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Abstract

In recent years, in relation to socio-economic and legal-institutional changes, universities faced a significant internal change that contributed to deepen the crisis of the traditional teaching-learning structure. This change can be understood within the broader transition from modern society to post-modern society, characterized by a double recurrence: the paradigm change from a rational and linear vision to an unidirectional relationship between system and actor; the strategic weight held by information, in the “knowledge society”. In this framework, we can understand the lively debate within the academy that develops under the label of “Third University Mission”, aimed to understand how the enhancement of economic and social outcomes of scientific and technological research is possible.

Keywords: Third mission University, policy development, research and innovation.

Introduction

In recent years, in relation to socio-economic and legal-institutional changes universities faced a significant internal change that contributed to deepen the crisis of the traditional teaching-learning structure. The assertion of a university of mass, the proliferation of degree courses, the gradual reduction of resources allocated to research, the development of scientific and technological research require to outline new strategies of governance in the university. This change can be understood within the broader transition from modern society to post-modern society, characterized by a double recurrence: the paradigm change from a rational and linear vision to an unidirectional relationship between system and social actor; the strategic weight held by information in the “knowledge society”. In this framework, we can understand the lively debate within the academy that develops under the label of “Third University Mission”, aimed to understand how the enhancement of economic and social outcomes of scientific and technological research is possible. The essay is the result of working progress research on the development of the Third University Mission in Italy¹. However, here we focus on a theoretical reflection. Given the importance of these issues, the author focuses on the definition of the most important scenarios of change contributed to this process (§ 2). Then, she reflects on the social mandate assigned in the twenty-first century to the University (§ 3) and the different ways in which this can be explained (§ 4). The author concludes the work with some brief reflections on the complex relationships between innovation-research and development.

¹ The case study, not yet completed, refers to the institution of a Science Park office at the second university in the city of Rome. In this analysis, particular attention is reserved to the promotion of university spin-offs and start up businesses.

1. The trajectories of change

For a long time, the process of scientific and technological development has been attributed to the intuition of men of genius capable to conduct complex research in the silence of their laboratory, in a cultural climate where companies were seen as an obstacle to research. In this perspective, science and technology showed a kind of superiority and they were conceived as something far away from the understanding of the layman. However, the technological development of the 900s challenged this view, leading finally to the rupture of institutional and ideological boundaries that have always ensured a strict separation among science, technology and society. Over the last 20 years a new sensitivity to the social dimension of science has been established. This process had as a consequence focused attention toward the control of various social, communication and decision dynamics which render knowledge possible (D 'Andrea, 2005, p. 11).

This change can only be understood within the broader transition from modern society to post-modern society, characterized by a double recurrence:

1. the paradigm change from a rational and linear vision to an unidirectional relationship between system and actor;
2. the strategic weight held by information in what Castells (2004, 2006, 2009) defines the information society: informational, networked and global. And it is the delicate intersection of these three immaterial factors that contributes to new knowledge and competitiveness in the context of global relations.

Nevertheless, our knowledge of the complex relationships among science, technology and society² is still partial. The effort made over the past fifty years has been precisely to get inside the black box (Latour, 1987) research to understand the nature of these interactions.

In fact, social sciences have always had a subordinate role compared to the natural sciences. However, it is becoming a vast movement of ideas in which social sciences can be a valuable support to the natural sciences, in particular for all those relational, diffusion and organizational management aspects that accompany any research path. This change of perspective takes place within a new cultural climate that recognizes complexity³ as the dominant feature of life that unfolds around us, requiring new interpretive, research and organization strategies. In the wake of these changes new management models are gaining ground. They aim to enhance cooperation, creativity and interdisciplinarity, leading the traditional top-down type organizational models to find new forms of self-organization.

The University and its role in knowledge production⁴ has also been affected by this transformative process (AA.VV. 2008) that aims to bring out the value of external weak links (Weick, 1976) that the university is able to activate in order to support and disseminate scientific and technology research results. In this framework, we can understand the lively debate within the academy that develops under the label of "Third University Mission" (Slipersaete, Gulbrandsen, 2007), aimed to understand how the enhancement of economic and social outcomes of scientific and technological research is possible (Feldman, Desrochers, 2003). The third mission of the university is based on the principle of "science for development" produced in the space of world polity of science (Drori et. Al., 2003), which had its most articulate theoretical elaboration in

² STS is a new and expanding subject. It emerged from the confluence of a variety of disciplines and disciplinary subfields, all of which had developed an interest in viewing science and technology as socially embedded enterprises.

