Niyato et al., 2011). This data exchange is already a part of wide area network (WaN). This hierarchy corresponds to "zones" axis of SGAM (Trefke et al., 2013). Within the scope of the paper, we primarily focus on the technologies used in NaN and WaN communication.

Wireless Communication

In the Central-European context, cellular networks or high-voltage (HV) PLC will almost certainly be used for WaN, reading metering data from concentrators or gateways. Existing wireless approaches include GPRS/EDGE, 3G network, LTE (Pham, 2013), or alternatives like ZigBee or WiMax. All these technologies are compared in (Usman & Shami, 2013). In (Rengaraju et al., 2012), Rengaraju et al. compare WiMax and LTE, conducting simulations on data up-link and emphasizing importance of the feature for smart grid applications. (Islam, et al., 2012) argues that since WiMax contains integrated mechanisms providing QoS, it is a suitable technology for smart grid applications, and conducts supportive simulations in OPNET. Recently, a novel technology, referred-to as LORA (LORA Alliance, Lora technology) is being developed. The approach is closely related to sensor networks and the Internet of Things, where smart grids are often considered to belong (Zaballos, 2015).

Growing number of smart grid devices communicating via cellular wireless networks becomes a serious issue (Kouhdaragh et al., 2015). Based on field measurements, (Madueno et al., 2013) concludes that the number of smart meters that can fit into a GSM cell is solely limited.

Powerline Communication

Powerline communication (PLC) uses electrical wiring to simultaneously carry both data and alternating current. PLC represents the natural way of developing communication infrastructure on existing power infrastructure (both low and high voltage). In the scope of Central-European networks, it will almost certainly be used for NaN communication. Powerline communication represents a rather noisy channel, whose quality depends on a wide range of factors including current power load of the wires, external electromagnetic disturbances or powerline traffic on

close wires. For longer distances, signals need to be amplified, which is why smart meters act as signal repeaters (Yadav) in majority of existing installations. Several low-level standards are relevant in central-European area: older narrow-band, BPSK-based Meters-and-More technology (Meters and More Alliance); newer narrow-band OFDM-based PRIME, G3 and IEEE-1901.2; and broadband over powerline (BPL) (Tonello & Zheng, 2009), each defining a communication stack up to the transport layer. Where Meters and More uses HDLC-based solutions, OFDM meters use TCP/IP networks, UDP in case of G3 (Kmethy). As for application protocols responsible for AMM data reading, Device Language Message Specification and Companion Specification for Energy Metering (DLMS/COSEM) is now basically considered a standard in smart metering communication, beating legacy protocols like SML and IEC 61850 (Feuerhahn et al., 2011).

A number of generic low-level modeling and simulation approaches has been proposed, among others (Prasanna et al. 2009; Tonello & Zheng, 2009; Andreadou & Pavlidou, 2010; Razazian et al., 2010; Tonello & Versolatto, 2010, 2011; Atayero et al., 2012; Canete et al., 2011; Lu et al., 2013), most concentrating on OFDM, particularly comparison of PRIME or G3. (Hoch, 2011; Skrek, 2015). Major technologies have been extensively tested in on-field experiments conducted as a part of OPEN Meter initiative (Open meter), Sendin et al. also published results from large field tests of PRIME-based meters in Spanish Iberdrola grid (Sendin et al., 2012). (Lo'pez, 2015) studies PLC (and GPRS) technology behavior under various conditions, with respect to previously proposed (Lo'pez et al., 2012) modeling methodology. (Wolkerstorfer et al., 2016) provides valuable long-term measurements of PLC behavior in various environments, together with simulation methodology taking into account low-level protocol overhead. Solely (Zaballos et al., 2009) has simulated transfers of DLMS messages over PLC in order to compare the standard with IEC 60870-5. Interesting work has been conducted by (Armendariz et al., 2014), connecting OPNET System-in-the-Loop module to Arduino Uno and Raspberry Pi nodes simulating metering devices. The nodes ran GURUX implementation of DLMS server so the exchanged messages were respecting the standard.

Unfortunately, the presented simulation approaches were only dealing with point-to-point communication, not taking into account repeater-enabled communication hops. In fact, none of them was focused on modeling end-to-end behavior of large AMM setups on application level. As for models of higher levels of ISO/OSI layers over PLC infrastructure, (Kim et al., 2008) presented a simulation setting with repeaters using Network Simulator 2, (Bauer et al., 2009) has analyzed the effects of employing IPv6 over low-speed PLC and finally (Matanza et al., 2013) proposed to model network effects of the low-level power-line processes using BER and then pass it to high-level network protocols.

Modeling Communication in Large-Scale Smart Grid Setups

To authors' best knowledge, the remaining research questions remain open: For given technology, measured quantities, measuring profile and reading frequency, (1) How does grid topology, disturbances and cross-talks from neighbor localities influence end-point metering data delivery? (2) How will the alarm signaling be influenced by normal AMM traffic? (3) What is the optimal setup of the information and communication processes? Should cross-talking be enabled? What is the optimal packet size? What is the best data reading strategy?

In order to approach the challenges, a higher-level modeling approach needs to be applied: covering solely individual communication transactions mitigates interferences between concurrent transmissions sharing a common medium or application protocol behavior. To face

the issues, behavior of realistic data AMM data flows on realistically generated communication network topology need to be analyzed. The simulated setup should conform to the following models describing the AMM setup:

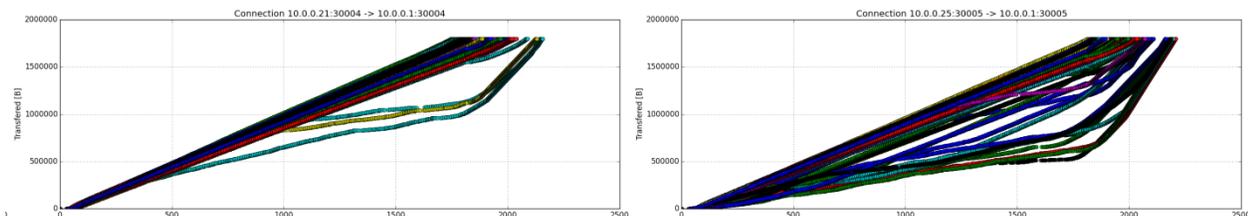
- Information scope – exchanged metering data: measured quantities, events and states; communication protocol message sizes dependent on transmitted metering data and protocol setup
- Power distribution grid infrastructure – substations, consumption points, distribution boards, their types, mutual power grid connectivity, power line settings
- Devices and IT systems used in the environment, their functions, communication behavior, installation setup and deployment onto the places of the distribution grid
- Communication technologies – communication characteristics of individual considered technologies, among others throughput, latency, jitter
- Communication infrastructure – set of lines and communication devices used to provide communication connectivity between grid agents: base transceiver stations (BTS), PLC signal repeaters
- Communication protocols – formalized routines for data exchange, specific message types, re-transmission strategies.

Implementation

The joint effort of the developers of the universal modeling and simulation tool GridMind (Rosecky et al., 2015) and CVUT communication experts forms an agent-based modeling and simulation tool aiming to cover the aforementioned issues. The tool is currently used in two commercial projects examining considered installation setups in two major Czech power distribution companies. Here, we'll sketch the development process of the final models.

Firstly, the behavior of 1 to n concurrent data transmissions on various types of shared communication media and network topology is analyzed, see Figure 1. A set OMNET++ simulations is conducted, in order to form statistical models of transport layer characteristics, such as – in the case of TCP – application data throughput; window sizes; packet loss; duration of connection initialization and termination, for particular simulation conditions and network topology. In-the-field measurements help to configure and validate the simulation setups.

Figure 1. Cumulative amount of transmitted data through the first, resp. second GPRS connection sharing the same BTS



The statistical models are then fed to the GridMind modeling tool, which generates realistic communication topology and traffic according to the amount of consumption points, setup of technical processes and used communication protocols. The tool then runs agent-based discrete-event simulations of the grid communication using state machine models of individual agents and

processes (communication and AMM), see Figure 2. Message delivery times are estimated based on based on computed transport layer characteristics under particular conditions. When the network infrastructure conditions change, for example a new transfer is started or a running transfer finishes, expected delivery times of running transfers sharing the same medium are recalculated: the rest of the data is transferred in updated conditions. Performance indicators like end data latency, percentage of missing data or length of metering data gaps are continuously observed and can be used to evaluate the simulated setup. In general, the tool takes a set of aforementioned models as its input and provides output in terms of satisfaction of individual communication requests.

Figure 4. Exemplar part of log record of state changes of communication state machines

```
elm496 is changing state from ssl::waiting_for_client_key
to ssl::connected at 14.266
elm484 is changing state from tcp::sending to tcp::connected at 14.266
elm484 is changing state from tcp::connected to tcp::sending at 14.266
elm478 is changing state from ssl::waiting_for_new_session_ticket
to ssl::connected at 15.427
elm484 is changing state from tcp::sending to tcp::connected at 15.427
elm484 is changing state from tcp::connected to tcp::sending at 15.427
elm484 is changing state from tcp::sending to tcp::connected at 16.829
elm505 is changing state from http::listening_for_request
to http::processing_request at 16.829
elm514 is changing state from bpl_dc_north_bound::waiting_for_command
to bpl_dc_north_bound::executing_command at 16.829
```

On-going Work and Future Directions

We are aware that the approach may need further specifications, particularly more extensive analysis of the influence of starting a new transfer or finishing an old one on other on-going transfers. The approach will be validated against net-flow monitoring records from in-the-field measurements. At the moment, it is used to compare considered technical solutions in PRE and E.ON power distribution grids. Statistical models of communication channels have been created for several wireless technologies under various conditions including signal quality class, external traffic class or amount of concurrent transfers. Similar analysis covering various implementations of PLC is still in progress. The problem for PLC appears to be much more complex, as the condition state-space is much larger (involving amount of repeater nodes, crossings, wire types and more).

Conclusion

Although a lot of attention is paid to the behavior of smart grid communication technologies in small scale, complex systems involving tens of thousands (or millions, when covering all smart grids from a distribution grid) mutually-interconnected nodes still need to be analyzed in more detail. Agent-based approach used in the GridMind tool has drained attention of all three Czech distribution companies and is currently being used in two commercial projects. More work needs to be conducted in order to cover the PLC infrastructure and the whole approach needs to be validated against measurements in the field. However, the approach is leading the way towards

viewing the smart grid communication infrastructure as a system of dynamic agents. Future research directions may include finding a (pareto-)optimal setup of communication protocols or data reading strategies.

Keywords: *AMM, communication, modeling, simulation*

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Innovation in cultural districts: the cases of Denver, Naples and Abu Dhabi

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ABSTRACT

Purpose: The aim of the paper is to analyse high technology cultural districts in order to understand the role of innovation at different levels (systemic level and firm level) and phases (both organic – the phase of service provision and induced – the phase of promotion).

Nowadays, high technology cultural districts are forced to face with the creation, development, diffusion of innovation, the management of relationships between different stakeholders that have to generate/implement innovation as well as the valorization and promotion of the cultural district.

This complex perspective leads to a precise structure of the paper that develops the analysis in some main points. The first regards the study of innovation in high technology cultural districts in order to understand its real meaning and how it is created and spread throughout the district. The second point deals with the investigation of interactions among stakeholders involved into a cultural district, that can be defined as a "well-recognized, labeled, mixed-use area of a city in which a high concentration of cultural facilities serves as the anchor of attraction" (Frost-Kumpf, 1998). It is a context in which it is possible to develop creative ideas, also through the support of high technology (van der Duim, 2007). The third point refers to the analysis of districts' valorization and promotion according to an innovative lens. Hence, the bidding agent of the previous points is the study of innovation and its role as both keystone and transversal component in this precise configuration of district.

The current research deepens the literature on cultural districts related to innovation theories and the dynamic capability and relational view. Furthermore, this paper adopts a specific focus on stakeholder competition and collaboration.

Methodology: The paper examines, through a multiple case study analysis, three districts: The Scientific and Cultural Facilities District (SCFD), located in Denver, USA, D.A.T.A.B.E.N.C. in Naples, Italy and Saadyat Cultural District Abu Dhabi, UAE, in order to understand how these districts innovate. The multiple case studies “facilitate identifying and analyzing particular patterns in certain processes and explaining differences across cases by contrasting them to each other” (Aaboen et al, 2012). Data are collected from different sources such as annual reports, feasibility studies and other secondary sources. Moreover, surveys to governance actors are administered in order to understand how the process is managed and deployed as well as the different mechanisms that interplay for the creation and diffusion of innovation.

Implications: This paper outlines both theoretical and managerial implications. From a theoretical point of view, the paper stresses the attention on the role of cultural districts as expression of specific local vocation (Testa, 2013) and strategic relationships among members. Secondly, the district configuration presumes the existence of relationships among competitors and, hence, the development of both competitive and cooperative attitudes (Nalebuff and Bradenburger, 1996), that this paper deepens. Actors operating in cultural districts possess a high territorial either productive or service specialization.

From a managerial point of view, the paper shows the stakeholders involved into a cultural district and, particularly, the collaborative and competitive processes among actors, generating knowledge transfer and sharing, in a value co-creation perspective. Moreover, another managerial implication is connected with the opportunity of implementing efficient interactions within districts because the set of privileged relationships can generate the creation/strengthening of innovation and improve time-to-market (Rindfleisch, Moorman, 2001). Although districts can favour innovation, this paper also explores if the related process may be gradual rather than fast.

Findings: Findings show that innovation plays a key role in high technology cultural districts innovation. The implementation of innovation process, consisting of a mix between current and new knowledge, is strategic for commercial objectives. The relationships among the stakeholders of the districts increase when members recognize the value of digital platforms in classifying and disseminating cultural heritage and its main peculiarities.

The districts’ external scenario is increasingly dynamic and the interactions among the internal members are becoming complex to manage and may involve a large number of stakeholders. Therefore, firms have to implement creative strategies and innovative business models in order to increase fluidity related to the dynamic nature of the collaboration.

Theoretical findings show that, despite substantial research in this field, there remain gaps in the analysis of the stakeholder collaborations in developing creative and high technology tourism/cultural districts.

Keywords: *cultural districts, innovation, collaboration, creative strategies.*

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Voluntary corporate disclosure in the Era of Social Media

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ABSTRACT

Conceptual and theoretical background – Over the time, several authors have provided many contributions on the topic of voluntary corporate disclosure (Dierkens, 1991; Eng and Mak, 2003; Fishman and Hagerty, 2003). Increasing attention of managerial and economic studies on the topic of corporate disclosure was principally addressed by Signalling Theory (Connelly et al., 2011), Capital Need Theory (Sale et al., 2007), and Legitimacy Theory (O’Donovan, 2002).

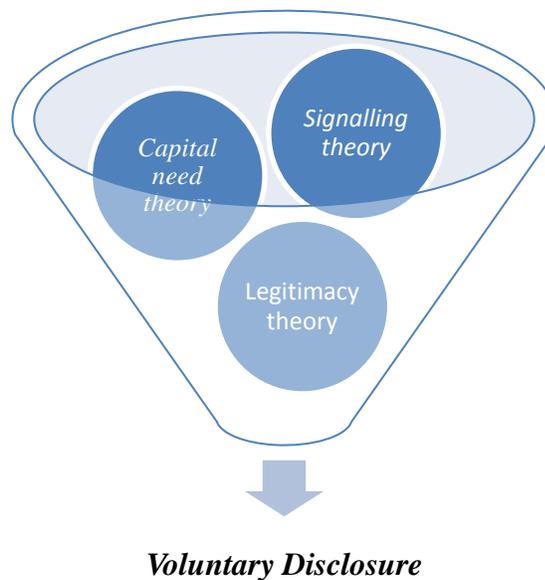
The signalling theory (Spence, 1973) highlights that the primary objective of corporate disclosure is to inform investors and market about the quality and the value of a company. According to this assumption, some studies have empirically analysed the relevance of voluntary corporate disclosure, in order to emphasize its effect on the cost of capital (Botosan, 2006). Building on this evidence, some authors underline that companies with a high standard of voluntary corporate disclosure show a lower cost of capital (Botosan and Plumlee, 2002, Verrecchia, 2001). This evidence is confirmed by studies of Gietzmann and Ireland (2005) and Francis et al. (2008) that point out negative relation between voluntary disclosure and the cost of capital.

Following the capital need theory, Healy and Palepu (2001) emphasize that investors’ perceptions of companies are significant to corporate managers expecting to issue public debt or equity.

Barry and Brown (1986) and Merton (1987) assert that managers, aware of the information asymmetry between them and outside investors, are willing to pay the premium price that investors demand for information risk related to companies. They underline that to reduce their cost of capital they need to reduce information risk acting on voluntary corporate disclosure.

Finally, legitimacy theory affirms that the existence of company is motivated by the alignment of its values with the values of society in which it acts (Shehata, 2014). This theory builds on the society's perception (Chambers, 1961) and it underlines how decision makers could be compelled to disclose information in order to modify the external users' opinion on company (Cormier and Gordon, 2001). More specifically, it highlights that there exists a 'social contract' between firm and society and only respecting this contract the company is legitimated to act (Yi et al. 2011). According to Deegan and Samkin (2009) companies should ensure that their operations are respectful of the bounds and norms imposed by the context because only respecting these indications companies can survive (Guthrie et al., 2006).

Figure 1. The contribution of Capital Need Theory, Signalling Theory and Legitimacy Theory to Voluntary disclosure



Source: Author's elaboration

The studies on voluntary corporate disclosure have offered many contributions in advancements of knowledge on the effect of traditional voluntary corporate communications on corporate performances (Healy and Palepu, 2001, Frankel et al., 1999) but they have not adequately investigated possible contributions offered to corporate performances by informal communication and by social media (Hanna et al. 2011, Mangold and Faulds, 2009).

Social media represents an interesting field of observation to understand how stakeholder react to company communications (Kaplan and Haenlein, 2010). They could provide to firms a relevant way to communicate directly with their stakeholders opening to the opportunities to receive direct feedback and to involve stakeholder in the definition of communication actives (Blankespoor et

al., 2013; Barile et al., 2013; Saviano and Caputo, 2013). They appear to be a field rich of opportunities and of risks that require to be better investigated (Veil et al., 2011).

Purpose – The voluntary corporate disclosure is acquiring a prominent role in knowledge economy (Dhaliwal et al., 2011; Eng and Mak, 2003; Francis et al., 2008). Several authors underlined the opportunities to involve stakeholder in companies' activities transferring the correct information in correct ways to them (Morsing and Schultz, 2006; Barile et al., 2015; Di Nauta et al., 2015). Building on this reflection, the paper attempts to analyse in which way voluntary corporate disclosure based on most used social network (Facebook and Instagram) impacts on companies' performances.

Analysing the posts shared by the 50 best performing European companies in the last three years, the research analyses possible relationships between social media voluntary disclosure (SMVD) and firms' economic performances.

Methodology – The paper builds on a literature review on the topic of voluntary corporate disclosure and social media in order to define a possible conceptual framework to analyse the contribution of SMVD to firms' economic performances. From the analysis of literature some relevant dimensions such as frequency, consistency, previous activity and stability are derived to explain in which way voluntary corporate communication based on social media is related to Return of Sales (ROI) in a sample of European companies.

Hypotheses herein are tested via Structural Equation Modelling (SEM) and the results are discussed both from theoretical such as from practical point of view.

Values and originality of the study – The paper offers a multidisciplinary framework to investigate role and contribution that social media can offer to the firm's strategy of corporate disclosure. It underlines risks and opportunities related to the use of Information and Communication Technology to communicate with stakeholder and to transfer knowledge and information to them (Joshi et al., 2007).

Conceptual framework is tested through empirical observation on a sample of European firms in order to investigate possible relationships among firm's activity on social media and their economic performances.

Managerial and practical implications of reflections and observations herein are analysed in order to offer first stimulus to the debate on the contribution of Information and Communication Technology to the knowledge management and communication strategies of firms.

Keywords: *Voluntary Corporate Disclosure; Signalling theory, Capital need theory; Legitimacy theory; Social Media; Structural Equation Modelling*

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Recent and actual computer era: is the Solow paradox restored?

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ABSTRACT

Introduction

Robert Solow made a comment in 1987: "You can see the computer age everywhere but in the productivity statistics." (Solow, 1987), (Brynjolfsson, 1993). His attitude was interpreted as a definition of a paradox by which he showed respect for the quality of technological change and its influence on general productivity. Referring to statistical indicators from that time (within the USA) is not disputable.

What is disputable is approximate assessment of the absence of the influence of technology on productivity. The second fact that could be understood from Solow's paradox is his attitude that computer age should be regarded as a technological revolution. In the literature that emerged more recently it is possible to trace the attitude that Solow's paradox is solved, that is, that there is no reversed ratio between computerization and productivity (Acemoglu et al., 2014). The paper considers Solow's paradox by examining the relationship between the individual and ICT in the work environment. If the application of ICT should affect the level of productivity, then it is not sufficient to observe just technology itself. It is necessary to observe the area in which the technology is applied, but also the way in which it is applied. At the time when Solow's paradox was defined, the opinion that computers will to a great extent replace humans prevailed. Although the time has shown that a paradox was only temporary, tendencies could be noticed recently in the application of ICT, which can lead to some kind of a renewed Solow's paradox. The paper deals with the analysis in the way Solow used to do. The aim of the paper is to detect circumstances and indicators, which can affect primarily the productivity of an individual and consequently the productivity of the company as a whole.

Defining the scope of the paper

Computers have found relatively quickly their place in all human activities. However, the influence on the basic activity depended on concrete cases. The computerization of the industry and accompanying services has had similar effects as the Industrial revolution. The primary intention of the computerization in industry was to replace human activities that can be automated. That meant to affect the well-known technological procedures in order to automate and upgrade these. At the same time there is a need to train workers in new skills and practices.

The very development and improvement of ICT has been relatively fast. The development of hardware from the first computers from the time when Solow was defining paradox is approximately a twenty-year period. The development of other technologies simply could not follow the speed of ICT development. The year 1987 is a year of the fourth generation of computers and the time of complete computerization. IT training is necessary and it takes time. If this necessity is connected to everyday work activities, then it is clear that it represents either additional work or the decrease in normal activities, certainly until a desired level of training and competency is achieved. Computerization has begun sporadically. It means that those activities included all generations of workers in all professions. Maybe the term “caught” is better than the term “included” in order to describe conditions at that time. Solow’s paradox in those circumstances is not a paradox, but a paradoxical consequence of circumstances in which Solow observed the relation between computerization and productivity. The entire problem could not be regarded as a matter-of-fact observation of statistical data without taking into consideration the other factors.

When with time the relations have become balanced, and primarily IT training and skills have increased in the application and use of computers, a paradoxical relation, caused by computerization, have disappeared slowly. Although, not completely. What will come afterwards and come with the fifth generation of computers will raise other questions and create other issues. The situation resulted in the need to use your computer more efficiently and in having a more drastic control (and decrease) of the investment in ICT. In those circumstances, with the excuse that the investment in ICT is too high, a serious consideration of outsourcing ICT and accompanying activities has begun. Companies are moving toward financial support of the core business. For IT experts these circumstances are detrimental and one has to be very flexible to survive. Economic relations and the conditions of recession will introduce some new ways of thinking and define some other relationships that will be discussed later on.

Therefore, today computers and ICT are unavoidable in all professions. However, the informatization of a profession and IT training of workers still demands time and money. But today there is an attempt to gain time and money in ways that can lead to recurrent paradoxical circumstances, which could not be seen in statistics. Does that mean that Solow’s paradox evolved?

The recent scope of ICT

What is today’s scope of the application of ICT and how does it affect productivity? That relation could be seen through periodical reports at the entire level of productivity of a certain surrounding - town, area or state. However, the entire statistics will show the most frequent average values. That picture is not the clearest as far as the scope and the way of ICT application is concerned. This attitude is exclusively connected to a question whether productivity is conditioned by the application of ICT, that is, computerization. The assumption of the author is that the conclusion refers to (or it referred to the time in 1987) and in drawing comparisons between the amount of investment in ICT and the entire yield achieved by production. The subject of this paper is not to question the applied economic methods. The authors are interested in the circumstances in which ICT is applied.

