

INTELLECTUAL CAPITAL IN SERVICE ECOSYSTEM PERSPECTIVE: SOME EVIDENCES FROM UNIVERSITY CONTEXT

FRANCESCO POLESE¹, MARIA VINCENZA CIASULLO¹, ORLANDO TROISI¹, GENNARO MAIONE¹

¹Department of Business Science - Management & Information System, University of Salerno, Fisciano, Italy

¹{fpolese, mvciasullo, otroisi, gmaione}@unisa.it

1. Introduction

In the current “knowledge economy”, organizations are increasingly dependent on intangible resources rather than on tangible ones for the creation of sustainable competitive advantage (Palacios and Galván, 2006). Among the various intangible resources capable of enhancing organizational performance a prominent role is played by Intellectual Capital (IC) (Madhavaram and Hunt, 2017; Sydler et al., 2014; Sullivan, 2000; Stewart and Ruckdeschel, 1998; Edvinsson and Malone, 1997). Although its meaning has been originally investigated in business context, over time, scholars' attention has shifted to public organizations (associations, government agencies, etc.).

In this regard, several authors (Paloma Sánchez, et al., 2009; Ramírez et al., 2007; Leitner, 2004) have recognized the importance of IC also in the university setting, attributing to it the capacity, if appropriately managed, to lead all actors directly or indirectly involved in study, research and teaching activities towards a profitable dissemination of common benefits. Not by chance, since the end of last century, some of the major international organizations (such as the European Center for Strategic Management of Universities - ESMU - the European Association of Research Managers and Administrators - EARMA -, the European Commission, etc.) have promoted numerous initiatives in order to foster greater awareness about IC produced and used in universities (Veltri et al., 2014).

Universities are the archetype of knowledge-based organization. They are the pillar of social and economic development thanks to their offered services: higher education, research and

knowledge transfer. Although a growing scientific and empirical interest, the efforts aimed at conceptualizing IC in the University setting present two fundamental gaps:

- little attention has been paid to the IC's ability to promote resource integration and alignment of objectives towards a shared co-creation by heterogeneous actors involved in a same (eco)system;
- the elements characterizing the different dimensions of IC (Human Capital, Structural Capital, and Relational Capital) have been investigated in a perspective anchored to Good-Dominant Logic, unable of capturing the dynamism that only a service-oriented perspective allows appreciating (Vargo and Lusch 2004, 2008).

Literature about service management and S-DL logic has offered and keeps on offering a great contribution to the chance to interpret phenomena of observed reality through a holistic and inclusive perspective. In particular, service ecosystems lens, enable to capture the dynamics allowing an adaptive service system to survive. In particular, service ecosystem can be understood as service systems capable of providing benefits to every entity belonging to them. Such entities, which can be represented by people, institutions or any other kind of material and immaterial resource, interact with each other for the co-creation of a mutual value, which, irradiating, favors the shaping of the SE inside and outside a given context (Kaartemo et al., 2017; Frow et al., 2016, 2014, Wieland et al., 2012, Vargo and Lusch, 2011).

Drawing on the call proposed by Lusch et al. (2016), in order to better understand Service ecosystem perspective, the paper examines university and the role played by University Intellectual Capital in Higher-Education as a broader service environment. The higher-education service represents a fundamental means for the economic and social development of a country (Hussein and Bhamani, 2012).

In light of what has been described until now, the work aims to achieve two specific goals:

- re-reading university in the light of S-DL assumptions, framing it in Service ecosystem perspective;
- framing University Intellectual Capital (UIC) according to the Service ecosystem perspective.

In order to reach the aforementioned objectives, the paper is structured into four sections: at first, an in-depth analysis of theoretical background is proposed, by focusing attention on the

concepts of S-DL, SE and UIC; subsequently, an example is proposed in order to foster a better understanding of what is theoretically debated; finally, conclusions are presented, implications are highlighted and both the limits of the work and insights for future researches are discussed.

2. Theoretical background

2.1 University Intellectual Capital (UIC)

In literature, the prevailing orientation about the concept of IC interprets it as decomposable into three closely interrelated and interdependent dimensions: human, structural and relational (Dumay, 2014; Lu et al., 2014; Dumay and Garanina, 2013). Specifically, a widely spread and shared conviction is that IC takes shape as a set of relationships among multiple resources - especially knowledge and trust - among people (Human Capital), embedded in the structure of organization (Structural Capital) and in its relationships area (Relational Capital).

Also with regard to university context, the prevailing IC configuration meets the taxonomy previously described, although with some differences dictated by the peculiar characteristics of university, which represents the archetype of knowledge-based organization.

University Human Capital (UHC)

Consistently with the widest shared definition in managerial literature, Human Capital (HC) is considerable as an agglomeration of knowledge, skills, abilities and experiences capable of ensuring a long and sustainable competitive advantage in the broad context of high education (Leitner, 2004). To this end, more and more HC enrichment programs have been implemented by means of wide-ranging actions, such as hard (e.g. money) and soft (e.g. compliment) gratification for employees, involvement of students through associationism, realization of initiatives aimed at facilitating the rooting of values and principles underlying organizational culture, and so on (Paloma Sánchez and Elena, 2006).

In this sense, hence, university takes shape as a promoter of organizational success by activating dissemination processes of knowledge among the actors belonging to it (professors, researchers, technical-administrative staff, students, visitors, companies, etc.) (Veltri et al., 2014). In other words, university, together with family, working environment and, more

generally, society, is considerable as a system that promote the growth of UHC. Furthermore, in university context the link between adequate UHC valorization and organizational success seems to be emphasized, since universities are constantly searching for human resources capable of absorbing and transferring knowledge (Vagnoni and Oppi, 2015).

University Structural Capital (USC)

University Structural Capital generically comprises the explicit knowledge embedded in the research-training processes and *third mission* of university, as well as the organizational culture and technological know-how (patents, licenses, proprietary software, computer files and so on) (Paloma Sánchez et al., 2009).

Therefore, it takes shape as the infrastructure supporting the organizational growth process, enabling Human Capital (students, faculty and technical and administrative staff) to carry out their activities, interacting within and with university. By making a parallelism with the idea of Structural Capital of private companies (Wang and Chang, 2005), USC can be divided into two sub-dimensions: University Process Capital (UPC) and University Innovation Capital (UInC).

- UPC includes both hard (such as databases and infrastructures) and soft (such as techniques, programs and procedures) variables involved in disseminating knowledge by means of study, didactic and research activities, culture, people's (professors, researchers, students, administrative staff, etc.) motivation to achieve university short-term and long-run goals (Veltri et al., 2014).
- UInC is the result of the simultaneous management of several variables that measure intellectual property (trademarks, copyrights, patents, university image, spin-offs, etc.), R&D investment, quality and quantity of people employed to promote technological progress, etc. (Leitner, 2004). This management is very delicate, since it implies the adoption of effective and efficient co-ordination formal and informal mechanisms to allow UHC involved in knowledge creation and dissemination (UPC) to seize the opportunities coming from progress and continuous innovation. The development of UInC requires significant investments due to the need to handle appropriately numerous variables, such as originality of ideas, creativity, fantasy, use of state-of-the-art tools and technologies, etc. (Ramírez et al., 2007).

