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IMPROVING THE COMPETITIVENESS OF ITALIAN PUBLIC UNIVERSITIES THROUGH INTERNATIONAL Ph.D. PROGRAMMES: A DYNAMIC PERFORMANCE MANAGEMENT APPROACH

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LIST OF ABBREVIATIONS

A.A. – Anno Accademico / Academic Year;

ANVUR - Agenzia Nazionale di Valutazione del sistema Universitario e della Ricerca / National Agency for Evaluation of Universities and Research Institutes;

CLD - Causal Loop Diagram;

CNVSU - Comitato Nazionale per la Valutazione del Sistema Universitario / National Committee for the evaluation of university system;

CRUI - Conference of Italian University Rectors;

CUN - Centro Universitario Nazionale / University National Centre;

DPM - Dynamic Performance Management;

ECTS - European Credit Transfer and Accumulation System;

EEA - European Economic Area;

ERA - European Research Area;

ERA SGHRM - European Research Area Steering Group on Human Resources and Mobility;

EU - European Union;

EUA - European University Association;

FFO - Fondo di Finanziamento Ordinario /Ordinary Financing Fund;

GDP - Gross Domestic Product;

HE - Higher Education;

ICT - Information and Communication Technology;

KPI - Key performance indicators;

M.D. - Ministerial Decree;

MIUR - Ministero dell’Istruzione, dell’Università e della Ricerca / Ministry of Education, University and Research;

NPM - New Public Management;

OECD - Organisation for Economic Co-operation and Development;

PA - Public Administration;

P&C - Planning and Control;

PM - Performance Management;

SD - System Dynamics;

SFD - Stock and Flow Diagram;

UNIPA - University of Palermo.

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Abstract

The Higher Education (HE) system in Italy consists of a University (state and private Universities, polytechnics, Universities for foreigners, schools of advanced studies and on-line/distance learning Universities) and a Non-University sector (among others, national academies in the Fine Arts, Cinema, Dance and Drama, Music Conservatories, schools and institutes for the education and training of professionals in various fields, such as language mediation, design, etc.).

According to Art. n. 33 of the Italian Constitution, Universities are allowed to perform autonomously within a regulatory framework defined by national laws¹. Thus, State Universities are public entities endowed with scientific, teaching, managerial, financial and bookkeeping autonomy. According to these principles of autonomy, each University may comply with the national regulatory framework by means of its own statutes and regulations, issued by Rector decrees.

Italian Public Universities are primarily State funding-based, but the percentage of funds allocated to Universities by State-sources have been decreasing² since 2001 and nowadays, the percentage of public funding appears to be aligned to most European countries. Moreover, a certain diversification of income streams is going through a widespread phenomenon, and Italian Universities seem more entrepreneurial and non-State funding oriented. Thus, exploring the

¹ Since then, some national laws, issued along the last 20 years, have reformed the shape of the higher education sector and contributed to define the following principles for universities:

- in 1989, the Law n. 168/1989 set up the Ministry of the University (MURST), then transformed into the Ministry of Education, University and Research (MIUR); since then, universities have been given increasing degrees of autonomy and related responsibilities, well embedded in statutes and regulations on financial management, teaching and courses, along with further autonomy in the process of recruitment of teaching staff;
- in 1999, the Regulation / DM n. 509/1999 introduced the CFU, university credit system, to sort out the issue of the high rate of university study dropout but, above all, to deal with the tendency towards students mobility and the alignment of the recognition of university qualifications with the ECTS system (European Credit Transfer System);
- in 2008, the Law n. 133/2008 deals with savings in public expenditures and, according to that, universities have been allowed to change their legal status to private foundations and consequently perform as private enterprises;
- lastly, in 2009, the Law n. 1/2009 issued an ongoing reform concerning procedures for recruitment of professors / researchers, which does not allow universities to overcome a fixed threshold of personnel costs as a compulsory requirement needed to go on with new recruitment's procedures. Moreover, the Law introduces some meritocratic principles applied to the process of resources allocation, such as the mechanism for the allocation of a percentage of at least 7% of the total FFO amount (where FFO represents the main State funding allocated to universities), that has to be measured by performance indicators related to teaching, results in research, along with the provision of facilities.

² The percentage was of 72, 9% in 2001 and of 64,3% in 2007 (CNVSU Report 2009/2010).

principles of the funding system for public Universities, the legal framework is given by Law 537/1993. Concerning funding mechanisms as well as the introduction of a more performance-oriented system of resources allocation, we can say that the main State funding allocated to Universities is named Ordinary Financing Fund (FFO in Italian) whereas, quite recently, a reforming framework³ has been introducing a model of resources allocation (concerning a percentage of at least 7% of FFO) based on three leading performance indicators, namely quality of teaching and research, along with quality/efficiency/efficacy in combination with the maintenance of buildings and University campuses.

In Italy, recent reforms of the sector have been inspired by various factors, and, in particular, by:

- the economic crunch, that Governments have been facing for a long time, which led to budgetary restrictions;
- the “marketization” of the Higher Education sector (Clark, 1998; Deem, 1998) with an higher competitiveness – at both national and international level – of the Higher Education sector.

Regarding the first aspect, the ordinary funding allocation carried out by the National Governments, as said before, is strictly dependent on the performance that each academic institution achieves. Particularly, academic performance is assessed by the Ministry of Education, University and Research (MIUR in Italian) on the basis of specific criteria and parameters which, above all, tend to measure intangible outputs and outcomes, such as quality in education and research activities, efficiency, effectiveness, internationalization and impact on the community.

So internationalization, as a performance indicator, is a central value for each University, acquiring more and more importance in a “Globalized World” which has pointed out a rapid development of Higher Education as a “market”, showing managing academic institutions, in most cases, unprepared for the challenges introduced by a competitive environment, particularly in comparison to other Countries’ best practices (Neely, 1999; De Boer and Goedegebuure, 2001).

Consequently, the rapid progress of a globalized HE system and the higher number of cross-border movements of students and teachers, push each University to increase programmes concerning international collaboration and competitiveness. As a result, internationalization and global competitiveness of Universities has become crucial for each University all over the world. In this context Jane Knight (1997) defines the internationalization of higher education as:

³ Law 1/2009, article 2.

“the process of integrating an international/intercultural dimension into the teaching, research and service functions of the institution, where internationalization is considered as a process in response to globalization and includes both international and local elements”.

Following Knight, Qiang (2003) provides a useful conceptual framework of four different possible rationales for internationalization in higher education:

- the political;
- the academic;
- the cultural/social;
- the economic.

The political rationale is principally related to issues of national security, stability, and peace as well as ideological influences ensuing from internationalization efforts.

The academic rationale is principally linked to the goal of achieving international standards for both teaching and research. More generally, the reasoning goes that by encouraging greater internationalization across teaching, research, and service activities, the quality of higher education can be enriched.

The cultural/social rationale is based on the view that the *“homogenizing effects of globalization”* (Knight, 1997, p. 11) need to be resisted and the culture as well as language of nations be respected. This view places particular emphasis on understanding foreign languages and cultures, the preservation of national culture, and respect for diversity.

Finally, there is the economic rationale, which, by many, is considered to be a direct response to the market forces associated with the economic dimension of globalization. On the one hand, the economic rationale underlies efforts aimed at developing the human resources/capital needed for the nation to stay internationally competitive; on the other hand, it underlies efforts geared towards increasing the institution’s (or sector’s) income by providing education abroad or attracting more foreign students.

Focusing, in particular, on this last rationale, the issue is gaining more ground also in Italy, as the positive effects that international courses can have on a University are quite broad. Moreover, these programmes led to a real improvement in the educational offer, image and, therefore, were able to bring new funds to the University, both in terms of distribution of the reward of the Ordinary Financing Fund (FFO), and as the acquisition of external funds. In recent years, the Ministry of Education, University and Research (MIUR in Italian) has been giving more weight to the internationalization process of Italian Universities. This can be seen, for example, through the Ministerial Decree (M.D.) n.71/2012, sharing FFO of the University for the year 2012,

established, in Article n.13, the allocation of a share of € 3,000,000 to be reserved for exceptional assistance to Universities and institutes of higher education for purposes relating to specific initiatives in the areas of research, teaching and internationalization of the University system. This is the first time in which a similar amount is included, reflecting the importance that the MIUR is giving to the international development of Italian Universities.

Of course the activation and implementation of International programmes requires the crucial involvement of, on the one hand, the administrative front office, having direct contact with students, and, on the other hand, of the administrative back office which is the macro management area essential for the coordination of all academic activities carried out taking into account available resources and local regulations.

The involvement of many actors, at different levels, and the importance of internationalization, requires an analysis and evaluation - central object of the following thesis – of the ways and the timing required to activate, in particular, an international Ph.D. programme in an Italian Public University.

A Ph.D. programme represents the “Third Cycle” of HE System⁴ and it is considered crucial as it contributes to generate Ph.D.’s, which, in great part, will be the future Professors, Educators and Managers of the entire nation. So any change in its regulation needs to be analyzed and discussed. In particular, in Italy, the recent introduction of the M.D. n. 45/2013⁵ by the Ministry of Education, University and Research is the final step of a process which is trying to make more efficient and competitive the Italian *Post Lauream* sector. In particular, it introduces the so called “ACCREDITAMENTO” of Ph.D. programmes, a new compulsory validation process that risks complicating the activation of a Doctoral programme, in particular, international Doctoral programmes. So the analysis of this Reform is required to explain in detail Ph.D. founding and prosecution over time. Furthermore, this kind of programme represents a crucial issue on which all Universities should invest, in particular, in terms of international Doctorates, because they can encourage, on the one hand, students to study in other countries around the world and, on the other hand, attract the best students from other countries to study in Italy thus implementing further resources for the Italian Universities. So starting from the above considerations, the analysis of the most recent Reform on the Ph.D. sector can represent a useful starting point to show, on the one hand, the importance of investing in the creation of international Ph.D. programmes, and, on the other hand, the strengths and weaknesses introduced by this law, in order to identify the levers on which Universities should bet to make their future more secure.

⁴ For a better analyses of the Italian University system see the figure 1.3.

⁵ Anticipated by Law 240/2010 art. 18 (so called “Gelmini Law”).

Consequently, we will answer to the following questions: What does this reform imply? What novelties does the validation process introduce? What changes will there be, in particular, for international Ph.D. programmes? What are the differences introduced in comparison with the previous code? Who are the subjects involved and the final customers in this process? What is internationalization of the HE system? How does it influence University image and attractiveness? How can internationalization and the comparison with international realities improve the performance of the Ph.D. sector? What are the consequences for a single University and for all stakeholders? How may the future of the University become under the implementation of international programmes?

The analysis of how investments in internationalization and in the development of international agreements play a strategic role for University development will be made through the use of two survey instruments: the use of *System Dynamics*(SD) approach, since it enables the exploration of the dynamic complexity included in internationalization, in order to test how it can contribute to a sustainable development and the improvement of the HE system, the image of the University and, consequently, its capability to acquire new funds; through the use of *semi-structured interviews*, which includes the involvement of subjects directly involved in the activation of International Ph.D. programmes.

In particular, to analyze the critical issues and benefits linked to the activation of this kind of University programmes, I will consider the specific case of the University of Palermo. It is a public institution which has, as its inseparable purpose, higher education and scientific research, but looking at its educational offer it is clear that there is only a small number of international courses with only 7 international Ph.D. programmes⁶. Consequently, as opposed to what should be done in a European and global context currently more focused on international cooperation and collaboration, our University is still little present in this area, in fact the low number of international programmes generates an educational offer not competitive, damaging students as final customers.

It is straightforward, therefore, to analyze and show, in the first chapter of the thesis, the characteristics of and supply of the Doctoral sector and within Italian public Universities, which are its decisions makers, key actors and stakeholders, with particular attention to the current law which regulates the Ph.D. sector in Italy, its characteristics and the differences in relation to the previous reform.

⁶ Data UNIPA: A.A. 2013/2014

Starting from this framework the second chapter will explain the international offer within the “Third Cycle” of the Italian HE system. In particular, the analysis will be focused on the analysis of internationalization as a means to improve University attractiveness and Ph.D. programme performance, considering the no-boundary global market in which they act.

The target to improve University performance over time led to the necessity to find new ways and instruments, this is the central topic of third chapter focused on System Dynamic approach: the possibility to use a dynamic approach in the complex system of internationalization can furnish reliable results in order to identify levers on which decision makers should invest.

The fourth chapter analyzes the critical issues and benefits linked to the activation of an International Ph.D. programmes, taking into consideration the specific case of the University of Palermo (UNIPA), the analysis, therefore will be extended to the Performance Management of the UNIPA Ph.D. Office.

The last chapter will show the concluding remarks and consequently limitations and recommendations for future research.

With the following research, therefore, I want to determine what the administrative, bureaucratic and educational processes that influence the activation of International programmes are, absolutely fundamental in a globalization context, and aims to show how the growing internationalization of the University of Palermo allows an increase of funding sources, both public and private, in order to enhance the University’s image, its attractiveness and competitiveness and, in this way, the identification of an approach to assure a long term sustainable development without reducing the quality of students’ supply.

Chapter I

Ph.D. PROGRAMMES IN THE ITALIAN HIGHER EDUCATION SYSTEM: GOALS, FEATURES AND PRESPECTIVES IN THE LIGHT OF RECENT REFORMS

1.1 Introduction

In Italian Higher Education System the Ph.D. degree is the highest awarded graduate qualification⁷. It is the result of a Doctorate programme, usually based on, at least, 3 years of graduate study and a dissertation. This academic level, worldwide, is known as “Doctorate of philosophy⁸” and varies considerably according to the country, institution, and time period, from entry-level research degrees to higher doctorates. Of course, Ph.D. holders are not necessarily philosophers but this term is used in a broader sense, in accordance with its original Greek meaning, which is “love of wisdom⁹”. At the end of their educational path, Ph.D.’s should be able to engage in thought experiments, reason about problems, and solve problems in sophisticated ways. The goal of Doctoral education is to bring the Ph.D. candidate from the level of a talented master's student, capable of understanding and reproducing knowledge, to a researcher capable to produce knowledge independently. This means that a Doctorate holder is independently capable of working at the frontier of borders of knowledge and managing the challenge of unexplored research areas¹⁰.

In recent years the role of Doctoral education across Europe has grown at a fast pace. As the notion of the knowledge economy spread, and the EU launched its Lisbon Strategy to make Europe the “*most competitive and dynamic knowledge-based economy in the world*”, many countries made big investments in Doctorate. In the Organization for Economic Cooperation and Development (OECD) as a whole, the annual growth rate of Doctoral graduations was 5% from 2000 to 2010¹¹; in some countries, such as Denmark, Norway and Italy, the number of Doctoral graduations doubled within the decade or even less¹². This rapid growth, combined with

⁷ Quadro dei titoli italiani – MIUR - <http://www.quadrodeititoli.it>.

⁸ “University of Oxford - What is a DPhil? The Oxford term for PhD”. www.uni-of-oxford.custhelp.com.

⁹ Used in the Greek writings of either zeal for or skill in any art or science, any branch of knowledge, see Passow (cf. Liddell and Scott, under the word).

¹⁰ Joanne Byrne, Thomas Jørgensen, Tia Loukkola. “*Quality Assurance in Doctoral Education – results of the ARDE project*” EUA Publications 2013, p. 8-9.

¹¹ OECD, *Education at a Glance*, 2012, p. 64.

¹² Eurostat, Education and Training, <http://epp.eurostat.ec.europa.eu>.

increased political attention to investments in research, is important to understand the context in which the reforms on Ph.D.'s took place. Particularly with the inclusion of the 'third cycle' in the Bologna Process in 2003, reforms began to be introduced across Europe. Because of these reforms Universities began to develop professional management in the governance of Universities, included the Ph.D. area.

The introduction of a managerial governance of Doctorate is highly linked to the new vision of Public Universities as "business-focused organizations". As stated by Amaral & Magalhães (2002, p. 6) "*education is no longer seen as a social right; it has become a service*". This concept derives from the need to establish governance and management systems for Universities, in order to guarantee their sustainable development. So Public University starts to be considered as an enterprise of persisting over time, whose target is the satisfaction of stakeholders, in relation with educational and knowledge development. This business vision of Public University is also a consequence of, above all, the economic crisis that Governments have faced in recent years. This economic critical situation has pushed Governments to improve investment allocation towards all public sectors (e.g., education, healthcare, infrastructures). This has involved a significant cut in financial resource transfers from central bodies to local authorities and delayed the enforcement of national development plans. Such a mechanism, therefore, causes that "*Universities have now to focus on performance management in order to improve both quality of products/services supplied to customers and expenditures rationalization*"¹³. Consequently, another reason, which identifies the Public University as a business and market oriented organization, can be found in the increasing competition among Universities which has determined a kind of 'marketization' of Higher Education. Students started to be seen as customers or clients and Universities viewed as service providers that want to meet their client's needs and expectations (Meek, 2003).

In this new vision of Public University, the Doctorate plays a crucial role because it is one of the core element in the performance evaluation of Universities and, consequently, for their ability to obtain financial funds. Moreover, the role of Ph.D. candidates is extremely important as they can, potentially, produce a large amount of scientific output, a crucial factor for the achievement of the Financing Ordinary Funds and of other private funds.

In Italy, the Ph.D. was introduced for the first time in 1980¹⁴ and could be offered by private or public Universities. Today it can be offered also by private research organizations¹⁵

¹³ Saravanamuthu & Tinker (2002); Adler and Harzing (2008); Marginson & van der Wende (2009).

¹⁴ D.P.R. 382/1980, "*Riordinamento della docenza universitaria, relativa fascia di formazione nonché sperimentazione organizzativa e didattica*"

but the principal subject, which offers this kind of programmes, is still Public University. The Ph.D. programme is the result of a system within the Italian Public University and it is usually composed of an administrative and an academic area. Furthermore, on the one hand, the accreditation of a Ph.D. programme is based on the collaboration between administrative office and academic subjects, in accordance to the indications given by MIUR, which confers official validity to the programme. On other hand, the academic area defines the didactic and research programme, which will be developed in the Ph.D.. Over the years, this system has been influenced by several reforms. The last one is the Ministerial Decree n. 45/2013¹⁶ by the Ministry of Education, University and Research. At present it represents the final step of a process which has been trying to make this sector more efficient and competitive. This M.D. in fact, increases the services offered by University introducing new typologies of Ph.D. programmes and opening to the International Doctorate. The analysis of the system, which administrates Ph.D. programmes and its evolution over time, will be the starting point to identify its main goals, features and perspectives. This will permit one to study the effects of the last reform of this sector, in order to identify its economic relevance for the Italian Public University.

In this first chapter of the thesis, the characteristics, also in terms of decision makers, stakeholders and key actors which act in the Italian Higher Education context, will be discussed and analyzed. Based on this framework the next phase will be focused on the actual law which rules the Ph.D. sector in Italy, its characteristics and evolutions in respect to the previous reforms. The analysis of the last reform of Ph.D. in Italy and its influence on University's stakeholders is the starting point for the study of a sector, which is crucial for the long-term success of each University.

1.2 University and Ph.D. in Italy: a general overview on the Doctoral sector

In the Universities of Medieval Europe, study was organized in four faculties: the basic faculty of arts, and the three higher faculties of theology, medicine, and law¹⁷. All of these faculties awarded intermediate degrees (bachelor of arts, of theology, of laws, of medicine) and final degrees. Initially, the titles of master and doctor were used interchangeably for the final degrees, but by the late middle Ages, the terms Master of Arts and Doctor of Theology/Divinity,

¹⁵ M.D. 45/2013 Art.2.

¹⁶ Anticipated by Law 240/2010 art. 18 (so-called "Riforma Gelmini").

¹⁷ De Ridder-Symoens, Hilde (2003). *A history of the university in Europe: Universities in the Middle Ages*. Cambridge University Press.

Doctor of Law, and Doctor of Medicine had become standard in most places. The Doctorates in these faculties were quite different from the current Ph.D. degrees; indeed, they were awarded for advanced scholarship, not for original research. No dissertation or original work was required, only lengthy residency requirements and examinations¹⁸. Besides these degrees, there was the licentiate. Originally, this was a license to teach, awarded shortly before the award of the master or doctor degree by the diocese in which the University was located, but later it evolved into an academic degree in its own right, in particular in the continental Universities¹⁹.

This situation changed in the early 19th century through the educational reforms in Germany, most strongly embodied in the model of the Humboldt University²⁰. The arts faculty, which in Germany was labelled the faculty of philosophy, started demanding contributions to research, attested by a dissertation, for the award of their final degree, which was labelled Doctor of Philosophy (abbreviated as Ph.D.) - originally this was just the German equivalent of the Master of Arts degree. These reforms proved extremely successful, and fairly quickly the German Universities started attracting foreign students, notably from the United States. The American students would go to Germany to obtain a Ph.D. after having studied for a bachelor's degree at an American college. So influential was the practice that it was imported to the United States, where in 1861 Yale University started granting the Ph.D. degree to younger students who, after having obtained the bachelor's degree, had completed a prescribed course of graduate study and successfully defended a thesis/dissertation containing original research in science or in the humanities²¹. From the United States, the Ph.D. degree spread to Canada in 1900, and then to the United Kingdom in 1917²². In particular, in the English Universities the introduction of the research doctorate largely happened to compete with Germany for American students²³.

In Italy, the introduction of the Ph.D. is a recent history. It was established by Presidential Decree No. 382, 11th July 1980, entitled "*Reorganization of University teaching, related*

¹⁸ Pedersen, Olaf (1997). *The first universities: Studium generale and the origins of university education in Europe*. Cambridge University Press.

¹⁹ Pedersen, Olaf (1997). *The first universities: Studium generale and the origins of university education in Europe*. Cambridge University Press.

²⁰ For further analysis: Rüegg, Walter. *A History of the University in Europe: Volume 3, Universities in the Nineteenth and Early Twentieth Century's (1800–1945)*. Cambridge University Press.

²¹ Rosenberg, R. P. (1962). "Eugene Schuyler's Doctor of Philosophy Degree: A Theory Concerning the Dissertation". *The Journal of Higher Education* 33 (7): 381–386.

²² Renate Simpson (1983). *How the PhD came to Britain. A Century of Struggle for Postgraduate Education, Society for Research into Higher Education*, Mellen Press.

²³ Renate Simpson (2009). *The Development of the PhD Degree in Britain, 1917-1959 and Since: An Evolutionary and Statistical History in Higher Education*, Mellen Press.

training and organizational experimentation and learning”, with the aim of representing a training path for research. Subsequently various reforms involved this academic area in correspondence with the increasing importance of Doctorates inside and outside Italy. Today, a Ph.D. is more than a simple result of a study programme. Nowadays, in fact, all Universities, Governments and stakeholders of European HE system give to Doctoral education a strategic role for the development of a knowledge society²⁴. This target acquires a greater relevance considering the actual economic crunch with the following budgetary restrictions imposed by national Governments²⁵. The subsequent challenge for the University system is to:

1. Rationalize University expenditures;
2. Improve University performance.

In this sense, in recent years, public authorities are more demanding with Universities. They started to ask if costs were justified by returns. They want Public Universities that cost less and work better, applying to them a trend, which is generally directed to all public administrations²⁶. Universities have become more entrepreneurial in order to raise their own funds because of dwindling state financing, yet the State still sees Universities as representing a big chunk of public expenditure and demands parsimony and output measurement²⁷. Also for these reasons, since the Eighties, Italian Universities have been fully invested, even if with adaptations, by administrative reform programmes, as in all major European countries. These reforms towards marketization, or the application of business management theories and practices in public service administration, came to be called, in professional parlance, the *New Public Management (NPM)*. Manning (2001) explains that:

“NPM generally is used to describe a management culture that emphasises the centrality of the citizen or customer, as well as accountability for results. It also suggests structural or organisational choices that promote decentralised

²⁴ Paradeise C., Reale E. and Goastellec G., A Comparative Approach to Higher Education Reforms in Western European Countries, in *University governance: Western European perspectives*, C. Paradeise, E. Reale, I. Bleikle, E. Ferie, Dordrecht, Springer, 2009, 197-225, 199, were is underlined as an effect of Lisbon’s strategy of 2001, *«the concept of «knowledge-based economy» became a kind of shared understanding or «buzzword» for change. It enhanced the need to monitor universities as producers and diffusers of knowledge for the sake of national and regional innovation and economic performance»*.

²⁵ Cosenz F., *Designing Performance Management Systems in Academic Institutions: a Dynamic Performance Management View*. Article presented in AIDEA Conference 2013.

²⁶ Christensen T., *University governance reforms: potential problems of more autonomy?* in *High Educ*, Springer, 30 dicembre 2010: *«The last few decades have seen a transformation of the notion of universities—from a perception of them as a deeply specialized type of professional organization, built on specialized knowledge, academic freedom and collegiality, with an elitist character—to a perception of universities as being almost like any other type of formal organization»*.

²⁷ Sowaribi Tolofari, *New Public Management and Education*. Policy Futures in Education, Volume 3, Number 1, 2005.

control through a variety of alternative service delivery mechanisms, including quasi-markets with public and private service providers competing for resources from policy makers and donors according to which should be introduced in public sector management perspectives used by the private companies like: calculation of cost-efficiency, the performance evaluation and others.”

NPM is generally viewed as a global phenomenon, as it spread quickly from the countries where it is said to have originated to other parts of the globe, influencing government policies both in developed and developing countries. This application of business management to Public Universities has been highly influenced also by globalization. In particular, it influenced the evaluation, assessment and funding of Universities; indeed they are evaluated according to international indicators which place them in international rankings; the quality of research in each Italian University is measured according to the international spread of their products and considering the ability to attract foreign students, which influence also their capacity to attract private and public funds²⁸.

In this scenario, with different actors, which play at different levels, we must start from the definition of Ph.D. as a sector within Italian Universities, in order to understand the importance of Doctoral programmes for the modern Public Universities. This will be a fundamental prerequisite in order to define the generating process of Ph.D. programmes and the structure of the system which administrates Doctoral programmes.

1.2.1 Italian University organizational structure and related key actors

In the attempt to understand the importance of Doctoral programmes for Italian Universities, our analysis starts from the description of the organizational structure which

²⁸ Ferlie E., Musselin C., Andresani G., *The steering of higher education systems: a public management perspective*, cit., 332-333: «The implication of supranational actors in higher education is somewhat more complicated as the European Commission formally has no competence on this issue. Nevertheless [...] it does not mean that there exists no European policy on higher education (cf. for instance the Erasmus programmes and the creation of ECTS). Furthermore the European Commission has competence over research and has developed for more than 20 years Framework Programmes, which impact on European universities through the funding of collaborative research projects. Last, but not least, intergovernmental initiatives such as the Bologna process, even if not led by the EU, affected the national systems of the signing countries [...] and cannot be ignored by the national education ministries. To these rather direct influences, one could finally add the more indirect role of actors such as the OECD in the development of international benchmark and good practices. Consequently, higher education institutions operate in regional, national and international networks simultaneously and have to engage with a wide range of different stakeholder groups».

generally characterized University in Italy. This overview will permit to identify the key actors inside each University and their role in relationship with the Ph.D. sector and programmes.

First, in our country there are currently 96 Universities²⁹, with 66 State Universities (in this category are included also three Universities for foreigners, three Higher Schools and two Institutes for Advanced Studies) and 30 Non-State Universities legally recognized (in this category are included eleven Online Universities):

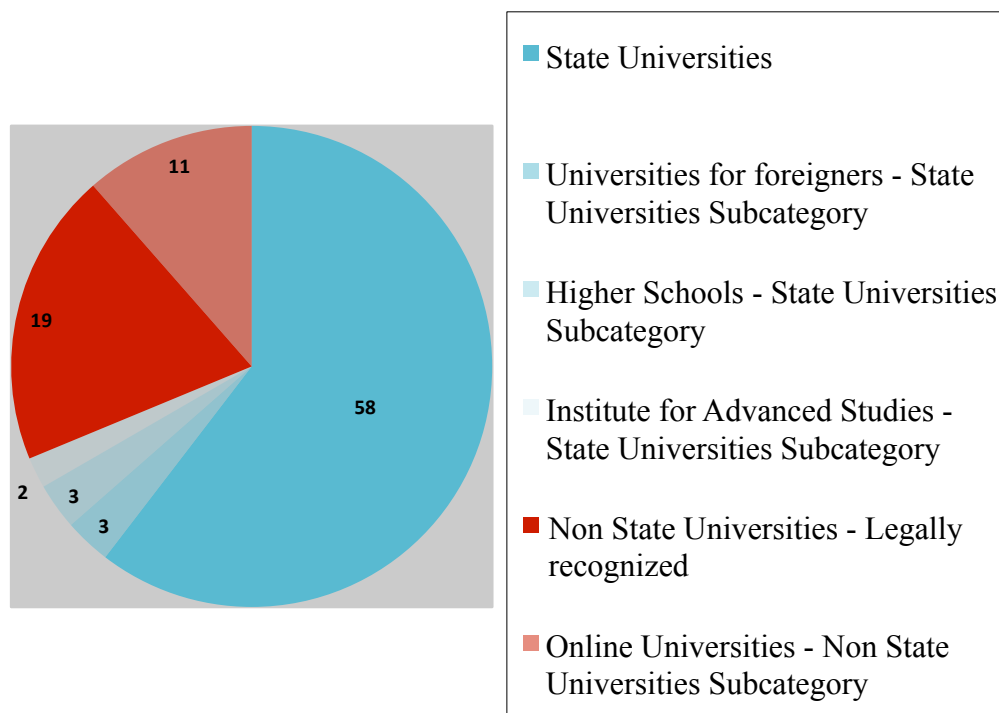


Figure 3.1 - Italian University composition

All the institutions listed above are entitled to award qualifications with legal validity all over Italy.

State Universities are public entities endowed with scientific, teaching, managerial, financial and bookkeeping autonomy; they have full legal capacity in matters of both public and private law. Their major tasks are scientific research and higher education. Due to the principle of University autonomy, each University may draw up its own statutes and regulations, issued by Rectoral Decrees. In this typology we find the technical Universities in the Italian system are named "Politecnici" that concentrate exclusively in the subject fields of the two Faculties of Engineering and Architecture. They adopt the same institutional model as that of State Universities.

²⁹ Data CINECA - A.A. 2014/2015, www.miur.it.

Also the Universities for foreigners are State institutions specialised in teaching and research for the development and diffusion of the Italian language, literature and culture.

Higher Schools regulated by special legislation are institutions specialised in postgraduate University studies and scientific research. They are State institutions like the two Italian Institutes for Advanced Studies which offer third cycle programmes (research doctorates).

Non-state institutions are legally recognized by the competent national authority. Their degrees, established in compliance with the general criteria laid down by national legislation, have the same validity as the corresponding degrees awarded by state institutions. Also in this case, according to the principle of University autonomy, each University may draw up its own statute and regulations by Rector Decree. Each statute states the regulations governing management, teaching and research within the institution. Inside this typology are classified also eleven Online Universities. Non-State Universities have to comply with the same general principles and criteria as defined by the national University legislation for State institutions. The differences between State and non-State Universities concern funding and governance.

The actual Italian University system has been modified by the law No. 240/2011³⁰, which represent the last reform of the system. Therefore, today, six subjects which play a crucial role within each University can be identified, they are:

- The Rector;
- The Academic Senate;
- The Board of Directors;
- The General Director;
- The Board of Auditors;
- The University Evaluation Unit.

In Public Universities, the Rector is elected among full professors and is the legal representative. He remains in office for a single term of six years, not renewable. The Rector chairs the Academic Senate and the Board of Directors, executes their decisions, supervises the general running of all University structures and services, is in charge of disciplinary matters, draws up agreements for external collaboration, and plans all University teaching and research activities. In non-state institutions, different rules may apply.

The Academic Senate, instead, is made up on an elective basis, in a number of members in proportion to the size of the University and in no more than thirty-five units, including the rector

³⁰ Law No. 240, 30th December 2010, *"Norme in materia di organizzazione delle università, di personale accademico e reclutamento, nonche' delega al Governo per incentivare la qualità e l'efficienza del sistema universitario"*. Published on G.U. No. 10, 14th January 2011.

and the elected representatives of the students; it is composed of at least two thirds by professors, at least a third by department directors elected in order to respect the diverse scientific areas of the University. It establishes the general guidelines for activities and plans University development. It approves the University regulations, coordinates teaching activities and has the authority to plan, coordinate and control University autonomy. The term of office of the Senate lasts for a maximum of four years and the mandate can be renewed only once.

The Board of Directors supervises all administrative, personnel and financial matters, and approves the budget. It is made up of maximum eleven members included the Rector and representatives of the academic and external business community as laid down in the statute. The Board of Directors remains in office for a maximum of four years, except for the representatives of the students, which remain in office for two years. The mandate is renewable once.

The General Director is responsible for the overall management and organization of services, the instrumental resources and the technical and administrative staff of the University. This subject is appointed by the Board of Directors on a proposal of the Rector, after consultation with the Academic Senate. The General Director, remains in term for periods not exceeding four years, but renewable.

The Board of Auditors is composed by three members and two alternates, with the President, chosen from the administrative judges and state attorneys and accountants, one real member and one alternate, appointed by the Ministry of Economy; one real member and one alternate chosen by the Ministry of Education among directors and officers of the Ministry. The appointment of members is made by Rector's Decree, the term of office for a maximum of four years; renewability of office once and prohibition to be a member for the employees of the same University.

The University Evaluation Unit checks the quality and effectiveness of teaching, verifying the research carried out by the departments in the University in order to promote positive values and the improvement of organizational and individual performance.

Another central aspect crucial to understand the University system in Italy is, in particular, the way in which Universities reach their institutional goals in teaching and research. Before the introduction of the Law No. 240/2010 (Gelmini Law), these targets were achieved through the identification and subdivision in:

- Faculties;
- Departments;
- Institutes;
- Service centres.

The Faculties coordinate teaching for the different degree courses. They appoint academic staff and decide roles and workload. The Faculty is run by the Faculty Board and the Dean.

The departments organize research according to the relevant teachings. They promote and manage research, organize Doctoral courses and carry out research and consultancy work outside the University. The department is run by the department board and its Director.

Institutes deal with a specific scientific sector where they carry out teaching and develop research. A Board and a Director run them.

Finally, service centres may be set up by the Faculties or the University for the provision of services of general interest. Interuniversity centres and consortia for teaching or research purposes may be set up with other Universities and with public and private organisations. In some cases interdepartmental research centres may also be set up, for example for the use of particularly complex services and equipment.

We must remember that from 1st January 2013 the so called “Gelmini Law”³¹ introduced a new organization for Universities. The subdivision described above was abrogated and substituted by a new one in which the faculties were eliminated in favour of the establishment of new structures often called: “Schools”. They are connecting structures in order to coordinate educational activities and service management for University courses. Each school is established by two or more departments. The faculties will remain active for the time necessary to manage the transition to the new institutional set-up and will gradually be closed. Even if, today, not all the Universities have applied the Reform it introduced a revolution in the governance of Italian Universities, which will be better analyzed in the next paragraphs.

Finally, as for the academic staff, we need to say that there are four different categories which can be represented as follow:

- Full professors – first level;
- Associate professors – second level;
- University researchers who can be given teaching responsibilities;
- Contract professors.

These categories and actors play a different but important role in the generation of Ph.D. programmes that we will analyze in the next paragraph.

³¹ Law 240/2010. For a first analyses of the Reform: «*La riforma dell’Università*», in Giorn. dir. amm., 2011 (F. MERLONI, *La nuova governance*, 353; C. MARZUOLI, *Lo stato giuridico e il reclutamento: innovazioni necessarie, ma sufficienti?*, 360; E. CARLONI, *L’organizzazione della didattica e della ricerca*, 366).