There are two prominent trends in the application of computers and organization of information systems. The first is the way of organizing information systems in a structural and architectural sense. Recent endeavors are articulated as cloud computing, and the other tendency is to insist on

a BYOD arrangement and engagement (Hayes & Kotwica, 2013). For further consideration it is necessary to elaborate both shortly.

It is probable that a more detailed study would show that Solow's paradox has, to some extent, condemned IT and IT experts. In the attempts to achieve profits that are as high as possible, the first branch inside the internal savings was IT and informatization. The additional reason for that was the fact that computers were produced in serial production, which decreased their price, however not the necessity for more frequent replacements with a newer and better models. Those considerations led to a revelation that ICT equipment does not have to be owned, it could be rented. This kind of attitude is uncompromising and it is valid only for the application of ICT, which is not involved directly with a production process, such as in a computer-controlled serial production like car production or any other production on a line. If ICT does not have to be owned, then it could be rented. The philosophy of renting ICT defined cloud computing (Puttini et al., 2013). By that, the use of computers has been put at the level of a community service. The explanation that ICT is paid as much as it is used certainly sounds good in all production plans at all levels – operative, tactical and strategic. Again, possible risks are not given careful consideration, that is, a financial effect or the influence on the production is what matters. The safety of these systems, from the aspect of the influence of appropriate information on the production efficacy and efficiency, is a phenomenon whose meaning it is necessary to emphasize, but further consideration exceeds the limits of this paper.

The phenomenon BYOD/BYOT/BYOA – (bring your own device/technology/application) (Lee & Levins, 2012), has not occurred by accident. On the contrary, it has resulted from computer "cloudiness". The previous statement could look as free and unchecked. BYOD has been created by using logic of financial savings through the ways of using ICT and payment according to the system "pay as much as you use". If it is possible to rent ICT from specialized companies, the logical sequence of thinking of the owners of companies is to insist on hiring employees who will bring their own ICT devices/ technology/ application software.

Is it possible for ICT to affect productivity in these circumstances? Does this lead to Solow's paradox? Was there an attempt to use work to show that the chances are high?

Before forming a hypothesis, which will be tested by a survey, it is necessary to emphasize another important fact or attitude. Productivity depends on more different factors, but it is of unique importance for this paper. That is the fact that total productivity depends on, in the first place, individual productivity in one business system or process. Consequently, if you want to put productivity and the application of ICT into a dependable relation, then the role and the meaning of employees should not be disregarded, that is, the use of this technology.

The survey and hypothesis

The survey was conducted by administering the questionnaire anonymously to the population that was considered to carry out their tasks, in some way, by using ICT. The questionnaire assumed the following conditions:

- the respondent uses various forms of ICT, which are the ownership of the employer, but could be their ownership, too,
- the respondent can use forms of ICT by not being dependent on the place and time of use, especially if it is possible to do tasks online.

The consequence of the mentioned conditions is the distortion of values and the absence of precise determination of basic terminology by which values are established.

The questionnaire focuses on examining articulation of factors that can influence productivity. These are: daily wage, work instruments – and in this case ICT, the relation towards ICT and the use of ICT in conducting regular duties. (for similar and more look at Bailey, C. 2016).

The hypothesis that should be examined:

Recent forms of the organization of the information system and ways of applying ICT could jeopardize directly the flow of a business function, and thus, productivity of a business system.

Demographic data on participants are collected with the aim of determining differences and drawing conclusions on specific parts of the tested population.

In order to address the survey objectives, descriptive statistics was performed. In addition, correlation analysis with Pearson correlation coefficient was conducted to examine hypothesized relationship. The results are briefly discussed next.

Among the 102 respondents in the sample, 53.9 per cent were male. Most of the respondents (62.8 per cent) had between 30 and 49 years of age, and about 89 per cent of them had university education or above (MSc, PhD). Furthermore, most of the respondents (52 per cent) worked in education sector. Slightly more than 40 per cent of respondents worked as operative employee, and majority of them (74.5 per cent) had permanent employment. About 47 per cent of the respondents worked 8 hours per day, while 24.5 per cent of them indicated they work more than 8 hours, and 22.5 per cent stated their working hours were not clearly defined. More than 67 per cent of respondents carry out business tasks using technology and devices that are partly property of employer and partly are their private property. Majority of the respondents (78.4 per cent) spent on average 8 or more hours in performing their business tasks. In addition, out of the total time spent in carrying out business tasks, 57.8 per cent of the respondents used ICT fewer than 8 hours.

According to the study results, the most frequently used device in carrying out working tasks was personal computer, followed by portable computer (laptop). E-mail is the most used ICT attribute in workplace.

Most of the respondents agree that the use of ICT facilitates the implementation of business tasks and flexibility of working hours, as well as makes one available to superiors and colleagues all the time in order to carry out tasks. Respondents are undecided regarding the statement that ICT makes one available to the employer all the time, and makes one's work time undefined, as well as regarding the statement that ICT demands permanent training which is not described in business duties.

Furthermore, respondents agree that an application of ICT in carrying out business duties makes the employee more flexible in planning how to perform business duties, it makes planning and determining deadlines more flexible, and that application of ICT in performing tasks outside standard working hours affects to a great extent the free time of the employee. Most of them agree that the use of ICT makes performing tasks easier.

In order to examine the nature of the relationship between ICT and work productivity, correlation analysis was performed. The results revealed that the use of ICT in performing business duties has positive, significant and moderate effect on work productivity ($r = 0.399$; $p < 0.01$). What is more, the use of ICT in regard to the employer positively, significantly and moderately effects work productivity ($r = 0.494$; $p < 0.01$). These results indicate that the more the ICT is used, the higher the work productivity. The moderate effect suggests that the role of ICT in work productivity cannot be neglected, although ICT is not the only factor that impacts work productivity.

Further research could examine the role of demographic characteristics on work productivity, as well as the causal relationship between ICT and work productivity.

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Different role and different business models: Cloud-computing ecosystems and the heterogeneity of actors

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ABSTRACT

In the last decades Open Innovation approach (Chesbrough, 2003) underlines that firms benefit from interactions and collaborations with external partners by permitting the in-flow of external technologies and technological competences. External technologies may be integrated with the internal technological base in order to generate new products and thus enhance the firm's ability to create value. However, firms' possibility to adopt an Open Innovation approach can be limited by two conditions: i) the lack of absorptive capacities (Cohen and Levinthal, 1990); and, ii) the difficulty to set-up appropriability mechanisms that protect partners' intellectual property from uncontrolled deployment by third parties (Cohen et al., 2000). In the first case, firms need to invest in both scientific and technological research that allow them to monitor the external technological environment, identify the owners of complementary technological skills and competences, integrate external technological knowledge with the internal knowledge base, and eventually convert the potentialities offered by external technologies into products capable of generating a competitive advantage. In the second case, firms both need to protect their technologies with patents and other forms of intellectual property rights, and to negotiate with potential partners the allocation of property rights on exchanged technologies.

Only once these two conditions are met and difficulties associated to their implementation overcome, firms may take full advantage of collaborations with external technology suppliers. Traditionally, firms that have undertaken such an approach have pursued an open business model (Chesbrough, 2003; Teece, 2010; Zott and Amit, 2010) characterized by a strict control over the core elements of the technology to be embedded into innovative products, while external technology acquisitions have been limited to marginal and complementary technological components, often customized by the external supplier for the benefits of the potential technology user. In other words, technologies and technological knowledge exchanged in innovative

collaboration processes are often specialized and (co-)developed ad-hoc to solve contextual problems.

When technologies object of exchange are General Purpose Technologies (GPTs), as in the case of IT platforms analyzed in this study, different forms of open business model may be pursued by partners, with advantages for both technology suppliers and technology users. Indeed, as prior research has shown (Helpman, 1998; Gambardella and McGahan, 2010), GPTs allow a different configuration of division of labor at the industry level and a different organization of the innovative process. A simple comparison between the business models based on Specialized Technologies (STs) with respect to business models focused on GPTs allows to fully get the sense of the advantages provided by GPTs.

In the case of an ST setting, the external technology is developed to respond to the potential user's application needs and to be fully integrated into its internal knowledge base. In this situation, the development costs of the specialized (that is, customized) external technology are totally incurred in by the technology supplier, while the technology user only incurs in the indirect costs of developing an absorptive capacity and of securing internal intellectual assets. Adaptations costs of external technology to internal needs, albeit not absent, can be supposed to be limited, given the fact that it is the technology supplier mainly in charge of providing a technological solution that fits context-dependent conditions.

By contrast, in the case of a GPT setting, the technological solution developed by the technology supplier does not respond to any specific (context-dependent) application condition, but is intended to satisfy a large number of possible application needs, not necessarily closely related one to the other. Indeed, the more general the technology is, the larger the number of application domains that can be served by the same GPT. In this case, albeit an ST solution implies a customization effort, the cost to develop a GPT is likely to be higher than that of an ST, provided that it requires to overcome the limited context-dependent conditions of a narrow application domain. Furthermore, the development of GPTs is often associated to the development of ad-hoc toolkits (von Hippel and Katz, 2002), which the technology supplier provides to users in order to facilitate the adaptation of the GPT to their local conditions.

Provided that such toolkits avoid adaptation costs to be excessively high for the users, both technology suppliers and technology users may benefit from a GPT setting: with respect to an ST setting, technology suppliers may more than compensate the extra costs of generalization of the technology by selling it to a larger number of customers (application domains); and technology users may benefit from a more stable technology, which has been already applied to other technological domains, without incurring in excessive adaptation costs.

IT platforms represent an interesting example of GPTs that allow the implementation of such open business models. With this in mind, this study aims at understanding the role played by key actors that participate in the development of IT platforms and also the principal reasons that can stimulate individuals/firms to participate in the project of IT platforms.

In order to achieve these objectives, we performed a descriptive-interpretative qualitative research, using single case study method (Yin, 2004), and we investigated the case of FIWARE, a funded EU initiative, which has seen the involvement of different actors (from large IT operators to small software developers) with the objective of developing a cloud-based, IT-based platform for potential business purposes. We selected the FIWARE platform for different reasons: (i) it is an EC project that is included in the Future Internet Private Public Partnership (FI-PPP) program, oriented to improve the effectiveness of business processes and infrastructures supporting applications in relevant areas such as transport, health, and energy; (ii) it can be used by a range

actors – large firms, small-medium enterprises, public administrations, software houses, etc. - to validate innovative technologies in the context of smart applications and to prove their ability to support user driven innovation schemes; and, (iii) finally, it facilitates the interactions and collaborations between business and academics.

By studying the case of FIWARE, we adopted the perspective of both large firms involved in the development of the IT platform, and small software operators involved in the development of subsequent applications.

Keywords: *Open Innovation; open business model; General Purpose Technologies; IT Platforms; FIREWARE.*

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The role of Customer Experience in re-purchase of Personal Technological Devices

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ABSTRACT

The smart-phones market is going on a deep change moving from a fast-growth one where producers had to convince customers to adopt their own innovations to a slower growing one where they have to be given enough reason to change the brand of the devices they are using.

Recent market data show that the personal hand-held devices market is a big with quite 1.5 billion devices sold in the 2015 worldwide (Canalis, 2016). Looking at market share data acknowledge that, in spite of the numerous competitors playing in the industry, most of the units are sold by only three of them (Trendforce, 2016): Apple (17.5% of the devices sold worldwide) and Samsung (24.8% of the devices sold worldwide), and Huawei (8.4% of the devices sold worldwide).

The market appears to be even more concentrated if it is analysed looking at the data on the profits earned by each competitor. By this perspective, we find out that almost all the competitors are operating in a loss as Apple got the 87% of the Global Smartphone Profits and Samsung collected another 13% (Jones, 2016), while most of the other vendors have broken even or lost money¹.

In spite of this concentration, the personal hand-held devices market was still considered an interesting one as its fast growth rate helped in creating market-space for every competitor, but, in the last couple of years its growth has slowed down as shown by data from IDC (2015), and Gartner (2016) moving from the double digit one of the past to a still high 9,7% growth rate. As a consequence, the intensity of the competition in the personal hand-held devices industry will become way fiercer (D'Aveni, 1995).

Moreover, the market is becoming in more and more countries a mature one as most of the potential users have already adopted a smart device (Kesiraju, 2015).

These trends foster changes in the market strategies that these players should take, moving from strategies targeted to early adopters (Lee, 2014) to those more oriented at stealing customers from competitors. At the same time, these operators will have to keep a steady pace at innovating their

¹ The sources of the article is Canaccord Genuity. According to Jones, Apple got the 92% of the profits, while Samsung got the 14%. At the same time Blackberry, LG and TCL (Alcatel) should have broken even, Lenovo/Motorola, Sony and HTC should have lost the equivalent of 1% of the industry profits and that Microsoft lost another 3%. In this report the losses are counted as “negative profits” we have adjusted the estimates to count only the market profits.

products as a way to maintain, or to gain, a sustainable competitive advantage (Barney, 1991; Grant, 1991). In addition, they will change their strategies in order to take into account that their potential customers will judge their devices not only on the basis of technical characteristics, but they will look at their previous experiences with the other product under the same brands as one of the main factors in making their purchase choices.

The topic of consumers' responses to innovation has already been found as a relevant one for strategic management and marketing fields (Cooper, 1998; Hauser, et al. 2006). Usually the most used approach in dealing with Innovation Adoption is the Technology Acceptance Model (TAM) developed by Davis (1989) to explain computer usage and adoption of new information technologies. However, several scholars (Westaby, 2005; Claudy, et al., 2014) have developed another framework built upon the Behavioral Reasoning Theory (BRT) as it sees the factors helping the adoption and those hindering it as conceptually different ones. In fact, scholars have shown that reasons to adopt innovations and reason against adopting them are usually qualitatively different and that the two classes will be able to influence the consumer's decision making processes in different ways (Garcia et al. 2007; Kleijnen et al. 2009).

According to BRT, the reasons for or against the innovation adoption will not impact on the consumer behaviour, but they will influence the consumers' attitude and intentions toward adopting the innovation and these will drive their behaviours (Westaby, 2005). Moreover, coherently with BRT, the reasons for adopting a given innovation will have a different effect from those against the adoption (Claudy, et al., 2014).

A similar results was already reached by several scholars in the field of service quality (Kano, et al., 1984; Chaudha et al., 2011) that developed an analytical framework to understand how a given feature of a product, or a service, will impact on the consumer satisfaction. This framework has been later used in addressing the drivers of customer satisfaction for services (Dominici and Palumbo, 2013) and for products (Dominici, et al., 2016) as well.

With this in mind, in this paper we look into both of these streams of research in order to develop a theoretical framework to link them, trying to fill the gap existing in literature. This framework will be used to assess how the experience of young students, enrolled in some Italian Universities, will influence their re-purchase intentions of smart-phone. We intend to evaluate the relative validity of both the TAM approach and the BRT one in this fast changing technological field.

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The leadership competencies and intuitive decision-making of top and middle level managers in the automotive industry

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ABSTRACT

The main purpose of the study was to identify the presence of intuitive decision-making by top and middle managers in Slovenian automotive industry, to identify the influence of their behavioral competencies and emotional intelligence on intuitive decision-making, identify their level of intuitiveness and on the basis of theoretical and empirical research establish competencies and factors of the model of leadership competencies based on intuitive decision-making.

A quantitative approach research was used, using a questionnaire, as a primary instrument to measure, contains the following structure: (1.) demography, (2.) emotional intelligence (SSEIT–Schutte Self-report Emotional Intelligence Test), (3.) decision-making styles (GDMS–General Decision Making Style), and (4) intuitiveness (AIM Survey–Agor Intuitive Management Survey). Statistical data analysis was carried out using the SPSS program version 21 and MS Excel version 2007 and the model was created using the program Pajek version 3. The following main methods were used for research data analysis: descriptive statistics, factor analysis, regression analysis and variance analysis.

Results of the performed quantitative research show that respondents are often directed by intuition when making important decisions (79,3% make decisions based on intuition) while statistically significant differences occur (1.) regarding sex as women on average rely slightly more on intuitive decision-making than men and (2.) regarding leadership experiences respondents with the least leadership experiences think they are not led by intuition while all other respondents think they are led by intuition (more than a fourth). The research findings indicate that behavioral competencies do not have any significant impact on intuitive decision-making and the same is true for emotional intelligence. Another more significant research finding shows a relatively high level of intuitiveness as the average result is 7.1 out of 12 points. Moreover, the research indicates that level of intuitiveness increases with years of leadership experiences and with higher level of education.

The performed research represent a significant contribution to new knowledge in the field of management and administration of companies as through implemented model of intuitive decision-making of top and middle managers in Slovenian automotive industry they involve a potential practical (applied) value added in respect of management personnel administration in the automotive industry and in other sectors. Research raises fundamental starting point for further in-depth and targeted research to other related areas of society. Originality of the research is featured by the fact that there is no domestic or foreign scientific literature available to demonstrate any research comprising elements of operationalisation (examination of relationship between leadership competencies and intuitive decision-making) used in the present research which confirms its originality.

Limitations of the research are defined in the following contexts: (1.) Limitation of capabilities to give an overall theoretical retrospective review of individual areas covered by theoretical part of the research. (2.) Use of standardized measuring instruments of foreign origin and occurrence of potential differences between the environment where the measuring instruments were designed and the environment where they have been used. (3) Limitations of capabilities of translation of measuring instruments regarding words, collocations and phrases pertaining to original questionnaires for which no adequate Slovenian translations exist. (4.) Use of the method Pajek which was used in the past research mostly in the field of natural science and networking while its use in the quantitative research represents a relatively new approach.

Keywords: *management, behavioral competencies, emotional intelligence, intuition, intuitive decision-making, automotive industry.*

Financial Systems

The financial law in Europe: a re-thinking of the role of law

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ABSTRACT

The debate over reforms in Europe after the current financial crisis (2008-2010) has shifted from economic to political grounds. In this light, this paper aims at providing a comprehensive overview of the main issues raised by financial law in Europe by virtue of a reflection of the role of law beyond economic considerations.

Following a description of the role of law in relation to financial development and financial stability, two main streams and theoretical approaches are explained through a minimalist and maximalist approach to regulation. Essentially, according to a minimalist approach law is ‘insignificant’ and the economic role of the State in the market is reduced. In this light, even the acceptance of market failures is better than government failures. On the other hand, according to a maximalist approach the role of law is essential in terms of constituting the financial system and in preventing new possible economic crisis. In other words, the State is the central actor for legislative reforms that aim to regulate the market and the concept of ‘good governance’ becomes crucial in order to assess the efficiency of the legal system.

Within this theoretical background, soft law is a new challenge in the financial environment because has contributed to a change of view on the role of law itself. Indeed, it seems that nowadays in Europe financial regulation is influenced by both hard law provisions and soft law guidelines and recommendations (for instance, the European securities and markets authority’s guidelines, the European commission’s green papers, etc.). Indeed, a hard law approach can constitute a hurdle for financial innovation due to the rapid pace of technological progress (namely, mobile payment solutions, clearing of derivatives, etc.). Hence, soft law that is non-state law can sustain financial developments due to its flexibility that can reflect the rapid and dynamic growth of the financial industry. Nonetheless, soft law acts are usually enacted by bodies or commissions of technicians (such as the European securities and markets authority, the European commission, the European banking authority, the European payments council, etc.) that can give rise to a democratic deficit in terms of political legitimacy and technocracy.

Hence, it is no more possible to implement a maximalist approach tout court in relation to the regulation of the financial system, and it will be argued that in Europe the role of law in relation to financial development and financial stability has been changed. In other words, the analysis concerning financial law emerges as a mirror of the role of law. Indeed, currently in Europe the applicable financial law is not completely based on hard law provisions and it is not solely based on soft law regulations, namely it is a mix of the two sources. Therefore, an in depth study of the role of soft law in relation to financial development and financial stability in Europe will constitute the first understanding in order to construct new policy interventions as well as

providing a justification for the possible lack of democracy in Europe that is continuously leading to a crisis of political legitimacy.

Financing Management of Companies

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ABSTRACT

Financial management of companies involves managing total assets, total liabilities as well as total equity. Effective financial management requires decisions on the amount and composition of assets and how these assets are to be funded. Once the management of company has determined the appropriate amount of current and fixed assets coupled with the amount of permanent and temporary current assets, it must decide how to finance these assets.

All permanent assets should be financed either with long-term debt or equity financing while the remaining current assets should be financed by short-term sources. Temporary current assets should be financed with short-term liabilities, and fixed and permanent current assets should be funded by long-term financing sources. Such a policy assumes that management is able to predict asset requirements with a great deal of certainty. If the financial manager attempts to finance permanent growth with short-term financing the company may face serious cash flow problems.

Financing management of companies requires decisions on an appropriate balance between short- and long-term financing sources along with optimal composition of both short- and long-term financing sources. Costs are the most important factor in making these decisions and financial managers have to minimize these. An Effective Interest Rate After Tax (EIRAT) is a true measure of the effective cost of sources of financing and it is important to calculate EIRAT for each type of short- and long-term sources before deciding which type should be used.

Short-term financing arrangements have several features that cause the stated interest rate on the financing to be different from the effective interest rate. Bank loans are an important source of short-term credit. Interest on bank loans may be quoted as simple interest, discount interest and add-on interest. Compensating balances and discount interest raise the effective interest rate on bank loans.

Long-term financing includes long-term debt and equity capital. The management of the company should consider a number of key elements in finally deciding on the choice between debt and equity. The cost of a long-term loan is the most important factor and an effective interest rate is the real rate of interest on a long-term loan, expressed as an annual percentage applicable for the life of the loan. Long-term arrangements have several features that cause the stated interest rate on the financing to be different from the effective interest rate. Bank loans are an important source of long-term debt for companies and interest on bank loans may be quoted as simple interest and discount interest. Long-term debt usually has a higher explicit cost but lower risk than short-term debt. The risk here refers to risk of insolvency or default.

Long- and short-term debt have been studied in many papers and books, but there are still gaps relating to the real cost of long- and short-term debt expressed as EIRAT in existing literature.

The aim of this paper is, firstly, to explore short- and long-term sources of financing available to companies; secondly, based on lowest cost criteria, to determine what sources of short- and long-term financing to employ taking into account the importance of scientifically-based financial management of companies. The company should bear in mind the cost of all available sources, decide on the optimal amount and optimal composition of the company's short- and long-term sources from a cost-effective point of view.

The purpose of this study is to determine how to make optimum use of available short- and long-term financing sources from a cost perspective. In striving to complete the gaps relating to EIRAT as a real cost of financing, the study makes its own contribution to research and, thereby, to managers. The outcome of this study will yield new equation models for calculating an Effective Interest Rate After Tax (EIRAT) for various short- and long-term sources of financing available to companies.

We analyze various short- and long-term financing sources available to companies from a cost-effective point of view and EIRAT as a true measure of the effective cost of sources of financing. The applied procedures for calculating EIRAT for various short- and long-term financing sources are considered suitable in determining independent variables; these in turn are deemed significant for EIRAT and this should be expressed in terms of these independent variables.

We analyze the following short-term financing sources available to companies: simple interest bank loans, bank loans with discount interest, bank loans with compensating balances, bank loans with discount interest and compensating balances, secured bank loans, lines of credit, factoring accounts receivable, inventory financing and commercial papers.

We explore the following long-term financing sources available to companies: long-term bank loans with simple interest, long-term bank loans with discount interest, long-term bank loans with compensating balances as well as long-term bank loans with discount interest and compensating balances.

The independent variables which impact on EIRAT for various short- and long-term financing sources are selected and the relations between them are defined. To enable us to model the relations between independent variables which determine an Effective Interest Rate After Tax (EIRAT) as a dependent variable for various financing sources, new equations are introduced. Consequently, the main findings are new equations for calculating EIRAT for different short- and long-term financing sources available to companies as a real cost of these sources.

The equation models for calculating EIRAT for different short- and long-term financing sources can be tested and used in practical calculations by using different financing sources available to companies. Numerical results obtained by using these equations should be considered and compared so that the financing sources that result in the lowest EIRAT should be chosen.

New equations for calculating EIRAT for various short-term and long-term financing sources available to companies are introduced and benefits that can be derived from these equation models include the following:

- Consideration and comparison of all available short- and long-term sources to companies regarding costs are easier as calculation of EIRAT is simplified by using the given equations.
- An optimal selection of short- and long-term financing sources can be made.
- Significant cost savings can be achieved by taking into consideration the cost of all available sources to companies.