University Relational Capital (URC)

University Relational Capital includes the network of economic, scientific, social and institutional relationships established and maintained over time within university and between it and its environment (Ramírez et al., 2007). This interpretation perfectly fits with the mission typically and traditionally pursued by every university: the creation and dissemination of knowledge. In this regard, URC seems to be instrumental to the increase of knowledge and its profitable exploitation in order to generate social, economic and technological progress (Leitner, 2004). As a component of IC, it is an intangible resource, based on the development and valorisation of relationships among universities, individuals or groups of individuals who can influence each other's study, research, didactic and third mission activities (Vagnoni and Oppi, 2015). The attitude of universities to stimulate the establishment of lasting relationships over time with the wide range of actors with which it interacts is critical for its competitive success in the higher-education context. However, in the face of the benefits of building a dense relational network, universities constantly make high efforts to cultivate relationships that can help them to achieve the pursued goals. In this regard, there are many difficulties in identifying all the involved actors, their preferences and expectations. In fact, very often, universities, due to their nature, high complexity of resources, multiple attitudes toward services and different exploitation in play, do not fully know all the actors with which they interact, being not able to efficiently and effectively manage the relationships established with them (Veltri et al., 2014).

To this end, an accurate analysis and a thorough awareness of relational network seem to be essential for enabling universities to conduct study, research and training activities and stimulate the launch and development of beneficial continuous improvement processes.

However, to date, IC has been analyzed especially in accounting literature by means of a normative approach and metrics for its evaluation (see Table 1). In other words, IC has been investigated mainly in quantitative terms, that is, through the objective measurement of its variables, such as the number of professors or students, the amount of investment for the purchase of books or electronic devices, etc., confirming a structural view of it. In addition, as concerns the methodological approach, *“IC accounting research focuses mainly on reports' content analysis related to different case studies, with the aim of detecting the main variables reported, how they were disclosed, and the defined measures”* (Vagnoni and Oppi, 2015, p.

337), as it was enough to represent the university capacity to generate knowledge. However, as Dumay and Garanina (2013, p. 19) affirm, there is a lack of knowledge related to "how IC works".

This consideration implies the need to give up Good-Dominant Logic in interpreting IC, which considers it as a stock of (operand) resources, without allowing understanding its real meaning and, above all, its contribution to universities and, more generally, to society in terms of widespread knowledge and well-being. In other words, it is not explained how IC is experienced, since it is not provided an answer neither to the question “how do manage a bundle of intangible resources in a system capable of creating a common value?” nor to the question “how do engage actors to feed processes aimed at foster the creation and dissemination of new knowledge?”. In this regard, managerial literature about UIC underlines the need to reinvent a new approach (Secundo et al. 2015) to develop theory in practice allowing understanding its impact in action (Secundo et al. 2016).

Tab. 1: Dimensions of UIC

AUTHOR(S)	PUB. YEAR	CONTEXT	UNIVERSITY INTELLECTUAL CAPITAL		
			UHC	USC	URC
<i>Sangiorgi and Siboni</i>	2017	Italian universities	<ul style="list-style-type: none"> ○ Number of academic staff total ○ Number of research staff ○ Number of full-time professors ○ Teaching assistants ○ Fluctuation of scientific staff ○ Growth of scientific staff ○ Average duration of scientific staff ○ Expenses for training 	<ul style="list-style-type: none"> ○ Investments in library and electronic media 	<ul style="list-style-type: none"> ○ Research grants abroad ○ International scientists at the university ○ Number of conferences visited ○ Number of conferences hosted ○ Number of employees financed by non-inst. funds ○ Number of activities in committees ○ Hit rate EC research programs ○ New co-operation partners
<i>Vagnoni and Oppi</i>	2015	Italian university hospital	<ul style="list-style-type: none"> ○ Professionals ○ Career paths ○ Academics ○ Students ○ Ph.D. students ○ Research fellows 	<ul style="list-style-type: none"> ○ Publications ○ Patents ○ Seminars ○ Research projects ○ Best practices ○ Integrated research center ○ Guidelines and protocols ○ Diseases records ○ Training of doctors, dentists and health professionals ○ Diagnostic and therapeutic pathways ○ Specialized ambulatories 	<ul style="list-style-type: none"> ○ Relations with regional, national and international commissions ○ Relations with associations and scientific societies ○ Spin-offs ○ Relations with the local health Unit ○ Relations with non-affiliated Academics in university courses ○ Relations with the social context and volunteering

<i>Bezhani</i>	2010	UK universities	<ul style="list-style-type: none"> ○ Academic staff ○ Number of research staff ○ Number of full-time professors ○ Teaching assistants ○ Fluctuation of scientific staff ○ Growth of scientific staff ○ Average duration of scientific staff ○ Expenses for training 	<ul style="list-style-type: none"> ○ Investments in library and electronic media 	<ul style="list-style-type: none"> ○ Research grants abroad ○ International scientists at the university ○ Number of conferences visited ○ Number of conferences hosted ○ Number of employees financed by non-institutional funds ○ Number of activities in committees ○ Hit rate EC research programs ○ New co-operation partners
<i>Veltri and Mastroleo</i>	2011	Austrian university	<ul style="list-style-type: none"> ○ Staff ○ Number of awarded teaching qualifications (habilitations) ○ Number of appointments to the university ○ Number of appointments from the university ○ Number of academic/art staff who have completed a temporary stay abroad amounting to at least 5 days (outgoing) ○ Number of incoming academic/art staff ○ Number of participants in programs for continuing education and personnel development 	<ul style="list-style-type: none"> ○ Funding for measures promoting equal opportunities for men and women and affirmative action for women ○ Funding for measures advancing gender specific education and research/development and promotion of the arts ○ Number of staff active at special institutions ○ Number of staff active in institutions for students with special needs or with chronic disorders, or both ○ Funding for specific measures for students with special needs or chronic disorders, or both ○ Funding for measures for balancing work/studies and family/private life for females and males ○ Cost for available online research data bases ○ Cost for available scientific/art journals ○ Total funding for large equipment for research and development and promotion of the arts ○ Proceeds from sponsoring ○ Floor space in m² 	<ul style="list-style-type: none"> ○ Number of staff in function as chairs, members or reviewers in external appointment committees and habilitation committees ○ Number of partner institutions/enterprises incorporated in cooperation agreements ○ Number of staff with functions in scientific/art journals ○ Number of staff in scientific/art panels ○ Number of borrowings from university libraries ○ Number of university library activities
<i>Ramírez et al.</i>	2007	Spanish universities	<ul style="list-style-type: none"> ○ Full time researches ○ Researches qualification ○ Incentives to research ○ Full-time administrative staff 	<ul style="list-style-type: none"> ○ Bibliographic resources ○ Resources from empirical primary data ○ Resources from empirical secondary data ○ Basic infrastructure 	<ul style="list-style-type: none"> ○ Participation in scientific meeting ○ Membership to scientific associations ○ Collaboration with forms and other institutions
<i>Leimer</i>	2004	Austrian universities	<ul style="list-style-type: none"> ○ Number of scientific staff ○ Number of full-time professors ○ Number of student assistants ○ Fluctuation of scientific staff ○ Percentage growth of scientific staff ○ Average duration of scientific staff ○ Expenses for training 	<ul style="list-style-type: none"> ○ Investments in library and electronic media 	<ul style="list-style-type: none"> ○ Research grants abroad ○ Number of conferences visited ○ Number of employees financed by non-institutional funds ○ Number of activities in committees ○ Hit rate European research programs ○ New co-operation partners