1.2.2 Doctoral cycle. Administrative and educational structure behind Ph.D. programmes

The Ph.D. is part of the 3rd cycle of Italian University educational supply, as can be seen in the following image:

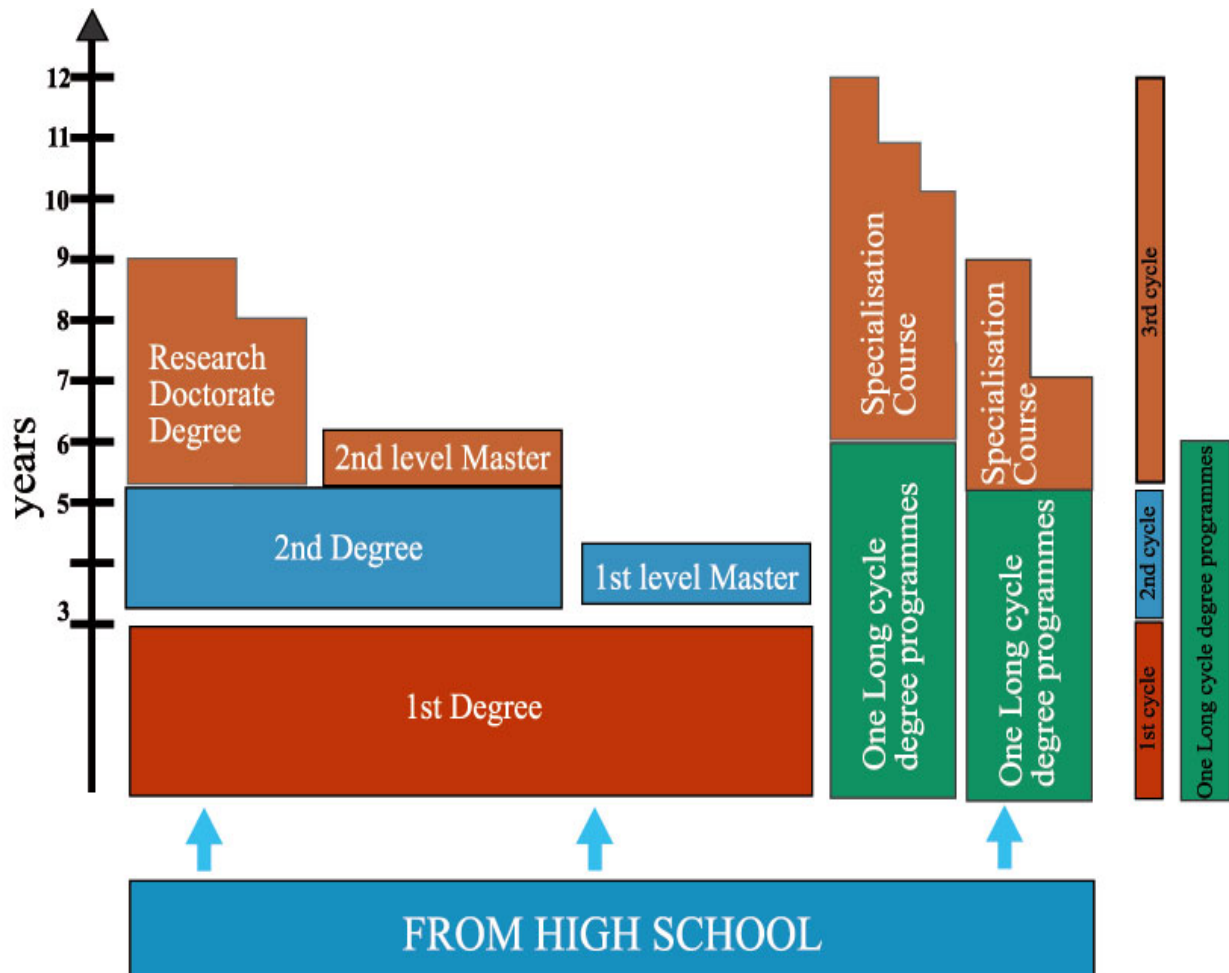


Figure 1.4 -TheItalian University system

The structure of the Italian Ph.D. sector and its rules and regulations is the result of a process which takes into consideration the last Italian reform on the Doctoral sector³² and the University Academic Regulations of each Italian University. This led to the generation of University Ph.D. programmes.

In this regard, the rules and regulations identify and define, among others:

- aims of the Ph.D. programmes;

³² M.D. 45/2013.

- accreditation, establishment and activation of each new Ph.D. cycle;
- admission to the Ph.D. programmes;
- timing and duration of the Ph.D. programmes;
- conferral of Ph.D.'s;
- financial issues and financial aid options available to Ph.D. students.

All these aspects will be analyzed in detail in order to define the complexity of a process that is central for the life of each University.

Consequently, starting from the objectives of Doctoral programmes, we can say that University Ph.D. programmes aim to generate students able to gain the expertise and competence required to conduct high quality research for public bodies and private entities or to become highly skilled professionals.

But, behind the achievement of this target, there is a particular process which led to the creation of a Ph.D. programme and this process starts with the so called “validation/accreditation”. In fact, pursuant to M.D. No. 45, 8th February 2013, Ph.D. programmes are established by the University after accreditation by MIUR and favourable opinion expressed by the *National Agency for Evaluation of Universities and Research Institutes* (ANVUR in Italian). After the initial accreditation, the maintenance of the required academic standards will be periodically verified, in compliance with the law.

Each University can apply for accreditation:

- as a sole promoter;
- with other Universities or highly reputable public or private research centres as according to Article No. 2 of the above decree;
- with companies conducting research and development activities, as per Article No.2 of the mentioned decree.

The accreditation process, is fundamental for the institution and annual activation of Ph.D. programmes. In fact, the establishment and activation of a Ph.D. cycle involves:

- an internal decision process, in accordance with the Statute of each University;
- an external accreditation process, pursuant to M.D. No. 45/2013.

The internal decision process, including both the establishment proposals and the annual activation, shall respect the deadlines of the annual Academic Planning.

The initial ministerial accreditation is granted when the following requirements are met:

- number of members of the Faculty Board and standards in terms of academic status and in terms of high quality and internationally reputed research;

- average number of fellowships calculated on the total of Ph.D.'s and number of fellowships for each Ph.D. programme;
- availability of adequate and sustainable funding;
- availability of specific and first-class research facilities;
- disciplinary and interdisciplinary teaching.

This accreditation has a validity of five years, it is subject to the annual ANVUR's assessment of the above-mentioned requirements and it is also based on the results of monitoring activities performed by the University Evaluation Unit. The new Validation process and its effects will be better analyzed in the next paragraphs.

After the Accreditation of the University, the single proposals for the establishment of a programme, which will have to receive the final approval of the University Board, have to include, for each programme:

- a) Name of the programme and its curricular structure, if any;
- b) Ph.D. Coordinator's name;
- c) Length of the programme, whose duration cannot be inferior to three years;
- d) Scientific themes related to wide, structured and clearly defined spheres;
- e) Learning objectives;
- f) Career opportunities;
- g) Ph.D. curricula, including planned educational activities;
- h) Detailed description of the Faculty Board;
- i) Maximum number of places offered;
- j) Maximum number and amount of available fellowships (the number cannot be inferior to four for the first year of each Ph.D. programme, and, on average, inferior to six, for the first year of the programmes offered by the School, if present), tuition waivers, if any, and amount of admission and tuition fees for the programme;
- k) Budget allocated to Ph.D. students for their research activities in Italy and abroad in the last two years of the Ph.D. programme, whose value cannot be inferior to 10% of fellowship;
- l) Other potential funding made available to the Ph.D. programme or the whole Ph.D. School, if present;
- m) Admission requirements;
- n) Ph.D. students' assessment criteria during the studies and admission requirements for the following academic years;
- o) Facilities and equipment Ph.D. students can use for their activities;

- p) Details about “in consortium” or partner institutions;
- q) Any other element required to verify that the accreditation standards are met.

The proposals for the activation of subsequent cycles will have to include all the information provided in the establishment proposals and specify any variations from the previous year.

Another important aspect is the management of Ph.D. Programmes. The Coordinator, a full time Professor, heads the Faculty Board and is appointed by the Academic Council.

The Faculty Board is composed of, at least, sixteen members (of whom at least 12 full professors and associated professors) belonging to the core fields of the programme. The members of the Faculty Board shall provide, in good time for the assessment of the requirements, documents showing research results of high international standards, in particular with reference to the preceding five years. The Faculty Board plans and manages the Ph.D. programme. It coordinates curricular activities and supervises research activities aimed at contributing to the advancement of research methodology and knowledge in a specific field.

The existence of the above requisites is checked by the University Evaluation Unit and then confirmed by the Academic Senate, which evaluates the scientific value of each Ph.D. programme. Instead, the economic evaluation on the sustainability of the programmes is given by the Board of Directors. These positive feedbacks must be submitted to the ANVUR’s favourable opinion and then confirmed by the MIUR, which validates the accreditation process and authorizes the establishment of the Ph.D. programmes, allowing their publication in a “competition call / notice of competition” realized by each single University.

In Italy, admission to the Ph.D. programmes is regulated by a public selection process decreed by the Rector as per art. 8 of M.D. 45/2013. Candidates with an Italian graduate degree or a foreign qualification suitable for admission are eligible to apply for a Ph.D. programme. The above-mentioned qualifications must be obtained before 31st October of the year when the programme begins. Further curricular qualifications may be included in the proposal for the activation of the programme and will be specified in the call.

Furthermore, the suitability of foreign qualifications is verified by the Admission Board in conformity with the applicable Italian and foreign law or in conformity with international treaties or agreements on the validity of qualifications for post graduate education.

Admission takes place after the selection of candidates. The prerequisites and the qualifications are evaluated and each candidate is ranked according to the assessment criteria specified in the call. Moreover, the Admission Board shall rank the candidates, who will then be admitted to a programme according to their ranking and within the number of places available. The Admission Boards are appointed by the Rector after hearing the opinion of the Faculty

Board and are composed of at least three members of the Faculty Board itself. In the case of Ph.D. programmes “*in consortium*” or in partnership with other Universities, the Boards are appointed in conformity with the terms of the agreement and with the law.

After the admission process, candidates admitted to a Ph.D. programme must enrol or decline their place in the manner and schedule stated in the call. In compliance with the law, students enrolled in a Ph.D. programme are forbidden to enrol on other University programmes, unless they suspend their studies in one of the two programmes, as per art.12.1, M.D. 45/2013. Students can be admitted to each year of the programme:

- with fellowship (merit based);
- without fellowship and with payment of registration fees.

Note that Ph.D. students are always required to pay regional fees, as per existing regulations. A fellowship can be granted by the University or by Non-University institutions and its amount cannot be lower than the amount stated by the Italian Ministry. Fellowships are annual and are paid out by monthly-deferred instalments. Compulsory Italian pension contributions (INPS “Gestione Separata”) will be deducted from the amount of each fellowship, as per current laws. For study and research activities abroad, authorized by the Ph.D. Coordinator, the amount of the fellowship can be increased up to 50% (calculated on the amount of the ministerial fellowship) and for a maximum total period of 18 months. In each University the University Board will then state the number of merit-based fellowships, the amount of registration fees, and the number and amount of tuition waivers granted. Moreover, the recent Art. 9.3 of the M.D. 45/2013, introduces a new right for Ph.D. candidates. It is a “Financial Aid”; in fact, regulations state that, in the last two years of the programme, each Ph.D. student is provided with a budget within the limits of the financial resources allocated annually to the Ph.D. School by the University Board for his or her studies and research activities in Italy and abroad. The amount of the budget may vary according to the field of the Ph.D. programme and cannot be inferior to 10% of the amount of the ministerial fellowship. The Coordinator always authorizes expenses in advance. The University directly covers the expenses on behalf of the student (e.g. cost of fares) or refunds the student’s out of pocket expenses according to the type of activity involved. In any case, the student must comply with the expenses policy of the University.

Admission to a Ph.D. programme implies a full time commitment, in compliance with the law. Ph.D. students must take part in all the activities defined in the programme structure, e.g. lectures and seminars, and pass the required tests and exams established for each year by the Faculty Board. At the end of each year and before enrolment on the next year, the Faculty Board verifies whether the student has met all the requirements as decreed by the Faculty Board itself.

The results can be positive or negative as follows:

- Ph.D. pass. The student can enrol on the next year;
- Fail. The student must leave the programme, unless he has already formally asked to withdraw from the programme.

Students cannot enrol on the next year before being notified about the results of their evaluation.

If a student is not admitted to the next academic year, the payment of the fellowship is suspended immediately after the last instalment of the last year of regular enrolment has been paid out.

Moreover, the Faculty Board can decree exclusion from the programme during the year if, for non-relevant reasons, a student repeatedly fails to comply with academic duties and obligations.

If a student is excluded he or she will have to forfeit the fellowship and repay it for the year.

The Faculty Board can decree suspension in the following cases:

1. Enrolment on another programme: if a student is enrolled on another programme, he or she can enrol on a Ph.D. programme after suspending the other programme. A student already enrolled on a Ph.D. programme can ask for and obtain suspension in order to attend another University programme (e.g. a Law Specialization School).
2. Documented evidence of extenuating circumstances: a student can ask for and obtain suspension producing documented evidence of extenuating circumstances of personal nature, such as paternal/maternity leave or serious illness.
3. Professional training (if compatible with the Ph.D.): temporary intermission consists in the “freeze” of all the Ph.D. programme activities and financial arrangements, which will be reinstated at the end of the intermission, after a period of time as long as the intermission itself.

In any case, we must remember that Ph.D. students can be authorized by the programme Coordinator to:

- temporarily study and do research in other Italian or foreign Universities and organizations;
- take part in meetings and seminars and other short-term projects related to their studies and research activities;
- take part in research projects funded by external bodies (e.g. the EU);
- work as teaching assistants and research assistants for the University in conformity with national and internal rules.

At the beginning of the programme, each student is assigned to a Tutor, selected in the Faculty Board, which will follow the academic activity of the Ph.D. candidate. Each Ph.D. programme establishes the programme requirements in terms of timing, parties and activities related to thesis

writing. Students, after choosing their Research Advisor among the Faculty Board, start to work on their research projects thesis approximately halfway through the programme. Their advisor may work with a co-advisor, who can also be chosen outside the University. In the case of double degree programmes, theses can be written under the supervision of two advisors, one from an Italian University and one from a foreign University. For each Ph.D. student a specific, separate formal agreement must be reached between the Rector and the foreign University. Ph.D. candidates will then submit their final draft (with an attached report on the activities performed during the programme and copies of their research papers, if any) to two Professors, chosen by the Faculty Board, who are not part of the University which will award the Ph.D. degree (External Assessors). The thesis will be submitted through the Administrative Office, which is responsible for the procedure. Within six months of the submission, each Assessor will issue a separate detailed written assessment of the thesis and recommend admission to the public defence or ask for postponement, for at least of six months, but no more than one year, if relevant additions or changes are required. After receiving and giving due consideration to the assessments, the Coordinator will admit or not admit the candidate to the public defence. In particular, a candidate will only be admitted if both assessments are favourable. After a postponement period, theses are always admitted to public defence, without exception. The new evaluations shall be issued by the External Assessors within 30 days and will be attached to the modified thesis. The public defence of the thesis must take place within three months of the end of the postponement period. Therefore, candidates admitted to the defence of their thesis are assessed, at times set in the annual Academic Planning, by a Thesis Board which is appointed by the Rector and in which the advisor and at least two members are part of the Permanent Faculty. After the discussion of the defence, the Board will issue a collegial reasoned resolution in writing. The thesis will be approved or rejected; if it is rejected, it cannot be submitted a second time and the resolution cannot be appealed. The University will deposit the thesis in the institutional registry, which is open to the public and is managed by the Central Library of the University. The registry is responsible for the conservation and the availability to the public of the thesis. The University will also give copies of the final thesis to the Italian National Libraries in Rome and Florence.

Of course, we must say that the above rules and regulations are general and can change from one University to another as an effect of the specific rules and regulations of each Italian University.

1.2.3 Ph.D. candidates. Skills requested and achievable goals

What does a Ph.D. stand for today? According to Melin and Janson (2006) to answer this question two lines of interpretation can be suggested. First, a traditional view where a Ph.D. is seen as a kind of diploma certifying one's ability to carry out independent and original research. This traditional view split between those who believe that the thesis is the ultimate evidence for being a researcher, whereas the modernists argue that the researcher, not the thesis, should be the product of the process. Secondly, a utilitarian view where the Ph.D. is seen as a professional degree and the postgraduate programmes are regarded as a high-level education, which follows the Master's degree. Pure research work is in those programmes only a part of a broader training. Is the completion of the thesis enough or should a Ph.D. student acquire a certain wider range of competencies? Nowadays potential employers from both the private and the public sectors want researchers with a wider set of skills and competencies than just specialized knowledge in a given topic. The skills, competencies and abilities that a Ph.D. graduate ought to possess in order to meet the demands from potential employers today could include (but are not limited to):

- managerial and leadership skills;
- the ability to communicate with the public;
- the ability to connect with foreign colleagues in networks;
- administration of projects;
- dealing with and understanding political circumstances;
- negotiating with business partners;
- cultural understanding.

These examples point towards a broad bundle of necessary skills with growing expectations on the Ph.D. student with regard to preparation for the world outside academia. In fact, the need for this bundle of skills can be seen as a result of a 'market failure': if more graduates earn a Doctorate degree, the imbalance of career positions in science and academia, and the increased number of doctorate holders leads to a higher percentage of doctorate holders going into business and other sectors outside academia³³. Consequently, these Doctorate holders need competencies that are different from those necessary for continued work within academia. In contrast, the openness to business and to other sectors outside academia not necessary should be regarded as a failure. In fact, a career path provides additional opportunities and consequently, those who choose it, should not be regarded as unsuitable for a scientific career. All Doctorate holders,

³³ Slaughter, S., Campbell, T., Holleman, M. and Morgan, E. (2002) The "traffic" in graduate students: graduate students as tokens of exchange between academe and industry. *Science, Technology & Human Values* 27 (2), 282–312.

independent of their future careers, need to develop a certain range of competencies. All researchers are working and living in a highly competitive, rapidly changing and complex world. It is no longer enough to be a good researcher; to a certain degree, researchers also need to be team leaders, managers and marketing experts. Consequently, they need communication and presentation skills, and knowledge about leadership and human-resource development, as well as knowledge about administration procedures and finances. An insight into cultural differences and human relations is another prerequisite³⁴. The formative years therefore have a double function. They prepare the young scientist for a career in academia, but also for a position outside academia. This double function may lead to ‘over-burdening’ of both graduates and their supervisors. Society expects Doctorates and their supervisors to be multi-skilled people, researchers, managers and entrepreneurs.

The question remains as to how these competencies can be acquired, and where and when the competence development takes place. At least two views can be identified. One being that these competencies need to be part of a structured Doctoral training programme and, from this perspective, the traditional ‘master-student model’ does not guarantee an adequate development of competencies. The opposite view emphasizes that development of competencies takes place alongside research work³⁵. Perhaps this argument carries heavier weight in the engineering and natural sciences as they include disciplines that traditionally combine Doctoral research with project work inside or outside the laboratory. Doctoral students are in daily contact with other researchers and often also their supervisor. Solitary research work with irregular meetings with the supervisor has rather been typical in the humanities and, in part, the social sciences. Therefore, it can be assumed that both views depend on which scientific area we look at and which academic culture we deal with³⁶.

As for the achievable goals of Ph.D. candidates, it must be remembered that, in Italy, like in most other countries, the Ph.D. is a basic requirement for a career in academia. It is an introduction to the world of independent research, a kind of intellectual masterpiece, created by an apprentice in close collaboration with a supervisor. But a Ph.D. is not just a *post lauream* degree that prepares to start an high-level research career at Universities, or exercise professions.

³⁴ Hara, N., Solomon, P., Kim, S.L. and Sonnenwald, D.H. (2003) An emerging view of scientific collaboration: scientists’ perspectives on collaboration and factors that impact collaboration. *Journal of the American Society for Information Science*, 54 (10), 952–965.

³⁵ Campbell, R.A. (2003) Preparing the next generation of scientists: the social process of managing students. *Social Studies of Science* 33 (6), 897–927.

³⁶ Wagner, C. (2005) Six case studies of international collaboration in science. *Scientometrics* 62 (1), 3–36.

Today, in particular, it represents a surplus value for the candidates giving them the possibility to enter in the employee system with higher specialization.

Even so, besides the precise aim of each candidate, at the end of the three year cycle they should be able to:

- Use a valuable set of tools that will serve in their work, such as the ability to set clear and effective goals, and to better manage time and risk;
- Identify a clear sense of their drivers, strengths and skills, guiding future career choices;
- Cooperate with people and interact with them in order to get things done.

Of course, we must say that, Ph.D. candidates are generally considered crucial for the economic and social development of a country. So, in order to identify their role and importance for the present-day Italian University and for the Italian economy, we will continue our analysis with the description of the evolution, over time, of the Doctorate in Italy. This will be made following the law changes incurred from the introduction of Doctoral programmes to the most recent Reform of the sector.

1.3 Italian Doctorate: the evolution over time

The requirements to complete a Ph.D. successfully vary enormously between countries, Universities and even subjects. In Italy, the Ph.D. generates the highest level of University supply. Within the Italian Doctorate, we can identify administrative and educational components; the result of their activity is the Ph.D. programme.

In Italy, a Ph.D. programme is a three-year path, introduced for the first time in 1980³⁷. Over the years, the system has been influenced by a great number of reforms. The most recent one is the introduction of the M.D. n. 45/2013³⁸ by MIUR in Italy and it represents the final step of a process, which is trying to make more efficient and competitive the impact of such programmes. In particular, it introduces the so-called “Ph.D. Validation/Accreditation Process” (Accreditamento in Italian), a new compulsory process that risks increasing in complexity the validation of International Ph.D. programmes. In particular, it introduces new rules for the accreditation of the structures that can release the title of Ph.D., regulated by ANVUR, while, under the previous law, the courses were established independently by each University after the

³⁷ D.P.R. 382/1980, “*Riordinamento della docenza universitaria, relativa fascia di formazione nonché sperimentazione organizzativa e didattica*”.

³⁸ Anticipated by Law 240/2010 art. 18 (so-called “Riforma Gelmini”).

achievement of certain minimum criteria. Another relevant innovation is that the number of Doctoral programmes validated is limited on the basis of two numerical parameters:

- the number of professors within the Faculty Board;
- the number of fellowships available apart from those covered by University.

In particular, in the following paragraph, to evaluate the current Italian Ph.D. system, we will analyze its evolution over time to the most recent reform of the sector in order to identify its strengths and weaknesses. The Italian Ph.D. system introduces a new system of governance for Italian Universities in consideration of the present-day globalized context in which the Italian Higher Education System plays.

1.3.1 Introduction of Ph.D. in Italy: Presidential Decree No. 382/1980

The Ph.D. in Italy was established by Presidential Decree No. 382, 11th July 1980, entitled “*Reorganization of University teaching, related training and organizational experimentation and learning*”, with the aim of representing a training path for research. At the beginning, this target was a kind of limit in terms of marketability of the title; moreover, the Doctoral title and degree was created to be spent, exclusively, in the scientific research area and, in particular, in the academic one.

We must remember that this Presidential Decree represents the moment of the establishment, next to the doctorate and closely connected to it, of the position of University researcher. This link is crucial, since it will be central in the first eighteen years of Ph.D. history. Moreover, the achievement of a Doctoral degree represented, in this period, the validation of the ability to meet, independently and correctly, specific and original scientific objectives in a disciplinary field.

Schematically, it can be said that the Presidential Decree No. 382/1980 identified Ph.D. as a preparation for research activity through specific strategies, some explicit, others implicit, but no less indicative of a figure uniquely directed to scientific research. This is clearly stated in Art. 69 - Title III: Scientific Research. It establishes that the locations where you can set up a Ph.D. are identified with “*Faculty and departments identified on the basis of general planning criteria which take account of the needs of scientific research*”. To highlight this requirement, the condition is the presence of a large number of “*qualified professors in order to guarantee the production of a specific and original scientific results*”. This specific orientation to scientific research is further enhanced by the indication of University as the primary place of scientific research. To confirm this, the job placement of the Ph.D. title is limited to the scope of scientific

research: *"It is established that the Ph.D. degree can be assessed only in the context of scientific research."*

In addition to these needs, another feature recognizes the Ph.D. as a preparatory time for an academic career. Particularly focused on research, it can be identified in the strong continuity between skills and knowledge required by Ph.D. candidates in the admission test and in what is required in the selections to become a researcher. Art. 71 establishes that: *"The exams for Ph.D. are designed to assess the candidate's aptitude for scientific research"*, while according to Art. 46: *"the exams for researchers [are] designed to assess the aptitude of prospective research"*. A third element of great interest that clearly defines the doctorate is the emphasis on Ph.D.'s results as a central element for the evaluation of the Doctoral training period. Indeed, a Ph.D. is *"given to those who have achieved, at the end of the programme, relevant scientific results shown by a final written thesis or a graphic work"*. In this way, the doctorate becomes a sort of scientific investigation period, centred on research results and on the demonstration of Ph.D. candidates skills, specifying, with the term "research", the ability to produce specific and original knowledge.

In Italy, the duration of Ph.D. is defined by MIUR. It consists in a minimum period, which is indicated as a three-year full-time course, without any other restrictions. But a particular aspect of the first form of Ph.D., ruled by Presidential Decree No. 382/1980, was the possibility of obtaining a doctorate degree just presenting the final thesis, as a privately developed writing, without attending courses:

"to the assessment, referred to in the preceding paragraph, may be admitted even candidates who have not participated in the courses provided; they have to possess valid licenses of research and have graduated in a course long a number of years one greater than the duration of the Ph.D. programme chosen" (Art. 73).

This possibility was a direct result of the emphasis posed on the achievement of an original and specific result. Of course, we must not underestimate the weight that this option had on the total number of Doctoral programmes, since the Presidential Decree No. 382/1980, provided that each year, the number of places that could be acquired directly with the exam, without the course, was a quarter of the total number of positions available. This aspect also identifies the Doctoral degree as a title, focused on the creation of professional figures directed to academic and scientific research.

This profile seems to be highlighted by the law No. 476/1984 which sets out the provisions for access to Doctoral research even public employees, introducing the possibility to leave their

place in “stand-by” for study purposes. This openness, also, shows another characteristic of the Italian doctorate, especially in those years: the presence of a number of older Ph.D. graduates (the average age in the first 5 cycles was 27.7 for both men and women). This also confirms that the first form of Ph.D. was totally oriented to the creation of candidates that would become academic researchers.

1.3.2 A new approach from 1998. The Berlinguer Law

The Ph.D. was originally a position fully linked within the academic world. The first real transformation of the Italian doctorate takes place 18 years after its establishment, with the Law No. 210/1998³⁹, “*Guidelines for the recruitment of researchers and University professors*”, signed by Minister Berlinguer, and then implemented with the Ministerial Decree No. 224/1999⁴⁰. This law, in fact, increased the autonomy of the University giving them, instead of national institutions, the management of competitions for the recruitment of teachers and researchers. With this law, there is also a new approach in Ph.D.’s.

Thanks to the Bologna Process⁴¹, which introduced a transformation of University teaching and the identification of Ph.D. as the third level of post-graduate training, the purpose of the doctorate becomes the acquisition of those skills necessary to the “know-how” of research. Consequently, the concept of the doctorate as the exclusive ability to develop original research, that had characterized its establishment in 1980, disappears. It also introduces the possibility that Ph.D. programmes are established through agreements with public and private entities with high scientific and cultural requirements. The identification of a Doctoral programme as a third cycle of studies, qualifies it as a “marketable” title. Moreover, one of the compulsory requirements for the validation of a Ph.D. is the collaboration with public or private entities, Italian or foreign, that allows Ph.D. students to have work experience in various work activities.

The first main difference is, therefore, in the first paragraph of Art. 4⁴², which focuses on Ph.D., in which it is seen as a qualification to be used outside the University context: “*The Ph.D.*

³⁹ Law No. n. 210, 3 July 1998: “*Norme per il reclutamento dei ricercatori e dei professori universitari di ruolo*” (G.U. n. 155 del 6/07/98).

⁴⁰ D.M. 30 April 1999, n. 224 “*Regolamento recante norme in materia di dottorato di ricerca*” (G.U. n. 162 del 13/07/99).

⁴¹ Bologna Process was launched in 1999 by the Ministers of Education and university leaders of 29 countries, the Bologna Process aims to create a European Higher Education Area (EHEA) by 2010.

⁴² Law No. n. 210/1998, Art. 4, Dottorato di Ricerca, par. 1: “*I corsi per il conseguimento del dottorato di ricerca forniscono le competenze necessarie per esercitare, presso università, enti pubblici o soggetti privati, attività di ricerca di alta qualificazione*”.

courses provide the skills required to produce high quality research in Universities, public or private entities". This deep change in the nature of the Doctorate is also linked with the abolition of the articles that allowed achieving the Ph.D. title without attending the Ph.D. courses. Such a change, is evident in the emphasis given to the role of education in achieving the title, in fact, in addition to the Ph.D. objectives, there is the reference to a *"teaching programme"*⁴³, introducing a dimension that was not mentioned before and considered scarcely relevant.

This approach is fully developed in the Ministerial Decree No. 224/1999, which defines the *"Regulations on Doctorate"*. This Decree, playing on the recommendations of the previous law, emphasizes the strong character of change, underlining that the Ph.D. degree is not just an academic title. This affects the whole Decree, starting from the requirements that the Universities should possess, for example: *"The possibility of collaboration with public or private entities, Italian or foreign, that allows Ph.D. candidates to have work experience in various work activities."*⁴⁴. In this field, there are many recommendations for a closer relationship between Universities and the world of work, in addition to designing a Doctoral teaching programme with external parties, such as small and medium enterprises or firms, etc.⁴⁵

In general, we can say that of the two possible visions of the Doctorate, in which one is more focused on the creation of an original research through the relationship with a supervising professor and another that identifies the period of the Doctorate as a moment of research training, emphasizing the methodology and the acquisition of cross-sectional techniques, it is definitely the latter to be privileged, almost in opposition to the former. As proof of this, in the M.D. No. 224/1999, we never find the references to the originality of the research, which is preferred, in Art. 4 with the definition of learning outcomes and curriculum development: *"The training of Ph.D. candidate is target to the acquisition of necessary skills to generate research activities of high quality"*. The document outlines always the need to plan in a precise and structured way the study programmes of the doctorate, emphasizing the need of a higher teaching activity. However, the most transparent point of the new setting of the doctorate is the

⁴³ Law No. n. 210/1998, Art. 4, Dottorato di Ricerca, par. 2: *"Le università, con proprio regolamento, disciplinano l'istituzione dei corsi di dottorato, le modalità di accesso e di conseguimento del titolo, gli obiettivi formativi ed il relativo programma di studi, la durata, il contributo per l'accesso e la frequenza, le modalità di conferimento e l'importo delle borse di studio"*.

⁴⁴ Ministerial Decree No. 224/1999, art. 2, paragraph 3d: *"la possibilità di collaborazione con soggetti pubblici o privati, italiani o stranieri, che consenta ai dottorandi lo svolgimento di esperienze in un contesto di attività lavorative"*.

⁴⁵ Ministerial Decree No. 224/1999, art. 4, paragraph 3: *"Nel caso di convenzioni o intese con piccole e medie imprese, imprese artigiane, altre imprese di cui all'articolo 2195 del codice civile, soggetti di cui all'articolo 17 della legge 5 ottobre 1991, n. 317, il programma di studi può essere concordato tra l'università e i predetti soggetti in ordine alla concessione delle agevolazioni di cui all'articolo 5 della legge 27 dicembre 1997, n. 449 e successive modificazioni e integrazioni"*.

loss of the expression “*original research*” in favour of the ability to carry out high quality research.

1.3.3 The Bologna Process and internationalization: Consequences for Ph.D.

As said before, one of the main events which influenced the historical evolution of Ph.D. is the so-called Bologna Process.

TIMELINE OF THE BOLOGNA PROCESS

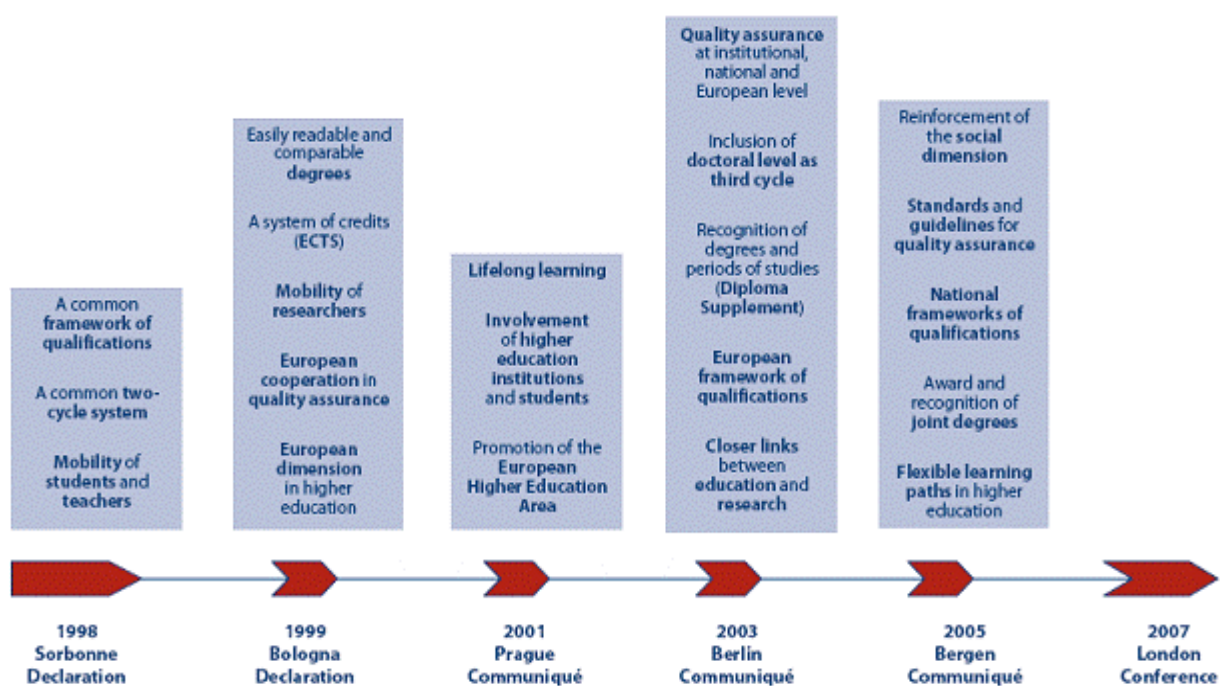


Figure 1.3– Timeline of the Bologna Process

Launched in 1999 by the Ministers of Education and University leaders of 29 countries, the Bologna Process aimed to create a European Higher Education Area (EHEA) by 2010; it has further developed into a major reform encompassing 46 countries. Taking part in the Bologna Process was a voluntary decision made by each country and its higher education community to endorse the principles underlined in the European Higher Education Area. The Bologna Process did not aim to harmonize national educational systems but rather to provide tools to connect them. The intention was to allow the diversity of national systems and Universities to be maintained while the European Higher Education Area improved transparency between higher

education systems, as well as the implementation of tools to facilitate recognition of degrees and academic qualifications, mobility, and exchanges between institutions. The reforms were based on ten simple objectives, which governments and institutions are currently implementing. Most importantly, all participating countries have agreed on a comparable three-year cycle degree system for undergraduates (Bachelor degrees) and graduates (Master and Ph.D. degrees). Moreover, the Bologna Process aims to facilitate mobility by providing common tools (such as a European Credit Transfer and accumulation System – ECTS and the Diploma Supplement) to ensure that periods of study abroad are recognized. These tools were used to promote transparency in the emerging EHEA by allowing degree programmes and qualifications awarded in one country to be understood in another.

An overarching structure (incorporating these elements) is being implemented through the development of national and European qualifications frameworks, which aim to provide a clearly defined system that is easy for students, institutions and employers to comprehend. Consequently, two basic degrees, Bachelor and Master, have been adopted now by every participating country; sometimes in parallel to existing degrees during a transition period, sometimes replacing them completely. European Universities are almost at the end of the implementation phase, and an increasing number of graduates have now been awarded these new degrees. Typically, a Bachelor degree requires 180-240 ECTS credits and a Master programme between 90-120 ECTS credits, with a minimum of 60 ECTS at Master level. This allows for a flexible approach in defining the length of both Bachelor and Master programmes. Many participating countries have made substantial changes to their systems in response to the Bologna Process. Introducing the new degrees has required a tremendous effort in reviewing curricula and expectations toward students. Already over half of European Universities have reviewed their curricula entirely, using the Bologna reforms to implement a more student-focused approach and new quality procedures.

In the third cycle, European Ph.D. programmes are not defined by ECTS credits, however, common principles are currently under discussion. Ministers meeting in Berlin in September 2003 added an Action Line to the Bologna process entitled “*European Higher Education Area and European Research Area – two pillars of the knowledge based society*” that underlines the key role of Doctoral programmes and research training in this context:

“Conscious of the need to promote closer links between the EHEA and the ERA in a Europe of Knowledge, and of the importance of research as an integral part of higher education across Europe, Ministers consider it

necessary to go beyond the present focus on two main cycles of higher education to include the Doctoral level as the third cycle in the Bologna Process. They emphasize the importance of research and research training and the promotion of interdisciplinarity in maintaining and improving the quality of higher education and in enhancing the competitiveness of European higher education more generally. Ministers call for increased mobility at the Doctoral and postdoctoral levels and encourage the institutions concerned to increase their cooperation in Doctoral studies and the training of young researchers.”

Research training and research career development - and the need to increase the number of highly qualified graduates and well-trained researchers - are also becoming increasingly important in the debate on strengthening Europe's research capacity. Furthermore, in order to raise awareness of the issues and provide a solid basis for the discussions, the European University Association (EUA) launched in 2004 a Socrates funded Doctoral Programmes Project to analyze key issues related to structure and organization, financing, quality and innovative practice in Ph.D. programmes. 49 Universities from 25 countries are involved in this project which demonstrates the commitment of the Universities and their desire to contribute directly to the wider policy debate on this important issue.

Aware of the importance of this topic for both governments and Universities and bearing in mind that research training forms a core mission of Universities across Europe, the Austrian Federal Ministry of Education, Science and Culture, the German Federal Ministry of Education and Research and the European University Association took the initiative to organize a “Bologna Seminar” in Salzburg on Doctoral programmes in order to reach a set of conclusions, identify key challenges and make recommendations for action to be undertaken (in the period 2005-2007).

The enormous interest in and presence at the Seminar of the academic community further demonstrates the ownership felt by Universities across the continent for the organization of Doctoral programmes and research training. Furthermore, participants welcomed the initiative of the European Commission to draft a “*European Charter for Researchers’/Code of Conduct for the Recruitment of Researchers*”.