Financial management should be based on financial strategies that help to achieve optimal results from the aspect of profitability and solvency. Effective financial management implies the use of an appropriate financial strategy, determination of the optimal ratio of short- and long-term financing sources and making decisions on the optimal composition of both the company's short- as well as long-term sources from a cost-effective point of view.

The financial manager of a company must lay out two financial determinants: the desired percentage of short- and long-term financing and the composition of short- and long-term sources. An Effective Interest Rate After Tax (EIRAT) represents the real cost of financing and to determine what sources of short- and long-term financing companies ought to employ, it is important to take into consideration the cost of all available sources and choose the source in accordance with EIRAT because that represents the real cost of financing.

Keywords: *short-term financing sources, long-term financing sources, cost of financing, effective interest rate after tax*

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A New Approach to Management of Cash in a Company

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ABSTRACT

Cash management involves having the optimum amount of cash on hand at the right time and also requires knowing the amount of funds available for investment as well as the length of time in which they can be invested. The main concepts underlying cash management and investments of cash are: accelerating receipts of cash, delaying payments of cash and investing surplus cash. Implicit in each of these three concepts is the corporate objective to maximize shareholder wealth.

A company can maximize its rate of return and minimize its liquidity and business risk by optimally managing cash.

The primary means for accelerating cash receipts are lockboxes and an efficient banking arrangement. A lockbox arrangement represents a mean to place the optimum collection point near customers and it is used both to speed collections and to get funds where they are needed. A company's decision regarding the payment methods and systems that will be used in various situations is a major financial decision (Maness et al., 2005). Delaying cash payment can help a company earn a greater return and have more cash available.

Efficient cash management means more than preventing bankruptcy as it improves the profitability and reduces the risk to which the company is exposed. Companies suffering from cash flow problems have no margin of safety in case of unanticipated expenses and they also experience trouble in finding the funds for innovation and expansion. This paper addresses how a company's cash and liquidity position affects profitability and how the cash balance will be influenced by the profitability of a company.

The aim of the theoretical research is to explore important activities of accelerating cash receipts and delaying cash payments, determine independent variables which have an impact on net savings and establish a relationship between them in order to develop new mathematical models for calculating net savings from establishing and changing the lockbox system as well as delaying cash payments.

The purpose of this study is to describe and explore ways of improving the cash position of a company in order to invest surplus cash and achieve a maximum return at an acceptable level of risk. The aim of this study is, to contribute to the debate by modelling the relationships between variables that determine net savings from accelerating cash receipts and delaying cash payments in order to develop new mathematical models to explain how decisions in management of cash are to be made.

A new approach to management of cash is based on the mathematical modeling and mathematical models which are created using mathematical concepts such as functions and

equations. Modern scientific knowledge is best constructed by carefully developing mathematical models and testing their ability to explain behavior in a company. Using principles of mathematical modeling as well as economic principles we develop mathematical models for explaining some aspects of the management of cash which have not been explored entirely in previous studies.

As the main concepts underlying cash management are speeding up receipts of cash, delaying payments of cash and investing surplus cash, we explore the very important activities of accelerating cash receipts and delaying cash payments to improve the cash position, invest surplus cash and achieve a maximum rate of return.

Net profitability from accelerating cash receipts and delaying cash payments, which have important implications for efficient management of cash, have not been explored entirely in previous studies. With the aim of completing the gaps relating to net savings from accelerating cash receipts as well as delaying cash payments, the study will explore costs and benefits from performing these activities as well as net profitability of these important activities in managing cash balances.

We explore costs and benefits of establishing or changing a lockbox system and delaying cash payments as well as net earnings from performing these activities. Using economic and mathematical principles we develop new mathematical models to explain how decisions in management of cash are to be made. We define independent variables which determine net savings from establishing or changing a lockbox arrangement and delaying cash payments and determine the relationships between independent variables in order to produce net savings from performing these activities.

The outcome represents new mathematical models for calculating net profitability from establishing or changing the lockbox system along with delaying cash payments and with these models a company can consider net profitability from performing these activities in order to improve cash balance for investments and improve profitability. These models allow quick evaluation of alternatives, leading to optimal solutions which are not otherwise obvious.

In developing new models for calculating net savings from establishing or changing the lockbox arrangement as well as delaying cash payments we use the basic analytical concept of comparing the incremental costs versus the incremental benefits.

If the net annual savings are greater than zero, then the company should set up or change the lockbox system, because the incremental benefits from establishing or changing the lockbox system are greater than the incremental costs. A company can delay cash payments in order to improve its cash position and earn a greater return on its money. Before delaying cash payments, a profitability analysis should be made and payments of cash should be delayed only if net profitability occurs. A new model predicts that cash payments should be delayed as long as there is no associated financial charge or impairment in credit rating and if net annual savings is greater than zero.

New models for calculating net savings from establishing or changing a lockbox arrangement as well as delaying cash payments can help to ensure that setting up a lockbox arrangement and delaying cash payments will result in net savings and can help managers in managing cash optimally. With these models a company can consider net profitability from performing these activities in order to improve its cash position and invest surplus cash as well as improve profitability. In measuring the effectiveness of these important activities in the management of cash balances, we believe our findings are also interesting for business practice. These models for calculating net savings can be tested and used for business practice.

Our findings indicate that managers should aim to keep as close to the optimal cash balance as possible and try to avoid any deviation in order to maximize the profitability of a company.

Keywords: *cash balance, liquidity, net savings, lockbox system, profitability.*

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Social Responsibility Disclosure and Financial Performance: evidences from some Italian Public Companies

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ABSTRACT

Modern companies are part of a complex system where each actor is linked to the other ones by several, different ties (Boardman and Sauser, 2008) and their actions should follow the social contract tying them with all the actors in a given system (Donaldson and Dunfee, 2002). Corporations have to interact with these other actors in order to get access to the resources they need in their operations (Pfeffer and Salancik, 1978). As a consequence they are embedded in a tight web of different relationship limiting their managerial freedom of choice (Freeman, 1984).

In fact the relational network linking all the various actors in a given system will help to propagate, and to amplify, both the positive and the negative effects company's actions have on each stakeholder, reaching even those actors that are embedded in the same network but are not in direct relationship with it (Ekeh, 1974; Harrison and Wicks, 2013).

On a similar page, Zimmerman and Zeitz (2002) hold that firms respond to the expectations of the various social actors in order to get the legitimacy needed to reap the maximum benefits out of the system of relationship they are part of. Accordingly, corporations need to build a set of stable, and mutually beneficial relationships with most of their interlocutors (Maak, 2007). According to some authors (Donaldson and Dunfee, 2002; Noland and Philips, 2010) this can be achieved only when all managerial decision are based on a set of shared values with the stakeholders.

Using this perspective it is clear that the enterprise can get the most out of the system it is embedded into only when its management is able to align the corporations activities with the interest of all the relevant stakeholder groups (Freeman, 1984).

Corporations can adopt social responsibility disclosure (SRD) practices to communicate the various activities they are carrying in their system to their stakeholders, and, as a consequence, they can influence their behavior (Auger et al., 2008). SRD activities are voluntary communications implemented to make the company a legitimate actor in its environment (market and society as well) (Campbell, 2000). They can help in creating a positive corporate association (Brown and Dacin, 1997) – i.e. the set of perceptions each stakeholder has of the firm behavior – that will influence how each stakeholder will evaluate all the corporation's activities (Mohr and Webb, 2005; Brown et al., 2006). Godfrey (2005) holds that they are one way to create an endowment of moral capital for the company that can be later used by management as a way to reduce the socially irresponsible activities' negative effects. Several authors (Nilsson, Tuncer and Thidell, 2004; De Pelsmacker and Janssens, 2007) have shown that insufficient transparency is one of the main SRD limitations, undermining their credibility. This risk is stronger when companies try to use SRD as a tool of brand reputation management (Hooghiemstra, 2000) rather than as a way to help external stakeholders in understanding their social performance (Berthelot, Cormier and Magnam, 2003; Dubbink, Graafland, Van Liedekerke, 2008). Voluntary SRD can be really transparent only when the company increases the level of detail of their social communications to allow interested stakeholders to get access to all the information they deem relevant (O'Brien, Teisl, 2004; Dubbink, Graafland and Van Liedekerke, 2008). According to Niskanen and Nieminen (2001) another way companies can adopt to increase the validity, and the effectiveness, of their SRD practices is to ask third parties to provide an evaluation about their activities and the related results. These evaluations can take the form of an ethical label – i.e. logos that companies can use to signal to stakeholders, mainly consumers, the respect of some basic principles (Font and Harris, 2004; Teisl, Rubin, Noblet, 2008) – or they can be given as an ethical rating, an evaluation of the corporation's social performance given by an independent actor that evaluates the corporation's performance using three different perspectives: the Environmental perspective, the Social perspective and the Governance one (Tani, 2012; Stubbs and Rogers, 2013).

According to Ingrain (1978), however, it is not possible to draw up a general criteria of the SRD content since it mostly depends on the market segment in which the company operates. Branco and Rodrigues (2008) show that SRD activities usually focus on four issues: environment, human resources, products and consumers, community engagement. Similarly, Hanss and Böhm (2012) have found that corporations have been driven by stakeholders' requests towards environmental sustainability and other issues related to social sustainability.

As SRD activities do increase the corporations legitimacy in their system it should help them to reach for a better financial performance but the academic literature on the link between Corporate Social Performance and Corporate Financial Performance has not found a clear results (Margolis and Walsh, 2003) with some authors finding a negative relationships (Wright and Ferris, 1997), some other a positive one (Orlitzky, Schimdt e Rynes, 2003), and other have not found any significant relationship (McWilliams and Siegel, 2000). Finally some other have found a U-shaped relationship (Barnett and Salomon, 2012).

In this paper we investigate the relationship between SRD activities and Corporate Performance. We develop a framework to study the relationship between these two looking into both the SRD practices in the Corporations Social Reports and institutional websites, and those communicated by third parties using Ethical Label and Ratings. In order to get a first understanding of the relationship between SRDs and FP we have used a sample of Italian Companies listed in the FTSE MIB.

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Sustainability, Business ethic and CSR

An empirical study of solving social and environmental problem by a business firm and sustainable business growth

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ABSTRACT

The objective of this research is to clarify empirically the relationship between sustainable business growth and the effort by a business firm to solve social and environmental problems.

In order for a company to continue, tackling social and environmental problems is required as social responsibility. Social or environmental problems conventionally have been regarded as market externality in public economics, and the solutions of such problems mainly have been treated as a governmental role. It is desirable, however, that a business firm tackle solving social and environmental problems positively and internalize market externality. A business firm might create more a cost-effective solution as compared with governmental solutions. In the first place, as the activities of a business firm may produce the social or environmental problem, the business firm might solve the root cause of the problem through innovation of its activities.

Solving a social or environmental problem is desirable for a company not only to fulfil its social responsibility but to raise its profitability. If the business firm's activities for solving a social or environmental problem can be connected with its profit, the profit can be an incentive for the business to invest further in the solution of social or environmental problems. Then, it is expected that the solution of a social or environmental problem is expanded sustainably. For example, the technology developed through the effort to solve a social or environmental problem might be useful for the firm's future business. Likewise, if the company builds a good relationship with a local society through solving a social or environmental problem, the company's good reputation might increase, which could increase the local society's future demand for the firm's products.

On the other hand, in prior empirical studies, the results of quantitative analyses about the relationship between a corporate-social-responsibility (CSR) activity and corporate earnings is inconstant (Vogel, 2005). A positive correlation is verified in some research and a negative correlation in others, while many research studies show no correlation. It is thought that CSR activity and revenue might not have a direct cause-effect relationship but instead have an indirect relationship. Further, CSR activity and profitability may differ in accordance with industry, company, strategy, organization, etc., and the result of each prior research study may vary by the mixture of those factors.

In this research, the strategic and organizational factors of the company were taken into consideration as intermediation or control variables on searching the analytical model regarding the relationship between solving a social or an environmental problem and business growth. The competitive advantage of the company was set up as a strategic factor. That is, although solving a social or an environmental problem may not improve profitability directly, it was assumed that some kind of competitiveness might be increasing.

Prior research on the competitive advantage of a company can be roughly classified into two kinds. The first is a competitive advantage regarding strategic positioning (Porter, 1980) with the external competitor regarding the goods and service a company provides. In relation to a positioning strategy, there is a coopetition strategy (Nalebuff et al., 1996), a platform leadership strategy (Gawer & Cusumano, 2002), etc. These strategy theories include not only rival positioning with a competitor but cooperation positioning with a complemental player. In this paper, this is collectively named a coopetition strategy.

The second kind of competitive advantage is regarding organizational capability (Ulrich & Lake, 1990). This advantage focuses on the organization and resources inside a company. In relation to organizational capability, there is a competitive advantage through dynamic capability (Teece et al, 1997), which makes an organizational capability correspond to changes in business environment flexibly.

In addition, the organizational factor was classified in this study as either the relationship with the external organization or the internal organization of a company. In terms of external organization, prior research on a sustainable supply chain management was mainly used (Carter & Rogers, 2008). To solve a social or environmental problem, it is useful to consider not only the efforts of the company but cooperation with companies which constitute a supply chain. In terms of internal organization, prior research on diversity management was mainly used (Cox & Blake, 1991). Work to promote diversity and inclusion in a company is in itself solving a social problem. For example, the creation of wide-ranging employment, a healthy workplace environment, etc. correspond to diversity management, and it is thought that diversity in an organization promotes innovation by a new combination of various knowledge and experiences.

In terms of research methodology, a questionnaire was sent to companies in the manufacturing industry. The object of the questionnaire was limited to this industry to reduce variability of the responses. The manufacturing industry was chosen because it is thought that it presents a large strain on the environment via its production activities, transportation, etc., and because of its heavy involvement in social problems such as an international labour problem. The questionnaire was sent to the major manufacturing firms in Japan, and 86 effective responses were obtained. The principal component analysis and the correlation analysis between principal component scores were conducted after evaluation of the ceiling effect, floor effect, and a reliability scale on the effective response.

The analysis showed that each competitive advantage (strategic positioning and coopetition strategy, organizational capability, and dynamic capability) had a significant correlation with business growth. Next, the solution of a social and an environmental problem had a significant correlation with organizational capability. Further, when sustainable supply chain management and diversity management acted as intermediary variables, the correlation with organizational capability became stronger, and a social and an environmental problem had a significant correlation with dynamic capability. On the other hand, neither the social problem nor environmental problem solution were correlated with strategic positioning or a coopetition strategy.

As consideration, strategic positioning and a competition strategy are the notions regarding a static competitive advantage at this time, and an organizational capability and a dynamic capability are the notions of a long-term competitive advantage for the future. Even if a business firm solves a social or environmental problem, the competitiveness of its product and service may not increase suddenly. However, it is thought that a company accumulates organizational capability by striving in research and development, etc. for many hours and cooperating with various external organizations toward problem solving that organizational capability. For example, the effort to reduce an environmental impact and cost reduction often come into conflict. Innovation is required to achieve conflicted aims simultaneously. Succeeding in realizing an innovation takes time and success is uncertain. If, however, a company succeeds in developing the technology after long-term efforts, creating an inexpensive product with a low environmental load, a competitor surely will require a long time to catch up to the company. It is thought that such a technical accumulation serves as a long-term competitive advantage.

In addition, to solve a social or environmental problem, diversity of knowledge and flexibility of organizational operation are considered useful. For example, a multinational firm often tends to make an advance into an overseas developing country in a quest to find a cheap work force and natural resources, and then tends to become a ringleader of a labour or environmental pollution. To solve such problems, it is desirable to promote an autonomous innovation in a developing country by understanding the actual local condition and transferring technology and managerial resources flexibly from the parent nation. For that purpose, if a company adheres to the existing organizational operation method in its own country, it may not work. It is thought that involving various employees from the developing countries in key business decisions in the parent nation can lead to useful and suitable cooperation with the various partners and stakeholders in a developing country, such as non-profit organizations. Although increases in such an organizational capability or dynamic capability might not be connected with revenue in the short term, it is thought that they promote the sustainable growth of a company in the long run.

In conclusion, the relationship between the solution to a social and environmental problem and the sustainable growth of a company has been quantitatively verified by using a strategic factor and an organization factor in this research. The results of this research are expected to promote the suitable decision of business firms to expand solutions for societal and environmental problems. A future research subject is to complement consideration of a quantitative analysis with qualitative analyses, such as a hearing survey.

Keywords: *Social and environmental problem, sustainable business growth, empirical study, strategic factor, organizational factor, competitive advantage*

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A critical view on the role of NGOs in systemic capacity building: insights from projects for promoting food production in Northern Ghana

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ABSTRACT

Development practitioners, scholars and critical observers from both developing and developed countries have noted with concern that aid which aims at providing ad hoc measures can be likened to a pain killer. It only temporarily relieves the situation of the beneficiaries without equipping them sufficiently with the right tools that will enable them let themselves off the hooks of dependency. The concern also relates to the proliferation of NGOs, which is growing, above all, in Africa and, especially in Ghana. The paper studies the three reasons for the fast growing number of NGOs: Firstly, many donor communities have lost faith in the poor performance of governments in the utilization of donor funds and thus are transferring the bulk of their resources through NGOs. A second argument is that NGOs are meant to have the expertise and the appropriate know-how to deliver quality services. Thirdly, NGOs are also noted as good agents for promoting democracy, resolution of inter-ethnic conflicts and promotion of peace.

The paper takes the example of Northern Ghana with its inadequate provision of basic social infrastructure for exploring the ability of NGOs to provide effective capacity building. It analyzes if NGOs have sufficient understanding and knowledge for operations and if their philosophy and objectives are enough to enable judgment and lasting successes. Weaknesses and strengths of NGOs are investigated as they still are indispensable organizations for developing backward areas, especially for fostering sustainable rural community development. But they need to forge a closer link between and among themselves on the one hand, and government ministries and development agencies on the other hand in order to ensure that their assistance projects build capacities and enhance capabilities for achieving lasting impacts. From there, the case of World Vision Ghana is explored.

World Vision Ghana is an international NGO that has been established in Northern Ghana for nearly two decades and is engaged in development activities in the rural communities. World Vision Ghana has embarked on the provision of credit facilities, improved variety of seeds, improved animal breed and the provision of water for beneficiary communities to water their

animals during the dry season. It also provides skills training to its target communities to enable them carry out food production on sustainable basis.

The study is of a descriptive type geared at finding out World Vision Ghana's contribution to permanent changes of rural development in Northern Ghana, like food self-sufficiency, access to potable water and sanitation services and education and training facilities. The methodology is comparative procedure. The comparative process is based on the 'before and after' (with and without) method. This type of evaluative procedure is meant to facilitate the setting up of benchmarks against the results before the interventions vis-à-vis the situation after World Vision Ghana's interventions. With its comprehensive measures and its approach to enhance system capacity, i.e. organizational systems and processes and allocating role capacity, World Vision Ghana's has recorded notable gains in infrastructure and production in its beneficiary communities. Based on this track record it can be concluded that an NGO like World Vision which embraces inclusive and wide ranging processes will provide long lasting impact and contribute to sustainable self-sufficiency in food production as shown by this example of Northern Ghana.

Keywords: *Sustainable Development, NGOs, Capacity Building*

Sustainability measured as Entropy Efficiency in the Balance Sheet of the Business Corporation

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ABSTRACT

This paper is about measuring sustainability in terms of entropy efficiencies of Corporations. In general entropy accounting measures the entropy efficiencies associated with any well-defined thermodynamics process of production, consumption and capital accumulation (i.e., surplus).

This may be contrasted to the traditional cost measure of productivity displayed in the Corporation's profit/loss balance sheet. While cost and entropy efficiencies may converge in the best of possible worlds, our concern is the increasing divergence between cost-efficiency entailed in the global production function and the entropy-inefficiency entailed in the global consumption function -sometimes referred to as the Jevon's Paradox. The analysis is framed in the concepts and methods developed for the System of Accounts for Global Entropy Production, (SAGE-P).

These accounts, while designed as a (nonlinear) thermodynamic accounts for a National Economy, (i.e., mirror image of GDP), may equally be applied to any well-defined boundary conditions of the Low Entropy Fund (LEF) described by the I/O matrix of material and energy inflow/outflow of production, (i.e., negentropy), consumption (i.e., entropy) and capital accumulation, (i.e., negentropy - entropy = surplus/deficit).

The corporation, by definition, occupies the production space of the Econosphere and contributes a given 'value added' to the (economic) LEF available for human consumption. The corporate accounts record inflow from, outflow to, the respective LEF of the Sociosphere and Ecosphere.

The inflow objects and/or functions from the respective LEF is given a positive sign and valued at prices, while the outflow (i.e., externalities) are given a negative sign and valued at the cost of replenishment of the LEF.

The module of corporation's 'entropy production accounts' is consistent with the objects, functions and classifications of the System of National Accounts (SNA). Thus, function is typed to standard industry classification (SIC) and object (i.e., product) is typed to the standard commodity classification (SCC). The corporations are further classified to the SNA's: (a) primary production, (i.e., extraction of renewable and non-renewable resources), (b) secondary production (i.e., manufacturing) and (c) tertiary production (i.e., services), or any proportion of (a), (b) and (c). The (c) category is further divided into: (i) physical objects/function with spacetime coordinates, (e.g., transportation) and (ii) abstract objects/functions that are identified in time-series but not space co-ordinates, (e.g., financial services). While (ci) is subject to the Entropy Law, (cii) is not. Nonetheless abstract objects are subject to information decay or in cases, such as investment in infrastructure, may be linked to entropy production indirectly in terms of a time-delay objective function. The distinction between abstract and physical objects and/or functions

in the SNA is critical in the transformation of the economy from high, to low, ‘entropy production’ per unit of consumption or for policies promoting growth of the in immaterial economy.

The paper will provide sketch outline on the method to measure entropy efficiency in objects and/or functions in the corporation balance sheet. This is presented for a sample corporation in category (a), (b) and (c). The starting point are the data-sets described by an I/O matrix in ‘topological domain spaces’ of the Ecosphere, Sociosphere and Econosphere.

We shall introduce a pluralistic valuation method unique to the properties of the matrix domain spaces such that objects/functions where: (A) values are conserved-in-themselves or existential \in Ecosphere, (B) values are conserved-in-use or service flow from stock \in Sociosphere, and (C) values are conserved-in-exchange or prices \in Econosphere.

Following the logic of the hierarchical structure of values, (i.e., existential $>$ use $>$ exchange), we may fit the topological domain spaces in the order: A[B (C)]. In other words the accounting objects/functions in the Econosphere is a sub-set of objects/functions in the Sociosphere and in turn is a sub-set of the objects/functions of the Global Ecosphere, (i.e., the Earth).

Large-scale systems and the temporal horizon of CSR

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ABSTRACT

"A slow sort of country!" said the Queen. "Now, here, you see, it takes all the running you can do, to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that!"

Carroll, Lewis: Through the Looking-Glass and What Alice Found There, Chapter 2

According to Business Dictionary (Business Dictionary), CSR is "a company's sense of responsibility towards the community and environment (both ecological and social) in which it operates".

Responsibility is a multidisciplinary problem, as the Organization Committee notes fairly in the announcement of 4th BSLab. International Symposium. In this document the list of four basic disciplines is offered: management, economics, engineering and sociology. According to the mentioned document efforts of these disciplines are necessary in order to solve corporate responsibility problems. We will remember that exact sciences usually solves the problems not only of necessity but of sufficiency also. These problems aren't less important for the humanities. Whether there are enough efforts of these four disciplines to achieve the aims of corporate responsibility?

But what are these aims? It is considered now that these aims go beyond of earlier established norms and beyond compliance and engage in "actions that appear to further some social good, beyond the interests of the firm and that which is required by law" (McWilliams, Abigail; Siegel, Donald, 2001); McWilliams, Abigail; Siegel, Donald; Wright, Patrick M., 2006). Such formulation allows wide range of interpretation. What reference points we will choose for the further movement? We believe that SCR makes sense when its aims are correlated to sustainable development of society.

