

**IL GOVERNO AZIENDALE
TRA TRADIZIONE
E INNOVAZIONE**

**a cura di
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**Società Italiana di Ragioneria
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NEW BUSINESS MODEL FOR VALUE CO-CREATION IN SMARTER UNIVERSITIES¹

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1. Introduction

In the last decade, some technological innovations and, in particular, web-based tools that facilitate interconnection, networking and sharing between people and groups (Mancini, 2016) have introduced some changes in the business model of organisations, including universities. In such context, new technologies have been the tool to improve data management and information transparency. Moreover, technology has also represented a means to provide new and additional services or revise the way to deliver traditional services (e.i. distance learning, etc.), or a tool for easily collecting data and information on universities' activities.

The implementation of these new technologies in the universities has led to the development of a new business model called "smart university". Some scholars describe the smart university as a digital platform that gathers essential information for the analysis and improvement of teaching quality and learning processes, the elimination or automation of no added value activities, and the production of useful data to improve decision making (Coccoli et al., 2014; Roth-Berghofer, 2014). However, the smart university model seems to be simplistic because it only considers the technological variable as the key driver of change, in interpreting the role of universities in modern society.

The recent economic and financial crisis have drawn the attention of European and national politicians on social issues, on innovation needs and on transparency of management processes, even in universities. Their initiatives emphasises the pivotal role of universities to contribute to the economic and social development (Europe 2020, Law 240/2010 and Legislative Decree n. 10/2012). Teaching, research and technology transfer are not seen as three independent and distinct moments of university business model, but as processes that must be conducted in cooperation and co-creation with several actors such as public administration (local and national institutions), companies and local community (EUA, 2014). In Italy, in

¹ Sections 1 and 5 are written jointly by the three authors, while section 2 can be attributed to Mancini, section 3 to Piedepalumbo and section 4 to Lamboglia.

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particular, the universities have been involved in a reform process that has redefined the organizational structures, the administrative and accounting processes and the assessment procedures for the allocation of government funding (Bonollo, Lazzini, & Zuccardi Merli, 2016; Giovanelli, Rotondo, & Caffù, 2016). The aims of the reform was to introduce a managerial approach based on efficiency, effectiveness, and transparency. Some studies investigate how information technology has been applied to administrative processes for financial performance measurement (Bonollo, Lazzini, & Zuccardi Merli, 2016; Paolini, Soverchia, 2015) and to operational processes for teaching and research performance measurement (Giovanelli et al., 2016, Cantele, Martini & Campedelli, 2012; Giuliani & Marasca, 2015; Greco, 2014; Rusconi, 2014).

When looking together at the use of web technology (Gontar et al., 2013; Lombardi et al., 2012), and the emphasis on social aspects and innovation development, the university have to rethink to their business model shifting into the so called “smarter university” model. (Coccoli et al., 2014).

Literature has not adequately investigated how universities can manage those concepts in an integrated way. While research on sustainability have analysed the relevance of social reporting in the universities, studies on IT have focused on the role and on the implementation of new technologies in several university’s activities, such as teaching, administrative processes, accounting and transparency procedures. The actual way through which university combine these aspects is still relatively unexplored.

Even if the concept of smarter university is not yet clearly defined, several studies identify three features:

- a) web and digital technologies are tools to realize a smart model in which universities manage strategic and operational processes in a collaborative environment;
- b) universities play a crucial role not only in the traditional field of education and research, but also in the social, cultural and economic development;
- c) universities support the co-creation of learning and research contents through working in collaboration with other organizations (national institutions, companies and local community).

Responding to this gap, the aim of this paper is to build and discuss a new business model for the smarter universities, which can integrate social, economic and sustainability drivers exploiting at the maximum level the potentialities of smart technologies in order to value co-create for all the stakeholders involved. We believe that the integration of all these elements is crucial for making a smarter university successful.

The question we seek to answer in this article is:

How can universities integrate economic, social, sustainable and technological aspects in a view of value co-creation and represent it in a Smarter New Business Model?

This paper is organised in five sections, including this introduction. Section 2 starts to analyse the concept of “smart” and arrives to define the features of the smarter university. In the third section, we consider the Triple Helix and the Quadruple Helix models in order to interpret the new role that the university have in the last years. The fourth section describes the new business model for the smarter university, presents the scope of the framework, its components and the relationship between them. In the last section, we summarize the conclusions of the study and some considerations for further research.