³ The complexity theory explains complex systems (as well as social ones) as systems whose dynamics and performance are the result of the interaction between spontaneous and many different actors, who co-evolve by moving within a changing competitive environment. The complexity theory explains that such systems are open, that interact with the environment and consist of networks of more or less complex components that interact locally and in a non-linear way. Key elements of these systems are: redundancy, that is, no element is essential because it lacks a specialization unifunctional; resilience, as a resistance to perturbations; adaptive capacity, indicating adaptation to the environment; self-organization that comes from below, activated by the same system components.

⁴ One of the most important steps in this debate was the Bologna process that produced The **Bologna declaration** (Joint declaration of the European Ministers of Education convened in Bologna on the 19th of June 1999). It proposed an European Higher Education Area in which students and graduates could move freely between countries. The principal aims agreed were: a) the adoption of a system of easily readable and comparable degrees; b) the adoption of a system essentially based on two main cycles: undergraduate and graduate.

Gibbons' works (1994), in reference to the new way to produce knowledge; and in Etzkowitz Leydesdorff's works (2000) concerning the model of the "triple helix"⁵. Within this debate, the university and its function of generation, transmission and transfer of scientific knowledge is considered essential for development and competitiveness (Etzkowitz, 1997; Etzkowitz, Leydesdorff, 1997). In this regard, however, it is important to remember that there is insufficient empirical evidence that can prove the existence of generally applicative positive effects on economic growth, for scientific research and training of human capital (Drori et. Al., 2003). Indeed, perverse effects, such as the "waste of talent" (Collins, 1982), are always possible.

2. Toward what kind of universities are we heading?

Changes in the regulatory and institutional systems of the most developed countries have produced remarkable effects on the overall education system, including tertiary education. In particular, we can observe, the weight taken, in recent years, by principles of new public management which aim to introduce into universities, albeit with necessary modifications, effectiveness, efficiency, quality and competitiveness principles. These important changes determined a reconsideration of the role and the mission of the university in view of a greater integration and openness to the territory. In fact, in the knowledge economy, the driving force of economic and social development lies in the continuous production of new knowledge as a factor capable to produce innovation⁶ and technological development. This rhetoric penetrated in a meaningful way in the common debate that one tends more and more to speak of university of knowledge. By this, we mean a renewed education system that is able to become an active factor in the development and promotion of the area. This renewal process has been widely supported and encouraged by comunitary policies which, at the end of the 80s, tended to privilege the local dimension as a terminal of development that need to be invigorated, this through decentralization processes and towards which targeted interventions should be oriented⁷. This trend has been transposed into the Italian legislation, from the second half of the 90s on.

In Italy, in the absence of specific regulations and specific guidelines, we observed a remarkable variety of solutions that brought to experiment models, tools and organizational choices of various kinds, both regionally and within single universities. In Italy, in particular, this development took place in a disorganized and poorly integrated way, which led to confusion in the minds of the people responsible for technology transfer and local development. In fact, we can see the proliferation of places and players of governance. The positive element that emerge from this state of matters is both the variety of experiences and the diffusion of university spin offs⁸. For these reasons, it would be interesting to conduct an analysis of best practices, in order to assess their transferability in other contexts.

3. What is the current role for universities?

Historically, universities were founded and have been institutionalized on the basis of their primary goal: spreading the first high-level training and training the country's ruling class. Shortly after, a second objective added to this, that of the discovery-oriented research. With rare exceptions, these two lines of action developed in parallel with little cross-contamination, in line with a conventional deterministic and linear logic, based on the separation between theoretical acquisition and practical application. Due to the influence of a pervasive "Fordistic" logic

⁵ See also the debate on the relationship between technology, innovation and policy (Shapira, Kuhlmann, 2003; Molas-Gallart, 2006; OECD 2007).