To move ahead further on this way, it is necessary to find some reasons to pick out those social goods that are necessary and sufficient for providing sustainable development ... of what? The scale of society in general is too big to list and specify in it all points of effective influence for concrete firm. So we need to follow on the way of decomposition of the problem of sustainable development and to allocate firm "neighborhood" as a possible scope of its efforts dictated by the idea of social responsibility. What is the volume of this "neighborhood" area?

It is possible within competence of a firm to determine this volume by the bold speculation that, by results of the credible researches, since its border, the neglect interests of wider environment won't do harm to the subject of responsibility (irresponsibility?) throughout certain time. This period of time, first, includes the period of existence of the subject of responsibility, secondly, may be, the estimated period of existence of those seniors on temporary hierarchy of subjects of

society for which the firm also takes the responsibility. Thus, the considered period of time extends to actual infinity. The firm has no opportunity to consider the cumulative effects caused by accumulation of results of super-slow trends. It is about, first, to provide own existence in more or less long-term temporary term and existence of the sponsored subjects, and secondly to exert positive impact on profitability of economic activity of the firm.

We believe important first of all interests of subjects of the European culture (the author of work believes himself belonging to it). Not because the author rejects ideas of multiculturalism, but because the European culture has the right to use instruments of self-organization which will provide its opportunities, equal with other cultures, in development of multicultural society of the future.

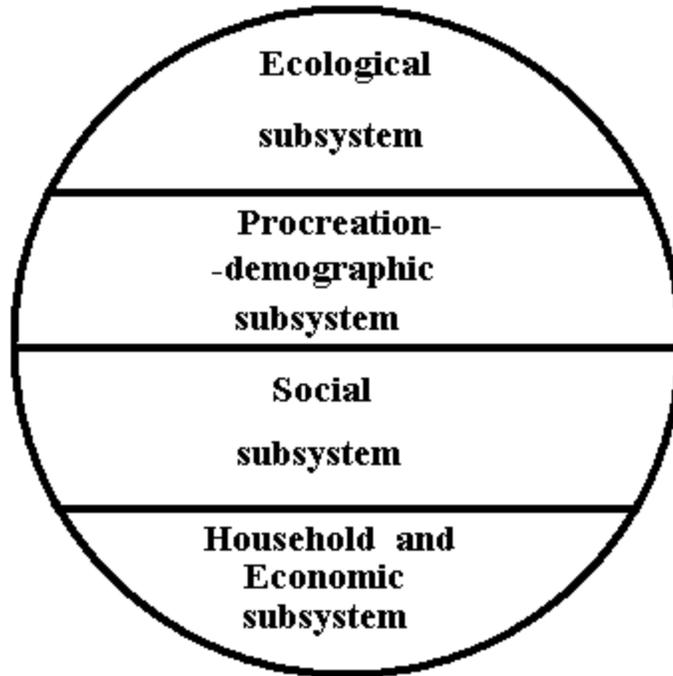
For the solution of the declared problem we suggest to use tools of the theory of large-scale systems (Peyt, 2013) We believe that the theory of large-scale systems can give us a chance to design some effective approach for successful governing business systems. According to this theory, the global system ("the home" of global society) is a large-scale system which represents a number of subsystems. After analyzing the empirical data, we propose to distinguish between four classes of subsystems that correspond to the following spaces: 1) the space of economic activities, 2) the space of social activities, and 3) the space of social processes and history, 4) planetary space.

They are named in the order of increasing spatial scale. The criterion for including the activities and the subjects which are undertaking it into one or another class are sequential answers to several questions:

- 1) Is the purpose of the subject under consideration to achieve and/or maintain economic viability?
- 2) Is the purpose of the subject under consideration to achieve and/or maintain social viability also?
- 3) Is the purpose of the subject under consideration to achieve and/or maintain the consistency of procreation-demographic processes also?
- 4) Is the purpose of the subject under consideration to achieve and/or maintain environmental soundness also?

The global system can be represented as an aggregate of subsystems of these four classes that are "drawn on each other" (the term by V.A. Lefebvre) (See Fig. 1).

Figure 1. Schematic representation of the global system as an aggregate of units belonging to four subclasses "drawn on each other".



CSR of the future has to provide the required quality of processes in all four layers of the global system:

- in an ecological layer – to stop degradation of subsystems of the nature;
- in the procreation-demographic layer – to stop depopulation of the world of the European culture (Livi Bacci M., 1998);
- in the social layer – not to allow critical values of social tension;
- in the economic layer – to resist to the crisis phenomena.

In the course of researches importance of cross influences between the processes proceeding in various layers of the large-scale system can be shown.

So, the rates of economic and social transformations dictated by modern ideas of CSR can be insufficient to stop a total disappearance of indigenous population of Europe (see the epigraph).

Keywords: *multidisciplinary problem, transdisciplinary strategies of research, Moscow Methodological Circle (MMC), demography, transformation, cumulative effects.*

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Social Report and Non Profit Organizations: Some Empirical Evidence

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ABSTRACT

Purpose – The purpose of the present research is to demonstrate as social report or balance (Catturi, 2000; Hess, 2007; Hinna, 2002; Mussari, Monfardini, 2010; Rusconi, 1998) is a tool to summarize social activities of organization profit and non profit in the current knowledge economy. In this way, the paper is directed to analyze corporate social responsibility (Dahlsrud, 2007; Manni, 1994; Sciarelli, 2007, Trequattrini et al., 2001) in the non profit field in order to show its relevance in creating collective value (Moore, 2005). Analyzing the international guidelines on the social report (Gabrovec Mei, 2004; GRI, 2002), the main aim is to discover key principles and indicators able to recognize and publicize non financial performance through the representation of social and intellectual capital perspectives.

Design/methodology/approach – The paper is developed by adopting a qualitative and quantitative approach with the aim to propose a comparison between a set of profit and non profit organizations. The sources used for the development of the paper are of secondary nature and the research is directed to academic and non academic communities. In this direction, the paper provides, at the same time, an updating conceptualization of the international literature on the topic analyzed.

Findings – In the light of the institutional mission of non profit organization, the findings of the present research derives from the analysis of evidence obtained from the comparison of profit and

non profit organizations. The creation of a set of indicators is useful to propose a new framework for the non profit field including social and intellectual capital perspectives.

Originality/value – The present research aims to provide strength and weak points of corporate social responsibility (balance sheets) in the field of non profit organizations. In this direction, the originality of the research is the proposition of an integrated report, including intellectual capital results (Bornemann, Leitner, 2002; Comuzzi et al., 2009; Edvinsson, Malone, 2007; Lev, 2003; Marchi, Marasca, 2010; Roos, 1997; Zambon, Marzo, 2007). The evidence of the study contributes to enrich the existing literature, in order to offer a practical use of such integrated report for the collective value creation.

Keywords: *social report, corporate social responsibility, non profit organization, intellectual capital.*

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Modeling the agents of cyclical change in order to determine appropriate movement towards sustainability

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ABSTRACT

It is argued that the degree of change required for the developed world to move to a sustainable pattern of life is in the order of a paradigmatic change as described by Kuhn (Smith, 1998). It follows that an understanding of the agents of change that has in the past been instrumental in the emergence of a new paradigm needs to be fully developed in order to assess whether it would be possible to engineer a successful transition into a sustainable model. Little research has been conducted into the factors that can shape a new paradigm. However Kondratieff's long wave theory (O'Hara, 1994) includes recognition that economic cycles and paradigm change are inextricably linked. A multi-disciplined approach taken by theorists seeking to understand the factors that contribute to the phenomenon has identified the role of societal, industrial and bureaucratic pressures in driving long waves (Perez, 1983, in Freeman, 1986).

Technological innovation can achieve significant strides towards the introduction of sustainable patterns of consumption. However, whilst Rogers, theory on the diffusion of innovation reveals steps that businesses can take in order to promote acceptance of new products (Rogers, 2003), those that could theoretically deliver significant benefits have met unforeseen obstacles that impede the achievement of their full potential. Analysis of typical barriers to adoption revealed a marked similarity to the agents of change identified in Kondratieff's long wave theory in that bureaucratic, industrial and social barriers were seen to operate (Castellano, 2015; Progressive Digital Media, 2015).

This coincidence underpins the central argument of this paper, that the interplay between numerous factors that are apparently external to both business and the innovation in question is critical to its successful adoption. In this paper the relationships between the influential factors that have been recognised by various theorists analysing Kondratieff's long waves have been brought together.. Using systems analysis tools, the understanding necessary to underpin the application of systems dynamics has been developed. Starting with systems maps and relationship diagrams, multiple cause diagrams and sign graphs / causal loop diagrams have been developed in order to identify the manner in which business can exploit such understanding and

consequently enhance the likelihood of the successful adoption of innovations that are more sustainable.

Kondratieff's long waves have a distinct form. They are cyclical, occurring over a 50 year period. The overriding question in this paper is whether this 50 year period and the character of the new paradigm manipulated and controlled. It is clear that in isolation, businesses are not able to exert much influence in removing these external barriers to adoption of an innovation. Identification of the agents of change seen to operate in Kondratieff's long waves reveal that the role of governments and education are seen to be central, but other factors ranging from national culture, to the complexity of technology itself are seen to influence the ease with which an innovation is accepted. This analysis would suggest that much greater levels of cooperation between these entities are needed if paradigm change and the acceptance of sustainable innovations is to be stimulated.

Keywords: *Keywords: Innovation, paradigm change, sustainable development, long wave theory, culture*

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Interactions Revolution

Globalized World Economy, Innovations and National Policies for Economic Growth

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ABSTRACT

Globalization of the world economy is not a new phenomenon. The old Silk Road, long journeys over the Oceans to both directions West and East are just the examples of simple forms of Globalization. Nowadays we are witnessing quite different and complicated picture of the globalized world economy, where political, social, cultural, environmental and military aspects are as important as economic ones (Keohane & Nye, 2000). Modern globalization is the complex interdependence of the countries which are not immediate geographic neighbors. Modern global economy went through two main stages: one area stated after the II World War, in early 1950s, when leading developing countries established different international organizations (both political and economic) to responses new realities and create the most favorable environment for global economic development. Later, in 1980s and more intensively in 1990s the process of globalization acquired new character which was caused by new technologies. Knowledge-based economy becomes the key for global world economic development. Technology, knowledge and innovations are the main pillars for raising the resource efficiency (Sepashvili, 2014).

The new goal for any national government is to insure science-based economic development to achieve higher standard of leaving for citizens. At the same time, they should adequately face the challenges of globalization targeting at positive benefits that global economy offers to players meanwhile avoiding negative impact that globalized world imposes on national developments (Farazmand, 2000).

The Ricardian concept of comparative advantage, which states that “nations, like individuals, can benefit from their differences by reaching an arrangement in which each does the things it does relatively well” (Krugman et al, 2012:24), is still valid if we apply it to technologies. According to its main principle, market forces will direct resources to the most productive fields. In other words, on contemporary stage of the world economic development, it is the most efficient for country to direct resources –capital and labor – to science-intensive fields, where they will be utilized in most efficient and productive way due to a high skill labor, new knowledge, developed technologies and continuous innovations. Thus, National government have to pay particular attention to issues such as educated and high skilled labor, advanced infrastructure (energy systems, telecommunications, transports est.), well functioned market economy, prudent monetary and fiscal policy and political stability, which is vulnerable variable in modern world suffering by various armed, military or pending conflicts.

But Ricardian concept does not say anything about that everything will be happen as it is described in the theory. The concept refers the possibilities and not the reality. Therefore, the strategic point of using the concept is to determine how to make all these smart things to happen

and how to translate the potential opportunities into reality. International distribution of production and pattern of the world trade are internationally determined by market forces in the world marketplace. In such reality, countries have to gain competitive advantages, which rely on knowledge and innovations. Four main determinants of the national countries shape the unique national environment that support/hamper countries' ability to success. These determinants together and separately form the environment where national firms and companies operate and create knowledge-based competitive advantages – very hard to be competed. These determinants are 1. Factor conditions; 2. Demand condition; 3. Related and supportive industries; and 4. Strategy, structure and competition. (Porter, 1998). All these systems differ according countries. In this regard, different countries' firms have different access to resources and this creates disparities in competition on the world markets.

Despite the fact that during globalization national borders have less meaning for global firms while they seek for the most advantageous place for economic profit, national countries create unique environment for them and ensure their sound positions on science-based world markets. Thus, participation in contemporary economy means to create appropriate sources for education, adequate infrastructure, political stabilization, market economy and so on.

In such situation it is very important for each country to define their position in the world economic space in a way not to harm national interest, avoid negative consequences of globalization and completely benefit by openness of the nation economy. This goal for political and economic decision- makers means to facilitate the growth of welfare in the country, which in its turn means to raise recourses – labour and capital - efficiency.

The situation is becoming more complicated due to the fact that technology and knowledge are the most important factors for economic expansion and increasing of income in contemporary world. On the world markets the firms of different countries and the national-less transnational corporations are competing with each other. Modern means of communications, IT technologies and transportation search for low-priced factors of production is carrying out over the globe. The development of new technologies (gen-engineering, telecommunication, microelectronics, new materials, bio-technology and est.) is defining the nature of the XXI century. This new model of economy changes social and economic objectives of nations. Transformations are occurring in the strategies of international business and marketing.

New technologies require more and more high-skilled workers. The researches of different international institutions prove that the gap between the salaries of high-skilled and low-skilled workers is increasing. It is not exaggerated, to say that one of the main components of the success of economic agents on the world markets is high-skilled labour involvement and utilization. Knowledge, representing the main production factor in knowledge-based economy, is inconsistently distributed. The human resource is exclusive production factor, holding of which by one or another firm doesn't automatically mean to hold and utilize the knowledge (Sepashvili E., 2011).

Technology achievements are a significant factor for development. Success of the country in science and more importantly, commercialization of scientific results defines positions in the world markets and generates higher incomes. However, business investments in research and development are keeping the paces. Multinational companies try to decentralize their innovation in developing countries to reduce the expenditures. Emergence and unprecedented wide spread of digital technologies together with such new technologies as gen-engineering, telecommunication, microelectronics, new materials, bio-technology and est. dictates national governments to take

special measures to generate knowledge and to encourage national firms for innovation. The models, ways and policies also differ according countries.

Keywords: *Global Economy, Knowledge-based Economy, Innovations.*

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A systems-theoretic perspective on corporate social responsibility

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The publication of the abstract was not authorized by the author

Poster session

Entrepreneurial University – Subsystem Determining the Success of Clusters

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ABSTRACT

In this paper we will try to discuss about the systemic effects of mutual influence of clusters and entrepreneurial universities. Clusters were first introduced as part of an economic analysis by Marshall (1890). “He described the advantages of agglomeration of economic activities in terms of availability of a qualified workforce and specialisation. Similarly, Schumpeter (1939) referred to the “swarming” or clustering of industry. Based on Alfred Marshall’s concepts, Becattini raised the issue of the importance of place-based economic development with the notions of external economies that changed the approach to industrial policy. More recently, the concept of clusters has been popularised and implemented by Porter (1990)” (COM (2008)652 final, p.7). From the modern examinations held on the clusters, we would like to single out Sölvell & Williams (2013), where the authors highlight the “five internal gaps” of the Clusters and indicate that “These gaps have great implications for innovation and competitiveness. It means that clusters despite their great potential for dynamic interaction between actors, often only exploits a small share of this potential.

We can see five internal gaps on the Figure 1:

1. The research gap barring interaction between firms and research organizations
2. The education gap barring interaction between firms and education organizations
3. The capital gap barring interaction between firms and education organizations
4. The government gap barring interaction between firms and public bodies
5. The firm-to-firm gap barring interaction among firms in the cluster”.

On the other side, we wish to focus on the Entrepreneurial Universities. There started the active discussions on them in the economic literature at the end of XX century. Since the early 1980s, US universities have greatly increased their entrepreneurial activities along many dimensions: patenting and licensing, creating incubators, science parks, and university spin-outs. FORBES ranked the country’s most entrepreneurial schools. The list of advanced universities is as following: 1. Stanford University; 2. Massachusetts Institute of Technology; 3. University of California, Berkeley. It should be noted that Harvard University, is on the 25 place in this list. The characteristics of the generations of universities according to the eight indicators based upon Wissema, J.G. (2009) is given by Kyrö P., Johanna Mattila J., (2012). Awbrey S. M., (2003) according to 12 indicators, interestingly makes the comparison of University Models, such as:

Traditional, Engaged and Business. Guerrero M., Urbano D., (2010) describes the conceptual model of entrepreneurial universities. It should be noted that Entrepreneurial Universities especially support the raise of efficiency of education and science policy in transitional and developing countries (Gagnidze I., 2015b).

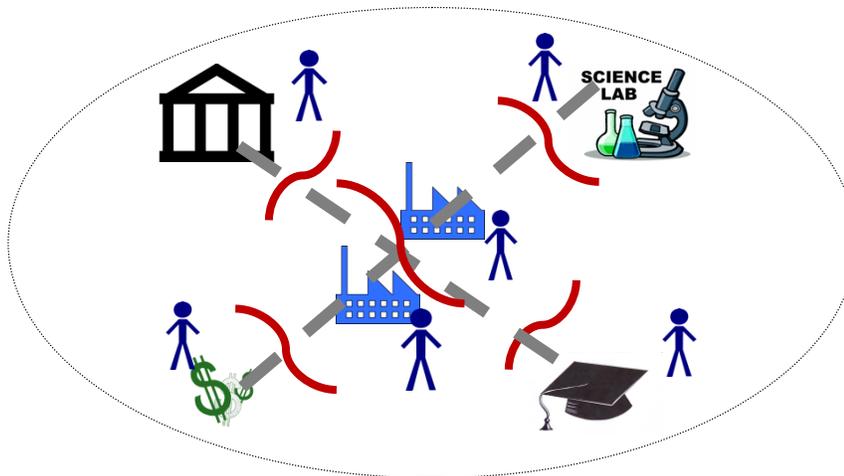
The formation of Entrepreneurial University starts with “Education - Science – Business” – establishing the effective links between all the parties of the knowledge triangle. European Commission (C(2014) 3282; 2009/C 302/03) draws its attention to the creation of such Universities. At the initial stage the formation of such Universities in the clusters will assist the neutralization of “the education gap” and “the research gap” that impedes the effective functioning of the cluster. In particular, it is shown in Figure 2 in the form of small triangle.

At the next stage “The university’s contribution to innovation in economic and social development is the heart of the entrepreneurial university concept. Academic entrepreneurship transcends simple knowledge capitalization as the university interacts with innovative actors from other institutional spheres to promote regional growth. These interactions form a university-industry-government triple helix” (Etzkowitz H., Zhou Ch., 2008).

At this time, another “The Government Gap” is effectively overstepped too. A larger and more effective subsystem created by the large rectangle is formed in the cluster shown in the Figure 2. The fact that the cluster is a system, we have reviewed in a number of papers (Gagnidze I., 2015a; Gagnidze I.,2015c). We think, this time we showed Entrepreneurial University is a kind of subsystem in the big cluster system and significantly contributes effective functioning of cluster.

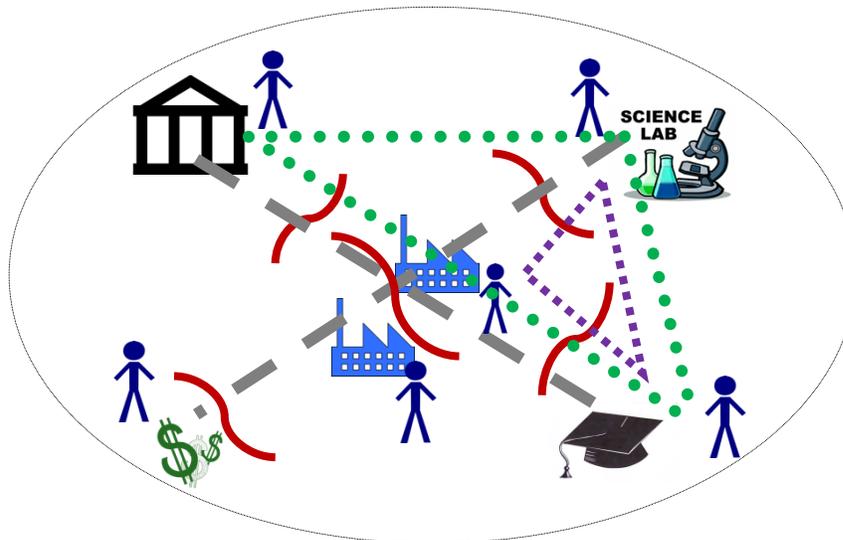
Keywords: *Cluster, Entrepreneurial university, System.*

Figure 1. The five internal gaps, inside the cluster



Source: Sölvell & Williams (2013)

Figure 2. As a result of formation of Entrepreneurial University, the neutralization of the results of the internal gaps in entrepreneurial universities based on the formation of models "knowledge triangle" and "triple helix" described in clusters



Source: Sölvell & Williams (2013)

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Defining company mission and social responsibility in business engineering

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ABSTRACT

The study aims at considering the associations between the components of the mission and identifying the role of the social responsibility in it by developing the model of a company mission. The study was accomplished by using the gravitation and new institutional theories and deduction and induction methods.

Based on the gravitation and new institutional theories, the work considers the trends of installation of social responsibility at the companies in the developing countries by considering the opportunities of intellectual production and services. The components of a company mission and the nature of the relationship between them are considered as such trends.

Key words: company mission, social responsibility, intellectual product and services, small open economy

Introduction

A company mission is, first of all, associated with its goals, with the horizontal and vertical relations to distinguish among them. As the system of the goals is established, it becomes clear that a company mission is also a kind of a system, with all its variables to be thoroughly considered. The major (central) goal of a company mission is meeting the consumers' (buyers') demand. At the same time, meeting the interests of the buyers and the state arising from the demand with purchasing incapacity is an important detail. Meeting these demands is one of the important goals of marketing management. The said goals belong to the field social responsibility. Meeting the state interests (both, national and global) is another important issue.

Development of a long-term economic policy at a microeconomic level is an important and basic element of business engineering. It must be developed by considering the basic changes observed on the national and international markets. The principal property (goal) of these changes is the introduction of innovative technologies and products, and the process of their production is the onset of a new technological cycle.

The process of innovation production can be activated through the globalization of the markets, what is not painless, as it leads to the conflict of interests both, at the national and international levels. Certainly, the principal means to realize the central goal of a company mission is the

adaptation to the demands of the markets undergoing basic changes. In respect of economic policy, it is instrumental and extremely problematic at the same time.

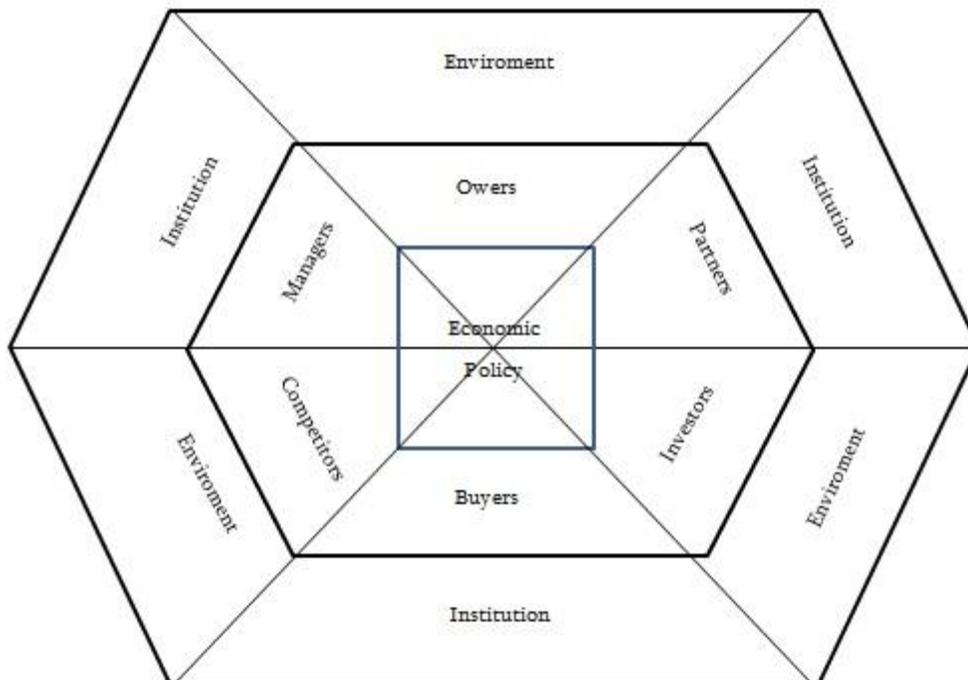
Defining a company mission

The process of defining a company mission complies with the market demands. This process identifies the market, studies its demands and defines the place and role of the mission (shaping the mission). In more concrete terms, a company mission is the catalog of aims the company starts to realize after it specifies its positions on the market (the processes are as follows: 1) identification of a company's position on the market, 2) establishment of the company's position, and 3) development of the company's position). The model of a company mission includes two groups of the following components with a certain controversy between them and frequent conflict of interests. The first group incorporates owners, investors and partners. The second group incorporates competitors, buyers and employees (managers, engineering-technical staff, workers, etc.).