2.2. Service-Dominant Logic and Service ecosystems view

Until the end of last century, managerial theory and, in particular, marketing studies were oriented towards an approach characterized by the centrality of material goods as a result of productive processes performed by organizations (Good-Dominant Logic - G-DL). However, over time, scholars and practitioners have gradually gained a mature awareness of the strategic centrality of services, no longer considered as residuals compared to goods. With the advent of the new millennium, the concept of service has become more and more prominent in both managerial theory and practice, so much to be the foundation for the development and diffusion of a new approach, known as Service-Dominant Logic (S-DL).

Proposed by Vargo and Lusch (2004), this logic has quickly spread first in marketing and later in all other managerial disciplines. According to S-DL, the fundamental basis of each exchange is service, understood as the application of knowledge and skills (operant resources) (Vargo and Lusch, 2016). The focal point of S-DL is to highlight the importance of service and its dominance over material goods. In other words, the transition from G-DL to S-DL is reflected in the idea that service is present in every exchange relationship, regardless of whether it is made through the use of goods or services as such: exchanges aim to the enjoyment not of material goods (operand resources) but, rather, of the benefits of specialized skills (operant resources). Another difference between Good- and Service-Dominant Logic is represented by the role played by consumer or, more generally, by end user in the process of value creation.

In fact, while in G-DL user is seen as a "consumer" and destroyer of the value created by organization, in S-DL he/she actively participates through the contribution and synergic integration of him/her resources with those provided by all the other actors involved in service exchange. In this sense, value is conjointly and mutually co-created: organizations cannot consider user as mere inert recipient of value, since they can only make a value proposition and only whether and when it is accepted by user, value is co-created by means of the synergic integration of all resources. In this respect, the need of a systemic approach to value creation arises (Meynhardt et al., 2016). The systemic notion of value co-creation emphasizes the role of direct and indirect service exchanges (Chandler and Vargo, 2011), as well as the importance of institutions' ability to foster and maintain dense inter-organizational relationships (Vargo and Akaka, 2012).

From this point of view, SD Logic recently has embraced a service ecosystem perspective able to a better understanding of the need for resources' integration, which is, as stated before, at the core of value co-creation (Vargo and Lush, 2015). In particular, Vargo et al., (2014, p.161) define service ecosystem as a “relatively self-contained, self-adjusting systems of resource-integrating actors connected by shared institutional logics and mutual value co-creation through service exchange”.

This last definition highlights the dynamism characterizing service ecosystems and underlines the relevant role of institutions. In fact, institutions (i.e. shared rules, norms, values and beliefs, shared language and technologies) and institutional arrangements (i.e. sets of interrelated institutions) are fundamental to shape a service ecosystem (Vargo and Lusch, 2016; Sitaloppi et al., 2016).

In particular, institutions and institutional arrangements lead actors to achieve a shared view of the environment in which they interact, based on common interests, cultural assumptions, evaluation methods, and mental frameworks. In other words, the service ecosystem lens allows interpreting its ability to adapt when it faces changes to survive (Lusch, Vargo and Gustafsson, 2016) in environments where actors' agencies and institutions interact to create value for themselves and others thus continuously shaping the ecosystem (Wieland, et al., 2012; Taillard et al., 2016).

More in depth, service ecosystems are dynamic value co-creation configuration of resources (i.e. service systems), including people, organizations, shared informations, and technology, all connected internally and externally to other service systems by value proposition aimed at creating a mutual value (Vargo and Lusch, 2011). Likewise, Maglio et al. (2009) consider as sets of people, resources and institutions aimed at creating a mutual value. Consistently, Ciasullo et al. (2016) state that value co-creation depends on social context (above all, relationships and structures), rules and resources, and vice versa. In sum a service ecosystem represents a community of interacting actors who share and exchange their resources in order to adapt to the environment and co-evolve. The actors involved in a service ecosystem share and recombine their resources, by means of value propositions that offer mutual positive advantages (Frow et al., 2014). This implies that actors coevolve over time, following non-linear paths and making the whole service ecosystem able to achieve a long-lasting well-being, constantly changing and adapting its structure (Vargo et al., 2008).

In this respect, service ecosystems are layered and nested within three levels: Micro-, Meso- and Macro- (Frow et al., 2014; Chandler & Vargo, 2011; Akaka, Vargo, & Schau, 2015). In light of this consideration, it clearly emerges that service ecosystems appear as decisive, or, as pointed out by Schröter et al. (2005), vital to human well-being.

What expressed until now highlights the need to interpret universities in a service ecosystems lens. In fact, university can be seen as a complex service systems capable of creating social and economic wellbeing in terms of knowledge creation and valorisation thanks to resource integration processes, institutional arrangement, alignment of individual goals towards the ultimate finality of value co-creation. In this perspective, also the role of the IC assumes different configuration, conceptualization and consequent reinterpretation.

3. University in Service ecosystem perspective: the main features

According to S-DL universities can be considered as systems in which value co-creation is constantly encouraged by means of the involvement of many actors (professors, researchers, research fellows, technical-administrative staff, students, external visitors, etc.) constantly moving and evolving, interacting in a non-linear way, organized in different categories and levels, characterized by a continuous learning cycle and reordering of the acquired knowledge (see Fig. 1).

Also the ultimate finality pursued by universities allows understanding why it is possible to consider them in Service ecosystems perspective: they, by providing an intangible with a common utility, represented by the creation and dissemination of knowledge, aim to foster social and economic wellbeing. In higher education service ecosystem, hereinafter the authors propose a conceptualization of university in the service ecosystem perspective. Three levels (Micro, Meso-, and Macro-) are identified and describes each one with its own peculiarities. These levels are “nested” (Mars et al., 2012) since every actor can have access to resources shared in each Service ecosystem level (Frow et al., 2016). The various levels are linked through value propositions, offering to actors the access to resources that foster well-being. According to some authors, (Akaka et al., 2013; Chandler and Vargo 2011; Edvardsson, Tronvoll, and Gruber 2011), the levels of any Service Ecosystem are changing since they depend on the role played by the actors within them, the exchanged and integrated resources between them and the institutions regulating their interactions. Moreover, it is worth pointing

out that each level constitutes the other two (“i.e. the Macro does not exist without Micro and Meso and vice versa”) (Akaka and Vargo, 2015; Latour, 2007)