⁶ Schumpeter (in Fagerberg, Mowety, Nelson, 2007) distinguishes five types of innovation: introduction of a new product; introducing a new method of production; exploitation of new markets, conquering of new source of supply of raw materials or intermediate goods; alternative ways to organize a business.

⁷ An interesting benchmarking of RTD policies in Europe is offered by Larédo (2001)

⁸ An interesting study about the University spin-off firms in Europe is available in Mustar, Clarysse, Wright (2007). Mustar, et.al. (2006).

characterized by compartmentalized organization, teaching and research tended increasingly to separate two distinct missions, establishing itself as a university rather than as a single and articulated strategy for the promotion of a single objective: scientific culture. In this view, which remained unchanged in the education system at least until the late 90s, the idea of a University capable of acting in a logic of diffusion, technology transfer and promotion is completely absent. Nevertheless, today, we observe a vast movement of ideas that assigns to Universities a participation role in local, national and global economic development. The result of this vision is the increasingly popular need to trigger a virtuous cycle among teaching, research, innovation⁹ and economic-productive system¹⁰.

However, in order to trigger virtuous circles where “third university mission”¹¹ can be realized or, rather, where universities can serve as a local development actor, through the dissemination of scientific and technological culture, it ‘s necessary to activate an integrated strategy where teaching, research and dissemination converge in a single development university project. This, however, requires a radical change, not a university enclosed in its borders, “an ivory tower”, organized on a taylorfordist and non-communicative logic, based on distinct lines of implementation:

- a) a teaching that aims to allow a growing number of students to finish school or graduate from university without looking to the coherence between training and market labour needs;
- b) a research (basic and advanced) that tends to respond to a “local demand” without considering (or doing so only in a casual and insignificant way) any links with the world ‘s economic production.

This is a self-empowered university, which lives to serve the interests of the academy and their lobbies without being concerned of the output production. From all this, as evidenced by the economic crisis of these past years, we can imagine a significant disconnection between the outgoing training profiles and the needs expressed by the world of work, as well as a strong gap between production and demand of scientific and academic research and technology expressed by economic sector and industry.

At present, however, the concept of the “third university mission” appears very complex to define, just as an analysis of the relevant literature tends to highlight (OECD 1996, 2002, Foray, 2004, 2008; Malerba, 2000; Netval, 2006). From this derives the difficulty to study the different ways through which to begin a monitoring and evaluation process of this sector with regard to their services and activities¹². In general, with the concept of “third university mission” we refer to the promotion of interventions that are capable to promote and disseminate research results; so that they contribute to the socio-economic development of territories in a local and national key. However, the type of interventions and the way in which these activities are managed, is very complex and not yet sufficiently studied and evaluated.

Although, in absence of both a system vision and a defined address line, we can see in the regulatory measures¹³ of the last ten years the tendence to stimulate universities to assume a mediation and a promotion role in the local economic development. One of the most important trends consist in Science Parks experiences which have the aim to favour the University role in the local development project¹⁴. The result of this vision is the increasingly popular idea, according to which a virtuous cycle that is able to integrate different knowledge, perspectives and skills, needs to be triggered. In fact, in the postmodern society the idea that innovation occurs in border interstices among interconnections of three systems historically distinct and not communicating with each other, education, university and work, is wide spread¹⁵. Under these changes, even in

⁹ Regarding the innovation concept see, among others, Von Hippel (1988); Stokes (1997).

¹⁰ Regarding *Strategic Management of University Research Activities* see also Schoen, A. *et al.* (2006).

¹¹ Regarding Third Mission of Universities see , among others: Larédo (2007); Frank *et. Al.* (2007),

¹² A useful try to measure Third Stream Activities is offered by Molas-Gallart *et. Al.* (2002).

¹³ Both of which are in a logic of decentralization and administrative simplification: Law 59/97, Law 196/97, Law 341/1990, Law 30/2001, etc..

¹⁴ A very interesting reflection has been offered by Allen (2007): http://www.google.it/search?client=safari&rls=en&q=%09Allen,+J.+%282007%29+Third+Generation+Science+Parks,+Manchester,+Manchester+Science+Park.&ie=UTF-8&oe=UTF-8&redir_esc=&ei=v4VwT-CcFo7FswbSjrnRAG.