1.3.4 The evolution of Bologna Process for Doctorate: Salzburg Seminar and its effects

While in the next ten years the Italian legislation on the Doctorate remains static, the introduction of the Bologna Process generated various measures at a European level with the target of the harmonization of the European area of Higher Education. With the Berlin Declaration of 2003 for the first time, there was a great emphasis on Ph.D. and education of future doctors. It emphasized in the Additional Actions, “*the importance of research and research training and the promotion of interdisciplinarity in maintaining and improving the quality of higher education and in enhancing the competitiveness of European higher education more generally*”. This implies a greater formalization of the Ph.D. as founding moment of the Bologna Process⁴⁶ and the identification of research, closely linked to the emerging knowledge-based society, as an integral part of Higher Education.

A key document in this context consists of the *Doctoral Programmes for the European Knowledge Society* presented in Salzburg in 2005, which laid the foundation for the development of joint Doctoral programmes in the European Union. From the discussions in Salzburg a consensus emerged on a set of ten basic principles as follows:

1. The core component of Doctoral training is the advancement of knowledge through original research. At the same time, it is recognized that Doctoral training must increasingly meet the needs of an employment market that is wider than academia.
2. Embedding in institutional strategies and policies: Universities as institutions need to assume responsibility for ensuring that the Doctoral programmes and research training they offer are designed to meet new challenges and include appropriate professional career development opportunities.
3. The importance of diversity: the rich diversity of Doctoral programmes in Europe - including joint doctorates - is a strength which has to be underpinned by quality and sound practice.
4. Doctoral candidates as early stage researchers: should be recognized as professionals - with commensurate rights - who make a key contribution to the creation of new knowledge.
5. The crucial role of supervision and assessment: in respect of individual Doctoral candidates, arrangements for supervision and assessment should be based on a transparent contractual framework of shared responsibilities between Doctoral

⁴⁶ Cfr. “*The doctoral level as the third cycle in the Bologna process*”.

candidates, supervisors and the institution (and where appropriate including other partners).

6. Achieving critical mass: Doctoral programmes should seek to achieve critical mass and should draw on different types of innovative practice being introduced in Universities across Europe, bearing in mind that different solutions may be appropriate to different contexts and in particular across larger and smaller European countries. These range from graduate schools in major Universities to international, national and regional collaboration between Universities.
7. Duration: Doctoral programmes should operate within an appropriate time duration (three to four years full-time as a rule).
8. The promotion of innovative structures: to meet the challenge of interdisciplinary training and the development of transferable skills.
9. Increasing mobility: Doctoral programmes should seek to offer geographical as well as interdisciplinary and intersectorial mobility and international collaboration within an integrated framework of cooperation between Universities and other partners.
10. Ensuring appropriate funding: the development of quality Doctoral programmes and the successful completion by Doctoral candidates requires appropriate and sustainable funding.

Consequently in this document there is the research of a common platform in order to balance the different needs that were present in previous documents, ranging from the need to claim the advancement of knowledge through original research⁴⁷ and the urgent need for Doctoral programmes to see even outside academia, providing the tools which will allow to access the world of work with the needed qualifications and encouraging the creation of programmes designed with external partners. In particular, two items of interest must be underlined. First the duration that needs to be established for a limited period of time, not exceeding, in any case, three or four years⁴⁸. The other crucial aspect is represented by the strong role given to

⁴⁷ Communiqué of the Conference of European Ministers Responsible for Higher Education, Bergen, 19-20 May 2005: “*The core component of doctoral training is the advancement of knowledge through original research. At the same time it is recognized that doctoral training must increasingly meet the needs of an employment market that is wider than academia*”.

⁴⁸ Communiqué of the Conference of European Ministers Responsible for Higher Education, Bergen, 19-20 May 2005: “*Considering the need for structured doctoral programmes and the need for transparent supervision and assessment, we note that the normal workload of the third cycle in most countries would correspond to 3-4 years full time*”.

mobility⁴⁹ in the perspective of internationalization of the European Higher Education system which had foreseen in international collaboration a key element for its future development.

Another key document to understand the European approach to the Doctorate is represented by the final considerations of the *Bologna Seminar on Doctoral Programmes* (Nice, 7-9 December 2006), entitled: *Matching Ambition with Responsibilities and Resources*. This document, in fact, presented an overall picture until its partial revision in 2009. The Doctoral programme is specifically linked to the other two cycles of the University system, avoiding its separation from the rest of the University supply⁵⁰. Emphasis is, on the one hand, on the importance of the diversification of Doctoral programmes and on the other hand, in connection with the labour market demand and the life-long learning perspective. The authors of this document are perfectly aware of the differences of such kinds of Ph.D. compared to many national traditions; therefore, one of the biggest sections of the text is dedicated to the different types of doctorate⁵¹. In this section of the document, the professional doctorate is seen as necessary to answer to different needs. This emphasis on the professional doctorate is balanced, in part, by the importance, much stronger than in other documents, of the originality of the research, it is required as an essential element to the quality of the final product generated by Ph.D.⁵².

Prepared by the previous documents, with the *London Communiqué* of 2007 the basic elements of the Bologna Process were reconnected to the new vision of Ph.D.'s. In particular, in this paper, there is great emphasis on the concept of compatibility and comparability of different European higher education systems, respecting, at the same time, their diversity⁵³. Along this line, there is the full recognition of the various Doctoral programmes that European Universities have structured throughout their history, often as an effect of different cultural traditions. This

⁴⁹ Communiqué of the Conference of European Ministers Responsible for Higher Education, Bergen, 19-20 May 2005: "We shall intensify our efforts to lift obstacles to mobility by facilitating the delivery of visa and work permits and by encouraging participation in mobility programmes. We urge institutions and students to make full use of mobility programmes, advocating full recognition of study periods abroad within such programmes".

⁵⁰ Bologna Seminar on Doctoral Programmes: «While doctoral programmes are unique they should not be considered in isolation but in relation to the implementation of the three Bologna cycles as a whole», p.1.

⁵¹ Ivi, p. 4, paragraph 3.1 *Diversifying doctoral programmes*.

⁵² Ibidem: «Original research has to remain the main component of all doctorates. There should be no doctorate without original research».

⁵³ London Communiqué, 18.05.2007, paragraph 1.4: "Our aim is to ensure that our higher education institutions have the necessary resources to continue to fulfil their full range of purposes. Those purposes include: preparing students for life as active citizens in a democratic society; preparing students for their future careers and enabling their personal development; creating and maintaining a broad, advanced knowledge base; and stimulating research and innovation".

identification, in fact, has at least two conflicting aspects: on the one hand, it is aimed at respecting national peculiarities and traditions, an aspect in part weakened, however, by the same recognition given to these different kinds of programmes; on the other hand, it meets the desire to differentiate, within single countries, the purpose of Doctorates, creating different types (vocational Doctorate, Doctorate directed to research and an academic career).

Finally, the Communiqué of the Conference of European Ministers for Higher Education in Leuven and Louvain-la-Neuve in 2009 reaffirmed that:

1. Higher education at all levels should be based on the most recent research in order to promote the whole society innovation and creativity;
2. The number of people able to do research have to be increased;
3. The organization of Doctoral research should provide the specification of high quality, but also be more open to interdisciplinary and cross-sectorial activities⁵⁴.

Public authorities and institutions of Higher Education are also entitled to the task of making more attractive the career perspectives of young researchers. It is important to underline that the European Ministers of Education in 2009, when the economic crisis had already erupted in all its gravity, continued to work to guarantee that the number of people dedicated to research increased over time. This is evident in the document of EUA Prague Declaration, *“European Universities - Looking forward with confidence”*, in 2009, which was affected by the uncertain economic climate that has characterized the last years and that exploded from 22 September 2008. In previous papers, in fact, it was possible to feel a great confidence in public and private investments on research as an economic driver, having a positive return to the entire society. This belief pushed the desire to see more and more research oriented programmes in collaboration with production realities external to the university campus, in an attempt to attract funding to finance part of research. The Economic crises and the weakness of the economic system produced a dual social problem, which has deep roots in the concept of the *knowledge society*:

- Cultural promotion, prosecuted through private funding targeted to intangibles (knowledge, culture, information, knowledge, etc.), which opened to researchers, intellectuals and creative people great opportunities for social improvement, seems to be replaced by a standardization of intellectual work, dependent on the achievement of pre-ordered tasks that have little to do with the research with a high scientific profile;

⁵⁴ 6th Bologna Ministerial Conference Leuven and Louvain-la-Neuve, 28-29 April 2009, point 15, Education, research and innovation: *“Doctoral programmes should provide high quality disciplinary research and increasingly be complemented by inter-disciplinary and inter-sectorial programmes”*.

- Public funds and institutions, consequently, return to play a crucial role⁵⁵, both in protection of an entire generation of researchers and intellectuals and in the emancipation from the immediate needs of the labour market⁵⁶, highlighting problems in public-private partnerships now in crisis.

But a relevant aspect, also linked to the economic crises, was the reduction in the number of Ph.D. programmes and subscriptions. With the Prague Declaration the possibility to undertake independent research is postponed after Ph.D. achievement⁵⁷ and the process for the recruitment of Ph.D. candidates became more difficult. Therefore, as a summary of what, today, the introduction of the Bologna Process brought to the European Ph.D. system we can identify:

1. The transformation of Ph.D. into a research training, with a role in teaching;
2. The postponement of research as original and individual in a post-doctoral period;
3. The opening of Ph.D. to extra academic world, both in the research of funds and as an employment destination.

In particular, the application of the Bologna Process principles to the Italian University system, leads to the last University reform involving, in its effects, the Ph.D. sector. The features and effects of this Reform will be analyzed in the next section.

1.4 The last reform and its impact on Ph.D.: Art. 19 Law 240/2010

The application of the recent University reform to the Ph.D. sector is represented by Ministerial Decree No. 45/2013. It is the application to the Doctorate of the Law No. 240, 30th December 2010 (so-called Gelmini Law), which introduced, as said before, new rules on University organization, academic staff and recruitment, delegating Government to enhance the quality and efficiency of the University system.

The Law 240/2010 introduces new rules in terms of University governance, in the attempt to increase the academic autonomy, modifying the administrative and educational actors within the

⁵⁵ *Prague Declaration, 2009*: «when private support weakens and business falters public funding is essential to guarantee continuity. Europe cannot afford to run the risk of losing a generation of talented people or of a serious decrease in research and innovation activity», p. 4.

⁵⁶ The topic is extremely delicate: on the one hand the Government must not fail in their role of educator, leaving the field open to the market and cultural trends, on the other hand does not exceed in the opposite side, strangling with excessive regulatory rigidity what is proper of an individual research project which has, as reference, a context wider of the national one. Marc Fumaroli, *L'État culturel. Essai sur une religion moderne*, édition augmentée, Paris, Éditions de Fallois, 2004.

⁵⁷ *Prague Declaration 2009*, p. 6: «Improving research careers: through transparency of recruitment and promotion procedures and granting greater independence for young researches at postdoctoral stage».

system. As a consequence the Ph.D. sector is also involved by the Reform. In these terms, the main novelties introduced can be summarized as follow:

1. The possibility to establish Ph.D. courses not only by Universities and public institutions, but also by other qualified entities;
2. The national accreditation made by MIUR, based on the evaluations made by ANVUR.

In particular, we will analyze the implications of the Ministerial Decree No. 45/2013 which is the application of the Gelmini Law to the Ph.D. sector. This analysis is crucial to better understand its effects on the Doctoral sector. Subsequently, this analysis will also demonstrate how the new reform opens to the creation of International programmes, even if for the actual global context in a very weak way for present-day University focused on the Internationalization of the HE system.

1.4.1 The Gelmini Law and the introduction of new elements for Ph.D.

The Gemini Law was formulated to respond to the need to redefine the Italian University *governance*. In particular, the reform was greatly influenced by the way in which Universities had exercised, in the past, autonomy in terms of teaching and recruitment. Firstly, producing an unjustified proliferation of courses with the related costs, secondly, causing an indiscriminate professional progression of internal academic staff, with a further increase in expenditure, not always accompanied by a similar increase in the quality of University teaching. In opposition to this, the Gelmini Law introduces new aspects on the governance of Italian Universities, asking them to redefine their governance and modify their statutes according to a specific procedure and in compliance with the guiding criteria set out in Art. 2 of the Law No. 240/2010.

As for the procedure, University Statute's changes must be prepared by an *ad hoc* organism, composed by fifteen members, chaired by the Rector, and with the presence of two members of student representatives and other twelve members selected, in equal measure, by the Academic Senate and the Board of Directors, including people who are not members of those bodies. Then, the University Statute drawn up must be approved by the Academic Senate, with the favourable opinion of the Board of Directors.

As for the content of the law, Universities must exercise autonomy statute in respect of a plot of precise guiding criteria established by law, which essentially identifies a governance model which is the same for all Universities. It is a model, in truth, that does not represent a

revolution in comparison with the current system⁵⁸. As seen before, for example, the subjects of the university government, compulsorily provided by statutes, are largely those now present in all Italian Universities: Rector, Academic Senate, Board of Directors and University Evaluation Unit, plus the Board of Auditors and the General Director (who takes the place of the current Administrative Director). Nevertheless, the “Gelmini Law” introduces significant innovations, in terms of distribution of functions between the different subjects; in particular, we can say that:

- The executive function is exercised under a procedural circuit which starts by the initiative of the Rector and ends with a decision of the Board of Directors, whose Rector is at the same time member and, maybe, also chairman;
- The legislative function is given to the Academic Senate, which approves the Regulation of the University and, after obtaining the opinion of the board, formulating the code of ethics and other regulations, with the exception of the administrative and accounting rules, for which the Board of Directors is responsible.
- The function to verify the quality and effectiveness of teaching and research is given to the University Evaluation Unit. In addition, it carries out an evaluation of the administrative performance. So the Evaluation Unit, on the one hand, provides to the other government subjects and in particular to the Rector and to the Board of Directors, the necessary information to play their function of strategic guidance and planning. On the other hand, the Evaluation Unit has the task of putting in connection the internal governance with the world outside academia. In fact, working in collaboration with ANVUR, it should ensure that the evaluation of facilities and teachers inside the University takes place according to the same criteria and indicators on the basis of which the University itself, as a whole, is then valued by public authorities. This evaluation is crucial to obtain Public funds.

Consequently, as underlined by the University National Centre, (CUN - Centro Universitario Nazionale in Italian), as a consequence of the Law 240/2010:

“The autonomy of University, in its different expressions of teaching, scientific, organizational, financial and accounting autonomy, suffered a reduction of functional spaces for Educational Institutions and Academic Communities with, at the same time, an asymmetric counterweight represented by increasing powers given to some of its decision makers.”⁵⁹”

⁵⁸ F. MERLONI, *La nuova governance delle università italiane*. Merloni underlines that the relationship between the new University subjects is in “continuity with the past”.

⁵⁹ CUN – Dichiarazione per l’università e la ricerca, le emergenze del sistema, January 2013, p. 21.

But, coming back to the central topic of the thesis, we can say that the Law 240/2010 focuses on the topic of Ph.D.'s in Art. 19, introducing changes to the mentioned Law 210/1998, and, in particular, the main switch is in point n. 2 where a new validation/accreditation process for Ph.D. programmes is introduced. This new validation process of the institutions that can release Ph.D. titles and courses is made by MIUR after a favourable opinion expressed by ANVUR. Under the previous law, instead, the courses were established independently by each University, after the fulfilment of certain minimum criteria objectively and often indefinite such as, for example, "*the presence in the Faculty Board of a relevant number of professors and researchers of the scientific area of the programme*" or "*the availability of adequate financial resources and specific structures for scientific study and research of doctoral students*".

Starting from this first analysis, the next paragraph will show that, as an effect of the Reform, the number of Doctoral programmes validated is limited on the basis of two numerical parameters: the number of professors within the Ph.D. Faculty Board and the number of fellowships available beyond those covered by University.

1.4.2 What change for Ph.D.: Ministerial Decree No. 45/2013

The last Reform of the University, represented by Law No.240/2010, tries to adapt the governance model of Universities to the actual legal-institutional context based on the one hand, on the autonomy of Universities and, on the other, on the responsibility for their teaching and research results. Its application to the Ph.D. system is represented by the Ministerial Decree 8th February 2013, No. 45.

First of all, the new Ministerial Decree does not change the definition of Doctorate, present in M.D. 210/1998 "*courses for the achievement of Ph.D. provide the required skills to carry out high quality research in Universities and public or private entities*". Therefore, there is not an evolution in the nature and purpose of the Doctorate. It is still seen as the third level of the Italian HE system, based on teaching and research activities, aimed at the learning of the "job of research " to be utilized on the labour market. But, compared to previous reforms, significant novelties are contained in Art. 4 (requirements for the accreditation of Ph.D. programmes) and in particular in paragraphs a) and c) and in Art. 13 (Evaluation and financing of Ph.D. programmes). In detail, Art. 4 establishes in paragraph a) there must be a minimum number of at least "*sixteen professors between full and associate professors of the sector or of the scientific and disciplinary course*". Paragraph c) establishes, as a requirement for the validation of Ph.D. programmes, "*the availability, in relation to each cycle of Doctoral course, of at least six*

fellowships or other forms of financing that are, at least, equivalent". Therefore, as said before, the number of Doctoral programmes that can be validated is limited on the basis of two numerical parameters: the number of professors within the Faculty Board and the number of fellowships available. About the number of professors, no relevance is given to University researchers, but only full and associate professors can satisfy the request of paragraph a). The researchers can be part of the Faculty Board, but without helping to meet these requirements, thus assuming, in this area of academic life, a sort of inessentiality. As underlined by the CUN:

"Since the inclusion of teachers and experts is still submitted to the possession of documented results of international research evaluated in Quality Research Evaluation⁶⁰ (Valutazione della Qualità della Ricerca in Italian), the exclusion of university researchers from the group of persons who may be considered highly qualified experts seems quite peculiar."

Another relevant aspect for the life of Ph.D. programmes is ruled by Article 13 that governs the rules for the financing of Ph.D.'s. Paragraph 1 establishes a new principle, introducing that the financing of Ph.D.'s is provided by Universities or other bodies of activators, with MIUR playing the role of contributor only for Universities, "*subjects activators provide the financing source of Ph.D. programmes. The Ministry contributes annually to the funding of doctorates activated by the Universities in accordance with the MIUR's limited financial resources*". Obviously, this is a provision that suggests an economic disengagement of the Ministry of Education. In addition, the ministerial contribution will be distributed on the basis of a qualitative assessment. In fact, the allocation of funds is determined by the MIUR, on a proposal of ANVUR, including the assessment of the following qualitative criteria:

- a) quality of research carried out by members of the faculty board;
- b) the Internationalization level of the doctorate;
- c) the level of cooperation with the business sector and the socio-economic impact of Ph.D.;
- d) attractiveness of the doctorate;
- e) provision of services, resources, infrastructure and financial resources available for Doctoral candidates;
- f) job opportunities for Ph.D.'s.

Of course, this risks to create a multiplier mechanism in advantage of Universities with greater availability of funds for research and equipped with own Doctoral fellowships. As evidence of

⁶⁰ The project Quality Research Evaluation (QRE) 2004-2010 is aimed at the evaluation of the results of scientific research carried out in 2004-2010 by the State and non State Universities, by public research institutions supervised by the Ministry of Education and other public and individuals who are engaged in research.

this, for example, the emphasis on the availability of Universities to find fellowships for Doctoral degrees and, even more, on the economic contribution that is expected from companies and private bodies. This, of course, seems to be in contradiction with the economic reality of the country, if we consider that in recent years (data 2009) the percentage of fellowships funded by private companies was less than 10% and those paid by private institutions was equal to 5.6%. This is also evident, in the latest *National Committee for the Evaluation of the University System*'s report⁶¹ (in Italian: Comitato Nazionale per la Valutazione del Sistema Universitario):

“...is difficult to believe that the situation of fellowships funding will remain unchanged or improve in the next future, because there is a significant reduction in resources, and also because the contribution of external bodies, although not negligible and constant in recent years, probably will reduce, as a consequence of the state of general economic crisis that involves also research institutions, government agencies and private bodies. Most likely there will be an overall reduction in the number of Ph.D. positions and fellowships, which will be most felt in those areas of science that do not have access to external funds. Considering also that an important fraction of Ph.D. graduates, especially in technical sciences, have immigrated to other countries for the higher opportunities, causing a lower number of researchers in Italy”.

Consequently, with the reform introduced by Law No. 240/2010 and by M.D. 45/2013, the bureaucratic accuracy concerning the indication of requirements is accompanied by a studied vagueness on the identification of funds. Moreover, in times of recession and crisis, private financing mechanisms identified appear difficult to find and, perhaps, only Universities and research institutions in more developed areas of the country, or that furnish disciplines closer to the needs of the private sector, may benefit sectors requests.

Moreover, another great novelty introduced by the Law 240/2010, is that Ph.D. programmes can be established not only by Universities and public institutions but also by other subjects defined as *"Italian institutions highly qualified for advanced formation and research"*⁶². This is

⁶¹ National Committee for the Evaluation of the University System, *Undicesimo Rapporto sullo Stato del Sistema Universitario*, January 2011.

⁶² Law 210/1998, art. 19, point 2: *«I corsi di dottorato di ricerca sono istituiti, previo accreditamento da parte del Ministro dell'istruzione, dell'università e della ricerca, su conforme parere dell'Agenzia nazionale di valutazione del sistema universitario e della ricerca (ANVUR), dalle università, dagli istituti di istruzione universitaria ad ordinamento speciale e da qualificate istituzioni italiane di formazione e ricerca avanzate. I corsi possono essere altresì istituiti da consorzi tra università o tra università ed enti di ricerca pubblici e privati di alta qualificazione, fermo restando in tal caso il rilascio del relativo titolo accademico da parte delle istituzioni universitarie».*

confirmed by M.D. 45/2013, Art. 11, so for the first time, the doctorate comes out from the almost exclusively sphere of public Universities, interesting also private research institutions. In addition, the "business" character of doctorate is accentuated by a sort of equivalence of Ph.D. fellowships with apprenticeships in private companies. This is also an attempt to stop that "destruction of talent" we have seen for a long time in Italy. According to a recent research of Confindustria Research Department⁶³, 75% of 12.000 Ph.D. candidates, that each year start their Ph.D. cycle, will not have the possibility to begin an academic career. So out of every four Ph.D.'s, just one will find a job inside University. At the same time, there is an opposite situation, with the business and industrial world asking for an increase of the investment in R&D, as a way to revitalize companies' competitiveness and occupation, in a period characterized by discontinuity and uncertainty about the future. So this openness to private and business institutions, introduced by the Art. 11 of the M.D. 45/2013, provides apprenticeships for the achievement of Ph.D. degrees.

Continuing to analyze the M.D. 45/2013, keeping always in consideration the difficulties related to the acquisition of funds for Italian University, we will analyze, in the next paragraph, the importance agreements can play between Universities, with particular emphasis and attention to the forms of cooperation between Italian and International Universities.

1.4.3 Art. 10 of M.D. 45/2013. A shy opening to internationalization

Art. 10 of M.D. 45/2013 establishes that:

"In order to achieve an effective coordination of research at international level, Universities can activate Doctoral programmes, respecting accreditation principles of Article 3, with foreign Universities and research institutes, highly qualified and internationally recognized, respecting the principle of reciprocity, based on agreements that provide an effective sharing of educational and research activities, an equal sharing of expenses, a shared model for regulation of financial support, arrangements for exchange and mobility of professors and Ph.D. candidates and the common decision on the issue of joint or double or multiple Doctoral title."

Consequently, with this Article there is an openness to the activation of international Ph.D. programmes for Italian Universities. So Art. 10 underlines the importance for Italian Universities

⁶³ Assessing the competitiveness of Italy Findings from The Global Competitiveness Report 16.03.2012

to cooperate with International ones in order to improve the quality of research and also to introduce best practices in the Italian Ph.D. system.

Since 1998, Italian Universities have been autonomously setting up and managing courses. Thanks to the reform, Italian institutions and international partners can establish study programmes in which students can work and deepen their research abroad. In Italy Ph.D. programmes made in cooperation with foreign institutes can be generally subdivided into:

- International Doctorates;
- Joint Ph.D.'s.

The former is a programme planned and activated by a single Italian University in order to attract in a Ph.D. cycle a significant number of foreign students or to give international knowledge to Italian students. The features of these programmes are:

- Professors' awareness to interact with different cultures (intercultural communication);
- Educational activities oriented to foreign students;
- Use of a vehicular language (usually English);
- Specific services for foreign students (Tutoring VISA, housing, etc.);
- Use of administrative staff capable of speaking in a language different from Italian;
- Evaluation performance systems that consider the specific features of International Ph.D.'s;
- The presence of a specific percentage of international students and professors.

The joint Ph.D., instead, is a programme based on a formal agreement between an Italian University and one or more foreign Universities, realized in different countries and with a compulsory period of mobility for all the Ph.D. candidates.

The features of these programmes are:

- A joint definition of the achievable results and of the didactic activities planned in the Universities involved;
- Use of different languages, in accordance with the joint countries, or the use of a vehicular language (usually English);
- Joint selection of Ph.D. candidates;
- Release of joint, double or multiple titles.

Two kind of mobility of Ph.D. candidates can be identified from this definition of International and joint Ph.D.'s, the "individual mobility" and the "structural mobility". There is an individual mobility when the achievement of the title is not influenced by activities carried out by the candidate in the foreign countries; this is the case of traditional Italian Doctorate. On the other hand, the structural mobility is typically the effect of the cooperation of Universities and is

evident in International and Joint Doctorates. This last kind of mobility should be encouraged as it increases the knowledge of the candidate and leads to full recognition of assets and skills acquired through these programmes.

The actions explained above are part of that process of Internationalization in which all the Universities aim for many reasons such as: improvement of training and research quality, economic and strategic reasons, the awareness of being pivotal for the social, civil, cultural and human development of the country. Consequently, international supply together with cooperation between Universities of different countries represents, today, one of the main assets for Italian Universities, showing, also, their impact on the local and international context.

Internationalization has various meanings that we will see better in the next chapter, but it is generally considered an indicator of quality, usually calculated following three simple parameters:

1. Attractiveness for foreign students;
2. Capability to attract foreign professors, researchers and post doc students;
3. Level of programmes in collaboration with foreign Universities and institutes, as joint and double degrees, international Ph.D.'s, etc.

Today, the level of internationalization in Italy is very low, for example, in 2010 in Italian Ph.D. programmes the number of foreign students were just 5.9% in opposite to an average of 20.4% in OECD Countries and 17.4% in UE States (OECD 2009⁶⁴). These figures can offer an initial idea of the Italian Ph.D. Internationalization level, totally in contrast with the global situation. Also for this reason, in the following chapter, the importance of internationalization for Italian Universities, the evolution of internationalization all over the world and its impact on the Italian Ph.D. system will be analyzed.

⁶⁴ Data Source: <http://www.oecd.org>.

Chapter II

INTERNATIONALIZATION AS A MEANS TO IMPROVE UNIVERSITY ATTRACTIVENESS AND Ph.D. PROGRAMME PERFORMANCE: A FRAMEWORK ANALYSIS

2.1 Introduction

As shown in the previous chapter, the Doctorate can be identified as one of the sectors within the Italian University system, whose final product is represented by the Ph.D. programme. But, if we try to make a comparison with other countries, we can identify various features and requirements, with Ph.D. programmes enormously different from one country to another, but also from one University to another within the same country. However, their importance is recognized everywhere, in particular in terms of international Ph.D. programmes more so considering the economic crunch and the high competitiveness which Universities have been facing in recent years (Bone, 2011).

Trying to explain why Universities should invest in this sector, we must say that, nowadays, Universities are changing as the context in which they must survive and deliver is changing. Today, in particular, this context has long become a globalized market where the good to be exchanged is knowledge⁶⁵. In particular, there is a passage from a model fundamentally based on Public funds, to one where there are much more diversified set of funders and clients (students and families, private sponsors, employers, public opinion and civil society bodies), also crucial for the financial survival of Universities (Bohm et al., 2002). Universities lost their monopoly of advanced knowledge production and transmission, and Higher Education institutions tend to compete and specialize themselves⁶⁶.

In this scenario Italian Public Universities cannot limit themselves to “*care for and attend to the whole intellectual capital which composes a civilization*”, as said by the English philosopher Michael Oakeshott (1942, cited in Bartell, 2003). Universities, in order to survive, should change their skin, look at the best practices of other countries and try to compete with them. This trend pushes Universities to consider students as clients and international students as the key clients for their evolution in more efficient bodies (Arthur, 2004). What said before contributes to the

⁶⁵ Vision Group (2007), *Le Università italiane nel mercato globale dell'innovazione, le opzioni per la riforma*.

⁶⁶ Vision Group (2011), *The Universities of the Future within the Global Markets of Ideas. The Internationalization Imperative*. German Rector's Conference, Berlin.

beginning of a global competitiveness in which the decision to invest in the Ph.D. sector and, in particular, in the activation of international Doctorates can play a strategic role. These programmes, in fact, allow attracting international students whose role is extremely important for the funding of Universities (Bartell, 2003). In particular, they are a crucial factor in most ranking systems. The World University Rankings are produced by the various specialized magazines with the aim of listing the best Universities worldwide. Moreover, as reported by King et al. (2011):

“University and other decision makers are not forced to follow University rankings – their choices are as free agents – but increasingly such choices are involuntary as the global league tables especially generate universalizing and dominating templates and structures that inevitably act back on organizational strategies”.

Among the criteria used, the degree of internationalization of the institutions assessed is analyzed and scored positively⁶⁷. For example, around 19% of the students at Harvard University (ranked in second place in 2011-2012) are foreign; and around 21% of the students at Stanford University (ranked in third place in 2011-2012) are foreign⁶⁸. The ranking position of a University influences also its capability to obtain Public funds and attract private funders⁶⁹.

The attractiveness for international students and their subscription in international Ph.D. programmes can be fundamental not only for Universities, in terms of ranking and financing, but also for the other Ph.D. candidates (Morris 2009). Moreover, the presence of international students is positive for both economic and ethical reasons. The economic reason is evident as an international student is not only a net contribution to the economies of the institution that attracted her or him, but also for a great number of stakeholders. As underlined in the research of 2011 entitled “Internationalization Imperative”, developed by the Vision Group, they can be quickly summarized as follows:

1. Increase of direct net contribution to the bottom line of the University.

⁶⁷ Sponsler B. A. (2009), *The Role and Relevance of Ranking in Higher Education Policymaking*. Institute for Higher Education Policy, September. For example, the Shanghai Ranking, one of the most recognized academic ranking systems, ranks universities in part based on the Percentage of International Doctoral Students.

⁶⁸ The World University Rankings. World University Rankings 2011-2012. Available from: <http://www.timeshighereducation.co.uk/world-university-rankings/2011-12/world-ranking>. Accessed in 2012 November 27th.

⁶⁹ For a deeper analysis of the effects of University rankings see: A. Rauhvargers (2011), *Global university rankings and their impact*.

2. A net contribution to the private or public parties that provide accommodation, eating or other living expenses.
3. The income to the actors that provide for leisure (culture, sports, social events, etc.).
4. The cost to the city of hosting the additional person (subsidized portion of public services – social security, travel, school, etc. – used by foreigners).
5. The net present value of the future travels to the hosting country that the international student would do because the student experience has increased the likelihood to go to that country.
6. The benefit to the hosting University, because of the competitive pressure that international students would put on the services made available by that University. Moreover, the international students, if satisfied with the experience, may also become a factor of marketing and branding of that institution.
7. The value to the country of the better attitude towards the hosting country that international students may develop towards the hosting nation which, sometimes may even become a sort of second nationality to that individual.

In addition to these economic reasons, there are other causes for which international students should be considered a “public good”. In fact, people who spent part of their school years abroad are less exposed to hostility toward foreigners (Hoffman, 2007). They also tend to become workers more able to adapt themselves to the continuous changes imposed by globalization⁷⁰. Therefore, a world with international students is likely to be more peaceful and to have a better standard of living⁷¹.

In the attraction of international students plays an important role the so-called Internationalization. It is defined by Jane Knight (1997) as:

“The process of integrating an international/intercultural dimension into the teaching, research and service functions of the institution, where internationalization is considered as a process in response to globalization and includes both international and local elements.”

Internationalization applied to Ph.D. sector aims, in particular, to stimulate the process of self-evaluation through a continuous comparison with cultural and scientific systems of other

⁷⁰ Vision on IAU, Global Survey Data (2005), “One person that has studied at least for six months abroad as opposed to some that did not is apparently not only doing better as far as remuneration is concerned but also in a more statistically significant way is twice as likely to go next year abroad, is three time more likely to have her or his children to go abroad and is four times more likely to agree with the definition that immigration is a very good thing as opposed to the ones that did not go”.

⁷¹ Discussion forum promoted by the World Youth Wave in 2010.

countries, European and non, according to the logic of a constructive competition, in order to create a more integrated world without losing each country's cultural identity (Robson, 2011).

Therefore, in this second chapter we will try to answer to the following questions: What are the main reactions of the Universities to the globalization of Higher Education? How does internationalization influence Ph.D. programme performance? How can internationalization of Doctorates improve the attractiveness of a Public University? What are the international Ph.D. programmes offered by Italian Public Universities?

The description of internationalization as a means to improve the attractiveness of a University will start with the analysis of how globalization influenced the HE system, the description of the crucial role of mobility and the increased competitiveness for Universities. Starting from this framework, the next paragraphs will focus on the influence of internationalization on the Ph.D. sector and its manifestation in terms of students' mobility. These analyses will also take into consideration the identification of ideal actors and stakeholders in the Ph.D. internationalization, in order to identify the economic and social reasons for which the Italian central State and all the Italian Public Universities should increase their attractiveness for international actors and their interests in international Ph.D. programmes.

2.2 Globalization and the *entrepreneurialization* of Public University

Globalization has become a widespread idea in national and international dialogue in the 1990s. Globalization's shifting and controversial parameters make it difficult to define. Still, the concept is poorly understood. It is often used to describe an economic phenomenon, where it refers to the latest stages of capitalism in which national economies are more and more interconnected and mutually interdependent (Ohmae, 1990). Yet, among economists, the term globalization and the particular economic phenomena it usually refers to are contested. Globalization is also used to denote cultural equalization through the diffusion of specific lifestyles, consumption patterns, dissemination of rationalism, instrumentalism and ways of organizing society associated with these ideas and values (Goldman 2001). Undoubtedly, the term globalization has clear connotations of global and system wide transformation. Motivated by economic forces and driven by digital technologies and communications, globalization links individuals and institutions across the world with unprecedented interconnection and immediacy.

Altbach and Knight (2006) defined Higher Education globalization as the "*economic, political, and societal forces pushing 21st century higher education toward greater international involvement*". The socio-political and economic conditions of the world today request the global

society to move toward an era of informed, culturally sensitive collaboration. In particular, during the last two decades worldwide Universities have come under increasing pressures to adapt to the rapidly changing social, technological, economic and political forces emanating from the immediate as well as from the broader post-industrial external environment. The unprecedented growth, complexity and competitiveness of the global economy with its attendant socio-political and technological forces have been creating persistent and cumulative pressures on higher education institutions to respond to the changing environment, requiring far-reaching institutional adaptations involving *“significant transformation in the organization of research, training, and administration in higher education”* (Cowen 1997, p. 549). There appears to be a concurrence of assessment that Universities are experiencing *“a profound shift: environmental forces have become so dynamic as to lead to a basic shift in the structure of education as an industry”* (Cameron and Tschirhart 1992 cited in Gumpert and Sporn 1999, p. 105); that changes taking place are *“revolutionary, rather than evolutionary”* (Kerr 1987; cited in Gumpert and Sporn 1999, p. 105); that *“the demands of global capitalism hinder the University’s ability to fulfil its cultural mission”* (Readings 1996 cited in Gumpert and Sporn 1999, p. 105); and that in the changed circumstances Universities are called upon to *“equip students with the necessary knowledge and skills in preparation for the job market”* (Gumpert and Sporn 2003, p. 70), which is increasingly global in character. Accordingly, institutions of Higher Education are including global and international themes in their mission statements and strategic plans. Knight and De Wit (1995) described Internationalization as the integration of an international/intercultural dimension into the teaching, research, and service of an institution. Internationalizing a University can require significant change and is certainly systematically complex. It requires dedicated faculty, staff, students, administrators, and community members who aspire to be transformational leaders in the 21st century global community. As Rizvi and Lingard (2010) argue:

“A global University must now be characterized by its engagement with the processes of globalization, its international networks and its internationalized curriculum. The field of international education has matured in recent years, with the greater recognition of how it uniquely spans the cultural, economic and interpersonal dimensions of global relations.”

Of course, in this scenario we must define, as a distinct construct from globalization, global education. It does what Higher Education has traditionally aimed to do: extend students’ awareness of the world in which they live by opening them to the diverse heritage of human thought, action, and creativity. Global education places particular emphasis on the changes in

communication and relationships among people throughout the world, highlighting such issues as human conflict, economic systems, human rights and social justice, human commonality and diversity, literatures and cultures, and the impact of the technological revolution (Altbach et al., 2009). Global education seeks to weaken the boundaries between disciplines and encourages emphasis on what interdisciplinary and multidisciplinary studies can bring to the understanding and solution of human problems. In trying to elucidate the concepts of globalization and global education, what needs to be recognized is that globalization is an inter-national and intra-national force, while global education is a teaching/learning paradigm. Thus, their areas of focus are in different domains.