The Micro-Level

The Micro-Level is characterized by the centrality of the interactions among single actors, which exchange services-for-service in order to foster the creation and dissemination of knowledge and improve their well-being (Frow et al., 2014; Vargo et al., 2008). Already at this level, it is possible to observe one of the assumptions at the basis of S-DL and, more specifically, of every Service System: all actors act not as simple passive and inert service recipients but, rather, as a participant actively involved in value co-creation process (Troisi et al., 2017, 2016; Loia et al., 2016). This statement is in line with the considerations of Vargo and Lusch (2011) and FitzPatrick et al. (2013), according to whom neither public nor private organizations can independently generate value, since they can make a value proposition and only whether and when users accept it, value is co-created. Concretely, at the Micro-Level it is possible to observe the dyadic interactions among single couples of actors (such as student-student, professor-professor, student-professor, researcher-administrative staff, administrative staff-visitor, and so on). At this level, the success of the exchange depends on the congruence of the set of institutions (Solomon et al. 1985) characterizing every dyadic interaction among single actors (Williamson 2000). Actor-generated institutions are definable as modalities with which interactions are made possible through coordination mechanisms (Frow et al., 2014), such as guidelines, social norms, symbolic meanings and routines that stimulate the aggregation of the involved actors, regulate exchanges and resource integration for mutual value co-creation (Vargo et al., 2011). Therefore, it is intuitive that the higher/lower the similarity of actors’ institutions is, the higher/lower the likelihood of success of their dyadic interaction is (Akaka et al., 2013).

For example, it is possible to consider the dyadic interaction professor-student and hypothesize the existence of their different institutions: the student could be animated by the desire to learn, while the professor could be interested exclusively in economic return. In this circumstance, although they exchange resources, they do not co-create value since their finalities are not aligned. Instead, whether they have the same institution (e.g. spread of knowledge), they synergistically integrate their resources, provide an integrated value proposition and, thus, co-create value.

The Meso-Level

Dyadic interactions existing among single couples of actors at Micro-Level are nested within a wider level, named Meso-Level (Chandler and Vargo 2011), in which other actors with their relative institutions are involved. In other words, at Meso-Level more Micro-Level interactions and sets of institutions are embedded (Akaka et al., 2013). In such a sense, it is possible to imagine that, whether at Micro-Level dyadic interactions among single couples of actors (student-student, professor-professor, researcher-administrative staff, etc.) are observable, at Meso-Level multiple interactions emerge, that is interactions among more couples of actors shaping an interactional networks by means of the exchange and integration of (operant and operand) resources (Akaka et al., 2013; Akaka, Vargo, and Lusch 2012). In university setting, for example, an interactional network is represented by the interactions existing among actors belonging to the same department, board of directors, interdepartmental research center, academic senate, library, student association, etc. However, since the focus shifts from single actors to networks, as typically occurs within universities, an actor can be involved in multiple interactions and, hence, exchange resources with other actors in turn involved in other interactions, and so on. This means that, at Meso-Level, the success of interactions depends on the congruence of an higher number and variety of interactions and, thus, on the adequacy of institutional arrangements, understood as sets of interrelated institutions that allow resource integration for value co-creation (Spohrer and Maglio, 2010): on one hand, they are able to facilitate service exchanges in order to foster a higher well-being (Frow et al., 2014); on the other, institutional arrangements enable and encourage alignment of actors' finalities, allowing passing from consonance (relational compatibility - in the potential sense) to resonance (effective interaction - in a practical sense) dell'intero network in which they are involved (Barile and Polese, 2010a, 2010b). In this regard, Gummesson (2002) states that the ability to converge institutions towards institutional arrangements is instrumental in the success of any organization, both private and public, and therefore also of universities.

Reconsidering the example described above at the Micro-Level, it is possible to imagine that the "misaligned" professor's finality could negatively condition the success of him/her department (mid-range structure) in comparison with other virtuous departments. In fact, the effects of a professor's incongruent institution also affect the interactions with other students