¹⁵ For a sociological theory of innovation see, among others, Mako Hill (2010).

Italy, albeit later than in other situations, university reforms were geared towards greater autonomy and openness towards the economy system, registering a certain increase and improvement of relations between the universities and the economic world (Anselin, Varga, Acs, 2002; Silvani, 2008). For this reason, it seems important to understand how we may conceptualize and organize relationships between universities and economic system; because different ways to interpret and organize “third university mission” and different organizational models may result from here.

4. Reflecting on steps universities can take

The great number of difficulties that one may encounter on the path of the research are often interpreted as a sign of decline that involves both the scientific and the technological system and the territory. Research problems, however, are often attributed to lack of resources. Actually, adequate funding and sound policies, would not be sufficient if they didn't also deal with many problems affecting the quality of research. Some of these problems are: the design of research programs, the establishment and operation of research networks, the communication methods between researchers and other actors, reasons that motivate researchers and companies to take a new research path, assessment tools of scientific and technological research, etc..

Therefore, for a better quality of research, we should plan policies to support communication among research networks, measures against the “brain drain” and for the strengthening of connections between universities and industry. Another issue to be considered when speaking about research is the training of human and organizational resources prone to scientific research in the corporate context. This is not always connected to an economic problem, but to other aspects, such as, information and relationships between entrepreneurial reality. In fact, at present, the university is facing a historical transition from the formation of our ruling class to the transfer of knowledge to businesses. This change requires, in a way, universities to adopt a business orientation. This is the reason why we speak of “entrepreneurial university” (Alessandrini, 2004).

Development, and technology transfer take place if there is an entrepreneurial spirit and if one goes beyond a mere involvement of researchers. This entrepreneurial spirit is crucial, even though, in Italy, it seems to run short compared to other countries like the United States. In Italy we are still very much conditioned by the idea of “job” and to the conception of universities as knowledge provider and not as an institution involved in the socio-economic development of the country. Therefore, we must encourage the creation of a new knowledge, as well as of a certain entrepreneurial spirit that Patrissi (2007) defines scouting. A reflection that addresses the field of scientific research, must also take into account the importance of other factors that affect the quality of research, such as: the management of researchers' networks, editors of new projects, management of research institutions, fundraising etc.. These factors are referred as mediators. In fact, it becomes increasingly clear that research is not separated from the wider social sphere, but on the contrary, it occurs exactly when the interaction with other actors take place. For this reason, in recent years, even in Italy, a plethora of intermediation actors developed within, or near, universities. They act in the intermediate space with the aim to promote matching between supply and knowledge demand.

The university of knowledge is, therefore, at the center of a dense and complex network of relationships. How Bleiklie and Kogan (2007) say “the actual organizational patterns of university governance have changed over the past few decades away from the classical notion of the university as a republic of scholars towards the idea of the university as a stakeholder organization”.

From the quality and efficiency of these relationships derive the success of innovation and technology transfer. For this reason, more and more universities tend to recognize and dedicate an important space to transfer and development offices¹⁶.

Following this reflection, we can imagine that the university can update the challenge of the “third mission” in different ways, depending on how the concept is translated into practice (Gherardi, Lippi, 2000). It seems possible to assert that the functions assigned to the third mission

¹⁶ In Italy, as well, we can register several experiments aimed to develop science parks: <http://www.apsti.it/>.

are at a crossing point between two dimensions: market and community, for which we may have a more or less extensive reading depending on the dominant interests. This perspective can be represented on an orthogonal board, which is expressed in the following format:

- “marketism vision” versus “social vision / community”;
- “narrow view” versus “broad view”.

The way in which these variables intertwine define a more or less reductive view of the function itself, giving shape to four different ways in which that mission could be interpreted. This has important effects on the organizational and strategic implementation prepared by the universities.

Obviously, these are ideal-typical models (Weber, 1958), which, in reality, can appear as spurious. Nevertheless, they may help us to understand the strategic decisions taken locally under different action logics (Zan, 1988) that guide local policy makers or university organizational leaders to plan and organize their relations with the territory. Remembering Arrow (1962), the relationship between research, competition and innovation is not straightforward. But it is extremely important to us to understand these interconnections to inform policy measures governments.