These two concepts are the effects of the recent global competitive environmental forces, which created unprecedented challenges for Universities: *“the borders of Universities have opened in new ways for their services and products”* (Gumport and Sporn 1999, p. 103). Cross border education, that is, internationalization, with consequent requirements for structural and cultural adaptations, is pervasive and an inescapable reality present on a worldwide basis (Gumport and Sporn 1999; Sporn 2003). As Torres and Morrow claim (1999, p. 44), *“perhaps no place has been more subject to these processes of internationalization and globalization than University”*. Higher education institutions’ task environment changed dramatically in the last twenty years. As underlined by Vaira (2004), the main features of these changes can be briefly summarized as follow:

1. Reduction of the State endowment to Public Universities, due to the balancing policies and scale-down of welfare system, which Universities have been represented as an extension of. This entailed for higher education institutions (but also for other public sector organizations and institutions) “to do more with less”;
2. Asserting a Higher Education structure of governance based on steering at distance and assessment. This, in turn is linked to let Public Universities have more institutional, organizational, curricular and financial autonomy.
3. Growing requirement to pursue, warrant and improve quality, effectiveness, efficiency and responsiveness in all the strategic Higher Education activities (teaching, research, curricula innovation, staff and budgeting);
4. Need to link up more systematically Higher Education formative and educational supply to economy and labour market dynamics and requirements as well as to the new social demand for Higher Education. This mean that Public Universities are socially, politically and economically responsible and accountable of their “products” and processes, pushing Higher Education supply to match its demand.

For the more developed countries, this has meant since the 1980s a deep process of institutional and organizational change of the national higher education sector and organizations. The entrepreneurial model becomes the basic and legitimated organizational principle, or archetype, deemed to be able to let Universities cope the challenges in their new task environment and constitute the pathway to pursue restructuring processes. This process of “*entrepreneurialization*⁷²” is, in turn, enforced by knowledge society discourse, which supplies HE institutions with a new legitimating criterion of their roles, tasks and institutional identity. Higher Education is represented as the fulcrum of innovative knowledge production, whose task is to contribute actively to the “national good” of economic competitiveness and development instead of the “universal good” of knowledge for its own sake (Delanty 2001; Gumpert 2000).

In this context, internationalization processes entail more or less strong resistances, conflicts, tensions but also efforts to conciliate, adapt, translate, and assemble the new with the old, the national features of the University system with the new globalizing pressures, the single institutions’ structural and cultural features with the new imperatives and demands. The University reaction to globalization will be better described in the following section.

2.2.1 Internationalization of University as a response to globalization

Higher Education takes place within a globalizing world (Enders and Fulton, 2002), consequently internationalization and globalization are often discussed together. However, although related, it is useful to distinguish the two phenomena. As seen in the previous paragraph and according to Knight’s (1997) own words:

“Globalization is the flow of technology, economy, knowledge, people, values, ideas ... across borders. Globalization affects each country in a different way due to a nation’s individual history, traditions, culture and priorities. Internationalization of Higher Education is one of the ways a country responds to the impact of globalization yet, at the same time respects the individuality of the nation.”

⁷² Vaira M. (2004), ‘Globalization and higher education organizational change: A framework for analysis’: “*It is the trend toward a more entrepreneurial and managerial pattern of organizational change. This is associated to the shifts toward post-fordist regime; commodification – expressing in client/ supplier relations and exchanges, and business “ethos” in almost all kind of organizations –; high flexibility, innovation and quality in production, products and work to match clients demands; precarization of work linked to costs reduction and flexibility*”. *Higher Education* 48: 483–510.

Consequently, the internationalization is generally identified as a sort of reaction to globalization even if it presents various interpretations. Many analysts, in effect, consider internationalization as the countries' or institutions' proactive responses to the external macro socioeconomic processes and effects of globalization over which they have no control (e.g., Knight, 1997; Van der Wende, 1997, 1999). According to Van der Wende (1996), internationalization refers to:

“any systematic, sustained effort aimed at making Higher Education (more) responsive to the requirements and challenges related to the globalization of societies, economy and labour markets”.

According to Van Vught and colleagues (2002), internationalization in Higher Education is seen to include several activities and processes such as the transnational mobility of students and staff, internationalization of curricula and quality assurance, inter-institutional cooperation in education and research, and the establishment of international University consortia. In this regard, it might be useful to distinguish between “Internationalization” and “Internationalism” (Stromquist, 2007; Jones, 2006), as they are characterized by contrasting considerations. Internationalism, on the one hand, emphasizes notions such as *“international community, international cooperation, international community of interests, and international dimensions of the common good”* (Jones, 2006). Internationalization, on the other hand, is seen to refer to *“greater international presence by the dominant economic and political powers, usually guided by principles of marketing and competition”* (Stromquist, 2007, p. 82). Stromquist concludes that Internationalization in Higher Education is therefore closely associated with the *“entrepreneurialism”* or *“academic capitalism”* that Slaughter and colleagues (1997) observed among Universities in the 1990s (in the United States, Australia, Canada, and the United Kingdom) as these were competing for external funds.

Furthermore, in the research of new funds, this application of entrepreneurial methods to Universities has been accompanied by a strong growth in the cross-border delivery of education, leading to a substantial market in export and import of Higher Education products and services (Van Vught, Van der Wende, and Westerheijden, 2002, p. 103). The motivation for increased cross-border delivery of education can be explained in two ways:

1. The presence of a much greater market for Higher Education, particularly in countries with less well-developed higher education systems. Moreover, it is through cooperating with institutions in other countries, and the sharing of resources this implies, that teaching and research programmes can be enriched and, in some cases, become affordable to the institution. This cooperation can be observed not only between developed, or developed and developing countries, but also between developing countries

(Murphy, 2007, for example discusses cooperation efforts between a Mexican institution and one in Eastern Europe).

2. Universities in Western countries see this increased demand for Higher Education, particularly in so-called developing countries, as a very welcome opportunity to boost their budgets, which, coinciding with deregulation in many jurisdictions, have experienced substantial declines in public contributions over the past decade. These institutions then compete with other providers for what they perceive to be lucrative cross-border opportunities (Kreber, 2009).

Although until the 1990s internationalization in Higher Education was largely understood to be a cooperative effort with its rationale based primarily on political, cultural, and academic arguments, many observers today feel that internationalization has become increasingly economically motivated (e.g., Kälvermark and Van der Wende, 1997; Van der Wende, 2001). While the political, cultural, and academic rationales are based on a culture of cooperation, the economic one is based on a spirit of competition. Surely, both these overarching rationales - cooperation across state borders and competition - can be observed in present-day efforts to internationalize Higher Education but it is the latter, which seems to dominate, always more, the internationalization agenda. In particular, Middlehurst and Woodfield (2007) note that the changing international context and the impact of globalization have led to two major trends in the HE system:

1. Increasing international competition (in research and education);
2. Increasing efforts to internationalize strategies and practices.

With regard to the first of these trends, it is perhaps inevitable, given the impact of the economic recession on the HE system globally, that a neo-liberal, market-driven approach to internationalization is increasing the drive for “*entrepreneurial competition for external funds*” (Levidow, 2002). About the second trend, many institutions began the internationalization process as a response to globalization by adopting a business focus. Forward thinking Universities have begun to address the need for a more reflexive, iterative and constructive dialogue with their communities to determine the scope, scale and content of an “*internationalization agenda*” (Bennett, 1993, cited in Turner & Robson, 2008).

Consequently, the last twenty years viewed, in particular, the internationalization process as a general trend for Public and Private Universities. This phenomenon in particular increased the competitiveness between Universities in order to attract always more international students. Therefore it is relevant to analyze what the economic and social reasons of this trend are. This will be better described in the next section.

2.2.2 Internationalization through mobility and exchange programmes

As seen in the previous paragraphs of this chapter, since the 1980s, Universities have witnessed greater interest in international education programmes. This is evident as indicated by curricula taking up international subjects, incorporating international comparative approaches, and increasing their offerings of international areas studies. However, it is particularly since the 1990s that internationalization is seen to be relevant across traditional programmes or disciplines. Echevin and Ray (2002) as well as Thune and Welle-Strand (2005) suggest that, at programme level, the efforts directed at internationalization are the results of the contribution of one or more of the following four factors:

1. The recruitment of international students;
2. The teaching process, through selection of particular course content and forms of delivery (including ICT), student mobility, language of instruction, etc.;
3. Resources, in the form of internationally recruited staff members, use of international course materials (e.g., literature), etc.;
4. Location, offering courses or setting up campuses abroad.

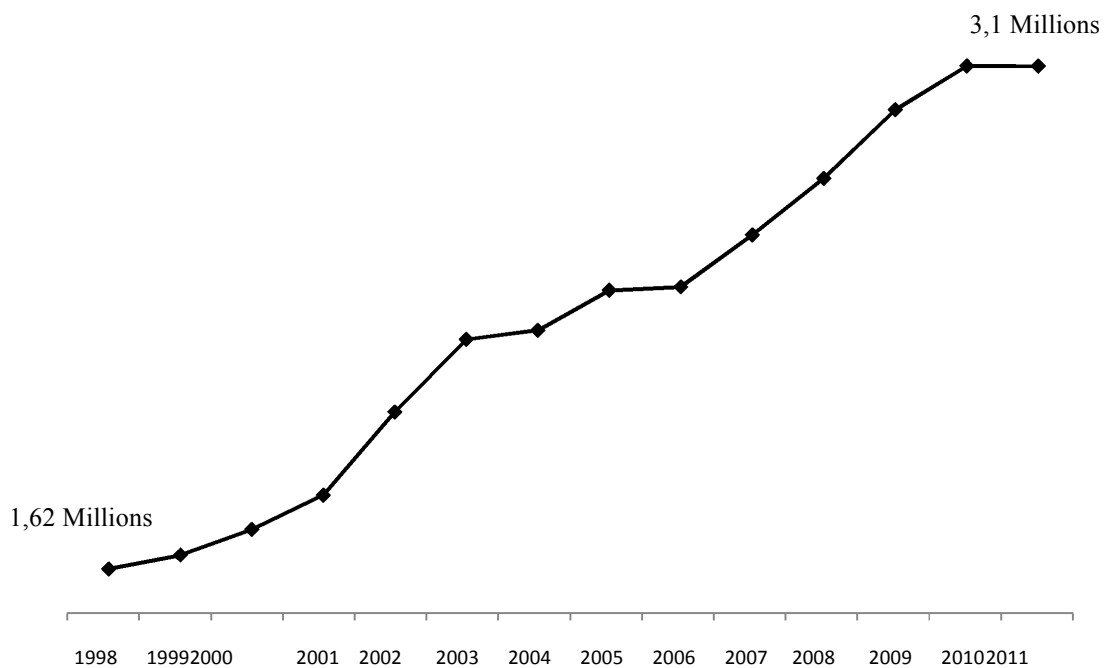
Taking an even broader look on internationalization, Knight (1997) argued that internationalization of Higher Education refers to *“the process of integrating an international/intercultural dimension into the teaching, research and service functions of the institution”* (p. 21). Qiang (2003), echoing the notion of integration inherent in Knight’s definition, concludes that *“internationalization must be entrenched (emphasis added) in the culture, policy, planning and organizational process of the institution so that it can be both successful and sustainable”* (p. 258).

Consequently, to guarantee this successful and sustainable development, all Universities, and, in particular, the Public ones, must consider the importance of internationalizing the contexts in which they act. Murphy (2007) discussed the extent to which internationalized campuses or programmes make a difference and cited a number of studies that attest to the positive effects of internationalization efforts on students. Based on these studies, she reports that governments and Universities hold the view that students who study on internationalized campuses demonstrate greater knowledge of international events, perspectives, and methods. She further observes that these students are seen to be better prepared to contribute positively to local, regional, national, and international progress because they develop skills deemed necessary for the modern workforce and global conditions, such as second-language acquisition, cultural awareness, international contacts, and adaptation skills (p. 173). She also reports on studies that show that

students themselves perceive an internationalized education to be beneficial for personal and career development⁷³.

These considerations have resulted in a remarkably rise of internationalization of Higher Education increased during the last ten years. As shown in the following graph, the number of international students doubled from 1998 to 2011 reaching 3.1 million units.

Graph 2.1 - Number of international students per year



Source: *Vision on OECD and UNESCO data*

This increasing phenomenon must be considered as beneficial both to the countries hosting international students and to the countries of origin, mainly for two reasons:

- To study abroad is a unique opportunity to develop from a point of view of the professional and institutional capabilities, as well as in terms of accumulating knowledge of foreign markets and networking with other leader countries⁷⁴.

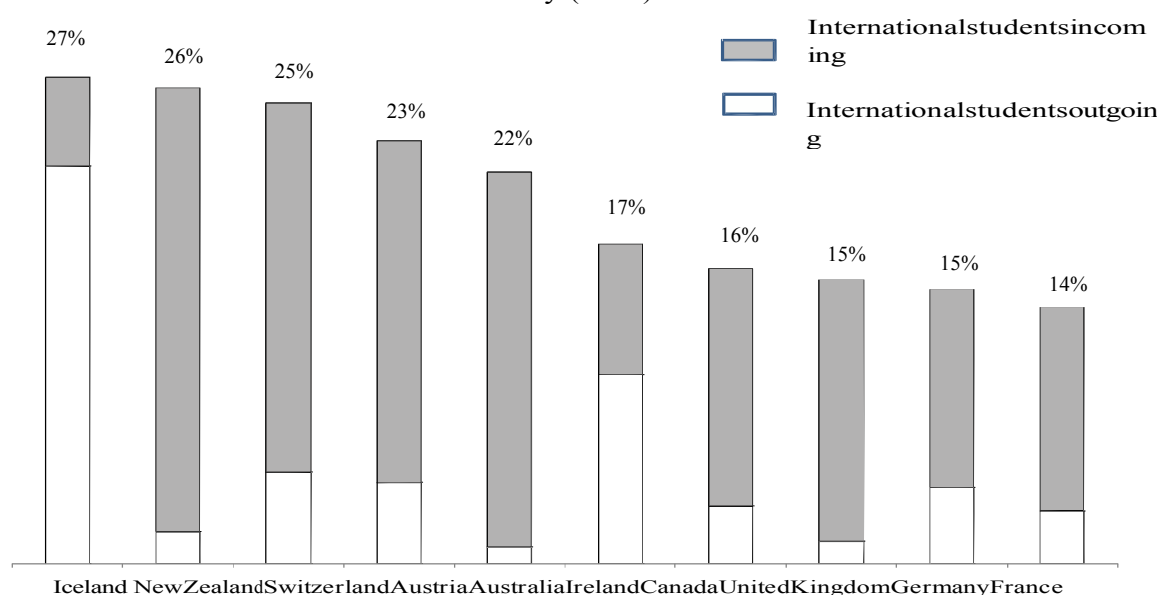
⁷³ Although all these studies are very encouraging, Qiang (2003) cautions that further research is needed “to identify those competencies which help students to be successful national and international citizens and to contribute to local and global work environments” (p. 250).

⁷⁴ This can be observed in the deliberate policies that countries such as China and Germany have pursued by increasing in four years of around a third an already high number of their nationals going abroad to study.

- To attract students requires that your own students and staff go abroad; an internationalized teaching staff and student population makesobviously lowers the country entry barriers for foreign academic staff and students⁷⁵.

Therefore, the outgoing and incoming internationalization are equally important for the modernization and higher competitiveness of a University. This can be seen in the following graph:

Graph 2.2 - Sum of international student incoming and outgoing as percentage of students in the country (2008)



Source: *Vision on OECD and UNESCO data*

This graph shows that small countries with high GDP per habitant and that are geographically peripheral, like Iceland, New Zealand and Australia, or, on the contrary, central to Europe (Austria, Switzerland) appear to be more Internationalized. Germany, Canada, UK appear to still have a competitive advantage. It is remarkable that neither the USA nor China appear in the top ten.

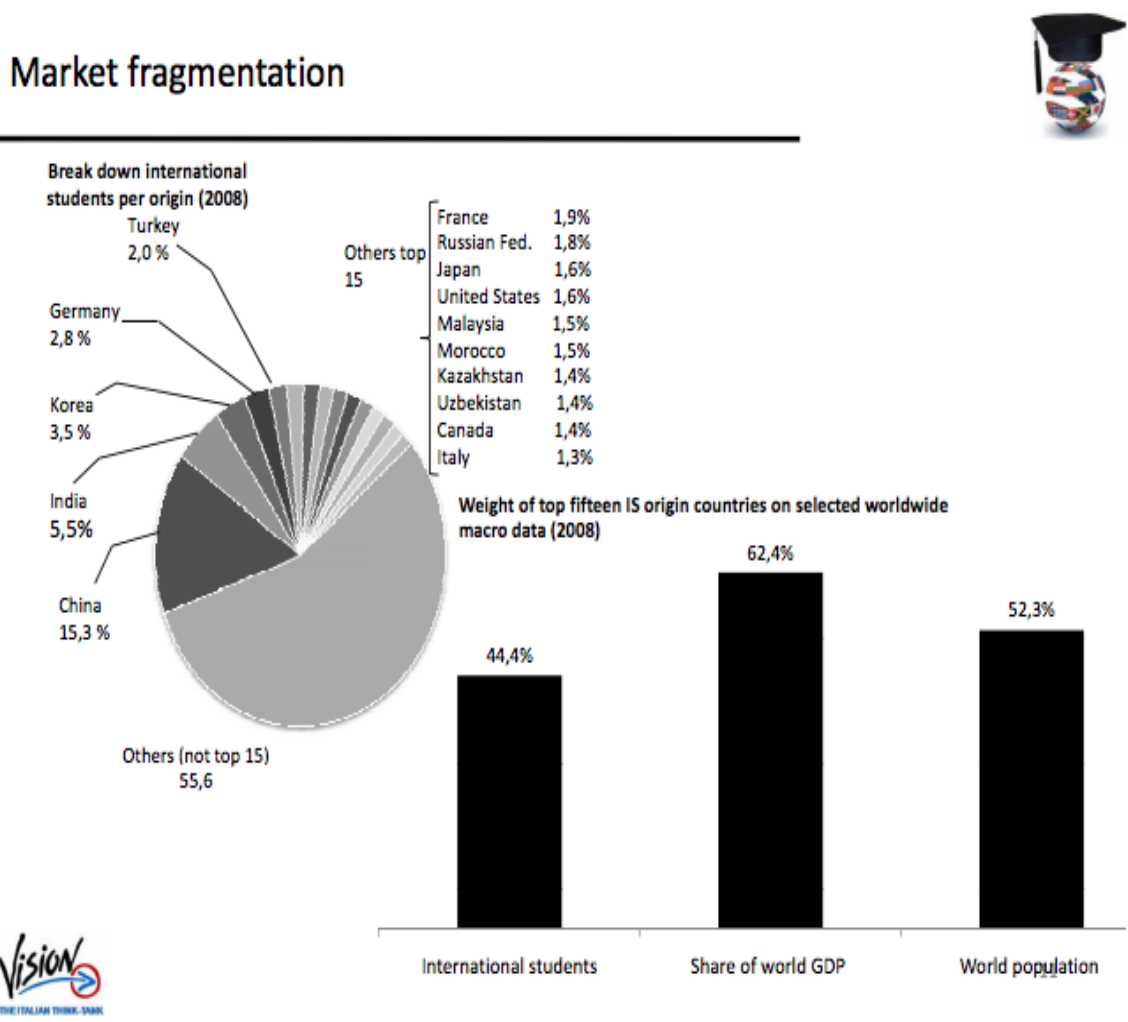
The reasons of the above phenomena and the analysis of the market leaders of Internationalization will be better defined in the next paragraph.

⁷⁵ OECD 2013 Education Indicators in Focus – 2013/05 (July).

2.2.3 A map to frame the international mobility flows

Today, international students are the bottom line of any internationalization that Universities may pursue and one of the main indicators of Universities' competitiveness. In fact, as shown in the first paragraph of this chapter, international students are beneficial for both economies but also for ethical reasons. The following graph shows how many international students come from the fifteen countries that generated more international students in 2008. The same table also shows the weight of each of these countries on the world economic output (GDP) and on the world population.

Graph 2.3 - Main features of origins of international student (per cent, 2008)



Source: *Vision Group on OECD, World Bank data - The Universities of the Future within the Global Markets of Ideas*

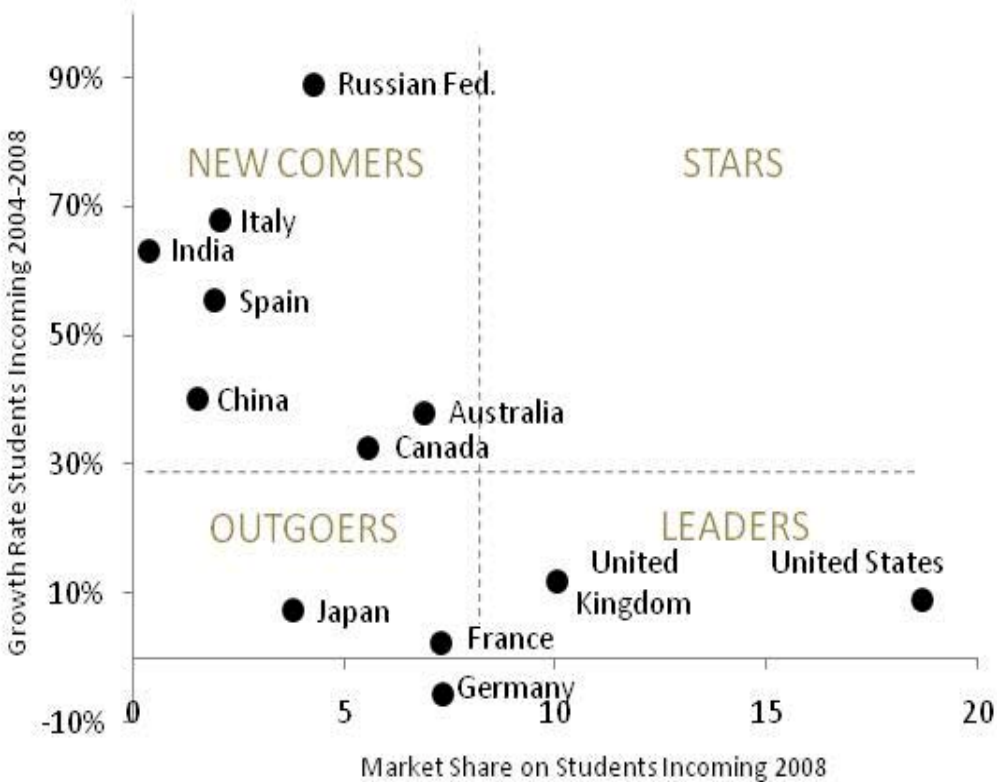
The previous graph, therefore, shows some interesting points:

1. The market is very fragmented. Although China and India are still the two most important countries, they only express one fifth of international students notwithstanding they host one third of the world population.
2. A relatively higher percentage of international students come from poorer countries that happen to be neither developed nor emerging (e.g. Morocco).
3. Countries like Vietnam and Uzbekistan are more than doubling the number of students that are studying abroad. This is, of course, an opportunity for them if they are able to leverage on the experience that their citizens are developing but also an opportunity for countries such as Russia, Australia, Singapore, Hong Kong that are progressively becoming leaders of increasingly large market niches.

Consequently, new competitors are stealing market shares from the current leaders with an important change in the competitive dynamics of the international students’ market.

The graphs below distribute the top ten countries in terms of number of hosted students per market share of the total market and growth rates.

Graph 2.4 -Market share and growth rates on the market of international students
(per cent,2008,2004-2008)



Source: *Vision on OECD and Unesco Data*

Is evident that, if we look to the international students as a market and apply an instrument typical of market analysis, in this case, the famous Boston Consulting Group matrix⁷⁶, we could think that although there are countries that hold a lead – USA and UK – and although other countries – India and surprisingly Italy – are growing more, we still do not have a “star⁷⁷”. Consequently although the United States and United Kingdom still hold the first positions in the ranking of countries in terms of capability of attracting international students, there is nobody that is the unchallenged star and there is space for newcomers. In particular, the countries with a higher market share show lower growth rates while the countries with a lower market share present higher growth rates. The interest for these trends increases if we consider some policies introduced in the following cases:

1. Australia, which may even find a specialization in this market due to its good Higher Education system and position in the part of the world that is booming⁷⁸;
2. China⁷⁹ and India⁸⁰, which are developing a strategy of attraction that may become a proper national policy;
3. Countries like Russia, with some of its most prestigious institutions including the Moscow State University⁸¹, Italy with an appeal on North African countries, Spain which may have an appeal on South Americans, may target the young that may have grown less happy to travel west and demonstrate that even regionalization is an opportunity for capturing an interesting position.

The competition for international students is, therefore, much more open than what normally is assumed. Of course, this high competitiveness in the acquisition of international

⁷⁶ The Boston Consulting Group matrix, also called growth–share matrix, is a chart that was created by Bruce D. Henderson for the Boston Consulting Group in 1970 to help corporations to analyze their business units, that is, their product lines. This helps the company allocate resources and is used as an analytical tool in brand marketing, product management, strategic management, and portfolio analysis. For a further analysis, see Henderson, B. D. "The Product Portfolio". Retrieved 16 May 2013.

⁷⁷ Stars are units with a high market share in a fast-growing industry. Stars require high funding to fight competitions and maintain a growth rate. When industry growth slows, if they remain a niche leader or are amongst market leaders it have been able to maintain their category leadership stars become cash cows, else they become dogs due to low relative market share.

⁷⁸ Ernst & Young Report (2012). *University of the future*, Australia.

⁷⁹ Futao Huang. *Policy and Practice of the Internationalization of Higher Education in China*. Journal of Studies in International Education, Vol. 7 No. 3, Fall 2003 225-240.

⁸⁰ Lavakare PJ. *Does India have an international higher education strategy?* International Higher Education 15 June 2013 Issue No: 276.

⁸¹ The Moscow State University is one of Russia's most prestigious institutions of higher learning, and has demanding entry requirements for prospective students. It ranked 43rd in 2008, 44th in 2009–2011, and 45th among 300 Best World Universities in 2012 compiled by Human Resources & Labor Review (HRLR) on Measurements of World's Top 300 Universities Graduates' Performance.

students can hide some negative elements linked to internationalization and to the struggle for best international students. These aspects will be shown in the next section.

2.2.4 Critical issues linked to students' mobility

The consequences of internationalization are still a debatable issue according to Kerr (1990) who said:

“It should be noted that, while internationalization or regionalization of higher education has its advantages, it can have its cost as well, particularly in the loss of diverse heritages.”

Following we will discuss some direct impacts upon the Universities and society. The direct consequence to the University, that is widely debated, is that internationalization will create the uniformity of University systems. In fact, a potential challenge arising from the globalization of higher education and the emergence of systems that help rationalize the flow of peoples, ideas, and credentials across academic systems (e.g., Bologna Process) is the risk that these may lead to a global homogenization of higher education. Of course, it may be that homogenization will never materialize, but there are emerging realities that will encourage it. For example, global ranking schemes such as those by the Times Higher Education (2010) or Shanghai Jiao Tong University (QS Top Universities 2010) force a common and limited set of criteria to which institutions have to take into consideration if they are sensitive to their ranking. The respect of these criteria can cause that the Universities instead of developing their own models and identities for a long period, will create the imitation or duplication of models, which will develop into more variety of models rather than the imitation of a single model.

The following considerations are on the language scholars in the international activities that will use to communicate. An argument perceived that any language may be suitable depending on the type of the activity and the involving persons. Another argument believed that English will be more important and essential for the international activities of the Universities worldwide (not only for the countries that use English as the national or official language). Since, at present, English is geographically used in most countries around the world and also because English has become the main language of knowledge dissemination worldwide. For example, the main internationally circulated journals are in English. A number of textbooks in all scientific fields are published in English. Computer-based networks, which have general important functions in transmitting knowledge, are also in English. Most international scientific meetings are conducted in English. Therefore, English has become an essential tool to access and contribute to knowledge worldwide. In practice, most students in the exchange programmes

prefer to choose to go to study in the countries which use English. Their main reason is that they need to practice their communication skills in English. Besides, the host Universities in the countries where English is not the national or official languages usually develop more courses in English to attract the foreign students and to solve the problem for the foreign students with the short period of study during which they cannot master the host University languages. The other aspect is to arm the teachers and students with the wisdom so that they can quickly follow the advancement of the learning science, which is mostly in the English media.

For the international activities in the regional level, sometimes English may not be essential but for the international level for the current world situation, English is mostly used as the medium. Therefore, this argument states that University internationalization will turn English into the common language among the scholars worldwide.

However, language as a means of the culture itself is still an on-going dilemma. One argument is that those who see the language as the media view English as the key to contact the outside world, as a tool for technological development, and as a tool to access to knowledge worldwide and nothing more. Another argues that English is the depiction of a culture and accepting the other's language is equivalent to adopting the culture that comes with the language too. Thus, this argument perceived that if English is used for teaching in the Universities (here it refers to the country where English is not the native language), it will affect the nation's language and culture. Consequently, the native language may be corrupted, degraded or even made extinct because the teachers and students would appreciate and value English more. This also affects high school education since the students will pursue their studies in the Universities and may value English more than their native languages.

Moreover, although mobility is considered mostly a positive phenomenon among academic staff, it does not always appear to be an advantage from the perspective of academic employment. On the one hand, there is a risk of brain drain if academics studying abroad decide to stay there. On the other hand, mobility can even hinder the academic career if the returning academic finds his or her old position occupied by someone else. In particular, as for the brain drain, we must clarify that for years countries and regions have been lamenting their condition as being brain drained. The argument is that some states have been losing most of their talents, after having invested for thirteen or more years of education and thus the taxpayer's money. In developed countries, the cost cumulatively spent for a person in education from the beginning of primary education to the end of secondary education can be estimated to be around 100,000 euro – an investment gone astray. From a traditional point of view the brain-drain problem exists because the scholars prefer to relocate where better facilities and better chances or opportunities

for advancement are. However, from another point of view, the free flow of scholars will stimulate competition forcing the institutions to develop even higher standards.

Confronting international students outflow as something negative that must be minimized would deny the nature of the process of knowledge creation and distribution in an Internet based society. Innovation, ideas, new approaches are not bound to a territory and, in fact, they increase their strength and reliability when they circulate. This also applies to people and thus there are several reasons to affirm that the whole concept of “brain drain” practically does not exist. They were identified by the Vision Group⁸² as follow:

1. Brains that stop to move may even risk to stop in terms of properly functioning; if a talent decides to “come back” and stays, he or she will progressively lose touch with the state of the art of research in his or her field;
2. Talented people who are abroad are the best possible marketing tool to attract international students and to influence in a positive way foreign countries;
3. Universities that have a high number of students and academic staff that are mobile are also the ones who have an advantage in terms of knowing beforehand and anticipating the evolution of the demand that international students will express.

Internationalization is not, therefore, about preventing people to move out or to possibly move for good people who are abroad in your country. Consequently, the more students you have abroad, the more students you are able to attract (Aittola et Al, 2009). Therefore, internationalization could be a win-win proposition if all levers and strings of the strategy are pulled at the same time. The concept of internationalization, however, becomes in the John Hudzik (2011) vision, the imperative around which “*all missions, all students and majors, all faculty and staff, all institutional ethos, vision and values*” get reshaped in a radical way because internationalization becomes as such intimately integrated with “*not peripheral but the core institutional vision and values*”. As such internationalization is not any longer something that you can add to an institution that stays local or even national and has as an almost direct consequence a change that makes the University itself international.

Keeping in mind the positive and negative aspects linked to the mobility of University students, the application of international strategies by Universities can play a strategic role in a more and more globalized Higher Education context. Obviously, these international strategies can be as many as the segments, the directions, the instruments and, more importantly, the goals that internationalization may have (Brandenburg and H. de Wit, 2011). In the next paragraph, we will analyze the influence of internationalization on Doctorate and, in particular, what kind of

⁸² Vision Group (2011), *The Universities of the Future within the Global Markets of Ideas. The Internationalization Imperative*. German Rector’s Conference, Berlin.

international programmes are offered by the Ph.D. sector of Italian Public Universities. This will permit also to underline their effects in terms of performance assessment, starting a dissertation on the performance of the Ph.D. sector that will be fully considered in the next chapter.

2.3 International strategies applied to the Ph.D. sector

In the view of many people, internationalization of Universities is, in a certain manner, a return to their origins. As Krawczyk (2008) puts: *“It can be seen that originally, during the medieval period, Universities had a strong international nature and that as a consequence of construction of modern nation-states, they underwent a process of nationalization”*. But today internationalization is something more, as stated by José Marques dos Santos (2013), of the University of Porto, internationalization *“is not an end in itself, but an instrument that today is indispensable for fulfilling the strategic objectives that emanate from each University’s mission”⁸³*. Considering this, Internationalization represents, for the major Universities worldwide, a strategic issue. The motivation for the present relevance of internationalization is closely related to the concept created by Slaughter and Leslie (1997) that is known as “academic capitalism”, in which researchers and University administrators are induced to participate in increasingly competitive environments, for fundraising of any nature (Krawczyk, 2008).

This is a scenario within which Italian Universities are asked to internationalize their campuses. The cooperation between Universities of different countries and with other economic and social actors is one of the main topics for Universities. Furthermore, it represents the best way to evaluate the effects of an institution on the national and international context in which it acts (Coccia, 2013).

To understand the importance, for Italian Universities, that international strategies can achieve, we must consider again the flows of students. During the last several decades, powerful new factors have reinvigorated the international dimensions of higher education and the cross-border flow of students, scholars, and ideas as well as global growth in higher education. Altbach and colleagues (2009) report⁸⁴ a 53 percent increase between 2000 and 2007 in overall global higher education enrolments. In just one year from 2007 to 2008 the Organisation for Economic Cooperation and Development reports (2010) that global mobility grew nearly 11 percent. The

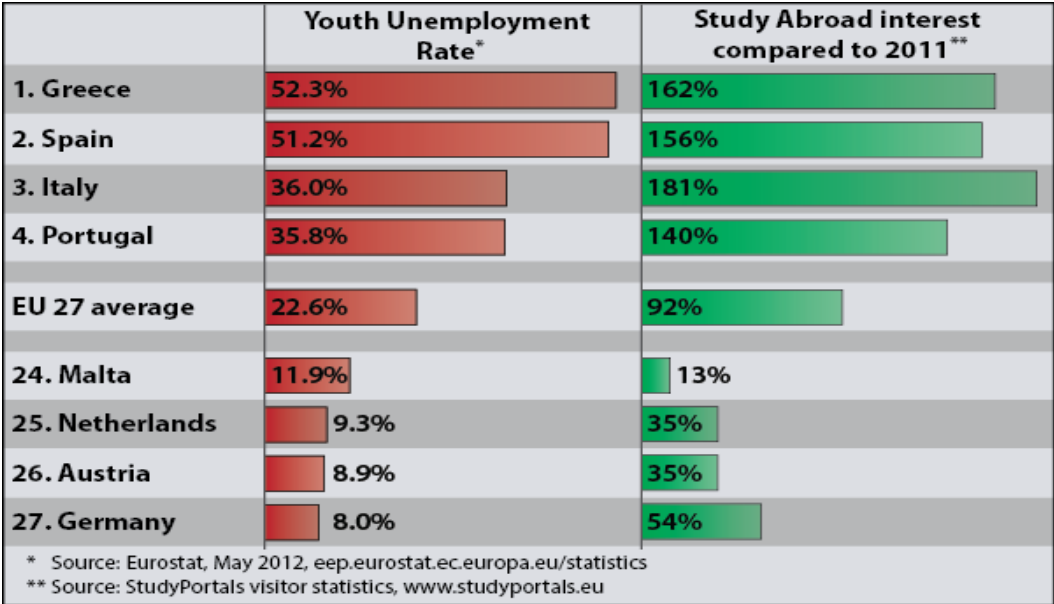
⁸³ For further analyses: Mariani A. W., Pêgo-Fernandes P. M., Samano M. N. (2013) ‘Internationalization of universities: the need to navigate in foreign waters’.

⁸⁴ For more details: Altbach P. G., Reisberg L., Rumbley L. E. (2009), ‘Trends in Global Higher Education: Tracking an Academic Revolution’. A Report Prepared for the UNESCO 2009 World Conference on Higher Education.

globalization of commerce, social forces, idea exchange, and growth in student mobility drive further significant internationalization of education.

As for Italy, we will start with a rapid analysis of how many Italians decide to study abroad and of the number of international students attracted by Italian Universities. According to MIUR, in 2010, the number of international students enrolled in Italian Universities were 57.447⁸⁵. We will see further that this number is very low in comparison with other countries similar to Italy for social and economic features. As for the number of Italian students abroad, it is almost equal to the number of international ones in Italy; this is an anomaly in a developed country in comparison with all the OECD countries with balances highly positive. In particular, compared with many other European countries, Italy has comparatively few international students studying in its Universities. Conversely, Italian students are among the most mobile in Europe and beyond. With a population of more than 2 million students currently enrolled in tertiary education, close to 3% of Italian students spend a period of study time abroad comparing favourably with France, Germany, Spain and the Netherlands. This trend is even more evident in the following graph:

Graph 2.5 – Relationship between Youth Unemployment Rate and Study Abroad Interest in Europe



It shows that the interest of Italian students to study abroad is the highest among European countries. The graph demonstrates, moreover, that this high percentage is linked to the high youth unemployment rate present in Italy. From this rapid analysis, is clear that a very number of

⁸⁵ Data Source: www.statistica.miur.it

Italian students are interested in studying abroad but, at the same time, there is difficulty in attracting international students to Italy. In the attractiveness process, which Italian Universities should undertake, the Ph.D. sector could play a crucial role. We have seen in the previous chapters the relevance of this sector, in particular for Public Universities. The products of this sector, in fact, concern the core of a University's research capability and are also seen as the primary sources of research productivity and innovation in the global knowledge economy. Its role of knowledge producer is increasingly important for the economic success of a country and to make it an important player in the global knowledge economy. Moreover, worldwide, Doctoral Education is seen as playing a crucial role in the production of knowledge, and doctorate holders are viewed as a primary source of innovation, research and development capacity and as workers able to perform well in complex, knowledge intensive situations. The importance to internationalize the Ph.D. sector is also underlined in the Bologna Process, the aim of which is to create the European Higher Education Area by implementing reforms that will improve cooperation among European Universities, raise quality, foster mobility of students and academic staff, and increase the employability of graduates (Bitusikova 2009). Consequently, to try to identify and encourage the adoption of international strategies in this sector is a question of vital importance for Italian Universities.