(not belonging to the couple considered at Micro-Level) and professors

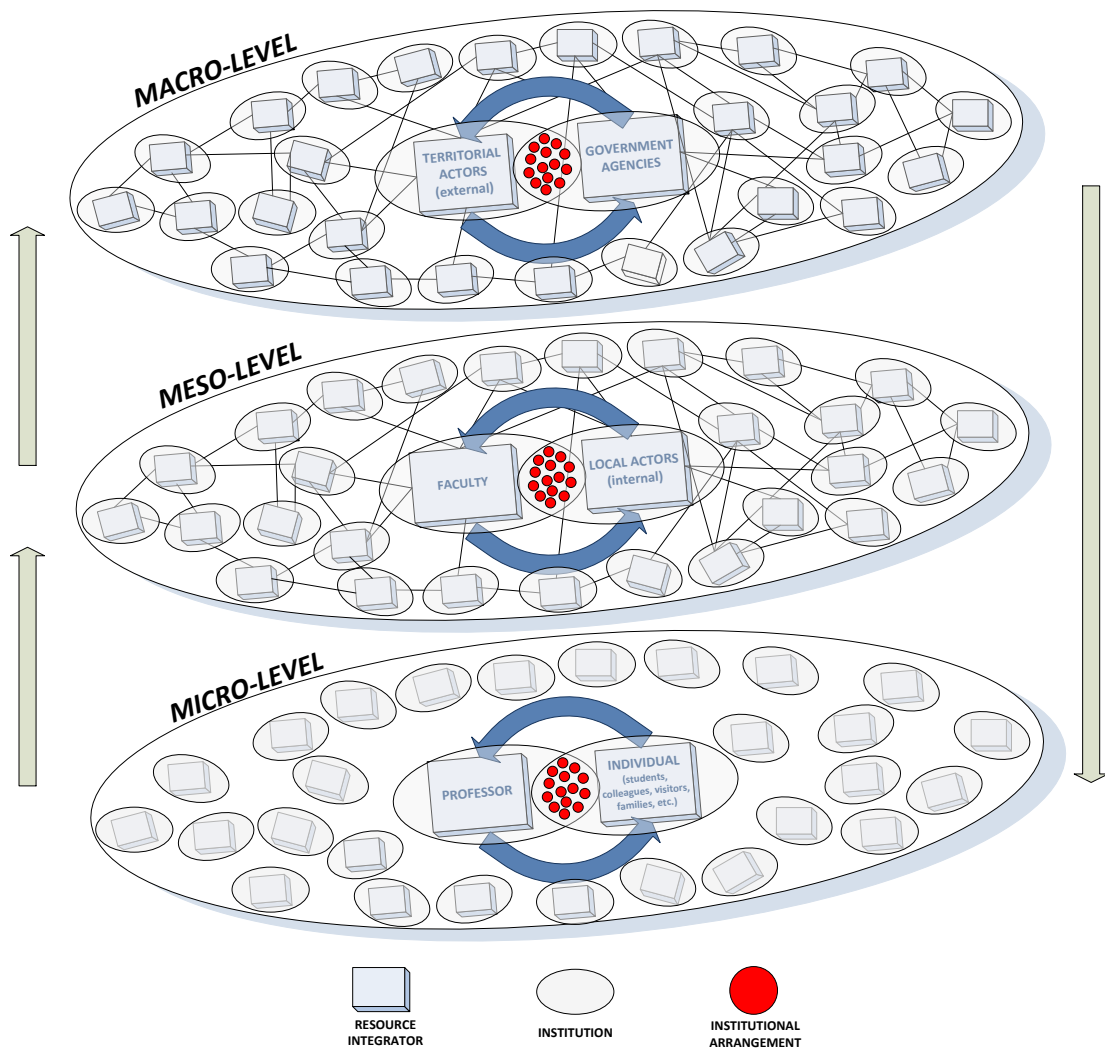
The Macro-Level

The Macro-Level represents the broader level of the higher-education Service ecosystem. It is populated by national and international universities, public and private research centers, national and supranational government agencies, business company associations, professional associations, etc. These actors directly or indirectly influence the shaping of higher education service ecosystem, outlining the institutional framework (normative, regulatory, cultural, cognitive elements - Scott, 2014, p. 56), which affects Macro-Level properties and stimulates changes in Micro-Level elements. In particular, national and supranational government agencies, in setting the institutions and policy conditions, should stimulate reforms aimed at enhancing the quality of training provision, the adequacy of teaching body and resources, coherence between expected outcomes and employment opportunities for students.

This is possible by promoting dense *networks of networks* among the various actors belonging to the Macro-Level. Yet, legal and political institutions lie in specific meanings emerging from institutional arrangements framed by social, cultural and cognitive contexts.

In this respect, reconsidering the example previously described, the professor's incongruence, besides producing negative effects at Micro- (couples) and Meso-Level (mid-range structures), also badly affects the wider socio-economic context, in terms of employment, flattening of professional levels, business competitiveness, negative perception of university's image to which he/she belongs (e.g. by holding a lesson at another university), etc.

Fig. 1: *University in Service ecosystem perspective*



Source: *Adapted from Akaka et. Al, 2013*

4. University Intellectual Capital according to Service ecosystem perspective

Framed university in service ecosystem perspective and reviewed University Intellectual Capital, so far understood according to G-D Logic (objective and structural) and, hence, focused only on its value-in-exchange, hereinafter the authors attempt to reinterpret it according to S-D L, that is emphasizing its value-in-use (i.e. its real value – applied knowledge and skills)

4.1 Scheduling higher education service

Scheduling Higher Education Service is implemented through collaboration paths, which involve many actors, who synergistically integrate their resources in order to propose a value proposition complying to social and economic development of territory. In this regard, it is

evident that value is co-created: any value partially dependent on the involvement of more actors is, by definition, a co-created value (Lusch and Wu, 2012), always including the beneficiary.

At Micro-Level, dyadic interactions develop among the following university resource integrators: professors, researchers, students, administrative staff, etc. However, the consideration of ecosystem perspective is important to extend the limited dyadic viewpoint to interactions among multiple actors (Vargo and Lusch, 2011a). This statement underlines the fundamental role played by URC already at Micro-Level. In fact, the moments of exchange among the aforementioned actors are dense, continuous, highly interactive and, especially, synergistically connected in order to enable scheduling higher education to the promotion and diffusion of culture. More in depth, professors and researchers engage in various moments of dialogue with students in order to understand and interpret their information in terms of motivations and training needs, interest in a specific course of study, and so on. On the other hand, a good value proposition requires the involvement of actors external to university system. For example, a professor could engage a manager or a professor belonging to another university in order to offer to students a richer knowledge by means of their witnesses. This example suggests a wider interpretation of UHC, since, thanks to resource integration fostered by actors' engagement (i.e. managers, professors of another university, etc.) UHC is not identifiable in the number of professors, students, etc. but rather in those who have effectively contributed to their and ecosystem's wellbeing.

Higher education service also requires the contribution of Meso-Level mid-range structures (such as, the office for the right to study) in offering a continuative assistance to disable students. In this case, what intervenes is not only the structural dimension of intellectual capital, understood as the number of facilities made available to the disabled students (wheelchair, lifts, access ramps, etc.), but also the resource integration favored by counseling, personal or extended to family. In such interaction moments, there is a better understanding of more appropriate didactic methodologies as well as of specific techniques to be used to enhance an improvement in learning experience. Also in this case, the effects will extend to the human and relational dimension of intellectual capital. In addition, the proposed example shows how Meso-Level is nested with Micro-Level, since good teachers' value propositions are institutionalized through shared cultural values and patterns.

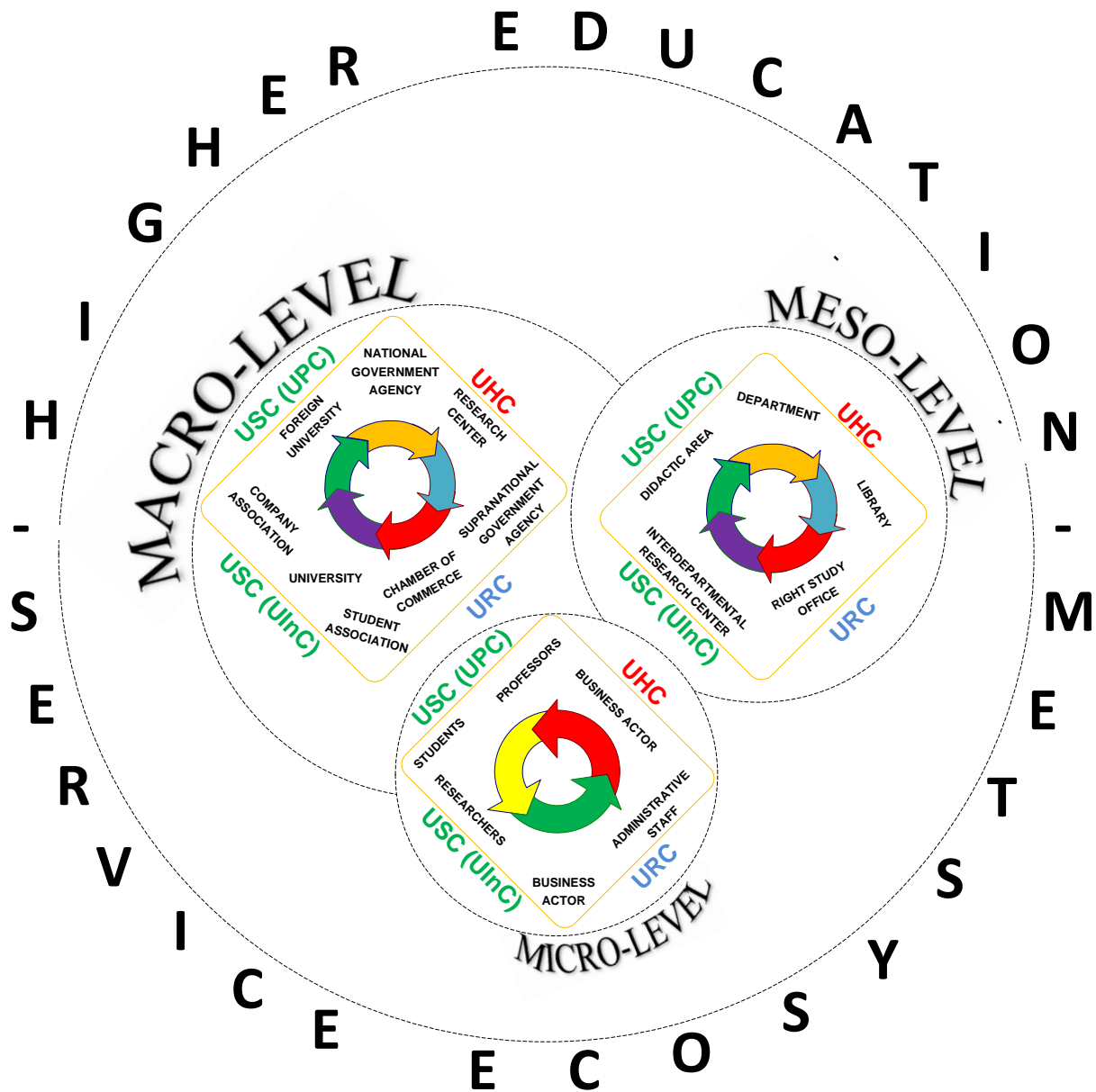
Going over, scheduling higher education service requires that good value propositions need to be arranged through the active involvement not only of students, professors, researchers and administrative staff, but also of entrepreneurial world, professional associations, local government agencies (chamber of commerce, municipality, province, high schools, etc. – Macro-Level). To this aim, many meetings, conferences, thematic days, initiatives, etc. should be organized with the socio-economic actors of the territory. The aim of these meetings is to capture specific professional needs and transfer them into the programming of courses to translate knowledge into employable knowledge and skills.