2. Universities as smart organisations: technology as a key driver

The word “smart” indicate the way in which emerging technologies, nanotechnologies and innovations are changing how we live, work, and spend our freedom time. (Gil-garcia, Helbig, & Ojo, 2014).

The term more developed in relation to smart is “smart city”. In recent years the concept "smart" has been used for the cities that, according to a theoretical simplification, is the adaptation of the city to the technological process through the use of ICT tools, communication, networks (Gil-garcia et al., 2014).

In general, Smart organisation are assessed by four criteria: efficiency, effectiveness, transparency and collaboration. All these criteria can be viewed from both internal (operational management inside organization) and external views (interactions with citizens, stakeholders and any other relevant non-governmental parties) (Nam & Pardo, 2011). Efficiency can be conceptualised as the combination of internal managerial efficiency in terms of processes and activities and service-oriented efficiency in producing and delivering public services to citizens. Regarding effectiveness, internal managerial effectiveness is about how smart organization initiatives improves the quality of internal management in government organizations, while service-oriented effectiveness is about how the smart organization initiative improves the quality of services delivered to citizens by enhanced communications and interactions with them.

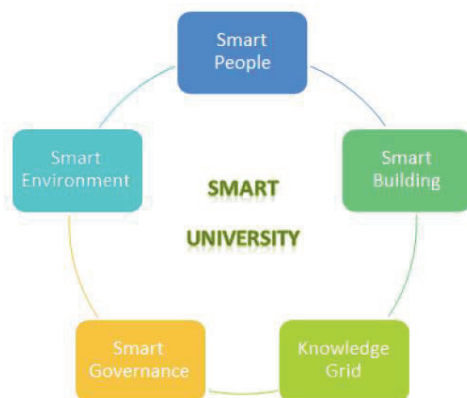
Transparency and collaboration are two of the important success factors for smart organizations initiatives. Internal transparency refers to

transparency in various process and integration across government organizations, and external transparency refers to accessibility of information and decision processes for stakeholders. Smart organization can be a “laboratory for collaboration”. While internal collaboration refers to collaboration between public organizations, external collaboration regards relationship between government and non-governmental parties including organized groups (companies, non-profits and civic groups) and individual citizens.

The city becomes the centre of gravity of a knowledge economy, in which the role of universities cannot be excluded by the increase of knowledge useful to change the citizens (Agnello, 2013). Universities acquire a central role in the interaction between institutions, individuals and companies resulting in innovation processes; economic development goes through a constant exchange of information and knowledge at the local level.

Based on the assumptions of the group of specialists, IBM attempts to outline the concept of smart cities, defined as: "the integration of infrastructure: physical, social, business and IT" (Harrison et al., 2010). By analogy we can apply the five elements, that Owoc and Marciniak (2013) identify as relevant for the concept of smart city, to the concept of smart university (fig. 1).

Figure 1- Smart university context (Marciniak & Owoc, 2013)



In order to be smart, the university must be intelligently managed; this means that managers must consider university as a system which include: human and social capital (people smart), physical infrastructure (smart

building), an infrastructure of integrated information (knowledge grid), strategic decision-making (smart governance) and aspects related to environmental protection (smart environment). Smart universities should also have:

- Group work, based on the smart infrastructures, where smart people cooperate. These tools help to improve the efficiency.
- Complex interaction, including the smart management of resources, equipment and utilities.
- Full integration of the supporting infrastructure.
- Innovation, which covers all activities of universities in order to spread the use of new technology.

3. Universities as smarter organisations: value co-creation as a key driver

According to the Europe 2020 strategy, universities should be recognized as vital partners for the economic and social growth of regions thanks to their role in research and innovation. In other words, there is an increasing emphasis on the function of universities beyond the "one" core activity of teaching and research. For this reason, universities are engaging in learning and co-production of knowledge beyond their walls, trying to transfer discoveries beyond the academic community, aiming to spill benefits directly over the civil society. This maybe the answer to local communities and taxpayers request for the “value” of universities, in the face of difficult economic situations. Thus, universities have to prove their value in terms of contributions and benefits for society (Kempton, Goddard, Edwards, Hegyi, & Elena-pérez, 2013).