The major exogenous factor influencing these components is the state economic policy.

We would like to consider the model of a company mission based on the model given in Figure 1.

Figure 1. Model of a company mission



In order to form a model of its mission, a company must thoroughly scrutinize and understand the major factors determining the company competitiveness. In this respect, the scientific literature mostly accents the various positive characteristics of the production factors and resources at the disposal of the company, with the human, information, financial, material, military, geopolitical and other resources playing a principal role. It is very important to consider the question at three levels: the potential of the home base country, the branch and the company.

At a country level, the theoretical basis to consider a company mission is the gravitation theory (Anderson, 1979; Deadorff, 1998; Anderson and Wincoop, 2003; Baier and Bergstrand, 2002; Feenstra, Markusen and Rose, 2001; Everett and Keller, 2002; Westerlund and Wilhelmsson, 2006; Santos Silva and Tenreyro, 2006; Helpman, Melitz and Rubinstein, 2008). The most popular uses of the gravitational models in practice are associated with the assessments of impacts on economic fluctuations, variables of economic policy, formation of integration associations, migratory currents (Grogger and Hanson, 2008; Beine, Docquer and Ozden, 2009; De Benedictis and Taglioni, 2011) and foreign direct investments (Bergstrand and Egger, 2007; Keller and Yeaple, 2009).

Following the action of the gravitation theory, the potential of the national markets of the neighboring countries is important. Despite their certain inadequacy with the reality, the gravitational models allow gaining the new information about the formation and reformation of the mission of the companies within the scope of the Agreement of Association concluded between Georgia and the European Union. For small and medium businesses, the anticipated formation of business activity within the limits of the national economies is important to be used to calculate the marketing potential in business engineering. Virtually, the studies based on the gravitation theory to scrutinize the development of export and import of the companies in any small open economies will yield a positive effect. The studies accomplished based on the data of the BRICS countries (Brazil, Russia, India, China and South Africa) (I. S. Trekurova and K.A. Pelevina) have demonstrated that the index of export-import ratio (elasticity) to the GDP variation of a partner country in the gravitational models of all countries of the Association is positive. This means that in the perspective, the company has, the growth of commodity and trade currents in the permanent process of business engineering is possible as the economic potential of the partner companies increases.

It is here the role of the state to support the business engineering is clear. In this respect, one must consider the real prospects to support the business engineering by the state economic policy (sectoral in our case). This must be possible only if a company plans to introduce the social responsibility measures (recommended by ISO26000) in its business.

The consideration of a company mission at a branch level is done based on the branch properties as a precondition determining it. The hierarchy of preconditions is interesting and is very important for the order, structural and process policy. The first-rate property in this hierarchy is the nature of scale economy. In the developed countries, the external scale economy results in long-term advantages and determines a mission of the company (transnational company in this case) on the global market. The nature of the scale economy determines the degree of capital equipment and capital intensity of the commodities produced in the branch, but at the same time, with the intellectual production and services the identification of the scale economy is quite difficult (or even impossible). The production scale economy is accompanied by the effect of experience (knowledge) accumulation and effects of economy caused by product diversity (differentiation). In this connection, it is important to note that these effects of the scale economy are attainable in terms of internal economy what is inaccessible for the companies in the developing or partially developed countries with small open economies. It is even more inaccessible for the countries beyond the regional integration, lacking the compliance of the sub-goals subordinate to the national goal (regional integration goal, such as EU, NAFTA, MERCOSUR, etc.) showing its negative effects when trying to develop a coordinated economic policy. In this respect, the process of globalization strengthens the internal scale economy and supports general wellbeing.

The measures undertaken by the sectoral policy to regulate the branch with the external scale economy are minimal, and such a regulation is virtually reduced to the opportunity to render support (Elhanan Helpman and Paul Krugman. *Trade Policy and Market Structure*. Cambridge: MIT Press, 1989. Laura d, Andrea Tyson. *Who's Bashing Whom? Trade Conflict in High-Technology Industries*. Washington, D.C.: Institute for International Economics, 1992). The same is true with the branches with internal scale economy. However, in terms of large open economies, the sectoral policy is subordinate to the order policy, which within the scope of the competition policy develops the regulations to protect and support the competition and prevent the abuse of power by the companies on the national (domestic) market.

The existence of the effect of the internal scale economy is of a particular interest in the fields of service and intellectual production. It is here where the particularly positive effects of the integration associations are seen. The successful operation of single currency Euro is a good evidence of the efficiency of the order, process and sectoral policy realized within the limits of the European Union. The European system, a giant implementer of the EU monetary policy creating the service products by realizing the monetary policy with the Euro zone operates with the principle of an internal scale effect. Acquiring the statehood function by an integration association leads to the external scale economy in the field of state service, being difficult to cede by any country in the European system (Greece is a clear example). Such a product in the field of service is the development of TARGET, the tax system adequate to the European market in the European system. This system was formed based on the existing elements and aimed at setting the minimal measures of harmonization of the monetary policy. The TARGET system allows the credit institutions of the European system to affect payments with Euro both, beyond the borders and on the territory of their countries. (R. Gvelesiani, I. Gogorishvili, *Economic Policy*, Book I, p. 225).

Analysis of the information about the opportunities of the existence of the scale economy effects of the intellectual production in the country is of no less importance in developing a company mission. In this connection, the work in the large open economies (developed countries) can bring high positive effects to improve the competitiveness of the companies. The picture is absolutely different in small open economies, with their vast majority, due to the limited opportunities to develop the scientific-educational field, having only one way to improve the competitiveness of their companies. It is the way of cooperation with the intellectual production of the integration associations and cooperation on commercial and non-commercial basis (I. Gogorishvili, 2012). The goal of the said cooperation is gaining the effects of the scale economy of intellectual production. The gravitation theory explains this process the best. In the developed countries, the process of intellect-driven production is fragmented to economize on capital labor and time. Thus, participation in the process of fragmentation is an efficient way for small open economies to build and strengthen the competitiveness of their companies. This component is particularly important in the build-up of a company mission in respect of establishing and developing one's positions in the first instance.

In the development of a company mission, within the limits of the environmental protection policy, the state must recognize and present the requirements to strengthen the social responsibility for company owners. This must be done with the aim of realizing the preventive measures to avoid any complication of social-ecological state. Usually in the developing countries, "the safe way is seen as the cart turns over", as the Georgians would say it. It is clear that the initiative to seek "safe ways" at the initial stage of founding a company must be determined when developing a company mission and setting it as an obligation.

Description of a company's competitiveness is a set of specific distinctive characteristics. As a social-economic system, it includes: the uniqueness of the technologies and resources at the company's disposal and knowledge, qualification, experience and creative skills of the company personnel (including managers). This kind of description notifies us about the perspective field of business where the company can be highly competitive. Virtually, it must be a list of socially important market demands, which the company will try to meet.

The company must determine the size of tax order for the products and services covered by its competitors. Specifying the conjuncture of the markets in question is an important component of a company mission.

Conclusions

The options of possible variation (expectation) of the economic-legal field are important to consider in designing a company mission. This activity means accomplishing studies based on a new institutional theory. In this respect, particularly important is to gather and analyze the information about the company's partners and competitors. The same must be done for all explicit or implicit "players" of the institutional environment.

Within the limits of the new institutional theory, a study must be accomplished to identify the factors hampering or supporting the selected field of business. Usually, in such a case, the degree of impact the lobbying groups have on the state institutions must be considered. At the same time, the study of the opportunities to prevent conflicts between the economic interest groups must be a primary goal. The possibilities to receive the support or face a clear opposition of the public organizations and social movements must be considered in the same context.

As regards the problems of the opportunistic behavior, it is important to identify the self-enforced opportunities in advance. Particular oppositions of the partners the companies in small open developing economies face more looks like the relations with competitors, as in fact, the parties reach the compliance of interests too rarely. When identifying a company mission, the presumable outcomes of subjective values, principles, recognized legal, moral, ethical and other restrictions must be assessed within the context of the property rights.

A special issue in shaping a company mission is the questions of relationship with the company's competitors, clients and partners, which, if scrutinized in advance, must become the precondition for future success. In this connection, the perspectives of the existence and development of the innovative technologies in the selected fields must be identified. It should be noted that the rule to assess the anticipated expenditures and incomes of a company must be specified with great scrutiny (based on calculations). This rule must compare the anticipated outcomes (forecasts) and possible expectations of the owners. All this must be accomplished based on the general (not specific) business indicators. Within the scope of the Agreement of Association concluded between Georgia and the European Union, the formation and reformation of the mission of the companies (and their social responsibility as well) must be in compliance with the expected outcomes of the gravitational models. Such an approach will allow expanding the area of social responsibility during the economic development processes.

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Influence of Tax Burden on Countries’ Financial Stability

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ABSTRACT

In today's modern world, where national economies became inseparable due to economic globalization, financial crisis and its effects no longer has borders. Relevance of state's financial stability was first acknowledged after Asian financial crisis of 1997. Research in this economic field intensified after recent economic downturn. These events fostered a need to express public and more importantly professional opinion on states' financial stability based on most recent and reliable empirical data. It is unanimously agreed in scientific literature (Hawkins & Klau, 2000; Nelson & Perli, 2005; Gray, 2007) that it is necessary to examine aforementioned area in comprehensive manner, integrating the analysis of various indicators. Globally acknowledged organization International Monetary Fund (IMF), defined financial stability of state as a mixture of economy, public finances and financial services. Changes in these areas are inseparable from state tax policy, which is analyzed by broad range of scientific publications. Nevertheless, literature review revealed disagreements in scientific community regarding effects of tax burden on financial stability. It should be noted that scientific efforts related to tax burden analysis have been focused on individually assessed economic (Kaštan, Machova, 2010; Burn, 2004, Kiss, 2005) and public finance (Amadeo, 2013; Laffer, 2004) domains. Systematic and complex investigation on the relationship between financial stability components and tax burden have not been done. Due to identified gap in scientific literature, this paper aims at contributing theoretically and empirically towards complex research on tax burden and states financial stability in the states of OECD (Organisation for Economic Co-operation and Development). The empirical research results show, that the stability of financial systems in identified clusters of low, medium and high tax burden shifted differently in the period of 2000-2012. This was mainly determined by local national financial and economic crisis. Higher financial state's stability was observed in clusters of high and medium tax burden level than in cluster of low tax burden.

The objectives of the paper were reached by developing system model to determine the impact the impact of tax burden level on states financial stability and by testing the model empirically. Correlation and regression analysis revealed weak relationship between overall tax burden and states financial stability, but more detailed analysis showed a statistically significant relationship between the data of low tax burden cluster states. However, identification of a single type of dependence and effects of overall tax burden on state's financial stability was unsuccessful. Financial stability of the public sector revealed strongest relationship with variety of tax burden

types. On the other hand, the assessment of the state's financial stability factors in association with the variety of tax burden types distinguished stability of financial system. Two types of tax burden – business income tax and personal income tax - recorded strongest relation with factors of economic stability, other types of tax burden oriented towards customers with financial system factors.

Keywords: *Financial Stability, Tax Burden, Financial Crises.*

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Role of the ERP systems in the successful management of Georgian companies

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ABSTRACT

In the era when informational technologies develop so rapidly, the ERP (Enterprise Resource Planning) systems have become a principle instrument of a successful business. ERP is an information system which ensures the existence of a single functional environment and enables management to successfully run a company by means of using the best practices and standards in the field of business. The ERP system integrates the processes of financial management, stocktaking, production, logistics, planning, sale, purchasing, distribution and other business units into a continuous chain. The ERP system potentiates comprehensive automation of company management but it goes beyond the scope of simply implementing computer systems. It's a shift to a new management concept which implies the use of new management standards and instruments. (Meskhia I. Seturidze R. 2016).

In modern terms, the companies trying to improve their competitiveness and secure leader's position on the market must attempt to accomplish the process of permanent reformation of their systems of business processes. One of the means to successfully manage a system of business processes is the introduction of ERP system by the companies.

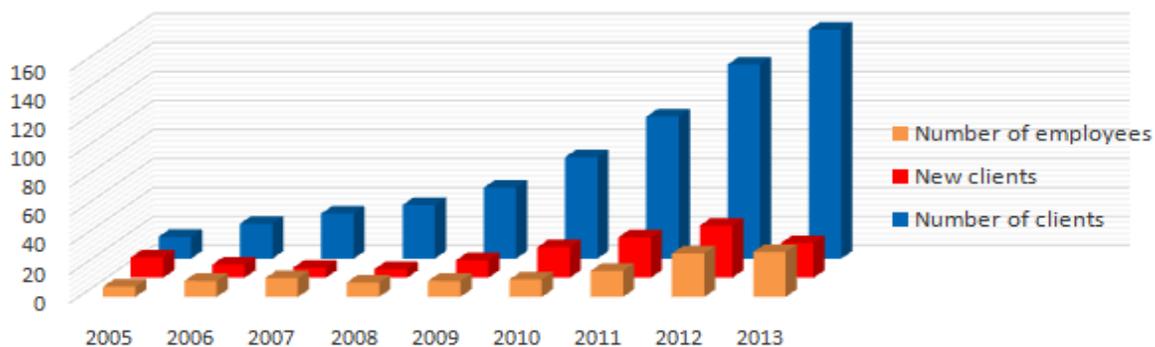
The ERP system has been successfully implemented in millions of companies throughout the world. There are companies on the world market, which have succeeded in implementing them. Such companies have competitive positions (My SAP, Oracle Applications, MS Dynamics, 1C, etc). Tens if such companies, foreign and Georgian, have already emerged on Georgian market (APEX, UGT, Delta Systems, BDO Solutions (former IBS), etc.). (Meskhia I. Seturidze R. 2016).

At first, the ERP system was introduced to the large companies in Georgia; however, the world practice showed that the use of these systems is also beneficial both, for small and average companies. Through its introduction, the companies gain the following opportunities:

- Putting the company registration to order;
- Using the labor resources efficiently;
- Gaining the information needed for business analysis and marketing;
- Optimizing their commodity and material reserves and monetary resources;
- Realizing the costs and income plan/factual analysis;
- Planning and modeling the company development scenarios based on the accurate and actual information;
- and so on.

The paper describes APEX, one of the most successful and fast-growing companies of Georgia working on introduction of the ERP systems and sharing the knowledge and experience to other companies. Since 2004, the company has been engaged in designing and introducing the automated systems of business processes in Georgia. APEX creates modern software, the complex of automated management systems, being a strong tool to register, analyze and manage the production, retail and wholesale trade and services at the companies. The system covers the distribution of finances, reserves, production, purchase, sales and mobile distribution, as well as retail, extended assets, human resource management, analysis and other modules. It should be noted that in parallel to strong functional tools, the mentioned system has a simple interface making its introduction and mastering quite simple. The company adapts the system to modern e-devices, uses cloud technologies, and it has integration support of Android systems and so on. This on its turn extends the circle of customers of ERP systems. It should be noted that among other things, the company trains its potential clients and any entity concerned of the ERP systems and improves their technological knowledge. This is directly associated with diminishing the risks associated with the innovative and technological development. The company has the potential to design market-oriented innovative services and improve its present service standards. We analyzed the trend of Company APEX for the last 10 years. The diagram shows the number of the Company clients and relationship between the numbers of the new clients and Company employees in different years evidencing the trend of growth of the Company (See Figure 1).

Figure 1. Relationship between the numbers of the new clients and Company employees in different years



The companies in Georgia engaged in the introduction of ERP systems have achieved success evidencing the perfection of the Georgian companies. However, without the support of the introduction of ERP system, the growing rates will be difficult to maintain.

The introduction of ERP systems in Georgia will also be facilitated by the companies in Georgia having had e-relations with the Revenue Service of the Ministry of Finances of Georgia in recent years. Such a relationship is quite successful through portal www.rs.ge, in particular, e-invoices, e-orders, special invoices, e-declaration, comparison of e-documents, e-submission of documents and online monitoring of their accomplishment, etc. The requirements of the Revenue Service to the companies are always considered in the APEX-ERP system and are given as an independent module. This helps the companies to discharge any obligation to the Revenue Service of the Ministry of Finance through the system quite simply.

The accomplished analysis allows making certain conclusion and recommendations:

- (1) The market and specific terms change instantly and the business companies find it difficult to withstand the severe competition. Introduction and perception of ERP systems in the complicated business world becomes necessary.
- (2) The companies engaged in introducing the ERP systems are the growing ones and have achieved certain success what evidences the perfection of the system of business processes in Georgia. They have the potential to design market-oriented innovative service and improve their present service standards.
- (3) The fact of the shift of the Revenue Service to e-service model in recent years promotes the introduction of the ERP systems in Georgia.
- (4) The ERP systems are introduced to almost all large-scale companies in Georgia with the works of perfection taking place at present.
- (5) It is recommended to gain support of the state and investors in introducing the ERP systems to small and average companies.
- (6) In order to advance the business processes in Georgia, it is recommended to popularize the ERP system in the country.
- (7) It is recommended to gain the support of the state and investors of the kind of companies working on the ERP introduction.
- (8) Cooperation with the higher educational institutions working on the introduction of the ERP system leads to the popularization of teaching the ERP system and training qualified staff what is directly associated with the diminution of the risks associated with the innovative and technological development.
- (9) Introduction of the ERP systems means a shift to a new management concept meaning the use of the world's best business practices and standards. This on its turn will allow the companies to have a successful management system.

Keywords: *ERP, Management, Companies, Informational technologies*

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User generated value factors in e-business

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ABSTRACT

The framework of the research is based on the analysis of the literature, qualitative and quantitative research methods. This research examines theoretical aspects of e-commerce as a part of e-business and presents a user characteristics (demographic, social) of online buying. The obtained empirical findings demonstrate that such factors as convenience, simple approach and better pricing have influence on e-business users. During the analysis of the social and demographic characteristics such as gender, it was established that the main reason for men to resort to online shopping is lower prices. Respondents in the 25-35 age group choose online shopping due to such reasons as lack of time and a wide choice. The most beneficial factors indicated by online users were the possibility to compare prices and purchase at a lower price. Moreover, the performed expert survey revealed that the price of goods or services offered online is understood as a complex of consumer reviews, recommendations and experience with that product/service, while less demands are projected towards product presentation, search mechanism, delivery and payment, when users are offered a safe, fast and convenient shopping process. The characteristics established by this survey could assist e-business developers in forming a targeted marketing strategy, and to determine and eliminate major obstacles in creating a convenient online shop attractive to users. Online shops can allocate valuable business resources in order to evaluate and apply knowledge about online user behaviour, future technological innovations and changes.

The aim of this research is to acquire an overview of the factors of users' generated value in decision-making to use e-business (shop online), and envisage future perspectives of e-business. This research reveals the factors, which stimulate online purchasing behaviour by analysing users' generated value factors. It also offers an overview of the factors, which have negative influence on promotion of online shopping, and benefits received through shopping online. Evaluation and online shopping are influenced by such factors as age, gender and employment status. The article provides future tendencies of e-business users based on the expert survey. The research raises a scientific problem - speed of change of the e-user behaviour in response to lack

of scientific researches that could help to understand e-user behaviour in e-business and online shopping.

Knowing what influences e-business and what kind of e-user behaviour stimulates shopping are the key tools of competition in a virtual space. Understanding users and generated value factors affecting their online shopping behaviour are widely studied from various scientific angles, which help to establish the main factors thereof. It also influences a number of other phenomena, such as the country's level of developing, generation, traditions, etc. (Ning Wan, Thesis 2015). The reasons why users choose using e-business are also studied from the point of view of various aspects. This means that the business developers, who can quickly grasp and understand the users behaviour and generated value factors influencing their shopping habits, will have an opportunity to attract more consumers, stabilise their position on the market and increase revenue. Moreover, online technological progress caused a remarkable growth of online trade and improved the level of web interaction: a possibility of online communication, posting and searching for information, and sharing experience on social networks, as a consequence of which, consumers expect an equivalent response for online shopping (Jung-Yu Lai, Ulhas K. R., Jian-Da Lin, 2014). Scientific literature presents the analysis of various aspects of users' online shopping behaviour. Therefore this research is based on the findings of different authors. Some authors examine the factors stimulating online shopping by comparing them with the factors stimulating shopping in stores (Park et al. 2013; Clemes et al. 2014) or on the contrary, what consumers find irritating or what discourages online shopping (Sam and Sharma 2015; Vosa et al. 2014), yet others concentrate on the consumer behaviour and shopping process in a virtual environment (Lai et al., 2014; Suki, Res, 2013) or research the factors influencing shopping decisions depending on the category of goods (Sam, Sharma 2015; Dai et al., 2014) or gender (Zhang et al. 2014; Frank et al. 2014).

Design/methodology/approach – research design is based on a two-step research process. The first stage reveals the factors, which influence the choice of users to shop online, by application of a quantitative study and organisation of an online survey. The survey respondents are 183 Lithuanian consumers shopping online. The second stage involves a qualitative study and the interview of 9 experts (e-business developers) through provision of structured open-ended questions aiming to determine the factors, which stimulate e-consumers to shop online, based on personal experience. This helped to assess the expert opinion towards the factors affecting e-users' decision, and look into the future perspectives. This research involves appellative conditions, and the obtained findings are not necessarily typical of all areas of e-enterprise. Thus, it would be useful to perform studies in the future to determine the differences of the factors, which affect online shopping, depending on the e-business area, services offered and product range.

Keywords: *e-business, e-commerce, user value, online shopping.*

Harnessing Collective Knowledge in Development of Absorptive Capacity

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ABSTRACT

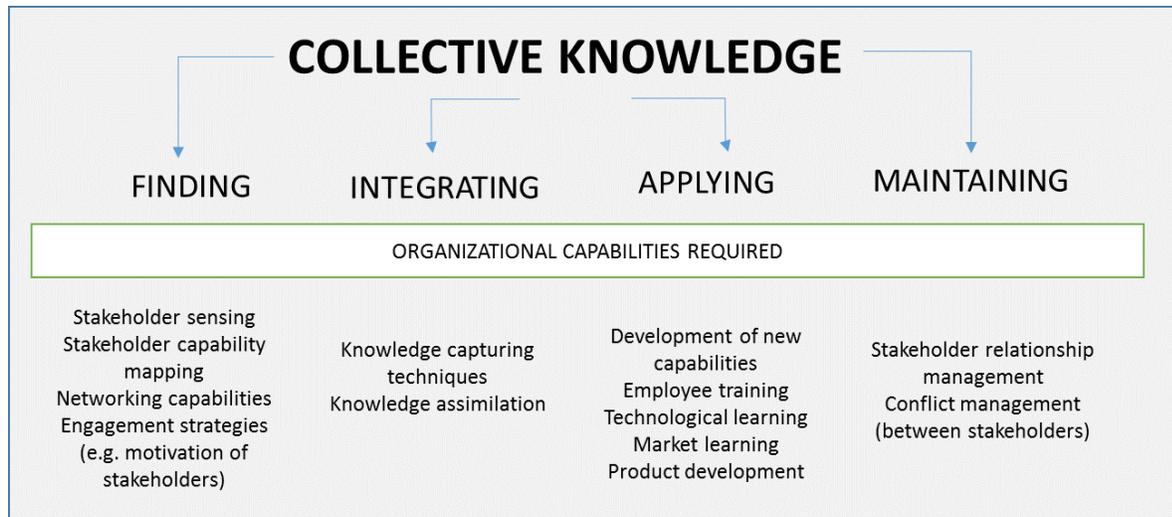
Due to the surplus of available information, changing needs of the customers and shifting nature of the innovation management adequate management of the external knowledge has to be developed by business and public entities. Importance of the external collective knowledge integration is highlighted in the literature (Wise et al. 2012; Skaržauskienė et al. 2015; Surowiecki 2004; Tapscott & Williams 2008), but current research efforts lack of understanding on how to manage such processes internally. Both scientists and practitioners agree that the competitive advantage no longer originates from the internal processes but depends on the external knowledge - to become competitive an organization should change the nature of relationships between the co-creators of value i.e. customers, stakeholders, partners, employees, etc. and adapt new organizational capabilities in order to manage the process. Insights and data can come from different external sources but it is important to have qualified people and appropriate organizational structure to recognize the value of external knowledge sources, digest it, and apply it to commercial ends. Such organizational capability of organization is defined as absorptive capacity.