In other words, these moments allow offering enriched/renewed didactic pathways, i.e. new value propositions stimulated by a synergic resource integration. Even then, nesting emerges between Macro- and Meso-Level as didactic area (mid-range structure) is inspired to delineate value propositions more complying with social and economic needs and expectations.

The analysis of interactions existing at Macro-Level emphasizes the need to consider how IC is affected by dynamics occurring in the broader socio-economic context. To say better, the ability to realize value propositions complying with the social and economic development of the territory is at the same time the effect and cause of the active involvement of actors not lying exclusively in the university system but contributing so that service ecosystem can adapt to contextual changes.

This means that in service ecosystem perspective the UIC concept moves to a wider dimension, assuming the connotation of Collective Intellectual Capital (CIC), thus not referred solely to university, but, more broadly, to all actors of social and economic contributing to value co-creation.

Fig. 2: *Scheduling Higher Education service ecosystem*



Source: Authors' elaboration

5. Theoretical and managerial implications

The reinterpretation of University system in the light of Service Ecosystem perspective and, at the same time, the contextualization of the different dimensions of Intellectual Capital to University ecosystem entail some interesting insights from both a theoretical and practical point of view.

Regarding the first aspect, the study represents a novelty in managerial literature, since there is a shortage of researches aimed at qualifying service ecosystem's main elements (Letaifa and Reynoso, 2015) or at applying service ecosystems view to reread concrete service contexts (De Groot et al., 2010). With particular reference to IC, knowing the level of service ecosystem (Micro, Meso, and Macro) could help managers in identifying more easily its various declinations (Relational Capital, Human Capital and Structural Capital) and favour the spread of benefits for the reference organization. The originality of the study, in fact, lies in the dynamic reconfiguring of Intellectual Capital from a service-oriented standpoint, which goes beyond the mere static description of its elements to concretely identify its role in resource integration and in *value-in-use* resonant interactions as a complex set of operant resources in actions.

In addition, by answering to the call proposed by Lusch et al. (2016), this work offers a better understanding of service ecosystems' dynamics, by providing insights into the process of resource integration and service exchange occurring within a complex ecosystem across nested levels (Akaka et al., 2015). A more detailed comprehension of the nesting between the three different levels (Micro, Meso, Macro) contributes to better define ecosystem actors and coordination mechanisms in university sector, which is a relatively unexplored field in service ecosystem literature.

From a managerial standpoint, instead, the identification of the specific mechanisms and actors underlying the three service ecosystem levels could help decision-makers to elaborate ad hoc strategies for developing user's engagement and optimizing resource exchange at each stage. In detail, Micro-Level conceptualization suggests that managers should foster actor's participation starting from the early stages of service provision, such as co-design, in which value propositions could be jointly created by harmonizing the different interests of the involved users. The definition of Meso-Level highlights the importance of gaining better alignment between actor's conflicting objectives through strategic partnerships and proper coordination mechanisms (such as academic spin-off) toward shared finality and common growth. Lastly, in Macro-Level decision-making should employ institutional arrangements in order to ensure the fit between overall system's goal and each system's objective through resonant and viable relationships (Barile and Polese, 2010).

Moreover, the application of the three dimensions of IC to the three ecosystem levels contributes to concretely define and explore the effective interactions among actors through

the recognition of regulations and actor generated institutions facilitating exchanges. This categorization can lead decision-makers to develop strategies for better managing IC through the adoption of coordination mechanisms aimed at mediating between the different stakeholder's interests in order point toward common growth and overall system's well-being. This harmonization can foster knowledge exchange and the creation of new knowledge, leading managers to increase service innovation.

The conceptualization of actors, mechanisms and resources involved in each ecosystem level could help decision-makers to identify and classify actors, their preferences and expectations and relational degree in order to better manage relationships and increase efficacy and efficiency in the long run.

The key role played by institutional arrangements should encourage university policy makers to establish resonant and sustainable relationships by supporting actor's ongoing participation and optimizing resources exchange.

6. Conclusion, limitations and insights for future research

Starting from a literature review about University Intellectual Capital, Service-Dominant Logic and Service Ecosystem perspective, the paper attempts to reach two specific research goals: first, it tries to re-read university in the light of S-DL assumptions by framing it in Service Ecosystem perspective; furthermore, it seeks to frame University Intellectual Capital according to the Service Ecosystem perspective.

In line with the first research objective, reinterpreting university as a service ecosystem by focusing on knowledge exchange and resource integration, and so from a dynamic point of view, allows categorizing university ecosystem's actors, their relationships, the nature of their relationships and the regulatory mechanisms for better manage these links.

Secondly, the application of IC and of its main dimensions to the three ecosystem level of higher education service ecosystem reveals that University Human capital, University Structural Capital and University Relational Capital can be observed at a Micro-Level, Meso-Level and Macro-Level.

For this reason, rereading CI in the light of service-oriented perspective implies the adoption of a dynamic process-based view rather than a quantitative analysis. The adherence to a

systemic approach is not only in line with S-D logic but also with systemic theories and, in particular, with *Viable Systems Approach's* assumptions (VSA, Barile, 2010).