The mode of interactions between the parties and the interdependencies between key players are been presented in the triple and quadruple helix models, which we consider to interpret the new role of universities.

The Triple Helix model (Etzkowitz & Leydesdorff, 1995) focuses on relationships between universities, government and industry. These actors operate on the same level, in a joint model, able to bring out a hybrid organization that develop innovation thanks to the interaction of knowledge and skills possessed by the three actors.

The triple helix: “[...] comprises three basic elements:

- (1) A more prominent role for the university in innovation, on a par with industry and government in a knowledge-based society.
- (2) A movement toward collaborative relationships among the three major institutional spheres, in which innovation policy is increasingly an outcome of interaction rather than a prescription from government;

(3) in addition to fulfilling their traditional functions, each institutional sphere also ‘takes the role of the other’ performing new roles as well as their traditional function. Institutions taking non-traditional roles are viewed as a major potential source of innovation in innovation” (Triple Helix Conference website, 2011).

The main feature of the Triple Helix model is that each actor carries out its traditional tasks (core activities) and can take the role of others (as secondary activities). Universities, for example, maintain the traditional roles of teaching and research, but also dedicate the effort to capitalization of knowledge, patents and start-ups.

Another feature is the kind of interaction between universities, industry and government system: the interconnection and the overlap between the three actors determine a spiral influence on their behaviours.

The triple helix model has been developed over time. At the beginning, it has been investigated by two opposing viewpoints: the statist model and the laissez-faire model. In the statist model, the government controls both academia and industry and it should take the lead in the development of projects and provide resources for new technologies. In the laissez-faire model, however, industry, academia and government are separate and independent of each other. Recently, literature has proposed a new model: the balanced model (Cai & Liu, 2015). In this framework, the three spheres overlap and collaborate. This model is preferable as the balanced configuration offers the most important insights for innovation, because the most favourable environments for innovation are created around the intersections of the spheres.

These three actors, which originally operated independently, tend to work jointly, generating several overlapping and continuously reformulating the institutional arrangements between them.

Another evolution of the Triple Helix model, is the “Quadruple Helix”. According to the innovative theory of quadruple helix, the economic structure of a country is based on four pillars: academia, industry, government, and civil society. A fourth actor (civil society) is introduced because of it is always looking for innovation both in goods and in services. Literature, however, has not yet investigated this kind of model, in particular the relationships between the four helices (Afonso, Monteiro, & Thompson, 2010).

The triple helix model formalizes the role of universities in knowledge building communities, seeing universities as more and more "entrepreneurial" institutions able to develop infrastructure and knowledge for the innovation processes through a strategic internal reorganization

(Huggins & Johnston, 2009). With the emergence of the knowledge economy, the role of universities has become increasingly significant. Universities today are seen as powerful engines of innovation and change in the field of science, technology and other creative disciplines. Universities and other higher education institutions, are considered as the main source of knowledge for use in the pursuit of economic growth

Also in the documents of the EU 2020 strategy, we find a lists of contributions that the university could make. These include:

- the definition of a regional smart specialization strategy, contributing to a rigorous assessment of knowledge;
- through their teaching programs, universities can improve the skills and competencies of staff, through training, advisory services;
- they can contribute to capacity building through training of new businesses;
- universities can play an important role in building social relationships that are the basis of the regional innovation system.

Considering the triple and quadruple helix model and the indication presents in the document of EU 2002, we can affirm that Universities have the ability to produce economic and social benefits. These processes should, therefore, be more widely promoted and built with the new impetus provided by the smart specialization.

4. The Smarter New Business Model

The business model concept has evolved over time. Its initial definition considers a business model as an archetypal and a tool able to describe “the design or architecture of the value creation” in a firm. It takes into account and represents all the mechanisms that a company uses to capture and deliver value from the understanding of customers’ needs, passing across the definition of the company’s response, to converting payments into profits (Teece, 2010).

Later, scholars start to investigate business model for sustainability considering when a company adds sustainable aims into its value chain. Some key elements are added to the initial definition of business model to arrive at a new version (Schaltegger, Hansen, & Lüdeke-freund, 2015):

- a) it describes not only how a company captures and delivers value, but also how value is managed, analysed, and communicated;
- b) It includes not only economic value but also social and ecological values;
- c) It shows how value is created not only for customers, but also for all other stakeholders.