Therefore, in the following paragraphs, we will evaluate the effects of Internationalization on Doctoral training and its influence on the international Ph.D. programmes offered by Italian Public Universities.

2.3.1 The Influence of internationalization on Doctoral training in Europe

The predecessor of modern Doctorate has its roots in the Universities of Bologna and Paris in the twelfth Century (Noble, 1994). Higher Education across Europe was at that time united in terms of its subordination to a common religion, a common language (Latin), a uniform programme of study and a uniform system of examinations. With the birth of the nation states, in the seventeenth, eighteenth and nineteenth centuries, however, national governments left their imprints on the development of Higher Education systems, including Doctoral education (Neave, 2001 cited in Nerad and Heggelund, 2008). Within this variety, two European models of Doctoral education can be identified (Bartese, 1999 cited in Nerad and Heggelund, 2008). The medieval model is based on the idea that the Doctoral degree was the sign of the highest intellectual competence and it authorized teaching at any European University. The process of acquiring the doctorate differed among faculties and Universities and could be either structured or rather informal. The Humboldtian model, instead, involved the students much more in

research. Written theses were required to obtain the degree, and the Doctorate was broadened to other disciplines. Furthermore, the Humboldtian doctorate was not so much a sign of high competence, but more an acknowledgement that the holder possessed the capabilities to be an independent scholarly investigator (Noble, 1994). These two models can be clearly considered examples of what Nerad and Heggelund (2008) identified as the “Traditional Doctorate model”. It is centred on individual students who perform research on a topic mostly of their own choice or on a topic suggested by a single master professor. In recent years, instead, there has been a great evolution in the forms of Doctorate. In particular, Universities are increasing their supply of International and Joint Doctorates. About this, in synergy with the European Research Area's goals⁸⁶, the Bologna Process, in particular, has played a vital role in providing a relevant impulse to internationalization of the Doctorate in Europe. Despite the important steps already achieved, the full recognition of the value of this kind of Ph.D. is still a work in progress. Problems arise because of the national laws of some European Union members, but are also due to a still pervasive conservative view in European Higher Education that encourages academic “protectionism” instead of promoting cooperation. The two main reasons for resistance to innovative joint Doctoral programmes remain, however, the misinterpretation of international mobility as the goal rather than one of the strategic tools of Doctoral training and a widespread fear that harmonization will homogenize the diversity of European Doctoral curricula, reducing its current richness to uniformity⁸⁷.

In this context there is a very interesting study entitled: “*Mapping exercise on Doctoral training in Europe*”, developed by the ERA Steering Group on Human Resources and Mobility⁸⁸ (ERA SGHRM), which considers the main features and tendencies of Doctorate in the European countries. Its target is the identification of the best practices and new management forms for the Ph.D. programmes. The report, elaborated in 2011, aims to define a possible “common

⁸⁶ The European Research Area (ERA) is a system of scientific research programmes integrating the scientific resources of the European Union (EU). Since its inception in 2000, the structure has been concentrated on multinational cooperation in the fields of medical, environmental, industrial, and socioeconomic research. The ERA purpose is to increase the competitiveness of European research institutions by bringing them together and encouraging a more inclusive way of work, similar to what already exists among institutions in North America and Japan. Increased mobility of knowledge workers and deepened multilateral cooperation among research institutions among the member states of the European Union are central goals of the ERA.

⁸⁷ De Rosa A. M. S. (2008). *New Forms of International Cooperation in Doctoral Training: Internationalisation and the International Doctorate – One Goal, Two Distinct Models*. Higher Education in Europe Volume 33, Issue 1, 2008.

⁸⁸ The ERA Steering Group on Human Resources and Mobility supports the implementation and the monitoring of progress of the EU2020 Flagship Initiative Innovation Union (IU), as well as the implementation of the ERA Communication “A Reinforced European Research Area Partnership for Excellence and Growth” (July 2012) with regard to researchers’ careers and mobility at EU and at national level (e.g. European Charter for Researchers and Code of Conduct for the Recruitment of Researchers, Scientific Visa, Innovative Doctoral Training, EURAXESS activities), as well as to the attractiveness of Europe to researchers in general.

approach” able to support the innovation of Doctoral training in Europe. The study identifies, in particular, the following aspects which should be present in each Doctorate:

1. Excellence of research. The achievement of excellent levels of research are fundamental for every typology of Doctoral training, central elements in this are the achievement of relevant academic standards and the existence of a University research context capable to adapt itself in comparison with other realities.
2. Attractiveness of University. The Ph.D. candidates should be attracted not only for the University training capacity but, also, for the ability of Universities to offer high job opportunities inside their academic staff.
3. Interdisciplinary of research. The research context must be culturally open, in order to facilitate comparisons with other realities.
4. Link with the labour market. This connection can be expressed by: stages, joint funding, the participation of professional and non-academic figures in the programme both in teaching and supervising, mentoring activity made by an *alumni* network.
5. International cooperation. It can be shown by the activation of Ph.D. in collaboration with international Universities, joint Doctorates, students’ and professors’ mobility, period of study abroad.
6. Quality assurance. It involves all the phases of Doctoral programmes, from the research context to the selection of candidates.

Therefore, the report highlights the growing pressure for the activation of new forms of Ph.D.’s which must also take into consideration the limits represented by national traditions, governments and funds availability. The diffusion of new forms is evident in the decline of the traditional Ph.D. model, as explained before, in favour of new kind of Doctorates among which the following:

- Doctoral school. It is a research and pedagogical structure that groups and coordinates several research teams in the context of a coherent research project and organizes and/or provides training activities for Doctoral candidates and prepares them to their professional career. It can be locally, regionally or nationally based.
- Graduate school. It is an institution of higher learning, usually division of a University, offering advanced programmes beyond the bachelor's degree.
- Collaborative research. It is a programme that involves the cooperation of researchers, institutions, organizations and/or communities, each bringing distinct expertise to a project, and that is characterized by a joint supervision of Ph.D. candidates.

They are expression, as said before, of what Nerad and Heggelund (2008) called the “Future Ph.D. model”. It is based on co-operative research teams, multiple mentors, integration of

international graduates and post Doctoral fellows into collaborative projects with other Universities, joint Doctoral degrees requiring international mobility, multi-language skills and transferable/professional competence. The vast majority of these initiatives take place on the institutional level and none of them are standard setting⁸⁹. Consequently, to analyze their effects we should identify the subjects directly involved in the generation of International Ph.D. programmes and their stakeholders. This will be defined in the following section, in order to identify the ideal subjects implicated in the Internationalization of Ph.D. programmes.

2.3.2 Ideal actors and stakeholders in the internationalization of Ph.D.

Doctoral programmes, as shown before, are a key component of the discussion on European higher education in a global context. At institutional level, attracting the best Doctoral candidates from all over the world, encouraging mobility within Doctoral programmes and supporting European and international joint Doctoral programmes and co-tutelle arrangements, are central to the development of any international strategy. Also in Italy, as seen in the previous paragraph, Universities are encouraged to enhance their efforts to support mobility at Doctoral level within the framework of inter-institutional collaboration as an element of their broader international strategy.

Doctoral training is *per se* international in nature and sufficient opportunities should be provided for Doctoral candidates to engage internationally. This can be done, for example, through the recruitment of more international staff; the organization of international workshops, conferences and summer schools; the development of more international Ph.D.'s and joint Doctoral programmes. In these terms, both the teaching and the administrative staff provides an essential contribution to a Ph.D. programme's internationalization. As explained by Axel Aerden (2014), three elements play a crucial role here:

1. the composition of the staff involved;
2. the experiences and competences of the staff;
3. the services that are provided to the staff.

The composition of the academic and administrative staff contributes in an important way to the overall quality of an international programme. Quantity of staff refers to the number of staff deployed in the programme. Quality of staff refers to their qualifications in a broad sense. It does not only refer to their subject/discipline specific knowledge, but also refers to their teaching skills and experience. These may be demonstrated through their curriculum vitae or

⁸⁹ Aerden, A., Frederiks, M., Van den Heuvel, E. (2012) The evaluation of the quality of internationalization: European and national approaches. Internationalization of Higher Education - An EAIE Handbook, A 2.2-4.

portfolio. The international and intercultural experiences and competences of the deployed teaching staff essentially determine whether a programme will enable all students to achieve its international and intercultural learning outcomes. An international experience improves the staff's competency to consider and include these developments and, more importantly, the international aspects of their discipline (Aerden, 2014). In the beginning of their teaching career, staff members cannot be expected to embody all the relevant international experiences and intercultural competences. On the other hand, experienced staff members should be allowed to update the acquired international experiences, intercultural competences and/or additional language skills. In both cases, the institution should provide opportunities for staff members to acquire these competencies⁹⁰. Such services can be offered in various forms and should, in some cases, be mandatory. Most services are offered reactively, to address concerns or to deal with competency gaps. These services can also be offered proactively by offering them in advance of anticipated demand or in anticipation of potential changes in the teaching and learning setting. In this way, these services actively provide support to staff in order to better meet the programme's international and intercultural activities and ambitions. The ambition level of the institution is considered the starting point for all internationalization activities. This ambition level is referred to the institution's intended internationalization and is identified through its goal⁹¹. Obviously, an institution's internationalization targets may originate from goals at another (e.g. national) level. These can only serve as a reference point, however. An institution needs to explain why and how these goals relate to and specifically suit the institution. Unquestionably, for the achievement of University's ambitions and goals, it is important that the programme's internationalization goals are shared and supported by its stakeholders; shared means that all stakeholders can identify in the institution's intended internationalization; supported means that all the stakeholders in some way contribute to its achievement. In higher education, a stakeholder is a person or organization with a legitimate interest in the operation of a programme or institution. A stakeholder may be among many others a student, staff, management, and representatives of the relevant professional field. The stakeholders are usually identified by the programme managers themselves. An institution with internationalization goals should have identified its specific stakeholders, both national and international. Again Axel Aerden (2014) explains that these stakeholders can be roughly identified by the level of their

⁹⁰ Lokhoff, J. & Wegewijs, B. (2010). *A Tuning Guide to Formulating Degree Programme Profiles Including Programme Competences and Programme Learning Outcomes*, Bilbao: University of Deusto.

⁹¹ European Association for Quality Assurance in Higher Education, 2009, Helsinki, 3rd edition. *ENQA report on Standards and Guidelines for Quality Assurance in the European Higher Education Area*.

knowledge and experience (i.e., the information they can contribute) and by their interest in the institution (i.e., the likeliness that they will actively contribute):

- Knowledgeable and interested. These are the stakeholders that an institution should fully involve in its quality assurance and enhancement activities;
- Knowledgeable but less interested. These are the stakeholders that require an additional effort from the institution to engage them in its quality assurance and enhancement activities;
- Less knowledgeable but keenly interested. These are the stakeholders that an institution should include in a satisfactory way (for both parties) in its quality assurance and enhancement activities, mainly as a safeguard from major issues;
- Less knowledgeable and less interested. These are the stakeholders that an institution should monitor and inform about its quality assurance and enhancement activities, mainly as an open invitation to join in.

The members of the institution's international network can, for example, be identified as knowledgeable and interested stakeholders. Instead, incoming exchange students, who are leaving or have left the institution, can be regarded as knowledgeable about certain aspects of the institution's internationalization but they are probably less interested to contribute. An institution needs to actively engage them, reach out to them in order to get feedback on the institution's services and facilities for international students. Therefore, the attractiveness in particular of students and stakeholders interested in institution activities is a strategic issue for the economic sustainability of Universities and in particular for the Public ones.

Starting from the above considerations on the international Ph.D. programme's ideal actors and stakeholders, we will analyze, in the next paragraph, the diffusion of internationalization in Italy, defining the International strategies applied, in recent years, to the Italian Doctorate.

2.3.3 International Ph.D. programmes offered by Italian Public Universities

The cooperation of Italian and international academic institutions aims at drawing Higher Education closer to top European standards, not only to enhance career perspectives and free movement of young researchers, but also to ease the recognition of qualifications in all the European Economic Area⁹² (EEA) countries. In the previous chapter, we introduced a distinction related to the Italian Ph.D. programmes made in cooperation with foreign institutes. We

⁹² The European Economic Area (EEA) comprises three member states of the European Free Trade Association (EFTA) (Iceland, Liechtenstein and Norway), and 27 member states of the European Union (EU), excluding Croatia which is provisionally applying the agreement pending its ratification by all EEA countries.

introduced the distinction between International Doctorate and Joint Ph.D.’s. But the Doctoral supply, in terms of programmes offered by Italian Public Universities, is higher. Amongst the wide range of cooperation typologies the most important are:

- Erasmus Mundus;
- Interuniversity international cooperation agreements;
- Doctorate in joint supervision.

The ErasmusMundus Joint Doctorate programme is a Higher Education cooperation and mobility programme. Funded by the European Commission, the programme aims at enhancing the quality of Higher Education, promoting dialogue and understanding between peoples and cultures and easing student mobility both within the European Union and worldwide. The programme works through a network of programmes of the second and third international levels (Master's degree and Ph.D., according to the Bologna Process). It also provides EU-funded scholarships for both EU and non-European students who participate in the courses. This programme introduces an idea of high integration in educational and administrative terms. As for the teaching aspect, each member must act in a complementary way, adding a vital value for the development of an innovative course, in order to attract excellent participants worldwide. From an administrative point of view, the Erasmus Mundus needs a strong integration in terms of admission and selection of Ph.D. candidates, tuition fees and learning outcomes. With this programme, the target is to guarantee an equal level of supply of participants regardless the specific University in which they are realizing their study programme (Coccia, 2013). In the following table, some of the best practices of the ErasmusMundus Joint Doctorates present in Italy:

Table 2.1 – Italian best practices of the ErasmusMundus Joint Doctorate

ETeCoS3 – Environmental Technologies for Contaminated Solids, Soils and Sediments	
Website	http://www.international doctorate.unicas.it
Partners Institutions	University of Cassino (coordinator) Université Paris-Est (partner) Unesco – Ihe Institute for Water Education (partner) 16 associate members (Universities, Research centres, firms)
Management Structure	Integrated with “Management Assembly”, “Supervisory Committees” and “external Advisory Board”

Tuition fees	Integrated with a clear definition of two categories of participants (Ue – Not Ue)
Mobility	In the sites of partners and members institutions
Fellowships	Erasmus Mundus/Miur
Title	Joint Degree
Ice – Interactive and Cognitive Environments	
Website	http://www.icePh.D.org/
Partners Institutions	University of Genova (coordinator) Technische Universiteit Eindhoven (partner) Universitat Politecnica de Catalunya (partner) Universitaet Klagenfurt (partner) Queen Mary, University of London (partner)
Management Structure	Integrated with various management figures (Ph.D. Steering Committee, Re-Examination Committee, Administrative working Group, Quality Assurance Board, Management Board, Selection/Admission Cmmetee, Didactic manager, Brand Manager)
Tuition fees	Integrated
Mobility	In the sites of partners institutions
Fellowships	Erasmus Mundus/Lakeside Labs
Title	Double/Joint Degree
Edle – European Doctorate in Law and Economics	
Website	http://www.edle-Ph.D.eu/
Partners Institutions	University of Bologna (coordinator) University of Hamburg (partner) University of Rotterdam (partner) Various associate members (Universities and other Institutions)
Management Structure	Not specified in the Website
Tuition fees	Integrated
Mobility	In the sites of partners and members institutions
Fellowships	Erasmus Mundus/Partner
Title	Double/Joint Degree

Source: *Coccia, 2013*

All these examples of Erasmus Mundus fall into the category of interuniversity international cooperation agreements. They are the most common cooperation agreements in Italy and define the guidelines of international cooperation within Higher Education institutions. Their main aim is to improve the internationalization process of research activity through the collaboration between Universities and Research centres involved in different branches of knowledge.

The Doctorate in joint supervision, instead, is a useful opportunity to enhance the international dimension of Doctoral studies both on individual and inter-university level. In fact, its key feature is that students can carry out their research projects both in an Italian University and in an International University under the joint supervision of two experts in the subject of study, one at each University. On successful completion of the Ph.D. course, the candidate will receive a dual award from each of the two institutions. Ph.D.'s in joint supervision can be also activated through a specific agreement between the Universities' Rectors involved. Until now, the Conference of Italian University Rectors⁹³ (CRUI in Italian) has signed only four Framework Agreements (Accordo Quadro in Italian) with France⁹⁴, Spain⁹⁵, Germany⁹⁶ and Switzerland⁹⁷.

In the analysis of the internationalization of Italian Public University we must also consider the existence of the so called bi-national networks. Their main objectives are the development of joint degree and Ph.D. programmes, the exchange of students and teachers, the enhancement of commonly recognized degrees and the experimentation of new teaching methodologies and technologies. There are various examples like the German-Italian University Centre⁹⁸ and the France-Italian University⁹⁹. In all these cases, the aim is the creation of a link between the educational, cultural, economic and entrepreneurial systems of both countries.

After this analysis of the international supply of Italian Doctorate, we will analyze, in the following paragraph, the relationship between Internationalization and performance assessment.

⁹³ The Conference of Italian University Rectors. The CRUI is the association of the state and private universities. Established in 1963 as a private association of Rectors, the Conference of Italian University Rectors (CRUI) has over time acquired an acknowledged institutional and representative role, as well as a practical capacity to influence the development of the university system through its intense activity of study and experimentation.

⁹⁴ Framework Agreements 02/1998 – CRUI and CPU – Paris, February 13th 1998.

⁹⁵ Framework Agreements 06/1998 – CRUI and CRUE – Madrid, June 15th 1998.

⁹⁶ Framework Agreements 11/2000 – CRUI and HRK – Berlin, November 17th 2000.

⁹⁷ Framework Agreements 01/2003 – CRUI and CRUS – Rome, February 26th 2003.

⁹⁸ The Deutsch-Italienisches Hochschulzentrum aims at developing a bi-national network dedicated to higher education, scientific and technological cooperation between Italy and Germany. Founders of this network are the University of Trento, the DAAD (the German Academic Exchange Service), the CRUI and the HRK (the Conference of Rectors of Italian and German Universities respectively). The relevant Ministries of both countries support this initiative.

⁹⁹ The Université Franco Italienne aims at developing a bi-national network between Italy and France. It is an institution created in for the promotion of university and scientific cooperation between Italy and France. It is does not offer any degree program or hosting students or teachers.

This will permit to describe how the activation of International strategies positively affects the performance of Universities in relation to their goals and objectives.

2.4 Internationalization and assessment process: a way to improve University's performance

At a time when public institutions are being held even more accountable by the public and various stakeholders groups, performance assessment has become an increasingly important topic (Brennan and Shah, 2000). Erwin (1999, p.15; cited in Brown & Glasner, 1999, p.31) defines it as a process that consists of “*defining, selecting, designing, collecting, analyzing, interpreting, and using information...*”. The ultimate purpose of the assessment process is to improve the performance of the institution relative to its goals and objectives.

As internationalization becomes an increasingly important aspect of higher education and continues

to move from the margins to the centre of the academic enterprise, institutions need to judge not only the quantity of activity but also its quality and its contribution to overall institutional goals.

There are many reasons to measure internationalization: as a component of overall institutional performance, to judge the effectiveness of an institution's internationalization strategy or its components, to benchmark with other institutions, and to improve internationalization programs and practices. Moreover, as already noted, one cannot ignore the fact that internationalization has increasingly become an instrument of competition. The competitive environment requires institutions to differentiate themselves from the competition, and establish their *brand* or *profile*.

Performance indicators such as graduation rates or having Nobel Prize winners on the faculty, for example, are concrete markers of success. In the internationalization arena, institutions commonly point to the number of international students, the number of education abroad programs offered, or the proportion of students engaged in education abroad as indicators of success. They may also choose to use indicators to benchmark their performance to that of peer institutions, either as a tool for quality improvement or to point out their comparative advantage.

The definition of indicators is strictly linked to the single University internationalization goals, Hudzik and Stohl (2009) note that goals define intentions, provide a basis for accountability, and drive behaviours. Institutions articulate goals with very different levels of specificity.

Some develop very broad goals and then narrow them with sub-goals or objectives; others begin with much more precise and measurable goals. A goal should express an ambition that goes beyond tactics – such as increasing the number of students who go abroad by 10 percent. At the same time, achievement of the goal must also be measurable. Expressing a vision in measurable terms often involves articulating a broad goal, which is then elaborated with sub-goals, also

called objectives. Thus, “developing global citizens” is not a measurable goal until the concept is clearly defined and translated into a series of measurable indicators such as: numbers of students going abroad, numbers of students engaged in volunteer projects with a global focus, student gains in inventories of global-mindedness and attitudes. A goal can have many different dimensions, some of which are more easily measured than others. The process of developing agreed-upon indicators and definitions of success is an important one and requires stakeholder input to determine which ones are most appropriate for the goal and for the institution (Hudzik and Stohl 2009; Beerkens et al. 2010).

2.4.1 Creating internationalization goals and indicators

As seen previously, the definition of internationalization indicators is closely linked to the University goals. Hudzik and Stohl (2009) use a taxonomy of inputs, outputs, and outcomes, defined as follows:

- Inputs: resources (money, people, policies, etc.) available to support internationalization efforts;
- Outputs: the amount of the various types of work or activity undertaken in support of internationalization efforts;
- Outcomes: impacts or end results. It is these that are usually most closely associated with measuring achievement and the missions of institutions.

Deardorff, Thorndike Pysarchik, and Yun (2009) provide a similar but expanded framework with their logic model for assessment, which includes five components:

- Inputs: human, financial, and other resources needed to achieve the goal;
- Activities: activities that provide opportunities to achieve the learning goal;
- Outputs: generally, types and numbers of participants;
- Outcomes: what participants know/think/and/or feel as a result of participation in the learning activity;
- Impact: longer term results.

As the preceding definitions point out, outcomes provide the major evidence of achieving specified goals, which include student learning, the quality of education programs, benefits to students and to the faculty’s increased reputation (Beerkens et al. 2010, p. 16). Because measures of outcomes are the most challenging data to gather, institutions frequently measure their internationalization efforts by looking only at inputs and outputs. Brandenburg and Federkeil (2007) focus on inputs and outputs, outlining an approach where institutions can take a snapshot of their international activities, which they call measuring “internationality”, or they can look at

progress over time, which they refer to as “measuring internationalization.” They also stress the importance of setting goals and developing a strategy to achieve them as essential first steps in the process. In their work with German Universities, they developed a total of 186 indicators, 170 of which can be tracked over time. While such a rich list of possible indicators is an enormous resource, institutions must make choices about what is important to know, how they will use that information, and what data can be realistically gathered. In the following table, there is a sample chart of goals, inputs, outputs, and outcomes.

Table 2.2 – Sample chart of goals, inputs, outputs, and outcomes.

SAMPLE GOALS AND MEASURES			
Goal	Sample Inputs	Sample Outputs	Sample Outcomes
Strengthen international and global dimensions of the curriculum	<ul style="list-style-type: none"> • Number of courses with an international/global focus; • Number and range of foreign language courses; • Number and proportion of faculty with international experience or expertise; • Number of joint or dual degree programs; • Number of courses offered in cooperation with an international partner through technology. 	<ul style="list-style-type: none"> • Number and proportion of students enrolled in courses with international/global focus; • Number and proportion of students enrolled in language courses at various levels; • Number and proportion of students majoring in programs with an international/global focus. 	<ul style="list-style-type: none"> • Demonstrated specific student learning outcomes as evidenced by portfolios, intercultural competency inventories; • Demonstrated language proficiency; • Career choices or volunteer engagement of graduates.
Enhance the quality of research and increase knowledge production	<ul style="list-style-type: none"> • Number of faculty/researchers with international experience, expertise; • Amount of funding for international cooperation 	<ul style="list-style-type: none"> • Number of publications per faculty co-authored with international partners; • Number of international 	<ul style="list-style-type: none"> • Awards, prizes, recognition, rankings of institutional international activity; • Growth in institution’s income from commercial

	in research; • Amount of funding from international sponsors; • Number of research projects with international partners.	conference presentations per faculty members.	applications; • Contribution to solving local or global problems.
Enhance the international competence and experience of faculty and staff	• Number and proportion of faculty and staff with international experience and expertise; • Number and proportion of faculty and staff educated outside the United States; • Number and proportion of faculty who are multi-lingual.	• Growth in number and proportion of faculty engaged in international cooperation for teaching and/or research; • Growth in number and proportion of staff engaged with partner institutions • Increase in number of courses with international/global focus.	• Enhanced reputation and recognition for the institution's international character and work • Increased student interest in international programs and activities as evidenced by course enrolment patterns, choices of majors.

Source: *Based on Hudzik and Stohl (2009) and Brandenburg and Federkeil (2007)*

2.4.2 Mapping internationalization

Mapping the institutional landscape of international programs, policies, and strategies (generally inputs and outputs) is a very useful exercise for any institution. Even small institutions can learn a great deal through this process, and often discover individuals and units engaged in international work that is not widely known and that can ultimately be a source of learning and synergy with other efforts. Once the landscape is described, indicators can be more clearly applied to the array of inputs and outputs identified.

Many mapping tools exist and although there is a great deal of similarity among them, they have different emphases (see Figure 2 for a sampling). In the area of internationalization, the earliest mapping quality review initiative was the Internationalization Quality Review Process (IQRP). Presented by the OECD, it is described elsewhere by Knight (2002, p.1) as *“a process whereby individual institutions of higher education assess and enhance the quality of their international*

dimension according to their own stated aims and objectives.” IQRP assessments involve internationalization policies, support structures, academic programmes, grants and contracts, students, research and scholarly collaboration, and human resource development programmes and opportunities. The IQRP process frames the assessment in terms of the context for internationalization and then proceeds to examine these specific areas. The International IQRP, begun in the mid-1990’s in Europe by the Institutional Management in Higher Education program (IMHE) with the Academic Cooperation Association (ACA) and the Conference of European Rectors (now the European University Association). A few years later, the American Council on Education adapted the IQRP and has continued to use its instrument with dozens of institutions in its Internationalization Laboratory¹⁰⁰.

Today, the International Association of Universities offers its Internationalization Strategies Advisory Service (ISAS) to institutions around the world, emphasizing the collaborative effort between IAU and the visiting team to help the institution clarify and achieve its goals¹⁰¹. The German Rectors conference offers an internationalization quality review program free to its member institutions¹⁰².

Beerkens et al. (2010) list 33 such efforts, which are a mixture of descriptive pieces, survey instruments, sets of indicators, mapping tools, and quality review guides. Here are but a few examples:

- The Indicators for Mapping and Profiling Internationalization of higher education institutions (IMPI) - project supported by the European Union, co-sponsored by six European partners, and coordinated by CHE Consult - has developed a toolbox of indicators for institutions to measure their performance in internationalization¹⁰³. IMPI was launched in 2009 based on a German project that started in 2006 with four institutions to develop indicators.
- The Netherlands Organisation for International Cooperation in Higher Education (Nuffic) has published a checklist detailing different levels of internationalization for different aspects (e.g. leadership and strategy, mobility and exchange, faculty¹⁰⁴). It has also developed a tool called Mapping Internationalization (MINT) that allows institutions or programs to map their internationalization activities¹⁰⁵.

¹⁰⁰ See: www.acenet.edu/Content/NavigationMenu/ProgramsServices/cii/current/networks/International_Lab.htm.

¹⁰¹ For further analysis: www.iau-aiu.net/content/internationalization-strategies-advisory-service.

¹⁰² For details: www.hrk.de/eng/projekte_und_initiativen/2410.php.

¹⁰³ See www.impi-project.eu and www.impi-toolbox.eu.

¹⁰⁴ For more details: www.nuffic.nl/international-organizations/services/quality-assuranceand-and-internationalization.

¹⁰⁵ See www.nuffic.nl/mint.

- The German Academic Exchange Service (DAAD), the German Rector’s Conference (HRK), and the Alexander von Humboldt Foundation (AvH) conducted a project with funding from the German Federal Ministry of Education and Research to collect data on the degree of internationality of German higher education institutions.
- The American Council on Education analyzed the data from two national surveys conducted in 2001 and 2006 to form indices of internationalization by institutional type¹⁰⁶.
- The International Association of Universities and the American Council on Education have developed qualitative internationalization review instruments that provide the basis for an institutional self-study.

Although the Europeans have been quite active in this area, it is likely that, as a result of the Bologna process, efforts will be undertaken in Taiwan, Colombia, and New Zealand, among others.

2.4.3 Key performance categories linked to internationalization

The tools used in the performance assessment process are the performance indicators. The Association of Universities and Colleges of Canada (AUCC, 1995a, p.3) defines a performance indicator as *“a policy relevant statistic, number or qualitative description that provides a measure of whether the University, some aspect of it, or the University system is performing as it should.”* U.S. Agency for International Development's Center for Development Information and Evaluation (1996, p.1) states that, *“Performance indicators...define the data to be collected to measure progress and enable actual results achieved over time to be compared to be compared with planned results.”* Performance indicators are operational units of analysis, ways of measuring in discrete ways the performance of the institution.

Using the description made by R. Michael Paige in 2005 the following table includes ten key performance categories, linked to internationalization that can be subjected to a performance assessment.

Table 2.3 - Internationalization Model: Key Performance Categories

1	University Leadership for Internationalization
2	Internationalization Strategic Plan

¹⁰⁶ The resulting series of four publications is available at www.acenet.edu/

3	Institutionalization of International Education
4	Infrastructure— Professional International Education Units and Staff
5	Internationalized Curriculum
6	International Students and Scholars
7	Study Abroad
8	Departments Involvement in International Activities
9	Campus Life - Co - Curricular Programmes
10	Monitoring the Process

Source: *Internationalization of Higher Education: Performance Assessment and Indicators*

The list begins with University leadership, meaning persons at different levels in the University who provide leadership and support for Internationalization. Leadership at the top from the University President or Rector is a critical part of the overall leadership picture, but there must also be leadership at other levels in the faculties, departments, and other units.

The second category, the strategic plan, is critical because it gives voice and form to internationalization. As mentioned earlier, the strategic plan consists of goals, objectives, inputs, activities, and specific targets and timelines. A good strategic plan is an indispensable part of internationalization. Referring to strategic planning in the College of Education and Human Development at the University of Minnesota, Paige (2003) states that the planning documents developed in 1991, “*guided internationalization throughout the 1990s and gave a strong sense of purpose and focus to the [International Education] committee’s work*”. Similarly, the institutionalization of international education, the third dimension, is critical because it makes internationalization sustainable. If the University has a governance structure for internationalization, the possibilities are greater that the process will succeed. The fourth dimension - an infrastructure for international education - refers to the presence of professional staff and units responsible for specific aspects of internationalization such as international students and scholars, study abroad, international grants and contracts, and departments development. In many countries, these are now recognized as highly specialized activities that require professional staff with proper academic training and years of international education experience. The literature is very consistent in placing the curriculum, the fifth category, at the heart of the internationalization effort. Universities are ultimately about students and what they learn. The curriculum is thus the embodiment of a University’s philosophy of what a higher education means. If teaching and learning is international in character, the message being

transmitted is that internationalization is valued, that students will leave the University having been given numerous learning opportunities such as second language and study abroad experiences. International students and scholars, the sixth category, can play a very important role in internationalization, in particular, through their interactions with host country students inside and outside of the classroom. If they are properly supported by professional staff and given assistance in being integrated into campus life, their impact can be even greater. The seventh component is study abroad. As shown before the Universities are consistent in identifying study abroad as a major focus of internationalization. Moreover, one of the explicit objectives of the Bologna Declaration was to remove obstacles to student mobility. So one of the most important national goals of the Bologna Process is to increase student and staff mobility¹⁰⁷. The eighth area is departments involvement in international activities. Their members are integral to the curriculum; the more involved they are in international activities, the more likely it is that they will incorporate an international dimension into their courses and work effectively with international students, among other things. Universities that support faculty participation in international conferences, research sojourns abroad, and similar international activities will be investing both in faculty development and the broader internationalization of the institution. Campus life and co-curricular programmes, the ninth dimension of internationalization pertains to the environment on campus outside of the classroom. Are there international events occurring on campus (e.g., music, dance, lectures)? Are there places for international and host country students to meet informally and socially? Are there clubs and organizations for student interested in international issues? Are there residence halls that promote international learning? Having an international atmosphere on campus can make an important contribution to internationalization. The tenth and final dimension is monitoring the process. It is important to have monitoring systems in place to track the progress of internationalization. Moreover, if no one is responsible for developing performance indicators, collecting data, interpreting data, and making suggestions for improvement, it will be impossible to accomplish the internationalization agenda.

After the identification of these key performance categories linked to internationalization, In the next chapter, the Dynamic Performance Management (DPM) will be introduced. The DPM permits to design and implement performance management systems in a public University by identifying and modelling those factors impacting on the performance of a specific Doctoral sector within an Italian public University.

¹⁰⁷ Aittola H., Kiviniemi U., Honkimäki S., Muhonen R., Huusko M. and Ursin J. (2009). *The Bologna Process and Internationalization – Consequences for Italian Academic Life* Higher Education in Europe, Vol. 34, Nos. 3–4.

Chapter III

USING A DYNAMIC PERFORMANCE MANAGEMENT APPROACH TO FRAME Ph.D. SECTOR IN ITALIAN PUBLIC UNIVERSITIES

3.1 Introduction

As introduced at the end of the previous chapter, the assessment process aims to improve the performance of the institution relatively to its goals and objectives. The improvement of University performance, in particular, is strictly correlated to the link: “client - product” (Cosenz, 2011). Within the University management, the identification of “products/services” and “clients” is crucial. Furthermore, an administrative “product” may take a different connotation as a function of the “client” to whom it is delivered (Pitman, 2000). Specifically, this link is the instrument through which the decision makers can identify their targets in terms of Planning and Control (P&C). The development of P&C in a University aims at fostering an improvement of University performance through the introduction of a set of parameters on which public funds are allocated. However, the complexity typical of Academic institutions requires the use of flexible and innovative organizational and decision-making models tailored to the specificities of the Universities. Particularly, to improve its performance, University must be considered a network of interdependent components that work together to accomplish a common purpose (Miller, 2007). In addition, according to Miller, the use of a systems approach means that processes and tasks performed by the organization are more important than the organizational chart. Changes in one area of an institution can cause changes, intended or not, in other areas, so an analyst who uses system thinking must look at the organization holistically. *“Systems thinking encourages leaders to recognize their organization's purpose and direction, interrelated parts, interdependence on other organizations, needs and requirements of external and internal customers and stakeholders, resources required to perform work, and products and services created for specific intended outcomes”*. It becomes possible to see *“patterns and events”* and to *“view ... problems not as isolated or random events but as sets of antecedent conditions that can be predicted and controlled”* (Miller, p. 37).

According to this framework, University must be seen as a system composed by different management areas, which should be organized to outline factors impacting on organizational performance and to model them. This view is fundamental for the improvement of University performance in a period in which, as shown in the previous chapters, the Italian academic system has been invested by a series of reforms which have deeply changed the management of public

Universities and in particular of the Ph.D. sector. As seen before, the reason for these reforms has been inspired by various factors, such as budgetary restrictions imposed by national Governments and the “*marketization*” of the Higher Education sector (Clark, 1998; Deem, 1998, Cosenz, 2011). In particular, the economic crunch has pushed Governments to improve investment allocation towards all public sectors including Higher Education. This has involved a significant cut in financial resource transfers from central bodies to local authorities and has also delayed the enforcement of national development plans (Cosenz, 2013). On this concern, given the increasing reduction of public funds, all Universities need to focus on performance management in order to improve their management system developing both quality of products/services supplied to customers and expenditures rationalization (Saravanamuthu & Tinker, 2002; Adler and Harzing, 2008; Marginson & Van der Wende, 2009). Furthermore, the ordinary funding allocation carried out by the National Governments is strictly dependent on the performance that each academic institution achieves. Particularly, academic performance is assessed by the Ministry of Education on the basis of specific criteria and parameters which, above all, tend to measure intangible outputs and outcomes, such as quality in education and research activities, efficiency, effectiveness, internationalization and impact on the community. These parameters and, in particular, the achievement of good results in terms of internationalization influence also the improvement of University position inside Italian and International ranks, fundamentally performance-based, increasing the attractiveness of external funds in order to ensure a successful University survival throughout time.

Based on the described conceptual framework, the aim of this chapter is to illustrate how to design and implement performance management systems in Universities. Of course, the specific complexity of a University management needs the introduction of a performance management and accountability system able to understand issues and opportunities that mostly characterize their own organization. In particular, we will try to identify and model those factors impacting on the performance of the Ph.D. sector within a University academic performance, using a dynamic performance management view. Likewise, we will analyze how the internationalization of the Doctoral sector can represent a crucial lever for University economic sustainability over time. In this analysis, the combination of performance management with System Dynamics modelling can facilitate academic decision-makers in the identification of key-performance drivers for pursuing a sustainable performance improvement in Universities. In this chapter, in particular, we will show how the System Dynamics approach enables exploration of the dynamic complexity included in the activation of an international Ph.D. program to test how it can contribute to a sustainable development of the higher education system, the image of the University and, consequently, its capacity to attract international students and acquire new funds.