This theory, in fact, employs the dichotomy structure-system (Barile and Saviano, 2011) to the exploration of organizational processes. Any observed phenomenon (a problem or entity), in fact, can be investigated through a double perspective: on the one hand, by objectively analysing the parts and relations that configure the “structure “of the investigated phenomenon (how it is made); on the other hand, by interpreting its interaction dynamics as an open system living in its context (how it behaves). Accordingly, based on the shift from the parts and to the system, organizations should be explored both at a multiple level of integration between the analysis of internal processes and resources exchange and of external relationships (Redfield, 2009).

What is more, the exploration of synergy for defining effective service interactions from a multi-layered standpoint is in line with the concept of service ecosystems as a set of embedded networks of interactions (Akaka et al., 2013). Detaching from a *Good-Dominant* to a *Service-Dominant Logic* in applying the concept of IC to Higher Education ecosystem's qualification highlights the necessity to reframe it as a set of operant resources actively fostering the emersion of resonance through *value-in-use*.

The main limitation of this work lies in its theoretical nature. Effectively, a descriptive and theoretical approach is employed for Higher education ecosystem's conceptualization. However, the reinterpretation of University and IC in service ecosystem perspective prepares the ground for the development of further researches aimed at concretely assessing their elements and roles in shaping resources exchanges through empirical evidences. For example, a qualitative analysis exploring the real mechanisms of value co-creation through the administration of interviews could be needed, in an attempt to shed light on the concrete practices (activities, relationships, regulatory mechanisms) shaping knowledge exchange in higher education service ecosystems. Therefore, to increase reliability, it could be appropriate to conduct the analysis in different universities, in Italy or abroad, by using both a qualitative (through interviews) or quantitative (by means of questionnaires) approach in order to allow for comparisons between the various samples, aimed at highlighting any similarities or differences and, thus, ensuring a more reliable generalization of the results.

7. References

1. Akaka, M. A., & Vargo, S. L. (2015). Extending the context of service: from encounters to ecosystems. *Journal of Services Marketing*, 29(6/7), 453-462.
2. Akaka, M. A., & Vargo, S. L. (2015). Extending the context of service: from encounters to ecosystems. *Journal of Services Marketing*, 29(6/7), 453-462.
3. Akaka, M. A., Vargo, S. L., & Lusch, R. F. (2013). The complexity of context: a service ecosystems approach for international marketing. *Journal of Marketing Research*, 21(4), 1-20.
4. Aryee, S., Walumbwa, F. O., Seidu, E. Y., & Otake, L. E. (2016). Developing and leveraging human capital resource to promote service quality: Testing a theory of performance. *Journal of management*, 42(2), 480-499.
5. Bagautdinova, N., Novenkova, A., & Sarkin, A. (2013). Quality management system formulation and implementation as a factor of enhancement of the university role in the local development.
6. Barile, S., & Polese, F. (2010a). Linking the viable system and many-to-many network approaches to service-dominant logic and service science. *International Journal of Quality and Service Sciences*, 2(1), 23-42.
7. Barile, S., & Polese, F. (2010b). Smart service systems and viable service systems: Applying systems theory to service science. *Service Science*, 2(1-2), 21-40.
8. Baron, A. (2007). *Human capital management: achieving added value through people*. Kogan Page Publishers.
9. Basole, R. C., & Karla, J. (2012). Value transformation in the mobile service ecosystem: A study of app store emergence and growth. *Service Science*, 4(1), 24-41.
10. Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *Journal of political economy*, 70(5, Part 2), 9-49.
11. Becker, G. S. (1967). Human capital and the personal distribution of income: An analytical approach (No. 1). Institute of Public Administration.
12. Benson, V., & Morgan, S. (2015). Social university challenge: developing pragmatic skills for social networking in future managers.
13. Brooking, A. (1996). *Intellectual capital*. Cengage Learning EMEA.
14. Camic, P. M., Rhodes, J. E., & Yardley, L. E. (2003). *Qualitative research in psychology: Expanding perspectives in methodology and design*. American Psychological Association.

15. Capra, F. (1997) *The Web of Life*. London: Flamingo/HarperCollins.
16. Chandler, J., & Vargo, S. L. (2011). Contextualization: Network intersections, value-in-context, and the co-creation of markets. *Marketing Theory*, 11(1), 35-49.
17. Ciasullo, M. V., Cosimato, S., & Pellicano, M. (2017). Service Innovations in Health Care Service ecosystem: A Case Study. *Systems*, 5(2), 37.
18. Ciasullo, M. V., Cosimato, S., Storlazzi, A., & Douglas, A. (2016, December). Health care ecosystem: some evidence from the International Consortium for Health Outcomes Measurement (ICHOM). In *Toulon-Verona Conference "Excellence in Services"*.
19. Crook, T. R., Todd, S. Y., Combs, J. G., Woehr, D. J., & Ketchen Jr, D. J. (2011). Does human capital matter? A meta-analysis of the relationship between human capital and firm performance.
20. De Clercq, D., & Sapienza, H. J. (2006). Effects of relational capital and commitment on venture capitalists' perception of portfolio company performance. *Journal of Business Venturing*, 21(3), 326-347.
21. De Leaniz, P. M. G., & Del Bosque, I. R. (2013). Intellectual capital and relational capital: The role of sustainability in developing corporate reputation. *Intangible Capital*, 9(1), 262-280.
22. Dumay, J. (2014). 15 years of the journal of intellectual capital and counting: a manifesto for transformational IC research. *Journal of Intellectual Capital*, 15(1), 2-37.
23. Dumay, J., & Garanina, T. (2013). Intellectual capital research: a critical examination of the third stage. *Journal of Intellectual Capital*, 14(1), 10-25.
24. Edvinsson, L., & Malone, M. S. (1997). *Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpower*.Brooking, A. (1996). *Intellectual Capital*. Cengage Learning EMEA.
25. FitzPatrick, M., Davey, J., Muller, L., & Davey, H. (2013). Value-creating assets in tourism management: Applying marketing's service-dominant logic in the hotel industry. *Tourism Management*, 36, 86-98.
26. Flint, D. J., Lusch, R. F., & Vargo, S. L. (2014). The supply chain management of shopper marketing as viewed through a service ecosystem lens. *International Journal of Physical Distribution & Logistics Management*, 44(1/2), 23-38.
27. Frow, P., McColl-Kennedy, J. R., & Payne, A. (2016). Co-creation practices: Their role in shaping a health care ecosystem. *Industrial Marketing Management*, 56, 24-39.