- Social Vision+

Welfare Style	Territorial development
-Narrow view	Broad view +
Service companies	Wild Speculation
- Market Vision +	

Where broad view and market vision intersect (lower right quadrant), we could have a situation where territory is viewed as a space for “wild speculation”. Presumably, this “broad and market vision” perspective tends to favour the immediate profit without foreshadowing recurrences or long-term scenarios. In this case, one may tend to favour the strengthening of economic power and of industrial lobbies that have more possibilities to direct research and investment, contrarily to the innovative and alternative paths. Hence, there is no interest for an individual and social emancipation which risks to be considered as a barrier to private interests.

Where narrow view and market vision intersect (lower left quadrant) we could have a “service companies oriented” solution. In this “market and restricted perspective”, the goal of enhancing economic activities tend to look at the commercial operation exclusively through the lens of a development economist. In this case, the research question is determined by the companies, the policies and the strategies adopted, which tend to satisfy this request. As to the “business service logic”, the innovative idea and business management can be favoured through the support of start-up business and actions oriented to disadvantaged groups or merit requirements. This way, we risk to support the market without considering the social impact that innovation, scientific and technological culture can have on the community.

Presumably, where narrow view and social vision intersect, we could have a “welfare style” support for businesses (upper left quadrant). In this “social restricted type vision”, there is the risk of a welfare assistance style, because of which any governance actor would be unable to promote responsibilities and development skills of private and public economic actors. This proceeding could trigger, as suggested by the complexity theory (Geyer, 2004), a process that, in the long run, tends to deplete resources and territory, inhibiting the pro-active ability of actors, organizations and territories and increasing the request for assistance.

On the contrary, where a broad view and social vision intersect, we could have a more significant “territorial development” (upper right quadrant). In this “broader social vision”, the territory is seen as a place of complex exchanges with other systems and subsystems. These exchanges cannot be completely controlled, but it is possible to interpret them as opportunities. Cooperation mechanisms that encourage social actors (individuals and organizations) to self-organize in order to act proactively in the complexity of the systematic network, without being overwhelmed, become very relevant. In this context, social capital (Fukuyama, 1996), quality of relationships between network members (Capogna, 2007) and the abilities of the implementation structures to put into practice their institutional leadership in a logic of coaching (ivi), all this plays an important role.

Therefore, we can say that in a perspective of territorial development, the “third university mission” considers technology transfer as a matter of a more extended context defined from the local network and its ability to govern the dissemination of scientific results and technological research. In this case, the social dimension is part of a wider process of collective empowerment which focuses on active and responsible participation of individuals and of the business world.

Those represented here are different ideal-typical configurations of the way to conceive and put into practice the “third university mission” concept (Gherardi, Lippi, 2000). This is a short but necessary reflection to start a debate finalized to understand what the desirable solution to invest in might be. In fact, each of these choices involves specific risks and opportunities. In Italy, the rough debates that characterize all the comparisons made within the university tend to be based, mostly, on the delicate matter of resources and evaluation.

Each perspective leads to a different process of organizing (Weick, 1976) the university ‘s function, which cannot be separated from the specific environment in which it is inserted. Presumably, it would be appropriate to start to imagine a new university model, more responsive to the needs of the current global system. The third mission university ‘s “marketist view” is seen, mainly, from an economic perspective. This risk is present both in a more reduced view (as a pure technology transfer, through the spin-offs promotion and patents), and a wider view (in response to pressure from large industrial groups). This “marketist view” involves the risk of orienting research exclusively towards an applicative field, to the detriment of basic research, where innovative results require time, and to the detriment of research in the humanities, where results do not have an immediate commercial applicability. This type of follow up can occur also in very lively economic and industrial territories. Conversely, the risk associated with a “limited social vision” is that of putting the grounds to a vicious circle of welfarism, already widespread in Italian entrepreneurial culture and easily replicable in particularly deprived contexts. The first two perspectives are short-term profit-oriented logics, while the third is focused on a redistributive welfare logic.