The analysis of the SD methodology will be anticipated by the evaluation of positive and negative aspects of Performance Management. Subsequently, the basic features of the SD methodology will be shown and how its use can be useful for the improvement of Performance Management of the Ph.D. sector. This will be the starting point for its application to the real case of the Ph.D. sector of the University of Palermo that will be fully analyzed in the next chapter.

3.2 Performance Management. Strengths and weaknesses

The recent economic crunch and the turbulent world in which we live makes performance a critical issue for Universities, and in particular for the public ones. The reduction of public funds and the contemporary growth in terms of demand shift the terrain of performance from governments to markets and incentives from public subsidies to private support. But what does performance mean for a Higher Education institute? First, we must say that the word performance means to do or to accomplish. It is what is actually accomplished, a result, an outcome or an organization's output (Miller, 2007). Its actual relevance is emphasized by Stiglitz, Sen and Fitoussi in 2009:

“Our societies have become more performance-oriented. We expect results, whether from our managers, our workers, or our politicians. Individual rewards are typically based on performance, and incentive systems have to be based on metrics. What we measure affects, of course, what we do. And what individually or collectively we are aiming at affects what we measure. There is an intricate relationship between objectives, measures and actions”.

Nevertheless, in the definition of performance a fundamental distinction must be made between profit and non-profit industries. In both cases, stakeholders and their preferences are the basis for determining performance metrics. The performance of lucrative entities is evaluated in terms of profits, sales, market share, productivity, debt ratio and stock prices. Instead, in the non-profit ones the evaluation of performance is more difficult. The purpose of a non-profit institute is to improve the lives of individuals, members, organizations, communities, and society as a whole (Epstein and McFarlan, 2011). Higher education institutions can be identified as non-profit bodies as they do not need to provide a monetary return on investment to shareholders. The definition of performance in higher education, however, is particularly difficult. As underlined by Miller (2007):

“Everyone talks about performance but usually with multiple meanings. It is measured in many ways such as: rankings, scores, data, beliefs and perception. It looks, in turn, objective and subjective, dictated by numbers on the one hand

and feelings on the other. Senior administrators think about it in terms of growth and academic quality. Faculty adequate it with productivity and contribution to student learning. Students look on it as an institution's contribution to their personal development. (...) To outsiders in government or business, it is about management and outcomes, accountability, completion, preparing for a career, cost benefits and more”.

It is evident that University performance cannot be confined to a single perspective. In particular, it cannot be identified as a unique way of conceptualizing, organizing and reporting results in institutions like Universities which are multipurpose organizations. People inside these academic organizations - the faculty, administrators and staff - perform different roles and responsibilities and often hold different conceptions of the organizational purpose (Miller, 2007). For these reasons, we must speak of organizational performance in the context of Universities. This topic was analyzed the first time in the 1980s by Kim Cameron and Alan Lindsay. Cameron conducted research on effectiveness in colleges and Universities identifying four domains: academic, morale, external adaptation and extracurricular domains (Cameron, 1981) but he left unclear the meaning of performance in the organizational context of Universities. Lindsay in his article of 1981: “*Assessing Institutional Performance in Higher Education: A Managerial Perspective*” put the focus on performance definition, underlining that its meaning is highly misunderstood. Subsequently these problems of definition can lead to further problems in measurement itself, as what is measured could be wrong and not correlated with the actual results.

To remedy this problem he argued that performance should be regarded as embodying two dimensions in Universities:

- *Effectiveness*: which is concerned with congruence between outputs and goals;
- *Efficiency*: which links outputs with inputs.

Lindsay's work made an important contribution to the definition of organizational performance but it did not provide a working definition that could be really adapted to the University context. In fact, for the definition of University performance we must consider not only what is produced in terms of outputs and goals but also how it has been produced (Lorino, 1991). As Cosenz (2011) argued, the evaluation of results is part of a wider system of management that needs to be oriented not just on the quality development of services supply but also on its underlying processes. An excessive attention on financial aspects would show just a partial and incomplete picture of performance; the traditional measures do not take into account the effects and the impacts of all the relevant variables that affect and interact with the activities of a public administration.

Today, therefore, a traditional view of performance, focused on the financial balance between expenditures and collections with the goal to pursue a financial equilibrium (Fitzgerald, 2007; Sporn, 2003; Modell, 2001; Pendlbury & Algaber, 1997), seems to be too bounded. It remains a central topic but, nowadays, the evaluation of performance requires a focus also on other perspectives related to the quality of programmes and the outcomes from undertaken policies (Chenhall & Langfield-Smith, 2007).

Therefore, for a sustainable University organizational model, the value creation, together with the financial balance (Moore, 1995), should be the central issue for a wide range of stakeholders (Guthrie & Neumann, 2007; Parmenter, 2007; Cave *et al.*, 1997). In academic institutions, value creation processes include several organizational units interacting to deliver “products/services” to external clients (e.g., students, enterprises, scientific community). In particular, in academic institutions, performance must be linked to the different areas identifiable inside the University:

1. Education;
2. Research;
3. Supporting activities;
4. Administrative back-office.

Different units can be identified within each area to which the achievement of specific end results are linked. A lack of coordination between the units involved in this delivery of “products/services” may substantially limit the capability of an organization of generating value. This is particularly crucial for Universities (Reponen, 1999). Moreover, as other public institutes, they are complex and dynamic systems. They are complex since a number of units, whose roles and know-how embrace diverse inter-related areas, are affecting performance. Then, complexity is enforced to the public University decision makers by the existing legal framework (Rosenbloom *et al.*, 2010). It is also dynamic, since the effects produced on performance by decisions made by the several (public and private) actors having an interest on the system itself, can be often observed after long delays. Such delays are due to the time it generally takes for public sector decisions to generate their own outcomes on the community. They also depend on the huge net of feedback relationships between different sub-systems (Bianchi, 2012).

To measure a complex structure such as a public University, composed by many areas and sub-areas, a very strong methodology is essential. To deal with such complexities a Performance Management (PM) approach, that aims to improve performance of public administrations, seems appropriate. PM systems represent useful frameworks to drive decision-makers in both designing competitive strategies and measuring resulting outcomes. Such systems are focused on the identification of outputs and outcomes, and of their own ‘drivers’ (Fitzgerald *et al.*, 1991; Otley, 1999; Ferreira and Otley, 2009). Performance Management systems, such as critical success

factors, key performance indicators, and the balanced scorecard, offer clear parameters for managers to better direct their organization (Van de Walle, 2001). The PM defines an area of interest with the purpose to build the right tools to identify, evaluate, control and manage not only the results but also the means used for the achievement of these results, respectively at a social, organizational and economic level (Fitzgerald, 1991). PM deals with different levels of performance, and focuses on a multidimensional perspective rather than just on a traditional economic and financial dimension.

On Performance Management Kourtit, Van de Waal and others, identified strengths and weakness of its application. In particular, it can improve:

- The accountability of the decision maker. Also in terms of higher transparency inside and outside communication;
- Collaboration and coordination between different units and areas;
- Attention to the achievement of objectives;
- Central and peripheral decision making processes;
- The participation and involvement of internal staff in the achievement of results and to the management processes;
- The quality of products and services offered and consequently the image;
- Motivation of employees, in correlation with a greater understanding on roles, targets that can be achieved and incentives.

On the other hand, some problems can be linked to PM if it is not well implemented to the features and objectives of the institution. These criticalities can emerge in case of:

- Excessive internal competition between units. This weakness can be linked to the reward system and to the so called “Tragedy of the Commons” according to which individuals, acting independently and rationally in their own self-interest, behave contrary to the whole group's long-term best interests by depleting some common resources (Hardin, 1968)¹⁰⁸;
- The predominating mentality to analyze, or at least give more attention, to the financial and economic measures, ignoring the other significant dimensions of performance (Kald and Nilsson, 2000);
- A poor selectivity of key variables, in favour of different types of indicators, mostly unnecessary, that can create confusion during the lever of intervention selection process (Bianchi, 2004);

¹⁰⁸ For the analyses of the application of the “*Tragedy of the Commons*” to University see: Brown J. R. (2000), ‘Privatizing the University-the New Tragedy of the Commons’. ESSAYS ON SCIENCE AND SOCIETY, Vol. 290 no. 5497 pp. 1701-1702.

- Subjectivity of performance indicators, that show a lack of reliability in compliance with the detected information (Saravanamuthu and Tinker, 2002).

Taken into account these general criticalities, it is also relevant to consider another, which has characterized present-day academic systems, i.e. the so-called dynamic complexity. In this regard, PM deals perfectly with static environments and complexities, namely the ones determined by a well-defined number of variables that interact with each other according to uniform and regular relations. Different is the case of PM dealing with dynamic complexities, which base their nature on uncertainty and unpredictability of the causal relationship between the variables that are object of the study. To tackle dynamic environments, it is necessary to find a methodology that is able to understand non-linear relations, time delays between cause and effects, and to use a balance approach of the adopted strategies, in the long and short term (Cosenz, 2011). Before identifying this new methodology, it is important to introduce the description of a dynamic approach to PM. This will be better discussed in the next section of the chapter.

3.3 A Dynamic approach to Performance Management

Each public administration faces many complexities due to the number of subjects, stakeholders and organizations involved. In these cases, a multidimensional approach becomes necessary. Moreover, the relationships among these actors cannot be ignored, since they have a concrete influence on the performance of every linked institution, as underlined by Bianchi (2012):

“in an inter-institutional system’s perspective, assessing performance sustainability requires not only a focus on the single organization’s results, but also on how such results contribute to the wider system’s performance, a factor that will affect the organization in the long run”.

As already mentioned PM is able to identify the responsibility areas and the relative levers of intervention, that a decision maker can use to influence the final results. Mapping those areas implies detecting the actual interdependencies among them, highlighting the available resources in each of these sub-areas, taking into account their restrictions such as time constriction, and evaluating their expected results (Bianchi, 2004). In order to facilitate the study and the management of academic performance Bianchi (2009b, 2012) identifies three complementary views of Performance Management:

1. The objective view;
2. The instrumental view;

3. The subjective view.

The “objective view” implies that products generated by the fulfilment of administrative processes are made explicit. The first step of this analysis needs to be based on an evaluation of the external perspective which takes into account the organizational environment. This means identifying first the users, or more in general the stakeholders, that the administration is facing, then the final products/services and the social benefits that the organization supplies to its clients. Once those are identified, it will be possible to set a number of organizational objectives, related to the end results to construct the respective outcome indicators. To understand the relevant role of the back office on the final results, it is necessary to provide a correct evaluation, taking into account the causal relations within the institution, and to foster accountability. Moreover, the use of this approach will allow to easily identify the area of competence and those that are at first responsible for the generated inefficiencies. Bianchi (2012) synthetically states:

“the design of a Performance-Management system requires that the chain of final and intermediate products delivered to both external and internal clients be fully mapped. It also requires that the underlying processes, responsibility areas, assigned resources, and policy levers be made explicit. These design requirements can be described as an objective view of Performance Management”.

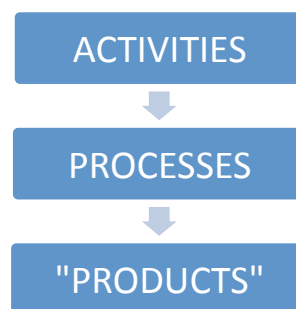


Fig. 3.1 - The objective view of performance (Bianchi, 2012)

The “instrumental view” supports decision makers in understanding how strategic resources allocation may affect performance. This perspective aims to identify a set of proper performance indicators, based on the relationships between the end results and the strategic resources. The strategic resources are the key factors that allow processes to start. In case of efficient management, the system generates value, that can be transmitted from the end results to the strategic resources creating an reinforcing feedback. On the other hand, a non-efficient management causes that the end results generated by the PA, with the execution of operative

processes, will gradually consume the initial set of resources. This view is defined instrumental since it identifies a set of levers of intervention (the instruments) connected to the critical success factors that can be directly influenced by the decision makers (Cosenz,2011). Those levers are called drivers. They are the link between strategic resources and end results. Possible examples of performance drivers related to the management of academic institutions can be those that measure the effectiveness of academic equipment (e.g. number of breakdowns) or the employees’ satisfaction.

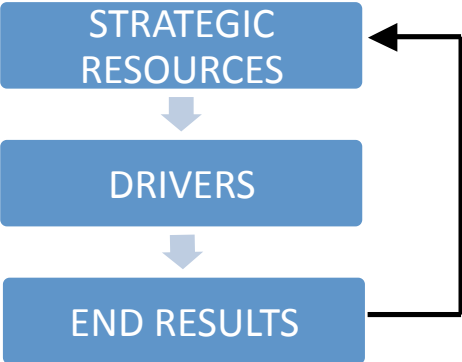


Fig. 3.2 - The instrumental view of performance (Bianchi, 2012)

The “subjective view” is a sort of synthesis of the above perspectives. It clearly makes explicit the goals, the related activities and processes, the final and intermediate results, all referred to each organizational unit examined. With this view of performance all the base activities, that are part of the processes, and the relative indicators, are made explicit.

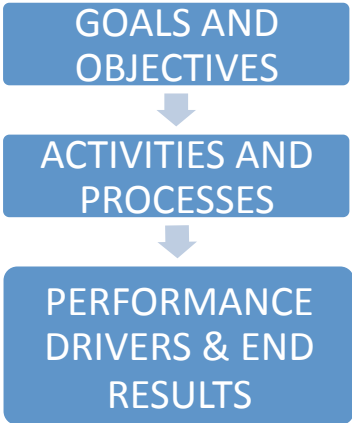


Fig. 3.3- The subjective view of performance (Bianchi, 2012)

The following figure provides a synthesis of the three dimensions of PM as described above:

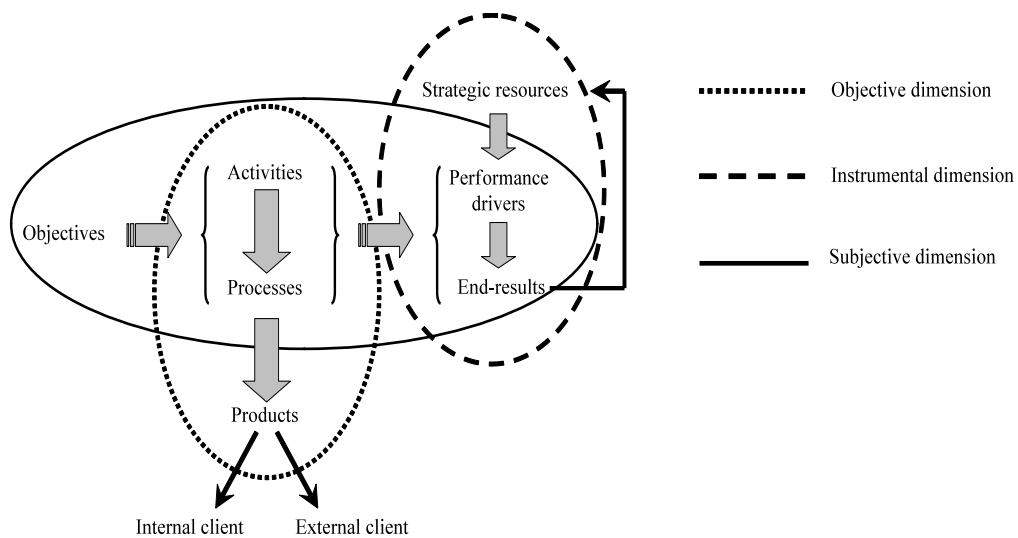


Fig. 3.4 - Three views for designing a Performance Management system in academic institutions.

These three views play a complementary role within an organizational system. They interact with each other and the use of one does not exclude the application of the other two.

Figure 3.5 gives another general picture of the performance dimensions showing their interactions.

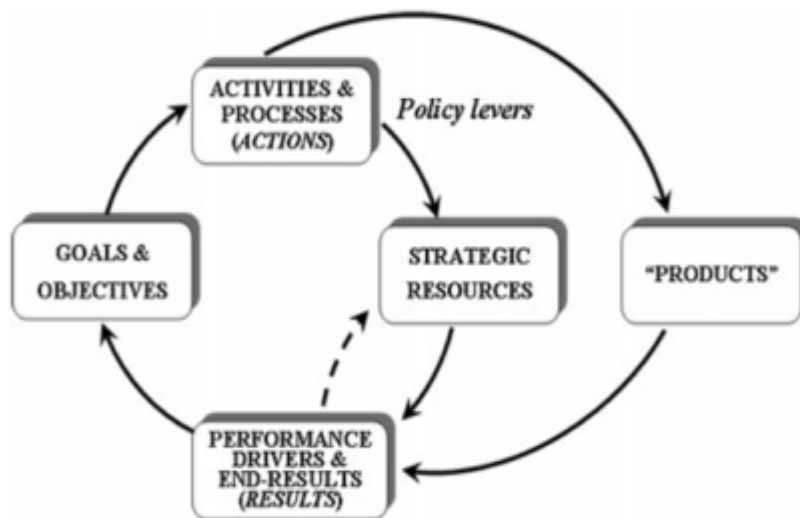


Fig. 3.5 - General picture of the three views of performance (Bianchi, 2012)

Identifying the products of an organization is the first step. Once they are defined, it becomes necessary, moving backward, to outline the processes and the activities, underlining the causal and effect relations. Then it is crucial to clarify the goals and objectives that were planned in every single responsibility area. To obtain a good performance such goals need to correspond with the end results, achieved through the pressure applied on drivers, and by the management of

a given set of strategic resources. End results should be able to describe if an organization can respect the various expectations coming from different sets of clients and stakeholders about the provided products (Bianchi, 2012).

This perspective implies a wider horizon of analysis compared to the ordinary tools used for the government of an organization, such as financial and economic indicators. But, as seen above, if PM is not fully implemented within an organization, some criticalities can emerge.

Taken into account those criticalities, it is important to consider the so-called dynamic complexities of systems. These systems base their nature on uncertainty and unpredictability of the causal relationship between the variables that are object of the study. Consequently, to tackle dynamic environments, it is necessary to find a methodology that is able to understand non-linear relations, time delays between cause and effects, and use a balance approach of the adopted strategies in the long and short term (Cosenz, 2011).

Therefore, it seems appropriate to support the strategic PM with other tools and methodologies. In particular, to overcome the effect of the mentioned criticalities, management practice can be supported by combining performance management systems with System Dynamics models. This methodology is perfect for modelling and simulating public administration performance because it supports decision makers in framing and understanding dynamic complexities inside and outside organizations, and fosters the design and implementation of eventual sustainable policies (Forrester, 1961; Sterman, 2000). Therefore, the combination of both PM and SD can provide decision makers resources to detect the key variables, to understand the mechanisms beyond each relations and feedbacks, and the consequences that a possible intervention on the policy levers can generate. In particular, the development of a SD model-based performance management approach may support decision-makers in identifying those policy levers on which to act to undertake sustainable performance improvement programmes in Universities.

In academic institutions, the development of SD models also supports decision-makers to better recognize and measure key-performance indicators and the factors impacting on them. Simulation also provides support in distinguishing possible trade-offs in the short and long term expected outcomes from adopted policies and furnishes a feedback structure to monitor the causes of the actual results. This means that we must analyze the use and coordination of strategic resources, their organization and combination in processes to understand how they influence the end results achieved. Modelling feedback relationships between end-results, performance drivers and strategic resources may support decision-makers in managing and measuring the performance of academic institutions

In the next paragraph, we will introduce and explain the System Dynamics methodology, how it is articulated, what its main characteristics are, and how it is possible to model a system with the

support of some relevant tools that can be used to give a deeper perspective of a specific phenomenon.

3.4 System Dynamics methodology

System Dynamics (SD) is a methodology and mathematical modelling technique for framing, understanding, and discussing complex issues and problems. Originally developed in the 1950s by Professor Jay Forrester of the Massachusetts Institute of Technology to help corporate managers improve their understanding of industrial processes, SD is currently being used throughout the public and private sector for policy analysis and design (Radzicki and Taylor, 2008). The relevance of SD is linked to its identification as a method for understanding the dynamic behaviour of complex systems. The problems addressed by SD are based on the premise that the structure of a system, that is, the way essential system components are connected, generates its behaviour (Sterman, 2000). If dynamic behaviour arises from feedback within the system, finding effective policy interventions requires understanding the system structure. Once a model is built, it can be used to simulate the effect of proposed actions on the problem and the system as a whole.

Meadows (1989) asserts that:

“the SD paradigm assumes that the world is composed of closed, feedback-dominated, non-linear, time delayed systems and thus the method must be most applicable to systems that do indeed possess these characteristics. In general, such systems will be characterized by distinctive dynamic patterns, long time horizons, and broad interdisciplinary boundaries”.

Having considered that, SD models are rational structures that generate a formal behaviour that must fit the empirical behaviour of the system being modelled. In the first place, for a model, to be accepted as valid, it is necessary that the hypotheses used to build the model should be compatible with available scientific or heuristic knowledge. Secondly, these hypotheses should be captured adequately with the representational tools of SD language, and all this information must be processed properly to obtain conclusions that will fit the empirical behaviour. These propositions have direct epistemological equivalences. This is the subject of the next discussion. Vázquez, Liz, and Aracil (1996) suggest three main kinds of knowledge involved in SD model building:

- Structural knowledge: this sometimes comes from the available theoretical knowledge, and is expressed with the help of scientific concepts. The only source of structural knowledge is the mental models which subjects/experts have about the system to be

modelled. Hence, structural knowledge is expressed only in intuitive terms and in ordinary language (Forrester, 1998).

- Quantitative Knowledge: this is reflected in reference modes, temporal series, empirical behaviours as well as knowledge concerning the initial conditions in which the real system is placed. In other words, the empirical knowledge is that available with regard to the variations of the relevant magnitudes of the system over time and the particular values of these magnitudes in a given situation.
- Operational knowledge: the specific SD skills and practical knowledge that the modeller uses when integrating the other two kinds of knowledge in order to represent the SD model. The SD model simulates the dynamic behaviour of the modelled system and assumes that it contains a certain structure. It is intended that the SD model will be able to guide policy actions of the real system.

Vázquez et al. (1996) claim that it is essential to have these three kinds of knowledge coherently included in the SD models, since, while empirical behaviours give the quantitative data and anchor in reality, mental models give information which is not so much quantitative but structural. Therefore, mental models can be said to be strongly interactive and to have a very rich and relevant representational content regarding the system structure.

Summarizing we can say that the application of SD is useful, in particular, to those systems with the following features (Bianchi, 2009b):

1. An environment characterized by a complex structure, not easy to comprehend due to the lack of information and to the cognitive limits of the decision makers;
2. The existence of specific levers that can be influenced by the decision makers to affect results towards the desired goals
3. A different reaction of results due to the effect of exogenous variables;
4. A verifiable difference of variable trends in the short and the long run;
5. Temporal delays of the system to changes in adopted policies.

Consequently, the application of SD is particularly relevant to analyze complex systems. But what is a similar context? According to Sterman (2000) a complex system is such since it reflects some characteristics:

- A. Policy resistance. This is based on the idea that a policy, not only fails to solve problems but actually helps to cause them. Most of them focus their strategy on a myopic short period; so reducing the effect in the present will not prevent an even bigger problem in the long run.

- B. Feedback. Almost nothing is exogenous; today it is possible to control and influence almost every aspect of reality even if we are not able to recognize these effects: “*our actions may trigger so-called side effects we did not anticipate*”¹⁰⁹.
- C. Analyzing our behaviour and understanding the relations between cause and effects will help us to identify the feedbacks of a system and how it is possible to affect them.
- D. Nonlinearity. The interactions between feedbacks in a complex system are in most cases nonlinear.
- E. Tipping points. Due to the nonlinear relations, sudden shifts in resources can happen.
- F. Eroding goals are particularly common in sustainability contexts due to our imperfect understanding of ecosystem dynamics. Due to limited information, natural variability, and limited knowledge of population dynamics, estimates of “normal” stocks and maximum sustainable yield are uncertain. Consequently, target stocks are vulnerable to political pressure.
- G. Time delays. Delays are very common in complex systems. This is a relevant issue that specifically influences policy effects. Once a policy is identified and applied, it takes time before it can produce an effect on the environment. In complex systems where the relationships between feedbacks are many and related by many cause and effect chains, before seeing an effect of an implemented policy, this has to pass through every relationship before an outcome is actually perceived.
- H. Stocks and flows. These are fundamental in a complex system and show two different types of behaviour. The stock is accumulative, while the other one, the flow, represents the cause of the accumulation process. It is possible to distinguish two types of flows, the inflow which is the incoming one that actually creates the accumulation, and the outflow, which is the out-coming one that drains the stock. If the difference between the inflow and the outflow, namely the net-flow, is positive then the stock increases and generates accumulation. On the contrary, every time this difference is negative, the stock starts to drain and no accumulation is verified.

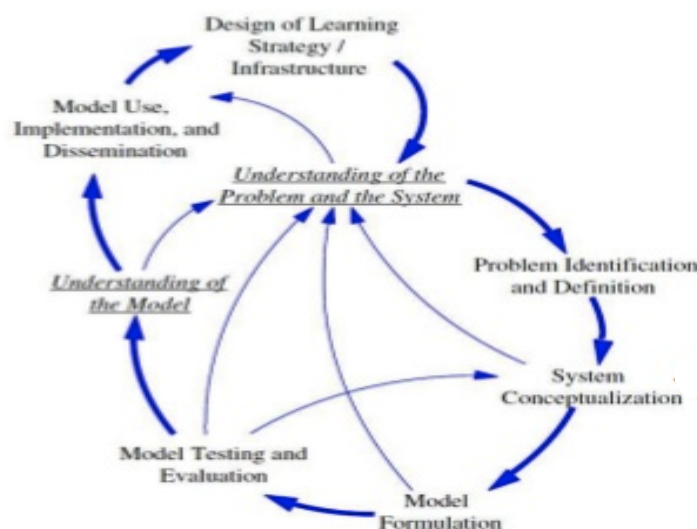
With the support of SD it is possible to understand the structure and the dynamics of the observed systems thanks to a learning oriented perspective, stimulated by the comparison between reality and the realized simulations. According to Bianchi (2009b), System Dynamics differs from traditional methodology as it is based on the mentioned comparison; decision makers are allowed “*to continuously review the assumptions previously made to extrapolate keys*

¹⁰⁹ Sterman J.D. (2012), Sustaining Sustainability: Creating a Systems Science in a Fragmented Academy and Polarized World, M.P. Weinstein and R.E. Turner (eds.), *Sustainability Science: The Emerging Paradigm 21 and the Urban Environment*, DOI 10.1007/978-1-4614-3188-6_2.

of interpretation that allow to understand and deal suitably with the complexity of the phenomenon observed". Decision makers can interpret reality by setting up the cause and effect relations between the variables of the system. This procedure leads to the construction of a simulation model based on the representation of these relations and the levers of intervention through which it is possible to intervene and influence the system. These simulations are developed with the support of specific software such as Powersim, Ithink and Vensim. The simulation process highlights the behaviour of the key variables over time, and shows the results of the chosen policies in order to clarify which one can be the most appropriate to reach the set goals. SD simulations do not focus on the spasmodic research of the exact values associated to the key variables but, more importantly, aim to show the behaviour of those variables over time and how they react to the adopted policies, providing decision makers the necessary awareness of delays, cause and effect relations, and exogenous restrictions of the system under analysis (Bianchi, 2009). SD contribution does not focus on the identification of the best political solution to settle the identified criticalities, but rather explains the relevant parts of the system and how their dynamics develop over time (Cosenz, 2011).

The following figure shows the modelling process described:

Fig 3.6 - Overview of the System Dynamics modelling approach



Source: *Best Practices in System Dynamics Modeling*, Martinez I. J. - Richardson G. P., 2001

The system dynamics model building process involves six key activities as shown in Figure 3.6. The activities are (1) problem identification and definition, (2) system conceptualization, (3) model formulation, (4) model testing and evaluation, (5) model use, implementation and dissemination, and (6) design of learning strategy/ infrastructure.

As shown by the figure above the key products are the understandings of the model and of the problem and the system by the decision makers. Thus, the development of a SD model requires an accurate analysis of the organization and of its external environment. A learning process towards its dynamics is necessary.

Cosenz (2011) states:

“The learning capacity of a system helps decision makers to understand the sources of uncertainties, inside and outside the structure, and to elaborate strategies in order to improve the performance in a sustainable perspective”.

This is particularly true for those systems characterized by dynamic complexity, plurality of causal links between the relevant variables and uncertainty about the external context. In this case, decision makers risk adopting decisions based on a superficial or partial analyses of the system, or being influenced by a wrong and late interpretation of the symptoms of a dysfunction in place (Bianchi, 2001).

According to Homer and Hirsch (2006):

“a central tenet of system dynamics is that the complex behaviours of organizational and social systems are the result of ongoing accumulations (of people, material or financial assets, information, or even biological or psychological states) and both balancing and reinforcing feedback mechanisms”.

System Dynamics uniquely offers the practical application of these concepts in the form of computerized models in which alternative policies and scenarios can be tested in a systematic way that answer both "what if" and "why"; doing so, the institution management is able to properly evaluate the effects of management policies adopted on organization performance both in the short and medium-long term.

Then, once the picture of the system is clear, and its main variables have been identified, it is necessary to link these variables with cause and effects circuits. These links and relations between variables are represented by circuits named casual loop diagrams. They will be analyzed in the next paragraph.

3.4.1 System Dynamics modelling: reinforcing and balancing loops

SD models are based on the design of structures characterized by casual loops which involve the main variables of the system. These circuits explain the behaviour of the identified relations, making the decision maker understand the reasons of a specific trend, pointing out the

performance drivers and the levers of intervention that are possible to affect to influence the system under analysis.

In detail, it is possible to distinguish two types of relations – direct and indirect – that characterize causal circuits (Sterman, 2000):

- The first one shows a positive connection between two variables, and is expressed by a “+” sign. A variation of one variable, either positive or negative, causes a variation in the same direction of the one to which it is connected.
- The indirect relations, on the contrary, are represented by a “-” sign, and show an opposite behaviour between the variables involved: an increase of a variable generates a decrease of the linked one and vice versa.

Once the signs among the relationships represented in the circuit are calculated, it is possible to define the polarities of the whole structure by calculating the dominance between the identified relations. If the direct relations are dominant then the circuit is defined ‘reinforcing’ and is represented by an “R”. This particular case represents an exponential behaviour both in terms of growth or decrease. On the contrary, if the indirect relations are dominant, the feedback is balancing and is expressed by a “B”. The balancing circuit represents a goal-seeking behaviour. As expressed by Sterman (2000):

“Of course no real quantity can grow forever. There must be limits to growth. These limits are created by balancing feedbacks. (...) All systems, no matter how complex, consist of networks of reinforcing and balancing feedbacks, and all dynamics arise from the interaction of these loops with one another”.

Therefore, through the SD method, it is possible to carry out a structure and behaviour analysis (Richardson, 1986; 1997), based on which the reinforcing loops underlying growth can be identified and fostered by proper development policies. In addition, reinforcing loops can be associated to corresponding balancing loops, which provide a source of limit to the growth of the investigated system. By promptly detecting and counteracting balancing loops, decision makers can foster sustainable development.

Based on what was said above, it is possible to distinguish between two different modelling approaches:

- Qualitative;
- Quantitative.

These tools support decision makers with different contributions, both with the aim of understanding complex systems and their dynamics. Each approach will be analyzed in the following sections.

3.4.2 Quantitative modelling

In System Dynamics the quantitative modelling approach is based on computer simulations made with the support of specific software, such as Powersim, iThink, Vensim and others. These software are used to capture the structure of a system and represent its dynamics with the support of the instruments provided by the computer simulators. Quantitative models are realized by feeding into the variables their respective quantitative data, and by typing the identified functions/equations which make the relations between the linked variables explicit to provide a graphical simulation over a defined period of time.

The variables used to build a System Dynamics quantitative model can be classified as follows (Bianchi, 2009):

- Stock. It is a particular type of variable based on the principle of accumulation. Stocks express the level and the variation of the strategic resources, tangible or intangible, inside a system in a well defined time horizon. In detail those variables represent the productive factors, tangible or intangible, from which it is possible to obtain the end results after they are processed by the inside procedures. The graphic representation of a stock is shown in the following figure:

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Figure 3.7 - Example of Stock variable representation

- Flows. These variables are the ones responsible for the accumulation and depletion process of stocks. SD methodology identifies two types, the inflow, which represents the incoming flow that increases the level of resources inside a stock, and the outflow, which is responsible for the reduction of resources. If the inflow level is higher than the outflow, it is possible to talk about accumulation. On the contrary, when the outflow is higher than the inflow, it is possible to talk about a depletion process. Flows represent the end results that affect the variation of the strategic resources. Figure 3.8 shows an example of inflows and outflows variables linked to the previous stock:

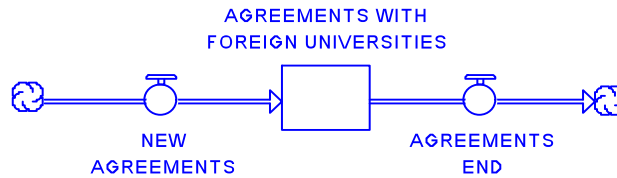


Figure 3.8 - Inflow and outflow representation

- Auxiliary variables. They are used to develop intermediate calculations that are fundamental for the comprehension of the model. They represent the performance driver, crucial for the transformation of the strategic resources into end results. Their graphical representation is shown by the figure 3.9:



Figure 3.9 - Auxiliary variable representation

The following figure represents an example of a quantitative model composed by two circuits: one reinforcing (R) and one balancing (B).

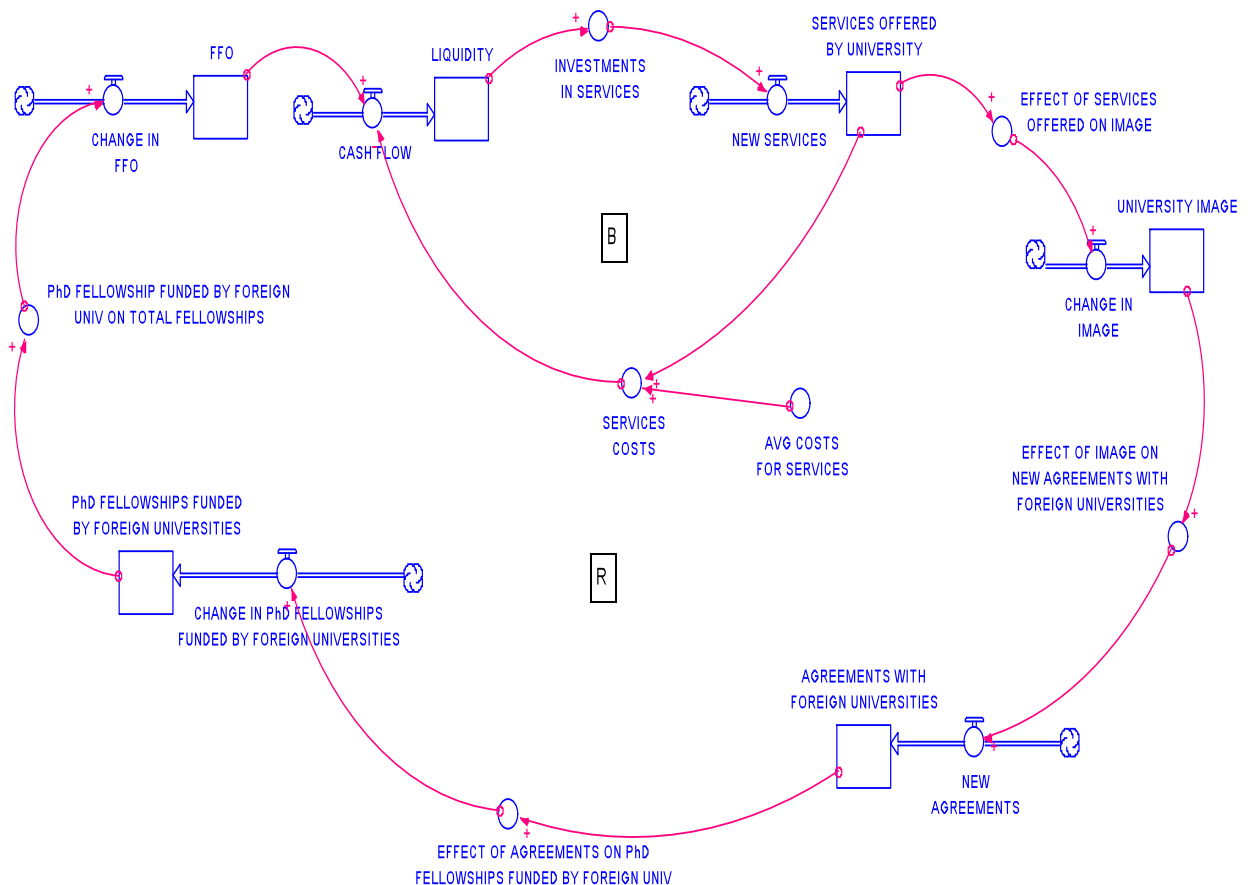


Fig. 3.10 - An example of a quantitative model (realized with iThink)

Particularly, the reinforcing loop (R) shows how an improvement of the University image positively influences— other conditions being equal – the acquisition of new agreements with foreign Universities. This will improve the Ph.D. fellowships funded by foreign Universities affecting positively the internationalization indicator (lever represented by the ratio between Ph.D. fellowships funded by foreign Universities and total fellowships). This will cause an increase in liquidity directly affecting investments in services offered by UNIPA. This, in turn, positively influences the University image. Thus, a higher supply in services involves an increase in terms of services costs for the University and, consequently, a decrease in liquidity (B).