28. Frow, P., McColl-Kennedy, J. R., Hilton, T., Davidson, A., Payne, A., & Brozovic, D. (2014). Value propositions: A Service ecosystems perspective. *Marketing Theory*, 14(3), 327-351.
29. Gummesson, E. (2002). Practical value of adequate marketing management theory. *European journal of marketing*, 36(3), 325-349.
30. Hitt, M. A., Bierman, L., Shimizu, K., & Kochhar, R. (2001). Direct and moderating effects of human capital on strategy and performance in professional service firms: A resource-based perspective. *Academy of Management journal*, 44(1), 13-28.
31. Kaartemo, V., Akaka, M. A., & Vargo, S. L. (2017). A Service-Ecosystem Perspective on Value Creation: Implications for International Business. In *Value Creation in International Business* (pp. 131-149). Springer International Publishing.
32. Kale, P., Singh, H., & Perlmutter, H. (2000). Learning and protection of proprietary assets in strategic alliances: Building relational capital. *Strategic management journal*, 217-237.
33. Kawulich, B. B. (2005, May). Participant observation as a data collection method. In *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* (Vol. 6, No. 2).
34. Kothari, C. R. (2004). *Research methodology: Methods and techniques*. New Age International.
35. Kruppke, H., Otto, M., & Gontard, M. (2006). *Human Capital Management*. Springer Science & Business Media.
36. Leitner, K. H. (2004). Intellectual capital reporting for universities: conceptual background and application for Austrian universities. *Research Evaluation*, 13(2), 129-140.
37. Lella, G., Fischetto, A., Cesarotti, V., Spohrer, J. C., Ren, G., & Leung, Y. (2012, July). Universities as complex service systems: External and Internal perspectives. In *Service Operations and Logistics, and Informatics (SOLI), 2012 IEEE International Conference on* (pp. 422-427). IEEE.
38. Loia, V., Maione, G., Tommasetti, A., Torre, C., Troisi, O., & Botti, A. (2016). Toward Smart Value Co-education. In *Smart Education and e-Learning 2016* (pp. 61-71). Springer International Publishing.

39. Longhurst, R. (2003). Semi-structured interviews and focus groups. *Key methods in geography*, 117-132.
40. Lu, W. M., Wang, W. K., & Kweh, Q. L. (2014). Intellectual capital and performance in the Chinese life insurance industry. *Omega*, 42(1), 65-74.
41. Luthans, F., & Youssef, C. M. (2004). Human, social, and now positive psychological capital management:: Investing in people for competitive advantage. *Organizational dynamics*, 33(2), 143-160.
42. Madhavaram, S., & Hunt, S. D. (2017). Customizing business-to-business (B2B) professional services: The role of intellectual capital and internal social capital. *Journal of Business Research*, 74, 38-46.
43. Madhavaram, S., & Hunt, S. D. (2017). Customizing business-to-business (B2B) professional services: The role of intellectual capital and internal social capital. *Journal of Business Research*, 74, 38-46.
44. Meynhardt, T., Chandler, J.D. and Strathoff, P. (2016), "Systemic principles of value co-creation: Synergetics of value and service ecosystems", *Journal of Business Research*, Vol. 69, No. 8, pp. 2981-2989.
45. Mincer, J. (1958). Investment in human capital and personal income distribution. *Journal of political economy*, 66(4), 281-302.
46. Nahapiet, J., & Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of management review*, 23(2), 242-266.
47. Ordóñez de Pablos, P. (2004). Measuring and reporting structural capital: Lessons from European learning firms. *Journal of Intellectual Capital*, 5(4), 629-647.
48. Palacios, T.M.B. and Galván, R.S. (2006), "Intellectual capital within Iberian municipalities (network)", *Journal of Knowledge Management*, Vol. 10 No. 5, pp. 55
49. Paloma Sánchez, M., & Elena, S. (2006). Intellectual capital in universities: Improving transparency and internal management. *Journal of Intellectual Capital*, 7(4), 529-548.
50. Paloma Sánchez, M., Elena, S., & Castrillo, R. (2009). Intellectual capital dynamics in universities: a reporting model. *Journal of Intellectual Capital*, 10(2), 307-324.
51. Ramírez, Y., Lorduy, C., & Rojas, J. A. (2007). Intellectual Capital management in Spanish universities. *Journal of Intellectual Capital*, 8(4), 732-748.

52. Riedl, C., Boehmann, T., Leimeister, J. M., & Krcmar, H. (2009). A framework for analysing service ecosystem capabilities to innovate.
53. Schröter, D., Cramer, W., Leemans, R., Prentice, I. C., Araújo, M. B., Arnell, N. W., ... & Anne, C. (2005). Ecosystem service supply and vulnerability to global change in Europe. *science*, 310(5752), 1333-1337.
54. Skaggs, B. C., & Youndt, M. (2004). Strategic positioning, human capital, and performance in service organizations: A customer interaction approach. *Strategic Management Journal*, 25(1), 85-99.
55. Spradley, J. P. (2016). *Participant observation*. Waveland Press.
56. Stewart, T., & Ruckdeschel, C. (1998). Intellectual capital: The new wealth of organizations.
57. Sullivan, P. H. (2000). Value driven intellectual capital: how to convert intangible corporate assets into market value. John Wiley & Sons, Inc..
58. Sydler, R., Haefliger, S., & Pruksa, R. (2014). Measuring intellectual capital with financial figures: Can we predict firm profitability?. *European Management Journal*, 32(2), 244-259.
59. Thomas, R. (2001). *U.S. Patent Application No. 09/877,474*.
60. Troisi O., Carrubbo L., Maione G., Torre C. (2017). Unity is Strength: Co-Creating Value in Working Context. *Journal of Business and Economics*, ISSN 2155-7950, USA January 2017, Volume 8, No. 1, pp. 97-104
61. Troisi, O., Carrubbo, L., Maione, G., & Torre, C. (2016). The more, the merrier: co-working as practical expression of value co-creation in sharing economy. *Tiziana Russo-Spena and Cristina Mele*, 1130.
62. Vagnoni, E., & Oppi, C. (2015). Investigating factors of intellectual capital to enhance achievement of strategic goals in a university hospital setting. *Journal of Intellectual Capital*, 16(2), 331-363.
63. Vargo, S. L., & Lusch, R. F. (2011, June). Service-dominant logic: Looking ahead. In *Presentation at the Naples Forum on Service, June* (pp. 14-17).
64. Vargo, S. L., & Lusch, R. F. (2016). Institutions and axioms: an extension and update of service-dominant logic. *Journal of the Academy of Marketing Science*, 44(1), 5-23.

65. Vargo, S. L., Wieland, H., & Akaka, M. A. (2015). Innovation through institutionalization: A Service ecosystems perspective. *Industrial Marketing Management*, 44, 63-72.
66. Veltri, S., Mastroleo, G., & Schaffhauser-Linzatti, M. (2014). Measuring Intellectual Capital in the university sector using a fuzzy logic expert system. *Knowledge Management Research & Practice*, 12(2), 175-192.
67. Wang, W. Y., & Chang, C. (2005). Intellectual Capital and performance in causal models: Evidence from the information technology industry in Taiwan. *Journal of Intellectual Capital*, 6(2), 222-236.
68. Whiting, L. S. (2008). Semi-structured interviews: guidance for novice researchers. *Nursing Standard*, 22(23), 35-40.
69. Wieland, H., Polese, F., Vargo, S., & Lusch, R. (2012). Toward a service (eco) systems perspective on value creation.