On the contrary, the “broad social vision” model tends to enhance the territorial dimension in a perspective of medium and long term development, promoting the community ‘s activation and participation. In this case, the community is considered a resource both capable to act responsibly on the basis of scientific innovation and technological progress, and as a catalyst for ideas. All this, according to a global development perspective, has as a final goal the enhancement and connection of local dimension to the opportunities offered by a global system. In the first two cases, presumably, the institutional actors engaged in local development to promote economic and commercial skills and a marketing-oriented economic exploitation under the influence of new public management fashion that has reigned in public services during all the 90s. In the third case, the focus is on legal and administrative skills, guided by the principle of compliance legacy, typical of a bureaucratic and administrative culture of our institutions. In the last solution, oriented towards the development of the community, we can notice forecasting and strategic skills, planning and networking competences, guided by the effort to enhance the “weak links” to overcome fragmentation between different policy actors and promote larger social entities (Granovetter, 1983). This is possible through the process of organizing activities in which universities are active. In these circumstances, the network model prevails. A model in which actors, public and private sectors, individuals and groups, are called to responsibly cooperate. In fact, as pointed out by Weick (1976), the territory exists only insofar as we are able to interpret it and activate it within frames of meaning (sensemaking) that allow us to interact with it, acquiring resources and

legitimacy and contributing to its modification. The way in which universities organize and interpret the challenge of the third university mission, and the relations with the environment in which they are inserted, will determine the strategic choices and organizational logic. It is precisely from here that the way of designing the university 's main functions and the internal management derives. However, the manner in which universities operate and interpret their role, as development actors, cannot leave aside the broader responsibility of institutional actors. They are called, at different governance levels, to imagine and design development policies oriented more towards harmonization of resources and expertises that now, in Italy, appear to be strongly fragmented and very often in conflict. This inevitably affects the actors ' ability to access and exploit opportunities.

Conclusions

Boschma, in *Proximity and innovation: a critical assessment, Regional Studies* (2010) shows that we can recognize five dimensions of proximity, on interactive learning and innovation, i.e. cognitive, organizational, social, institutional and geographical proximity. Thus, we can say with Agrawal, (2003) that not only one solution exists. The ability to transform results of scientific research into local economic innovation varies greatly in relation to the socio-economic and industrial configuration of each region.

To sum up, we can imagine that each change finalized to improve the Third University Mission in Italy should take into account at least five dimensions of the problem.

Firstly, The University is only one of a variety panel of actors called to imagine and invest in an innovation process defined "Knowledge triangle". Italy is characterized by an economic structure based on small and medium-sized businesses that do not have research and development departments. So, in Italy, it appears very urgent to think an alternative way to promote results of scientific research into local economic innovation, through the creation of chain processes in which Universities could participate with other istitutional actors to imagine local development projects. In this regard, it is important that local actors promote research and development policies capable to interact with the university as a primary development actor in the territory.

Secondly, connected to this, we observe the crisis of the traditional model of university governace, based on bureaucratic and collegial logic; while a new model founded on autonomy university and new public management principles struggle to assert in a climate of diminishing resources for academia and research. It is under the eyes of all that universities are looking for new internal organizational structures and new areas of recognition in the local and global space¹⁷. But all results of research on the state of Italian universities show that it still has a long way to go.

Thirdly, the need to promote new educational and pedagogical models and new methods of teaching appears more and more urgent. Teaching and research can not ignore the radical nature of technological change and the importance of the contextual dimension of learning and innovation.

Fourthly, it highlights the need to encourage, in all the professional body, new and wider managerial skills to manage the change and the increasing complexity. Today, both administrative staff and researchers need to know how to analyze the context and interconnections and, at the same time, to plan, communicate and assess research projects in an accountability logic. This require a radical change in recruitment and career logics.

Finally, we should consider the cultural dimension that helps to define the vision of development and of the implemantation we pursue. In fact, every vision of development and university role in promoting innovation and technological transfer is translated into actions, relationships, organizational processes and professional practices.

The social research, therefore, can help rebuild the local factors that contribute to the development of the third mission of the university and understand the trends overrepresented.

To conclude, sociological knowledge can help us to get inside this black box so little known and poorly theorized to better understand the interconnections between the multiple dimensions involved.

¹⁷ We can remember in fact the reform process the trasformed Italian University in last years.

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