First definition of absorptive capacity was introduced by Cohen & Levinthal (1990). Their work provides a classical view of the absorptive capacity process as the identification and recognition of new information and its assimilation, application and exploitation for commercial ends. Later Zahra & George (2002:186) suggested reconceptualization of the capacity as a dynamic capability “...pertaining to knowledge creation and utilization that enhances a firm’s ability to gain and sustain a competitive advantage”. Todorova & Durisin (2007) introduced the fifth dimension to Cohen & Levinthal model - recognizing the value. However, traditional models of the absorptive capacity development neglect the importance of relationships with the external stakeholders. We argue that significant new dimension should be added to the model of absorptive capacity management – maintenance. Contemporary organizations are social institutions meeting numerous needs of customers, employees, suppliers and other stakeholders. Resources and stakeholders are now embedded in networks and are interconnected. Also, the

maintenance element is of key importance due to the changing sources of the external information i.e. competitors, active members of social media and communities have become more active.

Development of absorptive capacity is an ongoing process. Hence, it requires constant maintenance of relationships with external sources of information. This paper describes a conceptual approach for managing collective intelligence in the development of absorptive capacity in organizations (See Figure 1 below).

Figure 1. Managing collective knowledge in development of absorptive capacity



Source: developed by authors, 2016

First three components of the model (finding, integrating and applying) are a simplified version of Cohen & Levinthal dimensions and deal with the traditional functions of absorptive capacity development. In addition to the new dimension we propose a set of organizational capabilities which need to be developed in order to manage collective knowledge available to organizations. The dimension of maintenance includes such organizational capabilities as stakeholder relationship management and conflict management. They are of key importance due to differing needs of various stakeholders. Proposed conceptual model could be a useful starting point for future research initiatives tackling the process of collective knowledge transformation into valuable resources for organizations.

Keywords: *collective intelligence, absorptive capacity, external stakeholders.*

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On the Modelling of Business Cluster Performance: Overview of Recent Approaches

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ABSTRACT

The meaning of establishing and operating business clusters that create the innovations is based on the synergy effect. The synergy effect means the key precondition under the mutual trust and sharing available resources (financial, technology, labour, and other tangible and intangible assets) that helps to cluster members to act together more effectively than operating separately. The assessment of cluster performance and innovation performance is important to find out what kind and how suitable is the operating result (its compliance purposes), and then - the need to more accurately quantify the measurable parameters on expert evaluation of the level and quality of innovation and deployment settings. In order to generalize the evaluation of the efficiency of business cluster performance, some parameters should be introduced.

In the terms of financial risk the business cluster can be treated as a set of interacting objects (stochastic network), which among other risks inherent and systemic risk, meaning the risk that problems in one cluster member can spread to another. Such a threat is possible, as the activity of members of the cluster is related to the creation and development of something new and unknown and objectively determined by a substantially higher risk than other forms of traditional activity is determined by varying the nature and extent of mutual obligations. Moreover, it is clear that the performance of each member of the cluster depends on whole cluster performance. The quantitative modelling of the performance of business cluster should be established with respect to risk, i.e. volatility and profitability, synergy effect, evaluation of distinguished output of cluster performance. Business cluster risk is strongly associated with the efficiency of performance.

Quantitative assessment of business cluster of performance depends on the risk structure. The most relevant fraction of the risk composes from uncertainty related to innovation and commercialization. In addition, other kinds of risk are relatively well-known in financial engineering (credit risk, liquidity risk, market risk, operational risk, moral hazard), different evaluation models needs to be applied.

Although the concept of cluster evaluation system is clear and helps various experts to get a clear picture of the effectiveness of the cluster performance, however, there are a number of drawbacks. Despite its clarity and relatively simple interpretation hitherto applied evaluation

methods of the business cluster performance are based on peer assessment score and are not sufficiently detailed, in addition, they has some subjectivity and it makes an assessment dubious. However, it is important to summarize and extend the functionality of the system of assessment and application possibilities. It would be true not only to state the fact in the form of reports, but also to obtain statistical data and methods based business cluster development forecasts.

The existing assessment tools are not yet very well developed to evaluate adequately the general efficiency of business cluster performance in the context of creation of innovations. However, from the side of investors, it is important to estimate the risk of innovation creation and commercialization. It is related to the high uncertainty due to the unclear, idiosyncratic and complicated process of innovation creation. The qualitative assessment of performance parameters is not very exhaustive and in often times does not provide the sufficient information about the state of business cluster and innovation creation and commercialization.

The performance and competitive advantage of business clusters creating and implementing innovations is based not only on the company-based resources and capabilities but on their collaboration. In this paper, we present the recent approaches of modelling of the risk and other performance parameters of business clusters based on the networking, contagion and correlation approach because it is well known that the business cluster performance can be based on the modelling the social network. The most usual problem of the evaluating of the performance is the lack of data. It is also revealed the modelling of synergy of business clusters due to inside interactions of its members is not yet developed. In the conceptual model, the relationship between the members of business cluster is described in more general way: the directions of interlinkages are defined and the assumption of the value of liabilities as geometric Wiener process is made. In addition, the value of innovation is treated as geometric Wiener process.

In this paper, the quantitative assessment of synergies related to the correlation (or other dependency structures) assessment. In particular, the lack of information on the different cluster inter-relatedness (i.e., correlation) level, since these data are generally not monitored, in addition to tests of statistical methods to determine the correlation level, e.g., credit risk models are complex and underdeveloped practical challenges. The risks of business cluster activity are specified applying the models from financial mathematics to evaluate the possible impact of uncertainty. In addition, the synergy effect is influenced by the individual links between members of the cluster type and intensity. This paper also provides an overview of issues related to synergies modelling. It is noted that the problem relating specifically to the assessment of the performance of business clusters, have devoted relatively little attention.

The deeper analysis of business cluster performance and innovation process demands more its parameterization. The purpose of this paper is to analyse and summarize the methods used in creating business innovation clusters to assess the operational efficiency - as well as identify and analyse the main problems associated with innovation creating business clusters operating performance assessment. Many descriptive and qualitative case studies of clusters have been conducted and some research is available that compares clusters across industries or regions. These efforts have generated relevant information on cluster components, structures, linkages, governance, and interactive processes. Recently literature has emerged on the policy experiences of governments with respect to cluster development and management. The main feature of business clusters should bet the synergy effect that depends on the type of interaction, the types of risk that face members of business clusters, costs and other factors defining the efficiency of business cluster performance. On the other hand, the external conditions also have a relevant impact on the performance of business clusters and their innovations.

The paper proposes generalized framework of the evaluation of business cluster and ways of assessment of relations within social network that represent the business cluster. In this paper, the overview of recent business cluster efficiency approaches is provided and the created conceptual framework of evaluation of business cluster performance and determination of the main channels of financial contagion within the network that affects the performance of business cluster. On the other hand, the necessity of additional information concerning the interaction, collaboration and liabilities between cluster members and arises the administrative burden. It is worth to emphasize that this paper investigates the impact of intra-cluster ties and extra-cluster linkages.

The proposed evaluation model is in theoretical exploration stage. Also, some additional assumptions are made. On the other hand, the limitations of this analysis may be the object of further research and further improvement. The lack of information concerning the structure and types of interactions and relationship between the members of business cluster means that it is necessary to search efficient statistical methods to evaluate parameters of unobservable process. In addition, the proposal to introduce a more general approach of evaluation system of business clusters performance and its applications need additional information (in particular - on the cluster of mutual assistance and liabilities). This should complicate business cluster management and possibly it can be treated as some additional administrative burden. In this research, the proposals are not made on the measuring of sustainability of business cluster performance. Also, the sustainability and the life cycle of business cluster is not analysed. It will be analysed in the next step of research.

Accurate evaluation of business cluster performance efficiency is relevant to institutions funding innovation projects (venture capital funds, public business support agencies). In addition, the following evaluation models that reveal more information about the performance of business clusters, in particular, are necessary and the cluster managers who seek to such organizations to be truly effective. This article aims to determine and analyse the main features of existing evaluation approaches of business cluster performance. This paper contributes to the further analysis of evaluation problems and possible improvements. On the other hand, the proposed approaches of modelling should imply the necessity to collect additional data concerning the cluster performance, and it can become as additional administrative arrangement.

Keywords: *cluster, efficiency, synergy effect, risk, uncertainty, network.*

What turns enterprise social networking tool into innovation difficult to adopt: case study results

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ABSTRACT

A positive effect on management sustainability, potential for value creation in such areas as internal and external communication, collaboration, knowledge sharing, influence that enterprise social networking (further – ESN) tools are becoming a more prominent form of communication within enterprises (Ahlqvist et al., 2008). Yammer, launched in 2008, is one of such collaboration software and business applications which is used by more than 200,000 companies worldwide, including DHL, Shell, Unicef UK, various universities, etc (Yammer.com; Pinto, 2014). Lithuanian organizations are no exception: even though the concept of ESN is still very new, it is applied in organizations both as separate tool, or in Sharepoint platform provided by Microsoft (since 2012; Taylor, Lunden, 2012) both in business and in public sectors (as announced in October 2014 that was integrated as a personal and safe platform for communication between all Lithuanian libraries (National Library of Lithuania, Inb.lt).

After a rapid spread across various enterprises and being adopted by most of leading companies in the world, news began to appear that the actual use of ESN has not been as high as hoped and that the management is struggling to make it work (Roe, 2014). The issue of a low innovation adoption rate was noted in regards to ESN tools and their implementation in organizations. One of the important notes is that the increase in ICT adoption leads to information overload in organizations (Edmunds and Morris, 2000, Eppler and Mengis, 2004). That might be one of the reasons, why despite the reasonably predictable benefits of ESN tools for communication and

information sharing within organizations. But apart from this, the experience in a number of companies shows, that such innovations are not easily adoptable. This type of technology is initially providing one more channel for receiving information, but until successfully and fully adopted, an innovation like this is in itself new information for employees. Thus, a number of organizations which choose to adopt ESN tools are possibly facing an implementation failure, mostly due to a lack of sufficient knowledge about this particular type of innovation and their diffusion process.

This all leads to the importance of better understanding the process of adoption of ESN service as innovation in organization. Analysis of failure instead of success stories gives a wider understanding of risks and dangers that organization might face and ways to overcome them. We believe our research is capable to address this problem by combining Diffusion of Innovations theory (Rogers, 2003) with Technology Acceptance Model (Lee et al, 2003; Chuttur, 2009). This allow to address factors important for adoption process of ESN tool in organizational settings, to address the adoption decision at individual, as well as organizational levels by taking into account the suggestions regarding the pro-innovation bias and looking at the actual case of ESN tool implementation failure within an organization, and this way learning more about the particular aspects of its diffusion and acceptance processes. Innovation-decision process model can be successfully applied for conducting a case study of enterprise social networking tool adoption and used with qualitative and quantitative research methods to collect relevant data for determining key factors for enterprise social networking tool implementation.

The main research question in this case analysis is what factors affect the adoption of Yammer in the selected organization and their importance for a successful implementation of enterprise social networking tools, by analysing qualitative and quantitative case study results. A qualitative research strategy was chosen for this research and a case study was conducted, while using both, qualitative and quantitative research methods. The selected company had ESN tool available for internal use for 9 months, up until it was decided to discontinue its use due to a low rate of adoption. Qualitative methods included the analysis of existing organization archival records (previous survey results, evaluating the need of internal communication platform by employees), semi-structured interviews (with the experts inside the organisation, the persons responsible for innovations related decisions and their implementation) and existing primary literature review (research of the constructs used in questioners/surveys in other researches) and were used to explore and define possible factors related to the adoption of an ESN tool. Based on them, a quantitative instrument for the investigation of the variables that relate to the implementation of ESN tool was create.

The research completed confirms the importance of combining different stakeholders' positions to have 360-degree view of the situation as well as analysis of organizational climate and specifics of the ICT –based innovation itself. Based on expert interviews, was recognized, that the training and the use of the ESN Yammer was voluntary and this attitude relates to the Company's policy. Based on Rogers's (2003) division of innovation decisions - this is an optional innovation-decisions, as the choice to adopt or reject ESN tool was left to make for every individual independently. According to the theory, the fact that decision is made freely and voluntary is important for the success of innovation adoption, but mainly only till the decision stage. Although as the situation shows, it is not critical to the final result, because in the stage of implementation, depending on the later effects of other variables, it may cause discontinuance in the stage of implementation. Although Experts themselves did not seem to understand clearly the reason of discontinuance, usage of Rogers' (2003) decision innovation model quite clearly showed few weak points: the lack of employees understanding of relative advantage which is also

closely related to observability and incompatibility – it is not in line with the existing customary system means used, as well as recognized difficulty to use which relates to complexity.

The next perspective to analyze situation is innovation development model by Rogers (2003). It clarifies the management steps to be changed. The empirical resources show that agenda-setting stage was partially implemented: the problem was continuously noticed doing daily tasks and during meetings. The missing point was the set of sequence of actions and organizing the hierarchy and change management identification. At the matching stage mostly was relied on the fact that Yammer environment is user friendly and easy to understand. Although conceptually it was a very successful choice (a good match with organizational policy, security standards), some groups of employees did not find this tool useful in their daily tasks completion. The re-defining/restructuring stage showed there were no needs to make modification of organizational structure. Innovation was chosen and adapted to the needs, the introduction of innovation was presented during several stages. In the clarifying stage the innovation was put into service in the organization and the basic idea of its importance became clear to a wide range of organization members. Although from this point the number of users had to increase, it had only declined with time. The lack of proper speed of the implementation and no actions taken when decrease was noticed lead to failed stage of clarifying and unfinished innovation process at the end. After nine month ESN did not become part of routine (no routinizing stage). The qualitative research note emphasizes the main missing points in all the process - the support and encouragement from the top management to use this new platform. The decision to adopt and the development of the tool were left too optional and this might partially not fit with the existing organizational culture.

The quantitative research concentrated both on Personal Innovativeness in the domain of IT (further – PIIT) and Perceived Usefulness (from Technology Acceptance Model – see Lee et al, 2003) (further - PU). The results indicate that the employees' age and PIIT related to their experience and frequency in using social networking tools in general and that PU of Yammer positively correlated with its longer use over time. Also, though employees indicated they had enough information about Yammer, in average they did not feel it is needed or could be useful for work. Their opinions about the organizational culture and the introduction by tops management were cautious, however, a number of respondents did indicate its importance for their willingness to use Yammer. These results only confirm the lack of support and encouragement from the top management to use this new platform recognized during the qualitative research.

Overall, the analysis showed importance of the introduction by the top management to this type of adoption decision, also who and how is introducing Yammer and what is communicated (or not) about its purpose, as well as whether the training is compulsory – these affect the number of initial users. To continue with initial users and increase the number, formulate favorable or unfavorable attitude towards the adoption decision of this tool, the share of information how Yammer is perceived by the employees (meaning, how useful this ESN tool seems for work and/or informal communication, how compatible employees find it with existing communication and information technologies in the organization, and how easy or complicated the use of Yammer is considered) must be organized. Personal Innovativeness in the domain of IT (PIIT) and Perceived Usefulness (PU) understood via analysis of individual characteristics of adopters, such as their age, ability and willingness to try new technologies, as well as trust in information and communication technologies. It determine employees' decision to try and learning about Yammer early on in the knowledge stage. It is important to take into account the nature of the

social structure within organization: relationships between employees and departments, communication patterns and problems within organization and organizational climate, since they can influence the rate of Yammer adoption and its continued use, and thus the success of ESN tool implementation.

Keywords: *Enterprise Social Networking Tool, Innovation Diffusion Theory, Technology Acceptance Model.*

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System dynamics for interest groups capacity building: implications for better inclusion

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ABSTRACT

In order to create the supportive environment for inclusion, policy management infrastructure has to be sensitive to the abilities inclusive society can express and develop. Public management faces a challenge to embrace as many interests as emerged in society and to create equal conditions for any societal interest to enter into policy processes regarding interest origins whether it is private or public. However, some interests emerge easier and find collective support in society quicker, others as marginal interests left behind the policy scene as rumor. So those interests, which definition is unambiguous and associated with common interest inside certain society group, have internal capacity to create organization of people with the common goal, to reach agreement for both their common interest and for the investment in the advocacy capacity to approach public management system. Other interests, public interest in particular, are less organized. Some of them are complicated to define and verbalize, difficult to describe the coverage of potential interest and motivate society to take collective actions. In that case, less organized interests accumulate less capacity to participate in inclusion processes and rarely have the opportunity to be heard before their capacity is not reached some recognizable level, participation infrastructure is prepared for. The picture of inclusion becomes more complicated when interest group capacities' set is discussed, since many different capacities overlap and have unpredictable impact on each other and on interest group performance.

The goal of the paper is to enclose the dynamic nature of the interest group capacities building and interdependency inside capacity set. So we argue that the whole set of capacities have impact on organizational performance and external recognition by policy partners and better performance have reinforcing impact on the further capacity development.

The system dynamic modelling technique is a useful approach to understand the dynamic nature of inclusion when different interests with different levels of preparedness and expression of capacity are meeting. The complex nature of inclusion is revealed through the channels interests are reaching public management, when certain criteria for interest entrance is set on knowledge and resource interest group possess and can offer to share. The other complexity is based on great

abundance of interests represented by groups with various levels of preparedness to participate in a public discourse. The huge variation in interests groups capacities complicate to unified the procedure of inclusions. The interest dynamics, when one interest is fulfilled and occasionally oversteps other interests, change the stability of the inclusion system in a nonlinear manner. A system dynamics model would permit explicit consideration of at least some of these issues.

Methodology

The system dynamics model was calibrated with data collected by employing various methods. Qualitative analysis with extension on three case studies (15 interviews during the period of 2015-2016) let collect data about interest groups ability to perform as an organization of collective interest and define the capacities necessary to invest. The case studies about three different interest groups who live in different organizational development phases provided data about the set of capacities that is most valuable in particular development stages. One selected sample is interest group in creation and establishment phase (patient organization), the second interest group is living in the stable growth phase (business interest group) and the last selected sample is assigned to the stagnation and reestablishment phase (innovation-based forum). Data describing inclusion infrastructure, where the interest groups with different capacities set meet each other with public management, were collected and analyzed employing social network analysis. Policy networks in three policy domains containing 1531 nodes in total and representing networks dynamics over the 3 years of 2012-2014 provide data about interest group capabilities to become a part of the wider inclusion network. Position in the network and relationship inside network provide two directions of knowledge: interest group capacities impact on ability to participate in the network and ability of inclusion infrastructure to recognize some interest groups which capacities are preferred.

Findings

The model is based on the practice Lithuanian public management has created with inclusion infrastructure where unintentionally the policy networks are built with the purpose to share knowledge where interest groups are expected to be more knowledge providers instead of being knowledge co-producers.

A causal loop diagram is developed with the purpose to explain the inclusion infrastructure ability to use knowledge coming out from expression of interest group capacity. So the variables such as type of capacity (internal management, analytical, advocacy, partnership) and knowledge generation phases (sharing, capture, transferring) are connected. In the model, inclusion infrastructure is characterized by the stock of the system knowledge that depends from the flow of independent knowledge provided by any interest groups. Reinforcing loops connect knowledge flows with interest group capacities. The threshold for entering the system is also modeled.

In the model, the interest group capacity enhancement during the process of interaction is limited. That means only those interest groups who are fully prepared in advance and are created mirror organizational structure as public management operates with, can be members of inclusion. Others with less developed capacity cannot be productive. The model demonstrates how interest groups, expressing capacities below capacity threshold, rely fully on the personal investment. Simultaneously those who are above threshold have a possibility to enhance capacity through the interaction, new knowledge, and new common agreement.

Conclusions

The model produces interchangeable links between capacities such as organizational management capacity, analytical and training capacity, advocacy and partnership capacity. Additional understanding about configuration of capacities set that motivate interest group to solve societal problems without interaction with political system is set and revealed. The model is prepared for policy testing to support interest group capacity building.

Keywords: *capacity, system dynamics, interest group.*

Agriculture, as the priority of the economic development of Georgia

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ABSTRACT

Georgia is a small developing country. Its population is 4,5 mln. people (2014); its area is 69.700 sq.km. It is located on the crossroads of Europe and Asia, in the south-west part of Caucasus. Caucasioni ridge divides the country into two parts, Ciscaucasia in the north and Transcaucasia in the south. Georgia is situated in the western part of Transcaucasia. Owing to the diversified relief, the country has a peculiar micro-climate. There are almost all types of a subtropical climatic zone in Georgia resulting from the natural barriers on the territory of the country: the Caucasioni and Southern Mountains and the Black Sea influence. Almost half of the natural riches of Georgia are the soils of the country. The land fund of the country is 7628.4 thousand ha, with 3025,8 thousand ha of agricultural land and 4602,6 thousand ha of non-agricultural land (Natural Resources and Environmental Protection of Georgia, Statistical Publication, 2014; Assessing the vulnerability to the climate change, Georgian Report). Mild climate, fertile soil and rich natural resources create the favorable conditions for the development of agriculture in Georgia.

Georgia is a traditional agricultural country. Nearly half of the population lives in rural areas, where a low-input, subsistence and semi-subsistence farming is a major source of livelihood (The European Union's Neighbourhood Programme). This is why one of the major fields where the country must start its social-economic revival is the agriculture and its development (The Ministry of Agriculture of Georgia, 2014). In the Soviet era, until the 1990s, the agriculture year after year growth rates were strong, with the plantations and processing plants providing employment, serving a command driven supply chain (The European Union's Neighbourhood Programme). Since the 1990s, for decades, the picture has been one of a continuing decline in agricultural production and of a significant fallback in the branch development as related to other sectors of economy (The Ministry of Agriculture of Georgia, 2015). In 2005-2012, the agricultural production of Georgia was characterized by a persistent decline (Kadagishvili, 2013). The areas of annual and perennial crops and plantings and the number of cattle, pigs, sheep and goats, as well as the contribution of the agricultural production to GDP also declined (Chitanava, 2015).

Since the new government's arrival at the helm of the country, the development of agriculture has been viewed as one of the priorities for the economy of Georgia. 182.282 GEL assigned from the country budget and 1 mlrd. investments in 2013 yielded the due effect and consequently, some positive steps were made. The terms to support the agriculture by considering the market motivations were identified in terms of ensuring greater availability of the farming techniques, making the fuel and weed and pest killers cheaper, giving the agricultural vouchers to farmers, adopting the law on cooperation, extending the local production aiming at securing food safety, allowing preferential credits to fruit and vegetable canning industry and budgetary subsidies to the grape and citrus production, introduction of agricultural insurance, etc. An important role in the project financing is played by the "Georgian Rural Development Fund" and state budget (Meskhia, 2015).