3.4.3 Qualitative analysis

The qualitative modelling approach aims to highlight the logical relations upon a system. Its task is to recognize the causal relationships among the variables identified, defining the direct and the indirect ones. Once done, it will be possible to verify the polarity of the feedback under analysis (balancing or reinforcing). In System Dynamics the qualitative approach is realized with the support of a specific tool, the so called Causal Loop Diagram (CLD). It is represented as a conceptual map that shows the existing cause and effect relations of a system. In detail, a CLD captures the feedbacks (Sterman, 2000) and identifies which ones produce a specific dynamic behaviour in a case study under analysis. The relationships among variables are expressed by arrows. The arrowheads are signed with a “+” or “-” based on the type of the existing relations; as stated above, in the case of a “+”, the effect is positively connected to the cause (direct), in the case of a “-”, the effect is negatively connected to the cause (indirect) (Sterman, 2000). A positive loop tends to reinforce or amplify whatever is happening in the system. This feedback generates an exponential growth as great as its dynamic behaviour: *“the larger the quantity, the greater its net increase, further augmenting the quantity and leading to ever-faster growth”* (Sterman, 2000). A negative loop tends to counteract the tendencies within a system, opposing change and seeking for balance, equilibrium and stasis. This feedback operates to bring the state of the system in line with a goal or a desired state, counteracting any disturbance moving the system away from its goal. It generates goal-seeking as its dynamic behaviour, describing processes that tend to be self-limiting.

The figure 3.11 shows an intuitive example of a CLD:

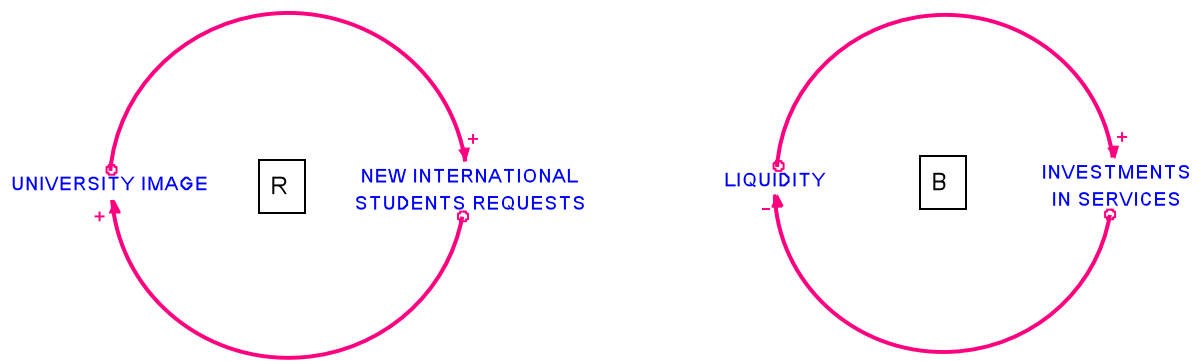


Figure 3.11 Reinforcing and balancing Causal Loop Diagrams

CLD and qualitative analysis can be seen as real effective instruments since they provide a first and simple graphical interpretation of the problem investigated. Not only do they clarify the cause and how they are linked to the related effect but also highlight the fundamental feedback mechanisms and identify which one is dominant in the specific case taken into account. Moreover, using this type of structure allows to underline delays, policies, boundaries, and enables to anticipate possible consequences not expected; this tool allows managers to access the power of system thinking (Wolstenholme and Coyle, 1983). Of course, if on the one hand CLDs are not too complex to build, on the other they generate a lack of precision because they totally ignore the quantitative perspective of a phenomenon. In particular, qualitative approaches do not provide real model simulations because quantitative data are not involved.

Furthermore, the simplicity that lies in the application of CLDs can be seen at the same time as a limit; a limit as it is easy to apply inappropriate insight to problems. Therefore the qualitative model does not give the possibility to understand the effects of one variable on another over time (Cronin, Gonzalez, Sterman, 2008).

It is well known that this particular tool has its strengths and limits and it is important to ensure a certain level of scientific rigor even if the only perspective of analysis is a qualitative approach. The development of qualitative analysis can be seen as a prerequisite for a quantitative system dynamics modelling activity and also as a free standing conceptualization based on system thinking, providing some level of insight by inferring rather than calculating the system represented (Wolstenholme and Coyle, 1983).

For the above reasons the qualitative analysis needs to be combined with the quantitative modelling as this union permits SD modelling to limit the weakness of PM, especially for the management of institutions characterized by dynamic complexity. Its application for the improvement of the Performance Management of University was introduced almost 20 years ago and will be better analyzed in the next section.

3.5 System Dynamics application to improve performance of Ph.D. sector

What emerges from the previous paragraphs is that the use of SD can hide some limits of PM especially when the decision-makers have to deal with complex and persistent issues, whose effects will be experienced in the long period (Barnabè, 2004). Furthermore, SD models, are able to understand non-linear relations, time delays between causes and effects, and show the evolution of the adopted strategies and of the key variables through their simulation over time (Cosenz, 2011).

Given the ability of SD models to support decision makers in framing and understanding dynamic complexities inside and outside organizations, it is possible to identify some application of SD modelling to the academic context. These applications started at the end of the 1990s in concomitance with the reforms of the Higher Education sector involving various scientific areas inside the Universities.

Today we can give a summary of the most important System Dynamics applications and publications, represented in the following table:

Table 3.1 - Principal applications of SD modelling to academic context

SPECIFIC AREA OF CONCERN	AUTHORS
Academic Legislation	Green (1994); Makintosh et al. (1994); Robertson (1999); Gornitzka & Maasen (2000).
Corporate Governance	Kennedy and Clare (1999); Saeed (1996).
Planning, Resourcing and Budgeting	Galbraith (1989, 1998a; 1998b, 1998c); Makintosh et al. (1994); Barlas and Diker (1996, 2000); Davies (1997); Kennedy and Clare (1999); Bell, Cooper, Kennedy, Warwick (2000); Vahdatzad and Mojtahedzadeh (2000).
Human Resources Management	Lewis & Altbach (1996), Shattock (1997, 1999).
Microworlds	Barlas and Diker (1996, 2000).
Enrolment Demand	Frances, Van Alstyne, Ashton, Hochstettler (1994); Frances (2000).

Source: *Sistemi di governo e di valutazione della performance per l'azienda "Università"*
(Cosenz, 2011, p. 143)

Of course, it is not a comprehensive summary of all the applications of SD within a University system but from these publications, we can define a first framework on the role which System Dynamics could play in the HE sector.

This is particularly shown in the following table:

Table 3.2 - Dynamic issues and System Dynamics tools/goals in Higher Education

ISSUE	REASONS FOR THE INTERVENTION OF SYSTEM DYNAMICS	SYSTEM DYNAMICS TOOLS	FOCUS AND GOAL
<u>Governance</u>	Complexity; Need for a system approach; Presence of behavioural side-effects; Short and long term effects of policies; Self-organizing sector, characterized by trade-offs.	Causal Loop Diagrams; Stock and Flow Diagrams; Boundary charts; Group Model Building sessions.	Strategic and long-term thinking; Organisational learning; Gaining insight; Development of a common understanding and of a holistic view; Inter and intra-organisational analysis.
<u>Changes in Teaching and Research Subsystems</u>	Non-linear relationships; Presence of behavioural side effects; Short and long term effects of policies; Self organizing sector, characterised by trade-offs.	Causal Loop Diagrams; Stock and Flow Diagrams; Dynamic simulation models; Group Model Building sessions; Microworlds.	Organisational learning; Gaining insight; Discovering side-effects; Strategic thinking.
<u>Planning, Resourcing and Formula Funding</u>	Complexity; Presence of systemic archetypes; Nonlinear relationships; History dependent sub-system; Behavioural side-effects.	Dynamic simulation models; Causal Loop Diagrams; Stock and Flow Diagrams; Microworlds.	Exploring complexity; Scientific and long-term thinking; Discovering side-effects.

<u>Stakeholders relationships</u>	Need for a system approach; Complexity; Policy resistant system.	Dynamic simulation models; Causal Loop Diagrams; Stock and Flow Diagrams.	Inter and intra-organisational analysis; Strategic and long-term thinking; Organisational learning; Gaining insight.
<u>Evaluation and quality assurance</u>	Need for a system approach; Presence of behavioural side effects; Complexity; Short and long term effects of policies.	Dynamic simulation models; Causal Loop Diagrams; Stock and Flow Diagrams; Microworlds.	Scientific and strategic thinking; Discovering long-term impact of policies; Identification of behavioural side-effects; Organisational learning.
<u>Enrolment Demand</u>	Short and long term effects of policies; Need for a system approach; presence of nonlinearities.	Dynamic models; Causal Loop Diagrams; Stock and Flow Diagrams; Microworlds.	Scientific and strategic thinking; Discovering long-term impact of policies; Gaining insight.

Source: *From Ivory Towers to Learning Organizations: the Role of System Dynamics in the “Managerialization” of Academic Institutions (Barnabè, 2004, p. 15)*

From the literature reviews we have given above, the authors’ opinion is that System Dynamics and System Thinking will progressively acquire a major role within what Barnabè (2004) calls: “*managerialization process of modern Universities*”. The use of simple System Dynamics tools as a Causal Loop Diagram or a Stock and Flow diagram could provide useful information on the system in which academic players are embedded and let them gain deep insight on the long term consequences of the actions carried out. Nonetheless, two weaknesses emerge from the cited contributions in this field. The first one is the tendency to keep SD and PM modelling separate. They proceed alongside without any possibility of actually connecting. The other one is that almost all of the literature cited above debate PM without suggesting any system of indicators linked to it (Cosenz, 2011). But in organizations, to manage is essential to know, to know is essential to measure (Amignoni F., Miolo Vitali P., 2003). In Universities, in particular, for the coordination of the different units and areas, the adaptation of a performance measurement

system plays an important role as it supports organizational units to better interact with other units located on both the lower hierarchical levels and on the same level. Therefore, a performance measurement system may represent a fundamental tool to support decision-makers in University management (Neely *et al.*, 2004).

Today, academic decision-makers are strongly limited in understanding management control results and, consequently, make strategy design and implementation due to several factors such as: management complexity, resistance to changes, uncertainty and turbulence from the external environment. Namely, the dynamic complexity underlying academic institution management represents one of the main causes for the unsatisfying performance levels achieved so far by Italian Universities (Cepiku & Meneguzzo, 2009). The use of strategic PM tools tailored to the needs of academic institutions and to their organizational critical factors is central to pursue a sustainable development in Universities. Moreover, its combination with SD modelling could eventually facilitate a process of organizational learning, a positive change in the mental models of the relevant actors, the creation of a common understanding about systems characterized by the presence of feedbacks and complexity and an overall better management of the available resources.

Therefore, in the next chapter, in order to illustrate how to design and implement performance measurement/management systems in Universities, we will apply the method just introduced to the real case of the Ph.D. sector of the University of Palermo. Designing a Dynamic Performance Management model, for this specific sector of the University of Palermo we will try to illustrate if, in a real case, the combination of Performance Management with System Dynamics modelling allows academic decision-makers to better identify key-performance drivers for pursuing a sustainable performance improvement in Universities.

Chapter IV

AN EMPIRICAL APPLICATION OF DYNAMIC PERFORMANCE MANAGEMENT ON THE Ph.D. SECTOR OF THE UNIVERSITY OF PALERMO

4.1 Introduction

As already seen in the previous chapters, Italian Universities, nowadays, operate in a new context characterized by a strong national and international competitiveness based on the performance level achievable by each University. Therefore, the academic competitiveness is based on the so-called *performance-based funding system*. According to this system, the level of competition of each University is linked to the performance level that it is able to reach and on the resulting capability of obtaining more funds. This is a result of the new public financing system that allocates resources on the basis of a performance-based ranking: in other words, the performance of each University is yearly assessed by the Ministry of Education which, subsequently, distributes the largest part of public funds to top ranked Universities. Such a mechanism is based on a meritocratic principle of resource allocation and, at the same time, its application encourages a performance alignment among all national academic institutions in terms of education quality, research output and management efficiency (Agasisti & Catalano, 2007; Bolognani & Catalano, 2007). This means that the adoption of a rewarding system aims at putting in competition public Universities to achieve not only financial resources but, above all, performance levels which may improve educational services towards citizens (Keenoy & Reed, 2008).

As introduced by Cosenz (2013), in Italy, the academic performance is measured by the Ministry of Education through a set of indicators which takes into account not only research and education activities, but also other critical issues, e.g., the level of internationalization, the ability to manage strategic resources, the capability to be funded by external financing bodies and sponsors. These performance indicators are based on “macro” measures giving “*limited information which make highly ambiguous and partial any effort aimed to understand and diagnose academic performance*” (Cosenz, 2013). Ministerial parameters are mainly focused on output, rather than outcome measures (Ammons, 2001) and related processes. Such a myopic and bounded view may result in a simplistic performance assessment, which may lead to distorted or wrong short-term evaluations, if observed under a perspective of University sustainable development. Potential risks of inconsistency in ministerial assessment may regard the following issues (Cosenz, 2011):

- The allocation of more funds to Universities with a better performance is likely to weaken the competitiveness of other Universities. As a consequence, it may enlarge the imbalance in the quality of the academic activities carried out by the latter in comparison to the former;
- The outcome indicators, used by the Ministry of Education to measure the ratio between the quality of training and the employment rate of graduates from each University, do not take into account the features of the geographical areas where Universities are located and this may involve a socio-economic imbalance in the development of regions;
- The ministerial effort to increase competitiveness in the academic sector and to lead Italian Universities towards higher performance levels in education and research should be accompanied by a parallel action aimed at promoting the streamlining of both bureaucratic procedures and supporting activities carried out by back-office units;
- Ministerial performance indicators mainly focus on “macro” level excluding the analysis of the contributions of back office units;
- The ministerial performance measurement system mainly focuses on the short-term and, therefore, it may not be consistent with broader goals of University sustainable development.

Even if these indicators reveal a limited and incomplete assessment framework of academic performance, designing performance measurement systems cannot overlook ministerial guidelines and criteria. The exclusion of ministerial parameters from the set of performance measures adopted by Universities runs the risk of diverting academic decision-makers’ attention on those measures leading to stable or increasing funding from the State. Instead, the performance assessment must be oriented to support an enhancement of those critical success factors creating value in academic activities (Van de Walle & Van Dooren, 2010).

The ANVUR identifies the internationalization of University as one of the main value creating factors for Universities. Actually, the ability of a public University to attract international students plays an important role in the annual performance evaluation conducted by MIUR. It, for example, identifies the promotion of an international dimension of training and research as one of the main targets for the University strategic planning in the period 2013 – 2015.

The above reasons allow us to focus on the analysis of research in a specific operational unit of the University of Palermo (UNIPA): Training for Research (TFR). It is a unit included in the “Research & Development” area and includes four sub-units including the Ph.D. Office. In the “Research & Development” area, one of the most important goals is improving the capability of the University of attracting international students, e.g., by submitting new agreements with foreign Universities and research institutes. In this area plays a strategic role the Ph.D. Office,

which represents the administrative back office responsible for the activation of those Doctorates that, as shown previously, are strategic for the attractiveness of international students. Here we will focus our analysis on an insight model framing the delivery of the specific ‘products’ related to the Ph.D. Officesub-unit, i.e. the validation of Ph.D. programmes.

In the following chapter, therefore, a Dynamic Performance Management perspective related to the UNIPA Ph.D. Office will be described. More specifically, in order to frame the main and crucial aspects linked to performance achievement of this area, we will start our analysis describing the administrative and organizational structure of the Ph.D. office, identifying the main products offered by this unit. Secondly, the specific object of the research project will be initially addressed through the use of the qualitative modelling approach. More specifically, a causal loop diagram (CLD) will be presented, which reconstructs the system of causal relationships that characterize the internationalization of the Doctorates. Moreover, using the SD approach described in the previous chapter, we will design DPM models related to specific ‘products’ linked to the Ph.D. Office. Lastly, the performance drivers on which decisions managers can leverage to improve UNIPA competitiveness will be highlighted.

In particular, we will attempt to map and combine the administrative and bureaucratic processes that influence the validation of Ph.D. programmes. Expected results will show that the improvement of investments in internationalization policies will increase the level of the UNIPA image. This may increase also University credibility, attractiveness and competitiveness and, in this way, a sustainable development and a Performance Management improvement without reducing the quality of the educational supply.

4.2 University of Palermo Ph.D. Office: structure and description

The University of Palermo (UNIPA), established in 1805, is a consolidated cultural, scientific and teaching presence in central-western Sicily. It is made up of five Schools and twenty Departments, operating in Western Sicily also through the branches located in Trapani, Caltanissetta and Agrigento. According to the Performance Planning 2013-2015 the UNIPA educational offer for the A.A. 2012/2013 consisted of 122 courses (1st cycle degree and one-cycle courses), 46 2nd cycle courses (master degrees), 15 University master courses, 37 Ph.D.s¹¹⁰ (in particular the number of Doctorates activated in A.A. 2013/2014 was reduced to 23¹¹¹). The University General Hospital “Paolo Giaccone” is also part of UNIPA. It was established with the Rector Decree of 1st April 1996, in application to Legislative Decree no.

¹¹⁰ Data Source: UNIPA Performance Planning 2013-2015..

¹¹¹ Data source: UNIPA Ph.D. Office.

502/92, and it is a local health corporation that works in synergy with the School of Medicine. In the twenty Departments of UNIPA, researchers study every day to find new solutions to the questions posed by nature, science and society. From Information Technology to Biology, from Mathematics to Medicine, to Social Sciences and Preservation of Cultural Heritage, the University works to make its contribution of innovation and progress to the international scientific community and the world of production. Moreover, to achieve this goal, the University of Palermo has set up a network of University labs (UniNetLab) for testing and transferring new technologies to SMEs. UniNetLab aims at implementing the technological innovation of enterprises for the economic recovery of Southern Italy. In operational terms, UniNetLab ensures the scientific and administrative coordination among the various research units. Nevertheless, each unit is autonomous as to the relationships with enterprises, which, therefore, can directly apply to the single facilities whose expertise they are interested in.

In terms of Human Resources, the UNIPA staff is composed by¹¹²:

- 880 professors (Full and Associate professors);
- 852 University researchers;
- 36 language specialists
- 1 General Director;
- 5 executive managers;
- 1774 Non Academic Staff.

Since 2008, UNIPA has started a renewal in organizational processes, to increase the quality of teaching and research activities and to foster efficiency. To this end, a change in the organizational structure was made. Today, UNIPA is organized around eight organizational units:

1. Education;
2. Research & Development;
3. Economy and Finance;
4. Human Resources;
5. Technical Services;
6. Property and Patrimonial Estate;
7. Legal Affairs;
8. Network Services.

¹¹² Data from www.unipa.it

Within the above subdivision, the Ph.D. sector is part of the “Research & Development” area. It is fundamental for the achievement of UNIPA targets and in particular for the acquisition of a higher percentage of FFO.

Specifically, a manager, who fosters strategic targets, directs this area composed by three Area Organizational Units (AOU) and twelve Basic Organizational Units (BOU) linked to four High Professional subjects (HP). The following figure represents the organization of the Research & Development area:



Table 4.1 - Organizational structure of UNIPA “Research & Development” area

Starting from the above figure, we must identify, in particular, the functions and features of the sub-unit, which includes the Ph.D. office. It is named “Training for Research” and its components are:

- Ph.D. Office. Administrative support to validation and management of Ph.D. courses;
- Research Grants. Technical support in the administration of researchers;

- Fellowships aimed to research. Also in this case administrative support for fellowships;
- Agreements for Ph.D. programmes.

The decision to analyze this unit is linked to the importance which should be given to internationalization of Doctoral programmes as a key component for UNIPA. As underlined by the EUA Report of 2007 entitled “Doctoral Programmes in Europe’s Universities: Achievements and Challenges”:

“...at institutional level, attracting the best Doctoral candidates from all over the world, encouraging mobility within Doctoral programmes and supporting European and international joint Doctoral programmes and co-tutelle arrangements, are central to the development of any international strategy. Universities are encouraged to enhance their efforts to support mobility at Doctoral level within the framework of inter-institutional collaboration as an element of their broader international strategy. International mobility, including transsectoral and transdisciplinary mobility should be recognised as having an added value for the career development of early stage researchers. increasing internationalization inside Universities, especially at Doctoral level is also important, and should not be forgotten. Doctoral training is per se international in nature and sufficient opportunities should be provided for Doctoral candidates to engage internationally. This can be done, for example, through the recruitment of more international staff; the organization of international workshops, conferences and summer schools; the development of more European and international joint Doctoral programmes and co-tutelle arrangements. The use of new technologies, such as using teleconferences, e-learning etc. should also be used to foster the internationalization of Doctoral programmes”.

Therefore, in the following paragraphs, a DPM perspective related to the UNIPA Ph.D. Office unit will be described. An efficient organization of this unit can lead, on the one hand, to an improvement in services offered by UNIPA to international students and, on the other hand, to the reduction of administrative bureaucracy linked to the validation, establishment and implementation of normal and international Doctorates. Both these results will improve the UNIPA image which is a strategic resource affecting the ability of foreign Universities and research institutions to invest in Doctorates. The image is likely to affect the behaviour of a number of stakeholders, which can influence University cash flows (e.g., enterprises, research institutes and public sector organizations).

Consequently, in order to frame critical issues related to short and long-term performance attainment of this unit, our analysis will be focused on specific final products offered by UNIPA Ph.D. Office and related to Doctorates. The following table represents the relation of these final products with their external clients and MIUR indicators:

FINAL PRODUCTS	EXTERNAL CLIENTS	MIUR INDICATORS
<p>Validation of Ph.D. programmes</p>	<p>Ph.D. Coordinators, Departments, ANVUR, MIUR</p>	<p>1) I, R and X Indicators based on scientific production of faculty board components; 2) Faculty board composition; 3) Coherent Ph.D. topic; 4) Ph.D. Coordinator Curriculum; 5) Avg. number of fellowships per Ph.D. programme; 6) Financial availability per Ph.D. programme; 7) Level of furniture and services for Ph.D. candidate; 8) Existence of a specific training project for Ph.D. candidates; 9) Scientific productivity of Ph.D. candidates and Ph.D.s.</p>
<p>Ph.D. notice of competition</p>	<p>Graduate Students</p>	<p>1) Proportion of Ph.D. fellowships funded by foreign institutes on total Ph.D. fellowships; 2) Avg. of fellowships per Ph.D. programme; 3) Percentage of Ph.D. candidates with international degree subscribed to the first year of Doctorate.</p>
<p>Ph.D. set-up and implementation</p>	<p>Ph.D. Candidates, Ph.D. Coordinators, Ph.D. Faculty Board</p>	<p>1) Total number of Ph.D. Candidates advanced to the next years;</p>

		2) Percentage of Ph.D. candidates with international degree passed to the next year of Doctorate.
Agreements with foreign Universities and external financing bodies	External Institutes, Scientific community	1) Acquisition of external funds for research; 2) Number of contracts and agreements stipulated with external and international institutions; 3) Percentage of research revenues obtained by external subjects.

Table 4.2 -Ph.D. Office: products, clients and MIUR indicators

In particular, the above products will be analyzed for their link to the internationalization of UNIPA supply and for their ability to improve the capability of the University of attracting international students and external funding.

As already discussed in the first chapter, the “validation of Ph.D. programmes” is the new final product offered by the Ph.D. Office. Introduced by the M.D. 45/2013 it is a compulsory process request for the Ministerial validation of Ph.D. programmes. As shown by the following table, it is the product of a four-step process, which starts with the analysis of preliminary conditions by the UNIPA Ph.D. Office and ends with the Validation of Doctorates by MIUR.

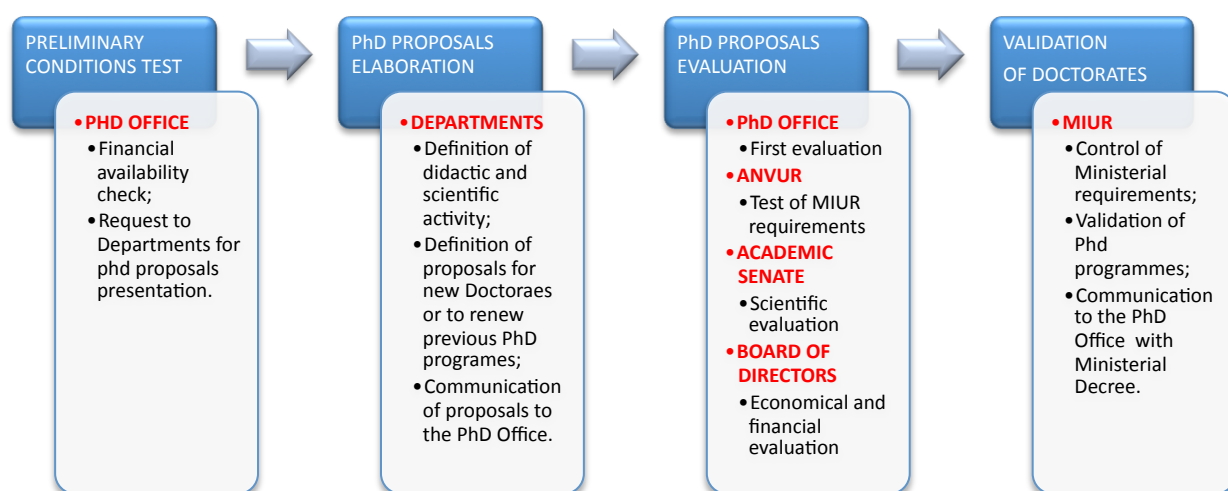


Table 4.3 - Validation process: phases and organizational units involved

In detail, after checking financial availability made in the preliminary condition test, the Ph.D. proposals are defined and communicated by each Department to the Ph.D. Office. Then, various subjects evaluate these proposals in order to assess their scientific, financial and formal validity. All the proposals positively evaluated are sent to MIUR to be evaluated and checked if in accordance with the Ministerial requirements. The validated Doctorates are communicated to the Ph.D. Office through a Ministerial Decree.

The “Ph.D. notice of competition”, instead, represents the next phase in the activation of Ph.D. programmes and the main product offered by UNIPA Ph.D. office. Table 4.4 shows the stages and organizational units involved. Starting from the communication of the Validation process results, the Ph.D. Office elaborates the Ph.D. notice of competition and submits the notice for its publication on the Official Gazette of the Italian Republic and on the UNIPA website. The following phase consists in the acquisition of Ph.D. candidates’ applications and the assessment of their requirements. Then a committee is appointed which receives and evaluates the applications. The committee is responsible for the Ph.D. admission exams and, helped by the department involved, proceeds in making up the list of candidates on the basis of the results obtained by each candidate. The last step is the publication of the list of candidates by the Ph.D. Office after controlling the documents presented by the departments.

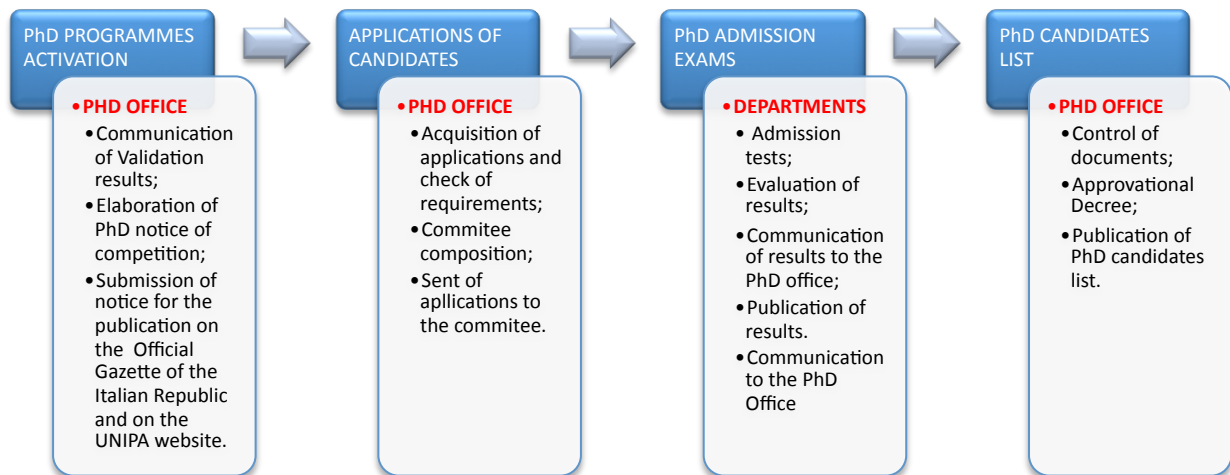


Table 4.4 -Ph.D. notice of competition: phases and organizational units involved

Another product offered by the Ph.D. Office consist in the set up and implementation of the Doctorates activated. As for the set-up of Ph.D. programmes, the activity of the Ph.D. Office

consists in the achievement of all the Ph.D. candidates subscriptions and in checking all the conditions requested for the candidates formal inscription, such as the payment of the inscription fees. These fees must be paid at the beginning of each year and are increased by a final exam fee paid *una tantum* and equal to € 150,00.

The annual fees are subdivided as follows:

Table 4.5 -Ph.D. fees for Ph.D. candidates with and without fellowship

FEE	Ph.D. Candidates with fellowship	AMOUNT	Ph.D. Candidates without fellowship	AMOUNT
REGIONAL TAX	YES	€ 140,00	YES	€ 140,00
SECRETARY RIGHTS	YES	€ 205,00	YES	€ 205,00
SUBSCRIPTION RATE	NO	-	YES	€ 295,00*

* Equal to € 795,00 if the annual personal income is higher than € 30.000,00

The implementation of Doctorates, instead, is the sum of various activities developed in the three years of the programme. These activities are:

- Communication to MIUR of Ph.D. programmes data sub-divided into number of candidates, Ph.D. cycle, year of enrolment, home country and gender;
- Monthly payment of fellowships to Ph.D.candidates;
- Formal definition of exclusions, disclaimers and admissions to subsequent years;
- Increasing fellowships procedures for study abroad periods;
- Definition of a call for the assignment of contributions to Ph.D.s without fellowship for a study period abroad;
- Checking of conditions for the admission to the Ph.D. thesis defence;
- Appointment of the final exam committee and payment for the members.

Eventually, the last product offered by the Ph.D. Office consists in the formal definition of the agreements stipulated with other Universities and external bodies. In particular, for Ph.D. programmes, this crucial activity consists in the collection of the agreements defined by Ph.D. coordinators, check of MIUR requirements (such as, the definition of the scientific lines of the

course and of the teaching activities for the achievement of the Ph.D.) and communication to the counterpart of the formal agreement stipulated. These agreements can be various as follow:

- Research Agreements without fellowships funding;
- Agreements with fellowships exclusively directed to international candidates or students from the funding country;
- Agreements with scholarships available for all the Ph.D. candidates;
- Agreements aimed at joint supervision of the thesis and the *Doctor Europaeus*.

All these kind of agreements represent one of the most important way through which UNIPA can improve its image and consequently its attractiveness and competitiveness. In the next paragraphs, therefore, we will demonstrate how the use of *System Dynamics* approach will help us to show the importance of agreements in the UNIPA internationalization process. Moreover, we will test how it can contribute to a sustainable development and the improvement of the HE system, the image of the University and, consequently, its capability to acquire new funds.

4.3 Qualitative analysis of the UNIPA Ph.D. Office

Based on the analyses conducted in the previous paragraphs, it can be stated that the SD methodology can reduce the limitations arising from the mere application of the traditional tools of PM in order to govern the dynamic complexity. SD simulation models allow decision-makers to understand the feedback mechanism that composes the system under analysis and to take into account the time delays that exist between the causes and effects of a policy. Therefore, on the basis of what has been said, the adoption of the SD methodology is complementary to the traditional P&C systems. Moreover, while the traditional P&C systems provides decision makers information on the economic and financial performance of the organization, SD methodology, being oriented towards a dynamic approach, provides a more extensive and comprehensive perspective of all the other areas that are important to consider in order to measure the performance. Based on this synergy, decision makers will be able to acquire a global vision of the reference system and, therefore, of the policies that need to be adopted to ensure the effective and efficient achievement of the strategic objectives. Hence, in order to obtain information pertaining to the level of achievement of strategic objectives and how the organization is running its operations, it is necessary to create a system of indicators specifically calibrated on the different key variables to be monitored in order to assess performance. More specifically, this measurement system, based on conceptual maps and feedback loops, allows analyzing in depth the phenomenon occurred and the causes that determined it. Furthermore, from a circular perspective of movement, this system of measurement should be able to allow identifying

possible levers of intervention that decision makers can use to drive the system towards the desired state. More in particular, through the use of system dynamics simulation models, policy makers have the opportunity to test the effects of policies and therefore to know in advance all the potential effects, both of long and short-term, which may arise from the implementation of these. Moreover, the measuring performance system has to be conceived in such a way to allow the elaboration of a continuous learning-oriented process by decision makers.

Therefore, a SD model aimed at supporting the management of the performance of a given organization, firstly, has to define the strategic objectives of the organization and, secondly, any eventual discrepancies between the actual state of the system and the desired one through appropriate performance indicators.

As pointed out by Bianchi, performance indicators are directly linked:

“to the combination of customer/product and to the underlying processes for which it is necessary to identify precisely the different areas of responsibility and the potential levers of intervention of the system under analysis and then define the cause-effect relationship which will finally result in the causal circuits of the system dynamics simulation model”¹¹³.

The instrumental view represented in the following table aims to identify a set of proper performance indicators, based on the relationships between the end-results (outcomes) and the strategic resources. As seen in the previous chapter, the performance drivers represent the levers of intervention. They are the link between strategic resources and end-results. These can be measured in relative terms; it is possible to represent them as a ratio between the business performance perceived by clients, and a second term of comparison representing a reference such as a benchmark or a target (Bianchi, 2012).

Drivers are crucial for an organization since they generate the final results. Therefore, it is fundamental to express the performance indicators basing the analysis on such drivers, in order to understand and clarify the single contribution provided by them for the achievement of the results, both at a global level and at an organizational unit level (Ewell,1999).

Hence, the table 4.5 shows what expressed above, identifying the strategic resources, the performance drivers and the end results which affect the UNIPA Ph.D. Office in the activation of Doctorates and in particular for the activation of the international ones:

¹¹³ Read more in Bianchi, C. (1996). “Modelli contabili e modelli dinamici per il controllo di gestione in un’ottica strategica”. Milano: Giuffrè.



Table 4.5 -Ph.D. Office Instrumental View: strategic resources, performance drivers and end-results

The strategic resources are the key factors that allow processes to start. In case of a non-efficient management the end-results generated by the P.A., with the execution of operative processes, will gradually consume the initial set of resources. On the other hand, an efficient management of the system generates value, which can be transmitted from the end-results to the strategic resources creating an reinforcing feedback. *“The end-results provide an endogenous source in an organization to the accumulation and depletion processes affecting strategic resources”*¹¹⁴.

¹¹⁴ Bianchi C. (2012). *“Enhancing performance management and sustainable organizational growth through system dynamics modeling”*. In *“Systemic Management for Intelligent Organizations: Concepts, Model-Based Approaches, and Applications”*, Groesser, S. N. & Zeier, p. 143-161.

In this specific case of UNIPA Ph.D. Office, we can determine more specific performance drivers which are the levers of intervention, connected to the critical success factors that can be directly influenced by the decision makers.

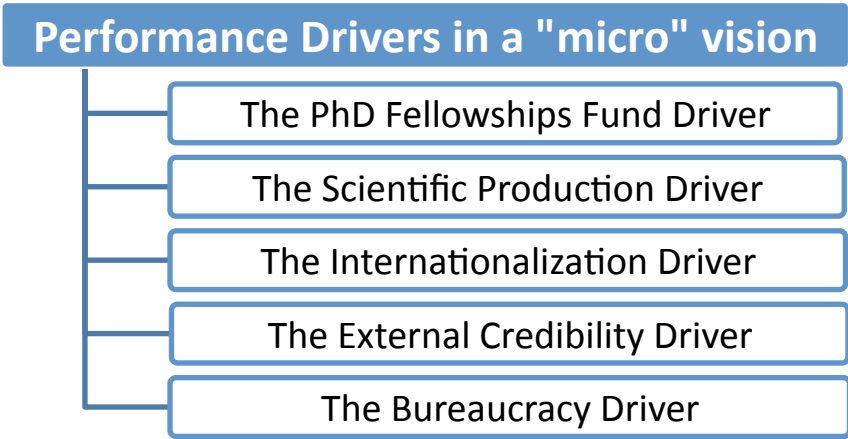


Table 4.6 - Ph.D. Office Instrumental View: performance drivers

Based on the above analysis, it is possible to outline intervention policies to allow UNIPA to develop in the long run sustainable competitiveness and financial equilibrium. More specifically, as can be seen from the model, in the specific case of UNIPA Ph.D. Office five key performance drivers have been identified on which decision makers can leverage to drive the performance of the office towards a path of progressive recovery of competitiveness and of financial equilibrium.