Moreover, literature develops some considerations on business model related to innovation (Wagner & Svensson, 2015) and company boundaries (Boons & Lüdeke-freund, 2013). The pursue of sustainable aims and the adoption of technological innovations introduce, into the second business model concept, a broad perspective in which value creation overcomes corporate boundaries and asks strong commitment of certain kind of stakeholder as suppliers and customers.

In our opinion, the application of the business model concept in understanding the university's value creation model, can lead a step forward in the evolution of the business model concept. In previous sections of this paper, we highlight that universities are recently moving from the traditional way to manage their business to a new one. Traditionally, universities are higher educational and research institutions where core processes are teaching and research. Universities carry out their core business interacting with government and industry in order to collect financial funds and to transfer innovative research. Generally, university, government, and industry develop their business independently from each other, they do not manage their business activities in a systematic and synergic way, in fact universities' research and education programmes are often curiosity driven and not related to local needs; while regional authorities' initiatives are usually demand driven. Recently, a growing number of studies and practical documents (Coccoli et al., 2014; Marciniak & Owoc, 2013; European University Association, 2014) stated that university should be seen in an holistic way in conducting its "three main missions: teaching and education, research and creation of knowledge, regional and social development" (European University Association, 2014: 15). Literature deals first with the concept of smart university, and after with the concept of smarter university, on which this research paper is mainly focus.

As described in detail in previous sections, smarter university come from the convergence of the following elements:

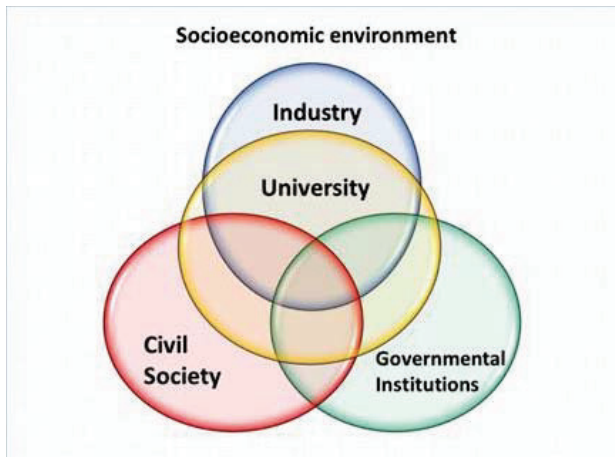
- an integrated and multidimensional definition of the value creation proposition that considers not only economic, efficiency and effectiveness in managing teaching and research processes, but also social and sustainability aims concerning economic, cultural and social developments of a region;
- an inclusive way to manage core business processes (education, research, third mission), based on a systematic partnership with key actors of the local environment, namely governmental institutions, industry and civil society. Among these four actors, partnership is based on co-creation processes realised through inter-organisational

relationship (dyadic, or triple or quadruple relationships) developed inside the business network. University plays a focal role in the network, involving and interacting with each partner in managing its core business processes along the following activities: mining, defining, designing, delivering, analysing, and communicating.

- an integrative, intelligent and generative way to consider the role of information and communication technologies, in particular smart technologies (web site, social network, digital platforms, intranet, groupware, semantic web, smart devices, internet of things, and so on). Smart technologies are not only a grid useful to restyle the existing business model, but also a pivotal and fundamental infrastructure to develop the smarter university business model. They are used to actively engage key stakeholders; easily manage co-creation in core business processes; establish a smart governance and management; sharing, and spreading different kind of knowledge (concerning teaching, research, administrative, and operational processes).

Figure 3 shows the central role of university in the smarter network. Overlapping areas are fields of co-creation, in fact they identify core processes or activities managed through dyadic or triple or quadruple inter-organisational relationship; while not overlapping areas comprehend activities managed outside the network.