In 2013-2014, following the efforts of the Georgian Government and the private sector, as well as the active cooperation with donor organizations, there were certain positive trends observed in view of extending production and export markets and attracting investments to the agricultural sector (The Ministry of Agriculture of Georgia, 2015). In 2014, the agricultural production turnover exceeded 249,1 mln GEL, what is 26% more the value of 2012; the agricultural production was more than 3583,2 mln. GEL, what is 18% more the same value in 2012. In 2014, the country gained the production worth of 4,5 mlrd. GEL through agricultural processing. The gross production volume in agrarian sector was 10% more than the same value of 2013, mostly resulting from the processing sector growth by 13,8%. As per the data of the same period, 2855 more people were employed in agriculture (a growth of 135%) than in 2012. The average monthly compensation of the agricultural employees amounted to 500,0 GEL, what is 18% more than the same indicator of 2012. In 2014, the volume of the direct foreign investments in agriculture had significantly increased since the previous years. In 2014, the size of the direct foreign investments in agriculture was 12 mln. USD, while the same indicator in 2015 increased to 29 mln. USD. In 2014, as compared to 2012, the production of grapes, hazelnut, nut, milk, eggs and meat increased, while the production volumes of wheat, potato, citrus and tea declined. In 2014, the contribution of the agricultural sector to GDP was quite modest (9%); however, it was 0,6% more the same value in 2012 [9, 4]. The Georgian export of the agrarian food is still low. Anyway, there were still some modest steps made to improve the export potential of the country, and the further growth of export depends on the successful and efficient operation of the agrarian sector and reasonable Governmental policy to support the agricultural sector of the country.

It is true there are certain positive measures taken in agriculture, but they are not regular yet. The agricultural sector must play a special and active role in securing the economic growth and social stability of the country. Aiming at developing the agricultural sector in Georgia, we think in terms of the following reasonable measures:

Particular attention must be paid to the training and retraining of the agricultural employees. Consequently, the need for introducing the modern techniques and technologies to the agricultural sector is obvious. On the background of the technical and technological re-equipment in the world, it is clear that Georgia lacks not only high-qualified agronomists, but technical staff (tractor drivers, combiners, etc.) also (Kadagishvili & Shaburishvili, 2013).

Despite the increased number of technique purchased by the government, the technical agricultural fleet fails to meet either quantitative or qualitative functional demands of the branch. High prices of Georgian agricultural products are mainly the result of high specific weight of the manual labour and failure to use the world technological innovations. The agricultural production

in cattle-breeding, field-husbandry, fruit-growing or any other field still fails to make use the new green technologies. The agricultural sector must be supplied with the agricultural techniques, and the centres of machines and tractors and their leasing are to be established.

The farmers' information and consultation service centres, retraining of consultants, equipping the centres with modern technologies and most importantly, running the agricultural production based on the scientific studies with the support of both, state and international donor organizations is necessary.

In order to develop agriculture, the system of crediting the entrepreneurs engaged in agriculture is to be put to order and improved, the tax legislation is to be further liberalized and the internal market is to be protected together with improving the country's export potential.

Ensuring the food and economic safety of the country, social significance of agriculture and high degree of its dependence on the natural conditions and other external factors necessitate the state's intervention in this sector. The world experience evidences that such interventions in most world countries are accomplished in different directions, with insurance being the most important of them (Shaburishvili, 2012). Due to high risks associated with the agricultural production, the state intervention and participation in the insurance seems necessary.

Particular attention must be paid to the institutional structure of the agricultural production based on cooperation. Development of cooperation in agriculture improves the competitiveness, secures a better availability of means of production and services, helps farmers improve market links and boost efficiency. This on its turn will support the economic growth.

Thus, the realization of these measures will undoubtedly yield valuable results, what will contribute to the development of agriculture and improved competitiveness and economic growth of the country. Georgia is able to meet not only the demands of its own people for food, but it can also become the exporter of agricultural foodstuff what will strengthen the country and support higher living standards of the Georgian population.

Key words: *Climate, Agriculture, Economic growth, Social stability*

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Some Aspects of Successful Brand (at Tbilisi consumer’s market)

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ABSTRACT

In the present-day conditions brand is an important attribute of goods. The goal of the research was to study the attitude of consumers to Georgian brands at Tbilisi (the capital of Georgia) consumer market; to establish how important for companies to manage a brand as a system consisting of a number of elements. Proceeding from the goal of this research the tasks of the study were: to determine consumer evaluations at Tbilisi consumers market about Georgian brands and their separate components; to find out the attitude of consumers to the advantages of Georgian brands, associations of consumers concerning successful brands; based on the results of the research to determine those weaknesses which hamper and prevent Georgian brands from success; to make certain proposals and give recommendations, which would help Georgian companies interested in branding issues to pay proper attention to fundamental principles of branding in their marketing activities.

As a result of the marketing research successful Georgian brands at Tbilisi consumer market were determined. In the process of their evaluation the following characteristics were taken into consideration: quality, distinguishing features and additional values. It was found out that Georgian companies make a number of mistakes as they consider a brand by only one of the aspects and not as a system.

The research method was of exploratory and descriptive nature. In the conclusive part of the work are given research results, conclusions and recommendations. If companies existing in Georgia will take them into consideration, it will help them to better make sense of branding, consider brand as an aggregate of number of components and the system, which needs constant analysis and decision-making.

We have selected the consumers of Georgian consumer market as an object of the research, their attitude to Georgian brands and to some of their elements. It must be noted that a number of products manufactured in Georgia are presented at Georgian consumer market. Some of them are exported. In 2015 among the largest groups of export consumer goods there were natural grape wines (export constituted 95 796 thousand USD), mineral and fresh water (82 211 thousand USD), vodka and alcohol (64 886 thousand USD) (National Statistics Office of Georgia). It is not a novelty to use brands in Georgia. Branding was applied in certain form in the past as well (Ten Oldest Georgian Brands).

Selling of goods with trade mark requires additional costs from the part of a company. But building up of image determined for a brand helps goods in positioning and therefore, in provision of certain place in the consumers mind. “Consumers may evaluate the identical product differently depending on how it is branded. They learn about brands through past experiences

with the product and its marketing program, finding out which brands satisfy their needs and which do not” (Kotler & Keller, 2012).

Benevolence and loyalty of consumers is connected to success of the brand at the market. An acknowledged advertising specialist Dr. Ogilvie said: “Anyone can produce something, but to make a brand one must have talent, faith and diligence” (Doyle & Stern, 2007). It is not easy for a brand to find success at the market and then to maintain it. It requires from a company constant attention, gathering of information, analysis and taking of right decisions. The difficulty is that the brand constitutes a set of different aspects and elements (Kotler & Pfertch, 2007). Study of the brand as a system and of the issues related to its success is one of the topical issues considered in this work using the analysis of Georgian brands at Tbilisi consumer market as an example.

Successful brand in the present-day conditions is not just well selected and original name or mark, but it is a system consisting of certain elements. To be successful the brand should meet functional needs of consumers, as well as to contain additional values for them. Additional values should satisfy certain psychological needs. But the basis for additional values is that the presented brand should be of outstanding quality and better in comparison with other similar products.

Successful brand contains broad and profound meaning. It should be considered as a system consisting of a number of components. According to the opinion of the scientists P. Doyle and P. Stern, successful brand is a set of three components:

- high quality goods (P),
 - differential characteristic (D),
 - additional values (AV)
- $S=P \times D \times AV$ (Doyle & Stern, 2007)

Each of the mentioned features is important for success of brand. First of all the quality of goods should be high. Successful brand cannot exist if its product is of bad quality. But manufacturing companies should create preconditions even for its products of the highest quality to make them distinguished and different from analogues. Manufacturing company will not be able to achieve it without making its brand (product) recognizable for consumers and getting differential characteristics of brand across consumers. Successful brands satisfy specific needs as they present products with unique combination of properties.

As to additional values, it can be evaluated according to perception by consumer of concrete brand and its advantages. Although competitors may duplicate manufacturing processes and product designs, they cannot easily match lasting impressions left in the minds of individuals and organizations by years of product experience and marketing activity. In this sense, branding can be a powerful means to secure a competitive advantage (Kotler & Keller, 2012).

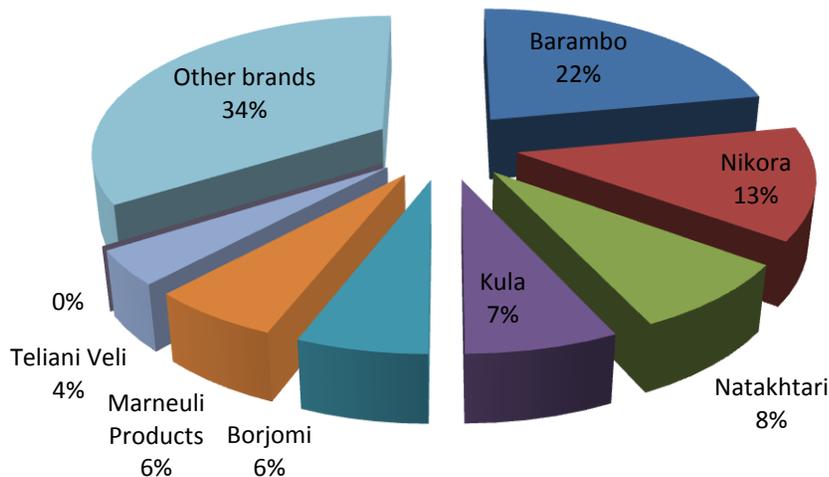
Additional values of trademark are the basis for creation of successful brand. E.g. the tests, by means of which consumers were asked to blindly evaluate competitive products without knowing their names, often showed presence of stable advantage. But if products are assigned names of well-known brands such as Coca-Cola, Sony, etc., consumers choose them without much thought and pay much more money (Doyle & Stern, 2007).

In February – March 2016 in Tbilisi we carried out the marketing research using quantitative method of the marketing research, namely, questionnaire survey (Kotler & Armstrong, 2015). We surveyed representative of different age, sex, nationality, religion, education, profession, having different income. 200 respondents have been surveyed. The questionnaire consisted of 20

questions. The format of the questionnaire was anonymous. After the survey the results were summed up and some conclusions made as a result of this work are given in the work.

As a result of the research the most recognizable Georgian brands existing at Tbilisi consumer market have been detected. These are Barambo, Nikora, Kula, Marneuli Products, Natakhtari, Borjomi, Teliani Valley.

Figure 1. The most recognizable brands



22% of respondents named Barambo (sweets), as the most recognizable Georgian brand, 13% of respondents named Nikora (meat foods), 8% of respondents named Natakhtari, 7% of respondents named Kula (fruit juice), 6% of respondents named Borjomi (mineral water), 6% of respondents named Marneuli Products, 4% of respondents named Teliani Valley (wine), etc.

As a result of the research it was found out that the majority of respondents, who had named some concrete brands as the most recognizable for them, buy these brands in most cases and are their consumers.

To the question: “If you do not buy famous Georgian brand you have named, what is the reason?”, - respondents named:

- high price as compared with foreign analogues;
- low quality as compared with foreign analogues.

For success of brand the quality of goods should meet requirements of consumers. Brand cannot be successful if its product is of poor quality. As a result of the research and according to answers of the respondents to the question: “What do you like in the Georgian brand which you think to be well-known and buy as well?” – it was found out that consumers like in Georgian brand Barambo:

- quality - 41% of buyers;
- taste – 50% of buyers;
- reasonable price - 36% of buyers;
- a wide range of products-18% of buyers; etc.

Some respondents named Barambo as well-known Georgian brand. But to their opinion, the named brand is not distinguished for their quality. 18% of the buyers is of such opinion. As a result of the survey it was established that 14% of consumers buy Barambo products because this is Georgian product.

Successful brands satisfy specific needs as they present products with unique combination of properties. Concerning Georgian brand Barambo named by the respondents as the most well-know to them, they named the following properties distinguished and different from competitor analogues:

- clean and hygienic preparation;
- tasty;
- quality;
- comparatively low prices;
- large assortment;
- advertising campaigns.

As to additional values, it can be evaluated according to perception by consumer of concrete brand and its advantages.

Analysis of the results of the research showed some shortcomings, which prevent Georgian brands from considerable success at the market. That's why I consider it important and advisable for Georgian companies to take a number of measures:

- improper appraisal of the branding concept and importance is observed, as the companies do not take much care about desires, expectations of consumers concerning concrete brand and do not try to take them into considerations in their work;
- less attention is paid to selection of the most effective channels of distribution of information of brand, which requires usage of target approach, i.e. provide with information those people, who can be considered as real and potential buyers of the given brand;
- in branding it is important for the product to be of good quality and have special properties making it distinguished from other similar products;
- managers of enterprises should realize that within the market economy conditions effective work of the companies is possible based on their positive image. Image of companies mainly depends on their brands;
- a part of Georgian consumers doubt if this product is manufactured with observance of proper hygiene requirements. That is why activities containing information about the issues concerning observance of aesthetic and hygienic conditions during manufacturing of certain product and their natural composition have positive influence on consumers. Georgian companies should pay proper attention to these aspects and use such approaches which would make people believe in their brands, and the companies should justify expectations of consumers in this regard;
- Georgian brands should focus more efforts to deserve loyalty of consumers. This necessarily implies brand-related experience of consumers and fulfilment of promises by the brand;
- some Georgian brands have their history, it comes from the past and its existence at the market continues. But the companies do not properly use opportunities of such brands. In the conditions of the present-day competitive market only the past and the present are not enough. Constant work in this direction is necessary. Management of the brand maintenance of brand success for a long time is one of the difficult tasks. And exaggerated self-confidence of the company (e.g. that its brand has been existing at the market for a long time) can be harmful for it;

- Georgian companies should pay proper attention to the sale process of its brand and service of consumers. Among its stuff the company should foster respect to its product. The company may hold training for its personnel which make them better understand and realize the main essence of the brand;
- branding approaches and principles used in the company should be related to each other. Measures to be taken in branding should be considered in an integrated manner and system approach should be used. Separate, isolated activities in branding will not give use considerable and long-lasting results.

Keywords: *Brand, Branding, Marketing research, Successful brand.*

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The value of a network, unexplored implication for mobile app: Doctor Chat case study

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ABSTRACT

Purpose

Sociologists and anthropologists, who initially studied networks, didn't pay attention to their economic relevance (Barnes, 1979). Some industrial sociologists (Roy, 1954; Dalton, 1959) had long stressed the role of informal networks as an antidote to formal organization practices and structures (Doerr and Powell, 2005). However, there is no much previous literature that applied internet economy research to network theories before.

The **mobile-app market** is quite competitive: there are over a million mobile apps in various marketplaces (Google Play Store, Apple Store etc). Online Social Networks (OSNs) is the new dominant paradigm, but developers need more information about apps in order to quantify their value: how determine the value of a network for a mobile app?

This is the main research question of the manuscript, which aims to define a new model to estimate the value of a network for mobile apps.

Design/methodology/approach

A theoretical framework is proposed based on wide literature review to define the better way to estimate the value for a mobile app. Subsequently, an exploratory case study is described in order to confirm our findings and practical implications (inductive reasoning).

Findings

This paper recognises the inability of traditional instruments to estimate the value of a network for mobile apps. Therefore, we provide a new estimation model through “Doctor Chat” start-up experience. Doctor Chat is a simple and useful mobile chat for doctors.

Research limitations

This paper is based upon inductive reasoning: the strength of our findings is based upon the evidence given, therefore it need to be checked through others case study in order to generalize conclusions.

Practical implications

The paper provides an useful tool for managers and developers in order to estimate the value of their app: knowledge of the value of its network is critical to define the company's business model.

Originality/value

This study provides a new model for approaching the definition of the value of a network. Given the increasing importance of mobile marketing, the paper develops a model specifically for mobile apps.

Keywords: *Value of network, mobile marketing, mobile app value*

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Model-Based Governance: How System Dynamics, Business Intelligence and Data Science are changing the practice of Policy Making

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ABSTRACT

Introduction

A number of changes in the contemporary data landscape have affected the implementation of Evidence-Based Policy Making, which actually takes place in an increasingly rich data environment and by means of different methodological and technological approaches.

If on the one hand, Data Science enables enterprises to gain sophisticated insights into their business, along with Business Intelligence tools, which provide decision makers with decisional support interfaces and analytical tools. On the other hand, Modelling and Simulation technics are currently dealing with a variety of ways to take advantage of the integration of data and models.

This work aims to identify System Dynamics as facilitator of the integration among such different fields and the definition of an effective Evidence-Based Policy Making built across the foundation of Business Intelligence, Big Data and Data Science theories, methodologies and tools.

The integration among those fields can help to frame a new effective Model-Based Governance approach. Under this perspective, this paper provide the position to start an analysis of the state of the art of the integration efforts provided so far, a comparative analysis of the pros and cons of each methodology and finally to frame the new methodological and technical integration.

Actually, this work aims to define the concept and boundaries of a new field of research and to demonstrate how a new Model-Based Governance methodological and technical approach, based on the above-proposed integration, can improve decision-makers practice in Industrial, Managerial, and Political contexts.

Context Analysis

The practice of Modelling and Simulation is deeply grounded in Information Science (Tao and Rich, 2014). Hence, if on the one hand, progress into the IT field can help to anchor and improve simulation practice and extend its applicability; on the

other hand, IT new trends can benefit from particular simulation techniques, such as the System Dynamics approach, when coping with today's business environments, which are characterized by a dynamic nature, increasing uncertainties, and rapid changes.

To survive and remain competitive in such a context, modern enterprises need to be able to adjust their internal structures and processes in response to changes in the environment and develop sophisticated tools for decision-making. IT branches – such as Business Intelligence and Data Analytics solutions - play a crucial role in realizing this vision.

Unfortunately, a critical challenge in Business Intelligence and Data Science context is to make their insights actionable i.e., to link their derived insights to high-level business strategies and organizational processes to take the best corrective actions at the right time and to examine how well each of the alternative corrective actions would affect enterprise strategic goals in the long term. Although the BI and Data Analytics help users to analyze the alternatives, the dynamics of the business, the notion of time, and complexities of the context are still mostly poorly discussed (Nalchigar et al, 2014).

System Dynamics, Business Intelligence and Data

Science Integration Towards overcoming this difficulty, System Dynamics modeling can facilitate decision making on alternative actions resulted from BI and Data Analytics insights by its capability to cope with Complex Systems with nonlinearities and time delays. System Dynamics models and methodology can make IT analytical tools more actionable by helping users to analyze the alternatives eliciting the dynamics and the causal structure of the business under study.

Unfortunately, SD tools, BI and Data Analytics tools are not yet tightly integrated. There is an issue depending upon the ability of these fields to support one another, and so there is a need for further tools/standards that help the three methodologies work together.

Hence, It should be pursued an integration, both methodological and technological, which utilizes the complementary advantages of BI, Data Analytics (Big Data, Data Science) and System Dynamics framework to evaluate actions impacts on business dynamics over time, to facilitate decision making over the derived insights, and hence to make BI and analytics systems more actionable.

The integration needs to be twofold. On the one hand, it should cope with a methodological integration, which could be accomplished, e.g. by defining a set of heuristics to derive System

Dynamics models from BI models and Big Data (Casado, 2004). On the other hand, there is the technical integration challenge, which cope with Open Standards definition, Vendors engagement, Integrated Platforms/Engines, dedicated libraries, Web Services languages, Model integration, Data interchange standards etc.

Brief Review of Past Integration Efforts

However, several - both methodological and technological - efforts to cope with such an integration has been done.

System Dynamics community is currently dealing with a variety of ways to execute e.g. the integration of data and models. Valuable efforts can be classified according to three paradigms (Houghton and Siegel, 2015) of integration:

(1) The first paradigm uses numerical data in support of modeling efforts by importing data into system dynamics modeling software. E.g. Markov Chain Monte Carlo (Diaconis, 2009);

(2) A second category of tools uses a standard system dynamics tool as a computation engine for analysis performed in a coding environment. E.g. Exploratory Modeling and Analysis Workbench (Kwakkel and Pruyt, 2014); Behavior Analysis and Testing Software (Süçüllü and Yücel, 2014.);

(3) A third category of tools imports the models created by traditional tools to perform analyses independently of the original modeling tool. E.g. SDM-Doc, a Documentation for model transparency (Martinez-Moyano, 2012); Automated eigenvalue analysis of system dynamics models (Gawad, 2005); PySD – Python library (Houghton and Siegel, 2015); “sd.js” javascript library created by Bobby Powers at SDlabs.

As a further example of integration, on December 2015, it has been released the newest OASIS Standard, XML Interchange Language for System Dynamics (XMILE) Version 1.0. XMILE enables the sharing of models and their archiving, the re-use of common components, the development of add-on tools that support the modeling process, and the integration with Big Data.

Furthermore, valuable efforts have been made towards the integration between SAP Business Intelligence tool and Big Data mining tools and Powersim with mySAP Financials Strategic Enterprise Management (SEM) .

Conclusion and Further Steps

In conclusion, this paper aims to define a new research field raised from the idea of enhancing the effectiveness of the actual Model-Based Governance approach through framing an integration between the System Dynamics, Business Intelligence and Data Science fields, including both methodological and technical aspects. The present state of this positioning effort will be presented as outcome in the final version of the paper, by setting the boundaries and stakeholders of the overall integration concept. This work provides the initial point of departure to develop future enhancements of the work through an open process of community engagement and stakeholders recommendations on potential future - both methodological and technological - research investments.

Keywords: *Model-Based Governance, Information Technology, System Dynamics, Business Intelligence, Data Science, Big Data*

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The enterprise relational view (ERV): exploring future in Strategic management

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ABSTRACT

The importance of relationships in modern society is unquestioned and in certain fields it has acquired a decisive role in value creation under particularly complex conditions. The enterprise system as a socio-economic phenomenon is a network of evolving relationships. Relationality is undoubtedly a useful key to understanding current and future entrepreneurial phenomena that, if used in systems thinking, represent a critical factor to observe complex phenomena. The contribution of systems thinking, in this perspective, is counteract disruptive disorder (Pardi, 1998), or entropy.

The term “relationship” signifies interactions born from connections in a specific context and it is the result of the evolutionary dynamics of the interactions of socio-economic phenomena. Relationships can have a nature of contention or exchange (Pellicano, 2016). Contention refers to the antagonistic category of win-lose that leads, in extreme cases to destructive lose-lose interactions. In the exchange case, the nature of the interactions can be occasional (or transactional), symbiotic and relational. The first is fed by an exchange based only on economic advantage. In the second, the exchange characterizes the dependence of a subject on another. In the third, subjects integrate with each other’s resources in a collaborative relationship with a long-term projection. Only in the last case is it possible to talk about “relations” since these manifest a synergic exchange projected over time. Relationships are therefore born from a state of structural connection between two or more parties, that on a systemic level evolve in interactions undertaken in a common path of collaboration and, therefore, of resonance (Beer, 1989). Using a cybernetic lens, the elements of a system are in reciprocal interaction for which

the action of an element on another implies a response (retroaction or feedback) of the second element towards the first. In this case, the two elements by a “feedback loop” are linked. The loop that binds an element “A” to an element “B” is called “positive” (relational) when a variation in a value sense for “A” produces a change in the same value sense for “B” (Wiener, 1948).

Focusing attention on the nature exchange in an integration framework raises questions as to the subjects involved in the entrepreneurial actions and to what the subject of active exchanges between these entities may be. One possible answer may lie in the resources, intended as object of dynamics integration typical of value co-creations processes.

The social and economic sciences (such as management, sociology and economics) have paid special attention to relationship phenomena. Management, as a social science, has framed the relations through different lenses such as trading activities, marketing (customer relationship management) and relationships with stakeholders (stakeholder relationship management). Nevertheless, there seems to have been no particular attention devoted to interpreting the enterprise through the lens of relationality from a systemic and service science point of view.

With regard to trading activities, the research carried out to date focuses attention on the relationship between two or more parties in an “object” (contract, tenders, procurement, etc ...). In this sense, the relationality is manifested in a (similarly) structured manner, within the context of one purpose (the instrument) dedicated mainly to the production of financial value. In this context, the relationships can only be considered instrumental and utilitarian and are not included in their entirety in a diffused enterprise relational culture, but only in part, and they are not framed from a systemic point of view. Relationship management is customer oriented (forming the basis of “Customer Relationship Management”) and therefore falls in the specific area of marketing. Some of the relevant studies in this area have focused on (1) customer relationship management strategies, (2) investigating possible links between customer satisfaction and business performance (Kamakura et al, 2002), (3) the links between customer loyalty and profitability (Rinartz , Kumar, 20900), (4) customer profitability heterogeneity (Niraj, Gupta, Narasimhan, 2001), and (5) customer loyalty programs (Verhoef, 2003). This analysis is reflected in work on relations in business-to-business (Håkansson, 1982; Håkansson, Snehota, 1995), and business-to-consumer marketing (Gronroos, 1983; Gronroos, Gummesson, 1985). Studies carried out by from the stakeholders’ point of view (stakeholder relationship management) seem to be closest to an integration of relationality in modern and future enterprises. This area of study, including stakeholder engagement, highlights the theme of relationship between management and stakeholders emphasizing the opportunity to include them – depending on their differentiated influence – within the decision-making process. This area of research does not seem to consider fully the opportunities for integration of stakeholders in value co-creation processes as an extension of the stakeholder engagement concept. Relationality and inclusivity, which are investigated in this study, should instead be seen as indissolubly linked aspects.

Sociology and economics (social-economic phenomena) have already focused on relation topic. In these two areas, there are recent and significant contributions that aim more to systematize and disseminate emerging theories (a paradigmatic significance) than to solve existing problems within their disciplines.

For the purposes of this work, the “relational theory of society” (Donati, 1991, 2011) is today considered as an emerging paradigm of modern sociology. The theory starts with the assumption that “... human reality is relational by essence” (Donati, 1991) and assumes that “...highly

modernized societies do not have an adequate social representation and that while the reality has become increasingly relational ...” (Scarcela Prandstraller, 2008), “... they haven’t yet a reflexive system suited to understand this phenomenology” (Donati, 1991). The theory assumes the principle that the core matter of sociology “...is not the organism, the structure or function, but rather the social relationship” (Donati, 1993).

Even economic studies have focused on the study of relations and in this sense economics acknowledges the “relational theory of happiness” (Bruni & Zamagni, 2004). This theory assumes that “... the critique of the classic economy (and market) ... leads to affirm not only that , intrinsic and instrumental motivations can and should co-exist in an economy, but that the economy (and markets) can become a place of authentic relationality, the creation of relational goods and forms of reciprocity ...” (Giovanola, 2012). On the concept of “relational good”, the sociology of economics areas have started an intense collaboration to better define this term (Martha Nussbaum, 1986 and Pierpaolo Donati, 1986 as sociologists; and Benedetto Gui 1987, and Carole Uhlaner, 1989 as economists). The definition of a relational good more in line with this work is by Martha Nussbaum, who argues that the relational good is human experience, which is the relationship per se that constructs the good: the intersubjective relation, therefore, is not something that “... exists independently of the good that is produced and/or consumed” (Bruni, 2011).

From this recognition arises an opportunity to investigate modern and future enterprises as a socio-economic phenomenon through a new lens. Under this lens it is observer subject (Maturana, 1988) who governs the enterprise through relationships devoted to value co-creation processes. This topic finds its natural place in the area of strategic management respect to the governance.

The key is centred on the relationality decreased in systemic studies and science service and assumes centrality in the perspective of observed subject, responsible for governance of organizations. The theoretical background is founded on a systemic matrix and on services: the “social system” of Parson (1951) and Luhmann (1984), the “viable system” of Beer (1989), the “systems view of life” of Capra & Luisi (2014) and the “service science” concept of Maglio & Spohrer (2008).

Systems thinking is particularly suitable to characterize the construction propositions of a model based on relationality because: (i) it tends to simplify complexity (entropy); (ii) it includes and explains the connections between multiple elements (e.g .the system is “... a whole by virtue of the interdependence of its parts (von Bertalanffy, 1968)); (iii) it puts forth a subjective vision that determines that the system observed depends on the observer (“... all that is said is said by an observer”, (Maturana et al, 1985)).

Service science (Spohrer and Mallet, 2008) and Service Dominant Logic (Vargo, and Lusch, 2004) emphasise in the service culture and in the transition from good to service, the value co-creation as a joint outcome that ensures the social cohesion of systems.

The emerging Enterprise Relational View (ERV) is an interpretive model that allows understanding complex active relationships in the strategic management area by using a systemic perspective. Those relationships manifest the capacity to enable interchanges of resources to mutual benefit between the involved parties, activating/increasing win-win value creation processes. This model is valuable as support for the subject responsible for governing activities in reading (observation) and understanding the relational dynamics underlying enterprise behaviour and in calibrating future actions under a new perspective. The propositions underlying the ERV interpretative model can be summarized as follows (Pellicano, Ciasullo, Troisi, 2016):

- Relationality and self-reproduction: the relational nature of communication processes constitutes and sustains the company recognized as a social autopoietic system.
- Diffusion and definition: the net-like and its related system are reader/perceived by the Subject Observer as parts of the specific context of the enterprise, considered, in turn, as part of general environment. Therefore, an enterprise, in the dual perspective of structure and system, is the result of a constructive personal observation (Ego – observer subject).
- Sense and cohesion: an enterprise is considered as a system that has a symbolic meaning, represented by value co-creation. A sense of belonging can be made possible by a complex mix of rational and emotional factors.
- Forming and formulating decisions: as a reflection of a problem's complexity, to the Subject Observer the decision-making process seems designed when the decision-making seems to be shared and diffuse, albeit with different roles, with all other subjects that make up the enterprise system (Alter – Ego' interlocutors).
- Co-creation and regeneration: the value co-creation internal to the relationships network that represent the organizational pattern of the system allows the self-reproducing regeneration of resources that nurture and allow the viability of the network.
- Resources and competitiveness: the competitiveness of the enterprise system is linked to the ability to acquire resources by establishing collaborative relationships, i.e. relationships with subjects who are holders of resources.
- Leadership and viability: the governing subject is the guarantor of relational harmony characterized by dynamism and contextuality. It is important, therefore, that its constant monitoring aimed at facilitating communication processes with the ultimate objective of keeping the enterprise system viable (Pellicano, 1994).

The ERV emerging model will be tested with a survey directed to the leaders (CEOs) of international business organizations in order to explore three additional key points:

- how: through the analysis of collected data, how should one measure the extent to which the addressees approach or diverge from the ideal model of relationality, and in what respects;
- where: in which sectoral/local contexts are central to the relationality of enterprise governance actions;
- why: verification of the existence through CEO profiling, or through analysis of typical cultural aspects of an area and of the individuals who are most central to important relationships.

Collected data will be analysed with quantitative techniques and predictive tools useful in validating the model.

In the study, current trends will capture significant signals that show that the survival of enterprises will be based, in the near future, on enhancing a culture of relationality that has been fully internalized by CEOs.

The planned scenario and its practical implications flow from the diffusion of a governance culture in which the subject observer is fully aware of the criticality of relations that are relevant to him/her because they are active (structural aspects) and increasing in importance (systemic aspects) with respect to holders of key resources. From this perspective, survival is linked to the relational capabilities of the observer and governed subject in regard to:

1. enterprise phenomena, which are ultimately nothing more than the daily dialogue between the subject observer (Ego) and its partners (Alter);

2. enterprise's viability, which depends directly, if not exclusively, on the Ego's ability to activate and cultivate relationships daily.

The relationality will characterizes, in our view, the future orientations of strategic management and its vision of enterprise governance.

Keywords: *Enterprise Relational View (ERV), Relations, Strategic Management and Governance, Service Science, System Think, Value Co-creation*

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Can we Save ‘Unlearning’? Taking a Systems Approach to Clarify the Concept and Distinguish Learning from Unlearning

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ABSTRACT

Introduction

Unlearning is a hot topic in various fields such as organizational learning, innovation, change and crisis management, and other fields (Leal-Rodriguez et al., 2015; Tsang, 2008). The idea is that people or organizations unlearn obsolete or hindering knowledge in order to increase the capacity to create new one (Hislop et al., 2014; Tsang & Zahra, 2008). Broadly speaking, there are two paradigms in the research on unlearning. Some researchers refer to the intentional elimination or discarding of knowledge (Casillas et al., 2010; Stein, 1995; Turc & Baumard, 2007), while others focus on the metacognitive processes leading to the questioning of deeply entrenched knowledge, which subsequently becomes subject to unlearning, e.g. rethinking previously held views and attitudes (Akguen et al., 2007; Antonacopoulou, 2009; Conner, 2010). Recently, the idea of unlearning has become subject to strong criticism.

Issues and Critique

Howells and Scholderer (2016) emphasize that knowledge cannot be unlearned. They argue that the concept rests on an erroneous interpretation of psychological experiments, and the term is only occasionally used for related processes such as extinction (e.g. Bouton, 2002). The authors highlight that the term is not even part of the PsycInfo-database, hence, the concept does not provide the scientific ground to which it explicitly refers. They conclude that researchers should forget unlearning.

Following their argument, we must raise the question how can we discard or eliminate knowledge. Can we select specific “pieces” of knowledge to delete them? Research in psychology, cognitive science and neuroscience suggests a dynamical systems perspective on knowledge and cognition (Menary, 2010). We form beliefs about the world, test them against the environment and – if they are valid - we build upon them to construct further beliefs, assumptions and expectations (Hohwy, 2013). Thereby, our knowledge takes the form of a network where views, beliefs and behaviours are coherent and closely entwined (Riegler, 2012). This implies that most knowledge is implicit and at the same time, it cannot be simply removed as it provides structure to our overall perception of the world (Clark, 2008).

As a further point of critique, it is unclear what the difference between learning and unlearning is.

In its broadest sense, learning is seen to be an acquisition of new knowledge while unlearning is thought to be the reduction of old knowledge (Azmi, 2008; Srithika & Bhattacharyya, 2009; Tsang, 2008). Individuals or organizations face conflicts between their knowledge and the environment and to catch up with external changes, they must get rid of their old knowledge (Akguen, Lyrn & Byrne, 2006; Hafner, 2015; Tsang & Zahra, 2008). How would this process be any different than learning? After all, learning involves periods of reflection where subjects use a meta-cognitive perspective to see if and to what extent their knowledge is suitable to perform a task (Hickson, 2011). For example, Argyris and Schoen (1976) suggest that there are different levels on which learning can take place; as opposed to single-loop learning, where subjects slightly adjust and improve their behaviour, they can also engage in double-loop learning where they detect mismatching experiences between them and the environment; they adapt the goal itself instead of behaviour. Double-loop learning is seen as a process where assumptions, premises or paradigms are being changed (cf. Georges, Romme & Witteloostuijn, 1999; Peschl, 2007) and in this respect, it would resemble to what many researchers refer to as unlearning. Using the term unlearning to describe occasional phases of reflection seems redundant, as it would highlight what learning theories already acknowledge. Learning and unlearning would be two sides of the same coin (Easterby-Smith, 2000).

Research Gap and Question

In response to the recent scepticism in the field, this research aims at revisiting the concept of unlearning and clarifying the term for further research. In line with previous research, I agree that there should be a concept in addition to learning as we might be in need of actively forgetting what we know in order to have a fresh look at the world and come up with innovative behaviour (Niri et al., 2009). We should 'save' the term as the capacity to get rid of knowledge in order to remain adaptive and flexible with respect to be innovative appears utmost important in hyper-dynamic markets and unpredictable environments (Ilinitch, D'Aveni & Lewin, 1996; Scharmer, 2008). However, I stress that we would have to take a (cognitive) systems theoretic perspective in order to clarify to what extent we could actually unlearn and how this would look like in practice.

The guiding question for this research is the following:

How could we reconceptualise the concept of unlearning from a (cognitive) systems theoretic point of view, clarifying how unlearning would look like in practice and what would differentiate it from learning?

Preliminary Findings and Further Research

Initial findings suggest that we could save the concept by considering two dimensions.

First, in order to distinguish learning from unlearning, we must consider that learning involves a goal or a concrete end state, which an organism aims to achieve. For example, when a student wants to perform a mathematical task but is unable to do so, he/she has to learn how to approach the problem in order to find a right solution (i.e. concrete end state). Similarly, if our assumptions about the world are contradicting to experiences from the environment, we have to learn how we can reconceptualise our thinking in order to resolve this mismatch (Georges, Rommes, Witteloostuijn, 1999; Piaget & Inhelder, 1971). Certainly, such processes may entail periods where we give up hindering beliefs and assumptions but from an overall perspective, they all point towards reaching a specific goal and thus, they are an inherent part of a learning process. In

order to be separate from learning, unlearning would have to be a process that lacks of such a goal. Consequentially, unlearning would be a process where an individual or organization gets rid of knowledge but they do not know what to expect once this process is finished. Thereby, unlearning is a process affecting fundamental views of oneself and the world and it makes space for the creation of radical new knowledge, i.e. knowledge, which is less influenced by previous knowledge. Thereby, individuals or organizations could recognize unknown potentials and may create new and innovative knowledge; they could literally find their real selves (Boyatzis, 2006). This process may be similar to psychotherapy where a patient gets rid of beliefs or behaviours but he or she does not know who he/she will become once the unlearning has been successful (Mason, 2015).

Second, we must take into account that it is unlikely for knowledge to be discarded or eliminated (Howells & Scholderer, 2016). From a systems theory point of view, I argue that a system (individual or organization) must be provided with space and freedom to re-organize itself while knowledge is being unlearned. The network of assumptions, beliefs and expectations about the world must maintain equilibrium. Therefore, I suggest that unlearning is not about discarding or eliminating knowledge but rather, the organism stops using it until it has been unlearned. One might argue that this kind of unlearning is learning itself. However, since the goal of the process is unknown, it should be labelled as unlearning.

In short, I respond to recent critique on unlearning by proposing that it may rather be seen as an intentional process where a system gets rid of knowledge by stopping to use it while the outcome of the process is unknown since there is no goal or defined end state. I argue that this kind of unlearning can foster the creation of new knowledge since the organism can build upon a new internal organization, which in turn, allows for a new understanding of the world.

At BSLab 2016, I will outline and discuss this alternative conceptualization of unlearning and furthermore, I want to propose how such an unlearning could be realized. Drawing analogies to psychotherapy, I will suggest concrete strategies and techniques that illustrate what unlearning means for practice and how it can be done successfully.

Keywords: *unlearning, systems thinking, innovation, learning versus unlearning*

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Sensing demand signals in markets as complex systems: Wal-Mart case study

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ABSTRACT

Due to the turbulence of the markets and considering the markets as complex systems, the aim of this work is to focus on the relevance of managing the variables in forecasting, reducing the possibility to fail in market strategy definition; the high volatility in consumer markets for example, could justify the investments in conducting complex statistical frameworks.

An empirical case study shows how could be possible to control many variables in order to optimize the prediction in demand management, in particular, in the retail industry. It is possible to obtain forecasts of demand using the history of sales yet, in the recent market turbulence could be useful to observe other factors. Forecasting demand is not just obtaining the history of sales, rather, observing other factors (external and internal) such as fuel price, consumer price index (CPI), temperature, markdowns etc., because, monitoring the variations of many more indicators, could increase the possibilities to better align tactics and future strategies that are of significance in the model. Analyzing weekly sales of 45 Walmart stores, additive non-linear model is introduced, that can examine the effect of each variable on the sales while holding of all other variables fixed.

The Complex Adaptive System (CAS) framework is used to describe the complexity of the market and to justify the necessity to manage high number of variables. The complex networks and markets could be considered as CAS and are characterized by high number of variations in relations and interactions that affect the involved participants that are free to adapt their strategy to survive in a system characterized by the absence of a government body. The property of adaptability, comes from the capability to analyze the change in the external environment; the actors learn and survive organizing and re-organizing themselves in these kind of systems.

This work presents a specific and practical approaches helpful to contribute to the adaptability of the actors to the complex systems, especially for the forecasts in consumer markets. The methods are alternative from the traditional approach and they are useful to make briefly structural analysis in demand forecasting based on inconsistent and volatile market. They are useful to predict the

future including a lot of variables, at the same time, having a high flexibility and interpretability they contribute the adaptability of companies to the complex systems.

Keywords: *Demand forecasting, Complex Adaptive Systems, Demand signals, Variability, Additive Non- Linear Models; Efficiency.*

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University. Elements for a study of social systems

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ABSTRACT

Systems thinking and philosophical thinking is the conceptual framework for the methodological development of the article.

H. Simon (2006), in his book *The Sciences of the Artificial*, develops a theory of design, understanding that the main concern of design as a discipline is how things should be, in order to create devices that achieve objectives. The device¹, driven by H. Simon term (2006), in contrast to the natural, is a production and creation of human beings, regardless if the device is concrete or abstract (hard or soft, trivial or non-trivial²).

An artifact is a creation of man (Simon 2006). For example, NASA, an organization designed in order that man can go to the moon and back to Earth; another artifact is the design of a fair and organized society under principles and values; other device is the typewriter. To this we call device might also be called artificial system, because their synergy, integrity and operation in its internal environment, interacting with their environment, consisting of the device, allows to carry out its goal as a unit, as a whole. As opposed to a natural system, where understanding and description of parts is studied, how they are and how they work by natural laws (Foerster 1991, p. 63). Artificial systems are characterized should be built, designed with certain properties, relationships and property relationships, so you can adapt and relate to their particular external environment, and also can achieve your goal.

Everything artificial system has an ultimate end? All artifacts, technical objects, artificial systems, we build and buy are supposedly trivial machines: a washing machine should be washed, a light bulb must give light, a toaster must toast, One Now university is a trivial system, ie, is a particular system invariant? The work of the French G. Simondon, the mode of existence of technical objects (2007) allows to argue that the purpose and use of a technical object is not explicitly -system artificially determined and clear limits (to meet a specific and unique needs),

¹ Term used for artificial system, technology, tool, instrument, machine, computer.

² For this research the concepts of Foerster (1991, p. 196) over trivial and nontrivial machines are made. A trivial machine is all that is given to the same invariable function. A non-trivial machine is one that is indeterminate and its behavior is related to earlier decisions.

this view, believing that technical objects are determined to some areas of work or some uses determined by the trades (like thinking that the hammer serves only to what is used by the carpenter), is given by the culture of an era culture that uses the technical object that and donates principles and values to these technical objects³

R. Ackoff (1998, p. 4), to show that the arguments attribute intentionality to technology are grounded in moral issues, realizes intellectuals who consider that, for example, the social order of a time determined by its technology, assigning demonic technology and anthropomorphic attributes.

Heinz von Foerster called 'anthropomorphism' action to project our own image on objects or functions of objects. "This can be demonstrated beautifully by giving names of parts of our body to things that have structural or functional similarities to those parts: the 'head' of a nail, the 'mandibles' of a press carpenter, [...] the 'sex' of electric [...] plugs, etc. "(Foerster 1991, p. 56)

Emerging contradiction and opposition between humans and technology appears only when you understand the technology as isolated or separate from humans. "Technology, of course, always appears as a break with the world of everyday life; however, its own functionality depends on insertion, so to speak, immediately within the same world of life that gives rise and begins creating a break "(Vargas 2006, p. 158). That is, to the extent that man determines and limits of functions artifacts, designs devices certain as exclusive operating, serving without the need for human intervention, ie, as suggested by the Organizational Design R. Ackoff (1999) is a system that their behavior is determined, a closed system. An example today of a closed system or system, are the robots, deterministic automata having a finite number of behaviors.

Phenomenological descriptions on information technology, G. Vargas Guillén (2006) argue that technology is an essence of an era of postmodernism (and essence of science is another time), however, "You can not say that there is an overcoming (Aufhebung) in it [technology], for example, life connected to the end (whether salvation, brotherhood, or any other intention). Nor can we say that it is the negation of the same [...] The truth comes from modern notions (whether democracy). Its functionality depends on the validity that is socially granted (eg comfort)" (2006, pp. 159-160)

Technology as essential technical object of an era is true through notions of modernity (efficiency, effectiveness, quality, performance, democracy, innovation). The functionality of the technology is validated through what society granted (safe, nice, easy, fast, etc.).

The claims of human beings, such as designing institutions, organizations, social systems, have always existed. The university, artifact created by man, it exists as an organization recognized since 1221: "Associations have been back a long way, yet there are; perhaps in human societies always there; So 'universitas meant a community or an association, a college or body constituted with a view to a particular purpose. In the Middle Ages still this sense of union, corporation and applies to all associative body dedicated to an office, for example, mercatorum universitas or guild of merchants '[...] but only for 1221 that' the corporation of teachers and students is

³ What kind of needs can be met with artifacts, artificial systems, technical objects, social systems? To answer this question this research argues from the thought of the French G. Simondon (2007), in their studies of the technical object, it argues that a technical object may be technical instrument or technical tool in these two categories may include objects technicians. The tools allow "prolonging and arm the body to fulfill a gesture" (Simondon 2007, p. 131), for example, the hammer is a technical object nailing action enhances our toes. The instruments are technical objects "allow to extend and adapt the body to get a better perception. The instrument is a tool of perception "(Simondon 2007, p. 131). The hammer can be an instrument plus tool, perfect for action (gesture) nailing nails, also it tells the man how much force should be applied to perform a certain action. Thus, the hammer for a carpenter's tool, and for a sculptor is a -cincel- instrument. In the twentieth century sets technical carriers machine configurations that automate processes and have ability to perform tasks without human intervention operations emerge. The reader is recommended to extend in Chapter II, Part II. The mode of existence of technical objects. Gilbert Simondon (2007).

recognized as moral and legal person. His name is classic: *universitas magistrorum et scholarium* '(Soto Posada, quoted in Vargas 2010, p. 5).

These designs -design universities systems have been designed from a telos of that system, a mission that should make the university system (Heidegger) (Derrida). The philosopher G. Vargas (2010) returns to Giambattista Vico to show that college was not a guild any, the office occupied the university is "what they call *sapientia* [...] are 'public gyms' and they are because there is do an exercise, exercise *sapientia*, with the analogous spirit to which it will take place between the Greeks and the body, in order to become 'useful to the state "(Vico, cited in Vargas 2010, p. 7).

However, the idea of the university designed as a place for intellectual trade is not exhausted, has changed, this can be evidenced, for example, models Napoleonic, or Humboldtian university, where the mission was to train officers for the positions of the state apparatus or the mission was to develop a research culture, respectively, said research dr. Martinez Boom (2013).

The Colombian philosopher Guillermo Hoyos Vasquez (1992) presents three possible purposes for which the Colombian university has directed its efforts: (i) a university for a modernization project on the development of science, technique and technology, the key to the industrialization of the country; (ii) a revolutionary university, quarry revolutionary subjects to realize social change; (iii) representation of the research university, characterized by being a university of excellence⁴.

Thus, the university is in a complex environment, and social system must *autorreferenciarse*⁵ to fit in an era called postmodern society, or joint venture. Where one of the main features is the technology and its integration into a social system, such as college or graduate program.

Metaphysical and systemic investigations have interests in the study of teleology (Ackoff 1998) (Foerster, 2002) (Simon, 2007) (Derrida, 1997) (Heidegger, 1977) (Flórez & Olave 2001) (Andrade et al 2001) (Restrepo, 2013). Designs information systems in organizations are based on the implicit and explicit concepts and philosophical assumptions about the nature of these and human organizations. Hirschheim & Klein (1989) argue that "These assumptions play the central role in guiding the information systems development (ISD) process. They Also Dramatically Affect the system itself "(Hirschheim & Klein, 1989, p. 1199), for this reason, it draws on the philosophical study of college, and systemic study on system design to understand the phenomenon of self-evaluation a graduate program.

Assumptions of systems thinking as of philosophical thought are studied, which are interpreted with the state of the art to propose a systematic methodology for designing self-assessment models.

The article aims to provide systemized elements, which serve as a guide for the diagnosis and design of self-evaluation models for universities, because in the state of the art, and practices in the design of models for self-evaluation in universities, predominantly hierarchical approach or

⁴ G. Hoyos (1992) states that university research is characterized by "a suspect narcissism; the best established academics with foreign ties, the break is accented with a society that was beginning to distrust the academy and sometimes I do without it. The university and its teachers are enclosed in his: knowledge production, international publications, accreditation of the best. It is the university of excellence "

⁵ N. Luhmann, in his social systems. Guidelines for a General Theory (1998) presented in Chapter I the concept of self-referential system as complex systems "there are systems that have the ability to build relationships with themselves and to differentiate those relationships over those of their environment" (p. 38) . This definition of self-referential system Luhmann guides us to ask whether the self-assessment model should, or should not, have operations to differentiate between internal and external relationships to their environment, ie the self-assessment model as a model for *autorreferencie* the system.

autocratic, where it is evident that there are high levels of instruction for its members in Colombian public universities, new emerging ICT must dominate and know them to accelerate productivity.

Keywords: *Self-assessment, Systemic, University.*

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