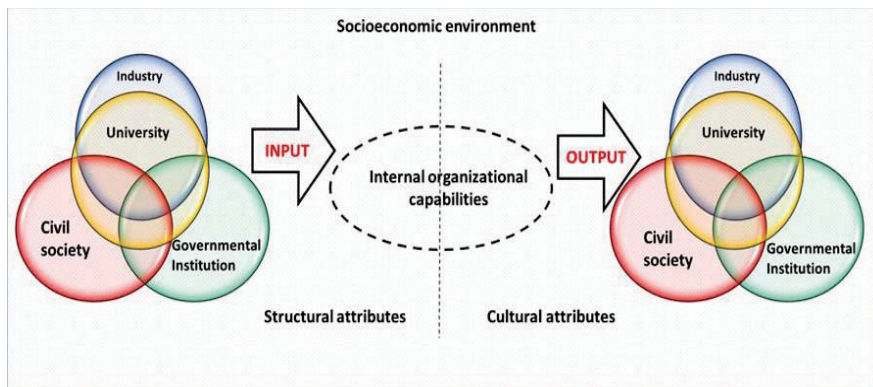
Figure 3- The role of university in the smarter network



The research question of this work concerns how universities can integrate social, cultural and sustainability drivers in their business model exploiting at the maximum level the potentialities of smart technologies and co-creation of production.

We can introduce the Smarter New Business Model (SNBM) (Figure 4) as an archetypal and a tool able to describe the business value proposition in firms where economic, social, cultural and sustainability aims are jointly and holistically managed through smart technologies inside an interconnected and ubiquitous inter-organisational network.

Figure 4- Smarter New Business Model



The SNBM concept is articulated in the following elements:

- 1) Smarter Value proposition: it describes the value that smarter university is able to co-create and deliver in its core activities/services that are education, research and dissemination. Its identifies the value coming from the university's strategic vision, based on its pivotal role in economic, social and cultural development of the region in which it decides to compete and on its ability to integrate with smart technologies education, research and dissemination beyond its boundaries (Donoghue & Kennerley, 2008). The value proposition contains at the same level economic, cultural, social and sustainability values.
- 2) Smarter Sources: it includes activities and resources (Wagner & Svensson, 2015). A smarter university deploys its core business through processes of key activities, managed with a pervasive and systemic adoption of smart technologies. For each business area, ICT

is an effective grid useful to perform the following activities in a collaborative environment (Figure 6):

- a. mining, it is a systematic and continuous process aiming at discover university and partners needs in order to define a shared vision and a clear roadmap;
- b. defining, classifying educational and research needs;
- c. designing smart educational and research programme;
- d. delivering the output of educational and research activities;
- e. analysing in details results and outcome of smart processes;
- f. communicate and share through open tools, educational and research results.

A smarter university realises its core business utilising some resources or inputs, they include structural and cultural attributes, from one side; internal and organisational capabilities and socioeconomic environment, from the other (Boons & Lüdeke-freund, 2013). The first ones are material and immaterial assets that constitute the structure of the smart university. They include:

- a) smart technological grid, as hardware and software devices and tools strictly interconnected;
- b) smart building designed coherently with green and ecological aims;
- c) smart people, as teachers, students, administrator, customers, suppliers, managers and other people that interact and co-create educational and research services with university using smart technologies.

The second prerequisite are internal and organisational capabilities and socioeconomic environment, they include:

- a) smart government and management which identify the ability of the university to activate strategic decision making processes. In this context the use of technology in business internal processes becomes a tool to enhance the skills and knowledge within the organization and to increase the level of integration among components of the organization;
 - b) smart environment.
- 3) smarter Financial Model: it reflects the equitable distribution of costs, specific investments, return and benefits (Birnbirg, 1998; Ring et al., 1995) among the actors of the smarter university business network (University, Governmental Institutions, Industry, Civil Society).

Figure 5- Activities flows in the smarter university



5. Conclusions and discussion

The paper presents and discusses a new business model for the smarter universities. The framework aims to interpret changes involving universities, and to integrate social, economic and sustainability aspects of the smarter universities in a view of value co-creation.

The paper presents theoretical and practical implications.

Firstly, we contribute to the literature providing insights into the ways in which studies regarding smarter universities currently lacks attention towards aspects that are crucial for a their successful management. Secondly, we propose a research agenda for smarter universities that incorporates the elements of the new business model.

The research is also relevant for practitioners. The new business model perspective reveals a number of new components and characteristics that need to be actively managed to create value by integrating social, economic and technological issue and sustainability. We aspects. The model could be used as a toolkit by managers in planning, implementing and assessing business practices in smarter universities, in terms of context (who e where) and process (how and what).

To build the model we adopt a theoretical approach based on a literature review. Future developments of the research will consider empirical case studies in order to deeply investigate this phenomenon and test the model.

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