Specifically these International Performance Drivers are:

- The Ph.D.Fellowships Fund Driver. This is given by the ratio between fellowships funds acquired by the external bodies and total funds allocated by UNIPA for Ph.D. fellowships;
- The Scientific Production Driver. It is the coordinators’ productivity defined by the ratio between papers and coordinators per year;
- The Internationalization Driver. It is the ratio between the number of Ph.D. candidates with an international degree subscribed to the first year of doctorate and the total Ph.D. candidates subscribed to the first year;
- The External Credibility Driver. It is given by the number of agreements subscribed with external bodies which must be compared with the level obtained by other Universities;
- The Bureaucracy Driver. It is the ratio between the new number of administrative steps required for the activation of Doctorates, introduced by M.D. 45/2013, and desired level which is supposed equal to the one scheduled before its introduction.

Among these parameters, only the first three are adopted by the ANVUR for the validation of the Ph.D. programmes proposed. In particular, the Internationalization Driver is the only one adopted by the Italian Ministry of Education to measure University performance. The last two have been introduced to improve performance measurement effectiveness and, as a result, to support strategic learning processes of academic decision-makers.

4.3.1 Casual Loop Diagrams applied to the UNIPA case

Starting from the above analysis, we can introduce a SD qualitative analysis based on the definition of casual loop diagrams able to show the relationship between the variables described above. As seen previously, causal loop diagrams are composed of the linkages among variables. A linkage is referred to as a cause and effect relationship connecting two variables. This linkage could represent either a positive or a negative relationship among variables. The arrows between the variables stand for their connections. Those arrows with a “+” sign indicate that the two variables will change in the same direction. Similarly, those arrows with a “-” sign indicate that the two variables that are connected will change in opposite directions. More specifically, the causal loop model proposed in this study highlights the causal relationship linked to the validation and activation of International Doctorates.

The following figure illustrates the basic model structure, which, specifically, consists of four reinforcing and three balancing loops. In order to provide a clear picture of the system described in the figure above, each feedback loop will be analyzed in detail to better understand the relationship between each variable and the effects of short and long-term produced on the system under analysis.

Specifically in figure 4.1:

- The feedback loop (R1) shows how an increase in terms of liquidity generates the possibility to invest in internationalization policies (such as the TRANSLATION OF “REGISTRATION MATERIALS” in English). This kind of policies leads to an improvement in the attractiveness of international students, and consequently an increase of international Ph.D. candidates. A higher number of international candidates acts positively on the image of UNIPA at national and international levels. A more positive image means giving UNIPA a higher credibility for external funders. In this way, a relevant number of external institutions, such as foreign Universities or research institutes, are always more interested in the activation of agreements with UNIPA. Each agreement increases the fellowships funded by external entities. More fellowships lead to

an increase in one of the drivers which positively influences the FFO distribution and, therefore, more FFO increases UNIPA liquidity.

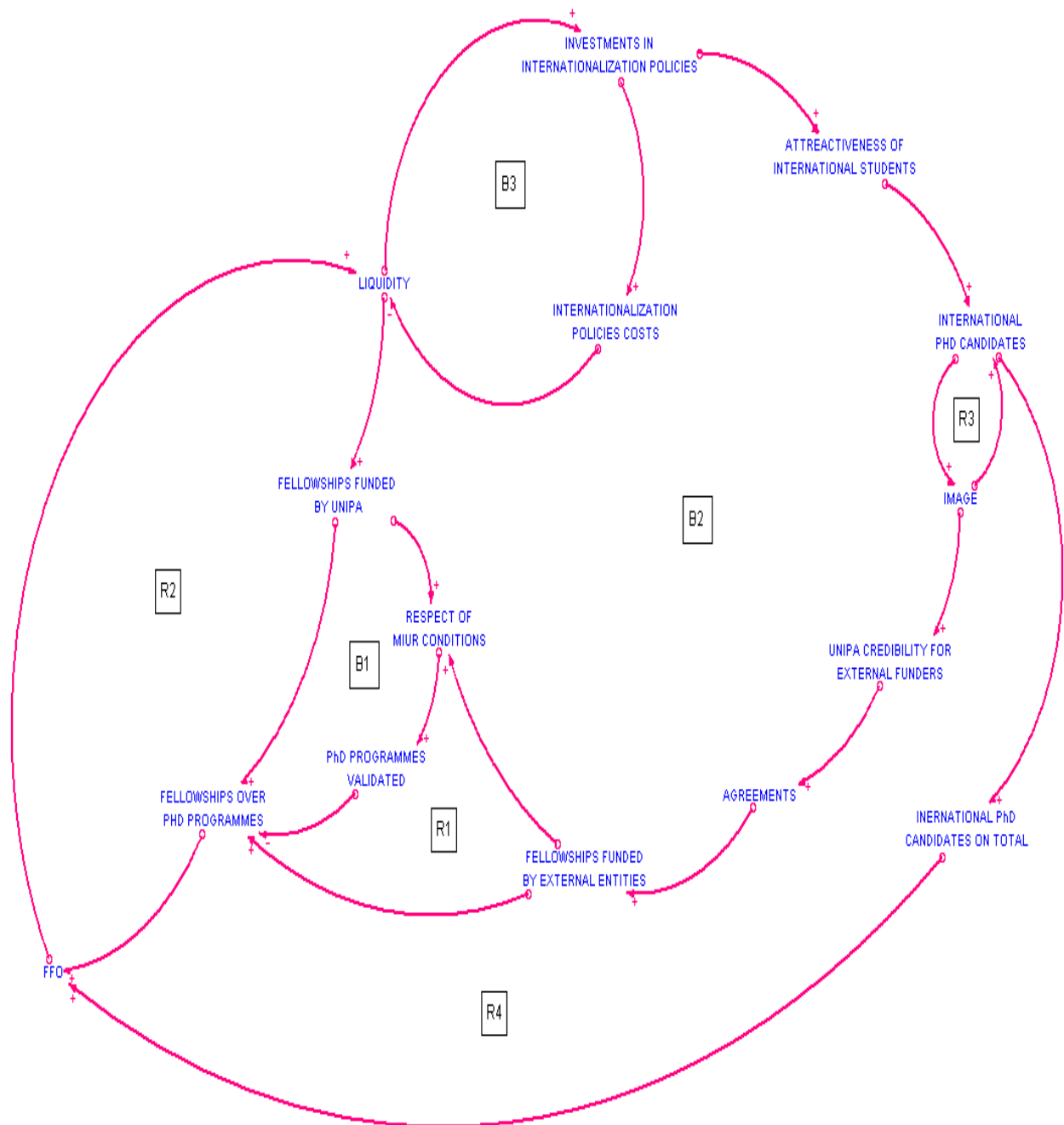


Figure 4.1 - Investment in Internationalization Policies Feedback Loop

- Similarly, the feedback loop (R2) shows how a higher liquidity gives UNIPA the possibility to fund more Ph.D. fellowships, influencing positively the FFO distribution and, therefore, increasing the UNIPA liquidity.
- The reinforcing loop (R3) shows the simple positive relationship between the number of international Ph.D. candidates and the UNIPA image.

- The feedback loop (R4), instead, tells us how an increase in liquidity improves the investments in internationalization and, consequently, the number of international Ph.D. candidates. More international candidates affect positively the internationalization driver represented by the ratio between international Ph.D. candidates with an international degree subscribed to the first year of doctorate and the total Ph.D. candidates subscribed to the first year. An improvement of this indicator causes, again, the possibility to acquire more FFO and, as a result, to improve the UNIPA liquidity.
- As shown in the balancing loop (B1) more liquidity gives the possibility to UNIPA to fund more Ph.D. fellowships. The possibility to invest more in fellowships gives the possibility to meet one of the new MIUR conditions required for the accreditation of Doctorates, as each Ph.D. programme must have at least four fellowships. Nevertheless, when the number of fellowships increases, there is an increase in Ph.D. programmes validated. A high number of Doctorates validated influences negatively the performance driver represented by the ratio between fellowships and Ph.D. programmes. It is reasonable to say that this generates a lower level of FFO achievable and a reduction in UNIPA financial availability.
- Similarly, the internationalization policies reduce the UNIPA liquidity (balancing loop B2). Higher liquidity improves the investments in internationalization and, consequently, the number of international Ph.D. candidates. When the number of Ph.D. candidates increase, there is an increase in the image of UNIPA at national and international level. Again, a relevant number of external institutions, such as foreign Universities or research institutes, are always more interested in the activation of agreements with UNIPA. Each agreement means, on the one hand, the activation of international Ph.D. programmes in accordance with external institutions and, on the other hand, an increase in the number of fellowships funded by external bodies. More fellowships give the possibility to meet the MIUR conditions and, consequently to increase the number of Doctorates validated by MIUR. A higher number of Ph.D. programmes validated influences negatively the performance driver represented by the ratio between fellowships and Ph.D. programmes. This influences negatively the possibility to achieve FFO from MIUR and leads to a reduction in UNIPA liquidity.
- Lastly, the feedback loop B3 shows that the decision to apply internationalization policies generates costs for their application, for example, the costs required for the translation of registration material in English. Obviously, these costs influence negatively UNIPA liquidity generating a reduction of investment in internationalization policies (balancing loop B3).

The next CLD shows the crucial role of the UNIPA image in order to improve its attractiveness in regard to external funders, first year potential Ph.D. candidates and in particular those Ph.D. candidates with an international degree.

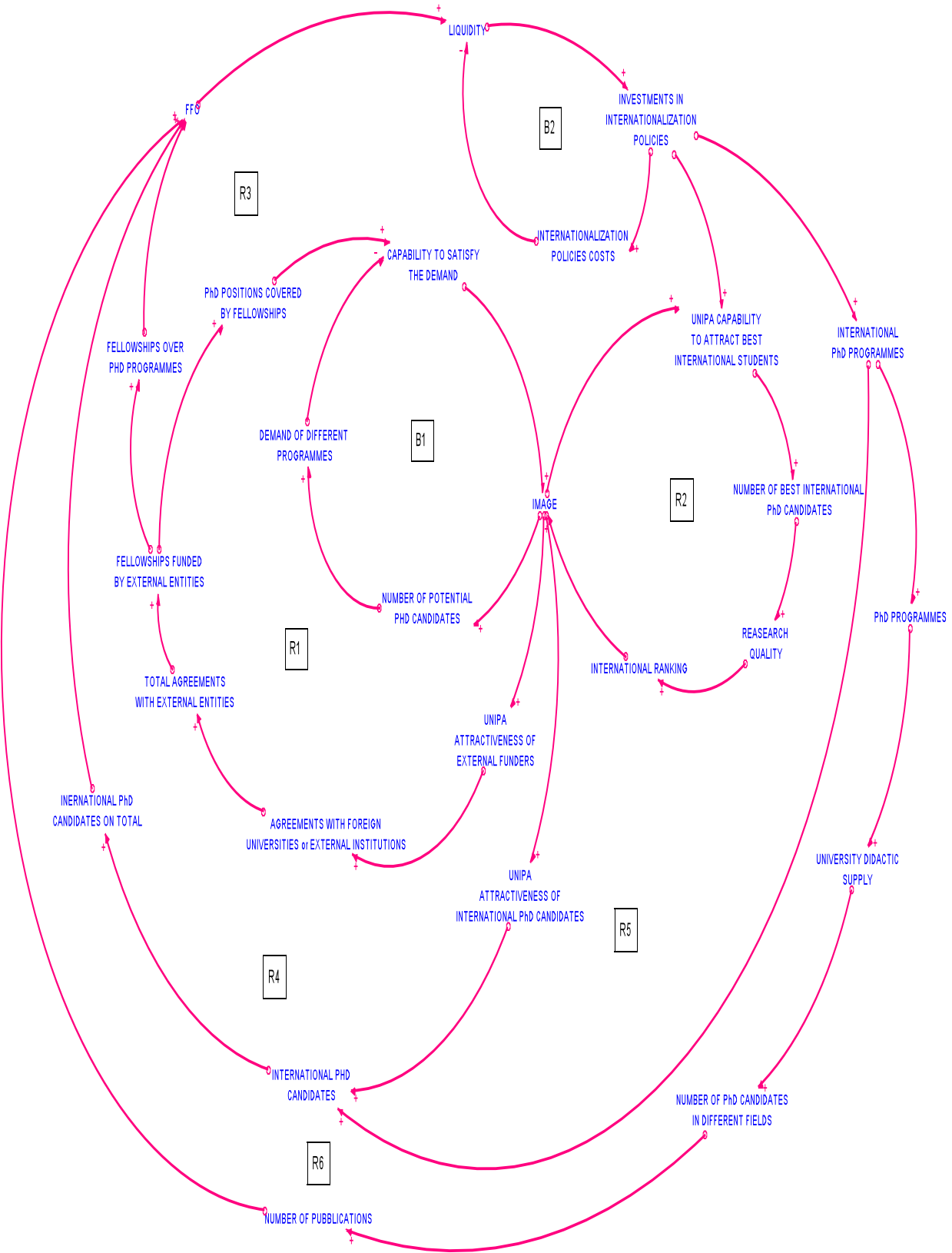


Figure 4.2 – UNIPA Image Feedback Loop

In detail:

- the feedback loop (R1) shows how an increase in terms of the UNIPA image generates the possibility to improve the attractiveness of external funders, this means more agreements with foreign Universities or other external bodies, such as private and public research institutes. More agreements cause a higher amount of total agreements with external bodies which generates an improvement in the number of fellowships funded by these external bodies. More fellowships give the possibility to cover more Ph.D. positions and consequently to satisfy the demand of international Ph.D. candidates. This satisfaction capability will generate an increase of the UNIPA image.
- As for the reinforcing loop (R2), a higher UNIPA image improves its capability of attracting the best international students which are searching for an international Ph.D. in order to start their research activity and career. This will lead to an increase of the number of better international Ph.D. candidates that, with good probability, will generate articles qualitatively relevant. The consequent improvement in terms of research quality will increase the UNIPA position in the University international rankings causing, again, a higher level in terms of the UNIPA image.
- Another reinforcing loop (R3) shows how a higher image improves the level of UNIPA attractiveness and, consequently, generates the improvement in the number of fellowships funded by these external bodies. More fellowships will lead to an increase in one of the drivers which positively influences the FFO distribution and, therefore, more FFO increases UNIPA liquidity. More liquidity generates more investments in internationalization policies and consequently increases the number of better international Ph.D. candidates. This will lead to an improvement in terms of research quality and consequently to a better UNIPA position in the University international rankings causing, again, an improvement of the UNIPA image.
- As can be seen in the reinforcing loop (R4), an improvement in UNIPA image generates also a higher capability of attracting international Ph.D. Candidates. This will affect positively the internationalization performance driver represented by the ratio between international Ph.D. candidates and total Ph.D. candidates. An improvement of this indicator causes, again, the possibility to acquire more FFO and, as a result, to improve UNIPA liquidity. Furthermore, more liquidity means a higher opportunity to invest in internationalization policies and consequently increase the number of better international Ph.D. candidates. This will lead to an improvement in terms of research quality and consequently to a better UNIPA position in the University international rankings causing, again, an improvement of the UNIPA image.

- In the reinforcing loop (R5), instead, the UNIPA image is not involved; in this case, the liquidity represents the crucial variable. An increase in terms of liquidity generates the possibility to increase the number of International Ph.D. programmes and, consequently, the number of international Ph.D. candidates. More international candidates affect positively the internationalization performance driver represented by the ratio between international Ph.D. candidates and total Ph.D. candidates. An improvement of this indicator causes, again, the possibility to acquire more FFO and, as a result, improve UNIPA liquidity.
- Similarly, the feedback loop (R6) shows how a higher liquidity gives UNIPA the possibility to invest in internationalization policies. This kind of policies leads, again, to an improvement in the activation of International Doctorates, and consequently to an increase of Ph.D. programmes. A higher number of International Doctorates means an improvement of University teaching supply and consequently the possibility to improve the number of Ph.D. candidates in different fields. More fields for candidates will lead to an increase in terms of UNIPA publications, which is one of the drivers that positively influences the FFO distribution and, therefore, with more FFO, an increase in UNIPA liquidity.
- As shown in the balancing loop (B1) a more positive image increases the number of potential Ph.D. candidates. These candidates will ask for different Ph.D. programmes causing a reduction in terms of UNIPA capability of satisfying this higher demand and consequently reducing its level of image.
- Lastly, the feedback loop B2 shows that the decision to apply internationalization policies generates costs for their application, for example, the costs required for the participation of Professors and Ph.D. candidates in national and international conferences. Obviously, these costs influence negatively UNIPA liquidity generating a reduction of investments in internationalization policies (balancing loop B2).

As said in the previous chapters the Doctorate is one of the most important assets for a University. This sector is fundamental to improve the amount of FFO that can be obtained by each academy. On the other hand, as said before, the achievement of this title is a fundamental prerequisite for the beginning of an academic career.

Each year, UNIPA sets up all the procedures for the renewal and the establishment of new Doctoral programmes. In this activity, the recent introduction of the Validation process has influenced the activation of Ph.D. programmes causing a major complexity for the entire Ph.D. sector. It is a new phase that anticipates the elaboration of the Ph.D. notice of competition. We

can absolutely distinguish these two processes but in both the key issue can be identified with the Ph.D. Office.

In the following figure a casual loop diagram related to the Validation process recently introduced:

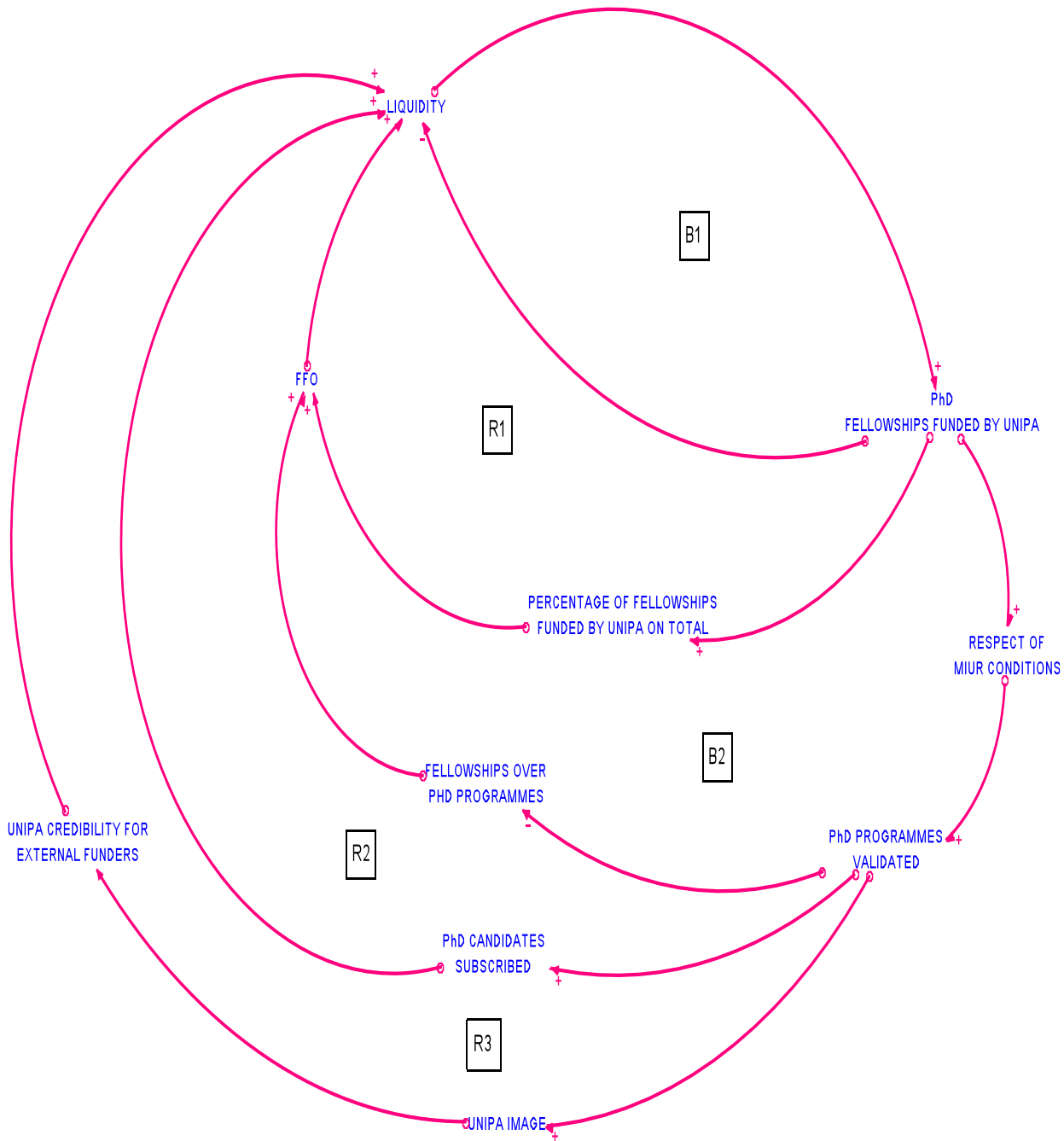


Figure 4.3 – UNIPA Validation Process Feedback Loop

Specifically:

- the feedback loop (R1) shows how an increase in terms of liquidity means the possibility for UNIPA to invest more and more in Ph.D.programmes and consequently to improve

the number of Ph.D. fellowships funded by UNIPA. More fellowships funded by UNIPA affect positively the performance driver represented by the ratio between fellowships funded by UNIPA and total fellowships. Obviously, this lever affects positively the amount of FFO achievable by UNIPA causing an improvement in terms of UNIPA liquidity.

- In the reinforcing loop (R2), once more, more liquidity causes an increase in the number of Ph.D. fellowships funded by UNIPA. This gives the possibility to meet MIUR requirements and, consequently, to increase the number of Doctorates validated by MIUR. A higher number of Ph.D. programmes validated generates an improvement in terms of new Ph.D. candidates subscribed and consequently increases UNIPA liquidity.
- Moreover, the reinforcing loop (R3) starts from a higher liquidity which generates an improvement in terms of Ph.D. fellowships funded by UNIPA. This improves the possibility to meet MIUR requirements for the validation of a Ph.D. programme. Consequently, more Ph.D. programmes validated improve the image of UNIPA and consequently its credibility for external funders. More credibility means more liquidity for UNIPA.
- The balancing loop (B1) starts from an improvement in liquidity which generates more investment in Ph.D. programmes represented by an increase of fellowships funded by UNIPA. A high number of fellowships financed by UNIPA influences negatively University liquidity causing a reduction of UNIPA financial availability.
- Lastly, the feedback loop (B2) shows how a higher liquidity gives UNIPA the possibility to increase the number of Ph.D. fellowships funded by UNIPA. More fellowships means a higher correspondence with MIUR conditions and, consequently, more Ph.D. programmes validated. A higher number of Ph.D. programmes validated influences negatively the performance driver represented by the ratio between fellowships and Ph.D. programmes. This influences negatively the possibility to achieve FFO from MIUR causing a reduction of UNIPA liquidity.

The last CLD shown in figure 4.4, instead, helps us to introduce the negative effects of administrative bureaucracy on UNIPA image and consequently on its attractiveness. In this case the bureaucracy is intended as a performance driver given by the ratio between the number of Doctorates to check and the members of Ph.D. office staff per year. In particular the bureaucracy reduces the available time for research and publication of Ph.D. coordinators affecting negatively the UNIPA image.

More in detail:

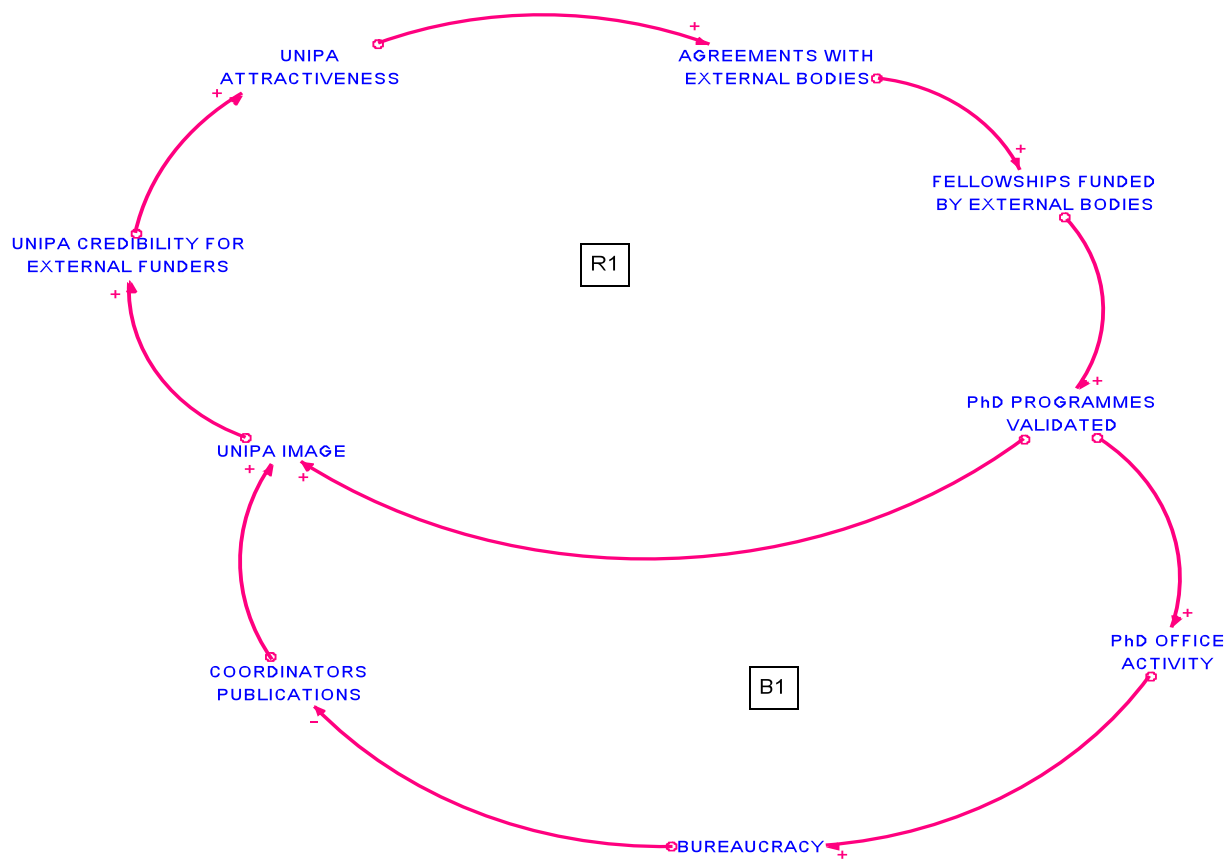


Figure 4.4 – UNIPA Bureaucracy Feedback Loop

In this case:

- The feedback loop (R1) shows how an increase in UNIPA image generates more credibility for external funders improving UNIPA attractiveness. This will generate more agreements with external bodies. Therefore, more fellowships will permit to validate more programmes improving image of the University.
- The balancing loop (B1) starts, once more, with a higher image which affects UNIPA credibility and attractiveness causing more fellowships and Ph.D. programmes validated. This will improve the UNIPA Ph.D. office activity causing a higher bureaucracy. In this case, the bureaucracy is considered as an intangible value which influences negatively the teaching and research activity of the Ph.D. coordinators. Moreover, they are more involved in administrative activities reducing the available time for research and publication. Less publications cause a reduction in UNIPA image.

The above analysis show the logical relations upon the system. Starting from these considerations, we will develop, in the next paragraph, the quantitative analysis of the model by feeding the variables, introduced with the qualitative analysis, their respective quantitative data, and by typing the identified functions/equations, that make the relations between the linked variables explicit, in order to provide a graphical simulation over a defined period of time.

4.4 Quantitative model of the UNIPA Ph.D. Office

The stock and flow diagrams were developed with iThink© 9.1.4. We divided the model into smaller units, all intertwined, in an attempt to facilitate its understanding. These units were given the following headings:

1. Ph.D. validation process;
2. International Ph.D. candidates;
3. UNIPA attractiveness and agreements;
4. Bureaucracy;
5. Policies and investments for Ph.D. internationalization.

The Ph.D. validation process is based on the number of Ph.D. programmes activated by UNIPA, the funds necessary for the financing of the programmes and the bureaucratic requisites expressed by ANVUR and MIUR. The Ph.D. validation process is represented by a double chain which leads to the publication of Italian and international Ph.D.s on the UNIPA notice of competition. The differences between the two chains consists in the requisites necessary for the validation and in the funding sources.

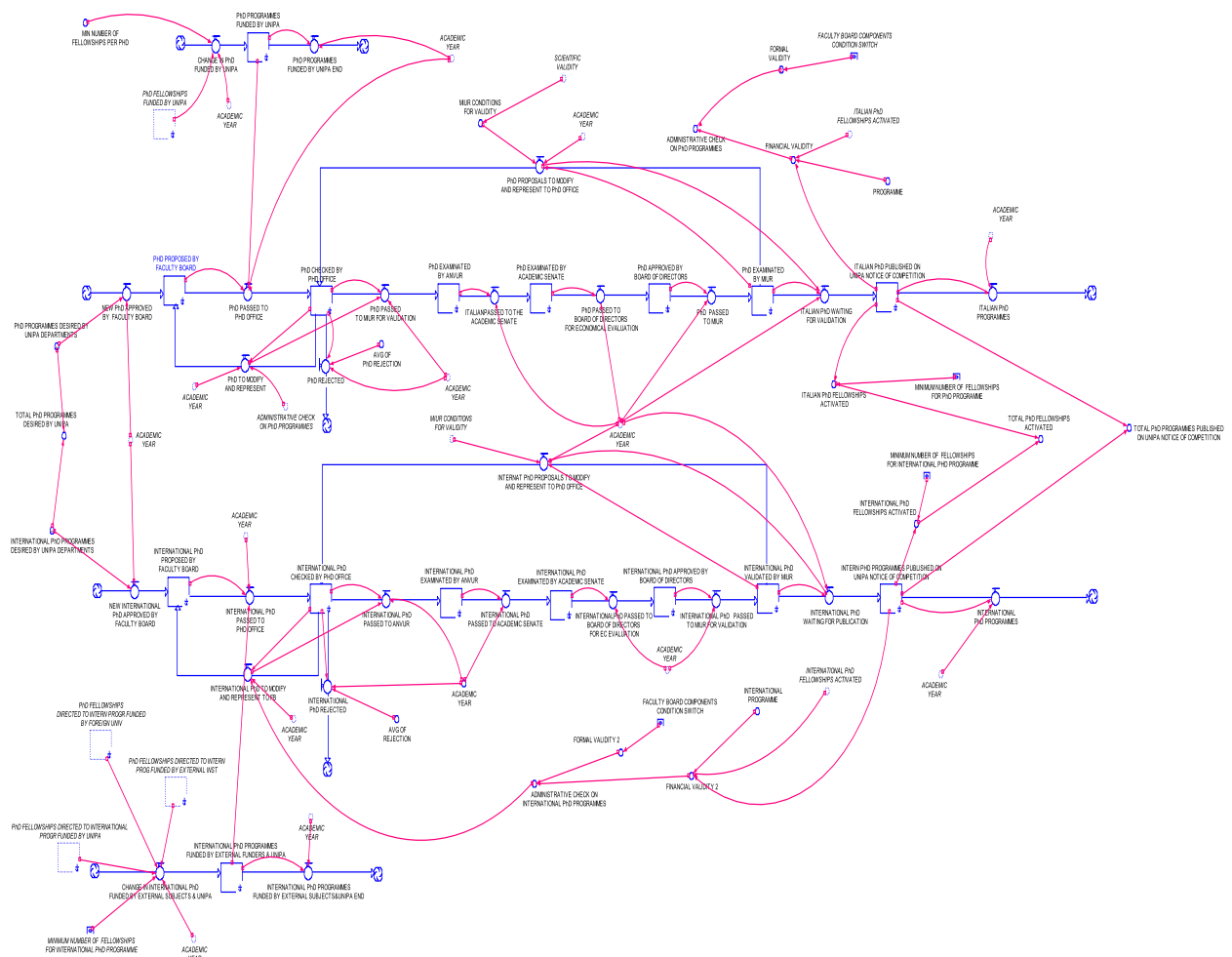


Figure 4.5 – UNIPA Validation Process – SFD

As shown in the figure above, the entire structure is composed by seven stocks; the first one is the Ph.D./International Ph.D. proposed by the faculty board; its inflow consists of the sums of new Ph.D.s proposed by each UNIPA department per academic year. More in detail it is evident in the following figure:

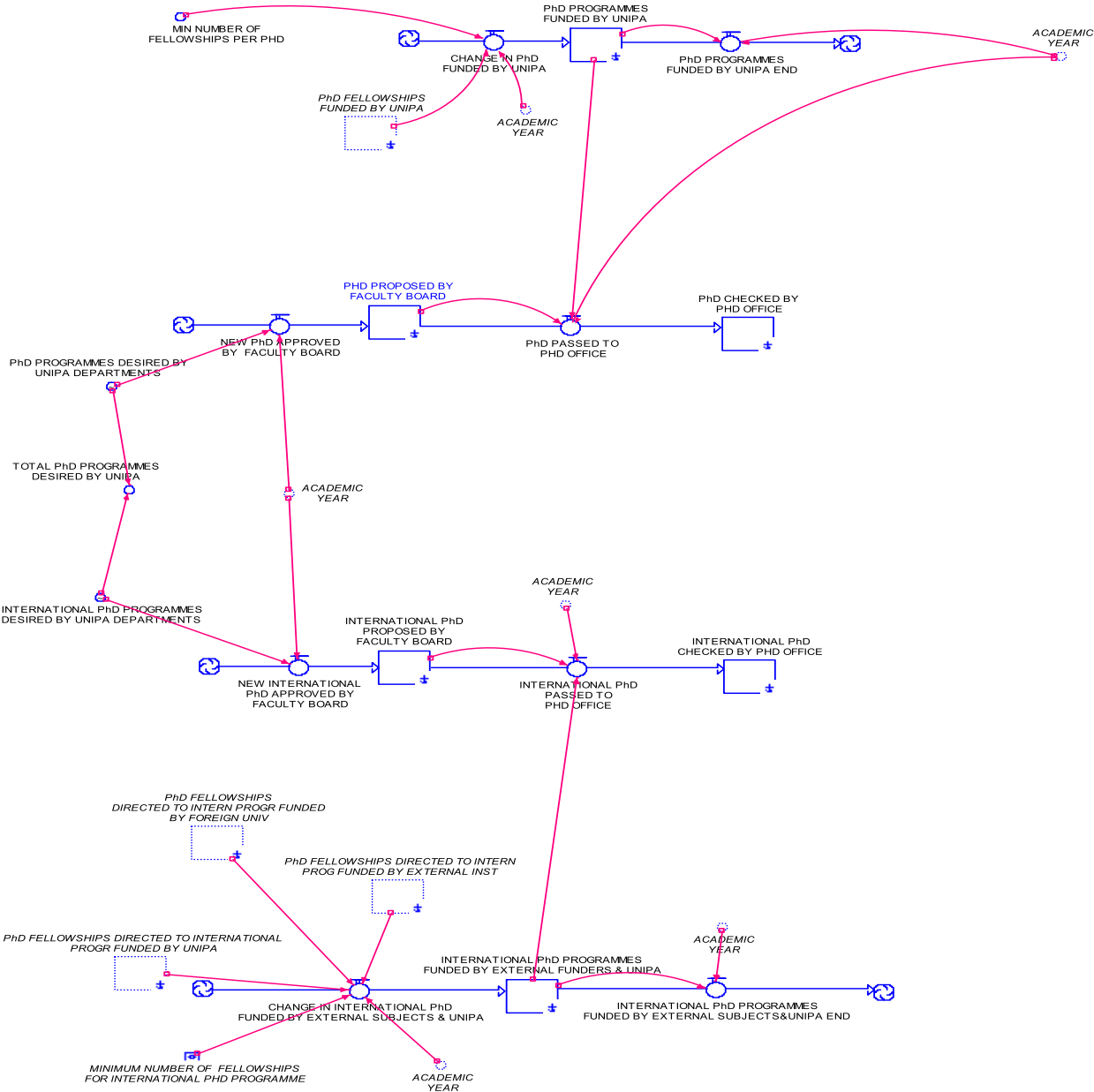


Figure 4.6 –Doctorates passed to the Ph.D. Office– SFD

The Doctorates effectively passed to the Ph.D. Office are represented as an outflow which is represented by the following equation:

$$\text{Ph.D. PASSED TO Ph.D. OFFICE} = \text{IF}(\text{Ph.D. PROPOSED BY FACULTY BOARD} > \text{Ph.D. PROGRAMMES FUNDED BY UNIPA}) \text{ THEN} (\text{Ph.D. PROGRAMMES FUNDED BY UNIPA} / \text{ACADEMIC YEAR}) \text{ ELSE} (\text{Ph.D. PROPOSED BY FACULTY BOARD} / \text{ACADEMIC YEAR}).$$

This equation expresses that the number of Ph.D.s that will be passed to the UNIPA administration for the following stages of validation are exclusively those with a financial cover. The outflow of the Ph.D. proposed by the faculty board generates the stock “Ph.D.s/International Ph.D.s checked by the Ph.D. Office”. In this phase, there is the administrative assessment on Ph.D. programmes; it depends on two kind of control:

1. Formal validity: It consists in the confirmation that sixteen members effectively compose the faculty board.
2. Financial validity: In this case, UNIPA must assess that the average number of Ph.D. fellowships per programme must be of six fellowships for Italian Doctorates and four for the international ones.

This is shown as follow:

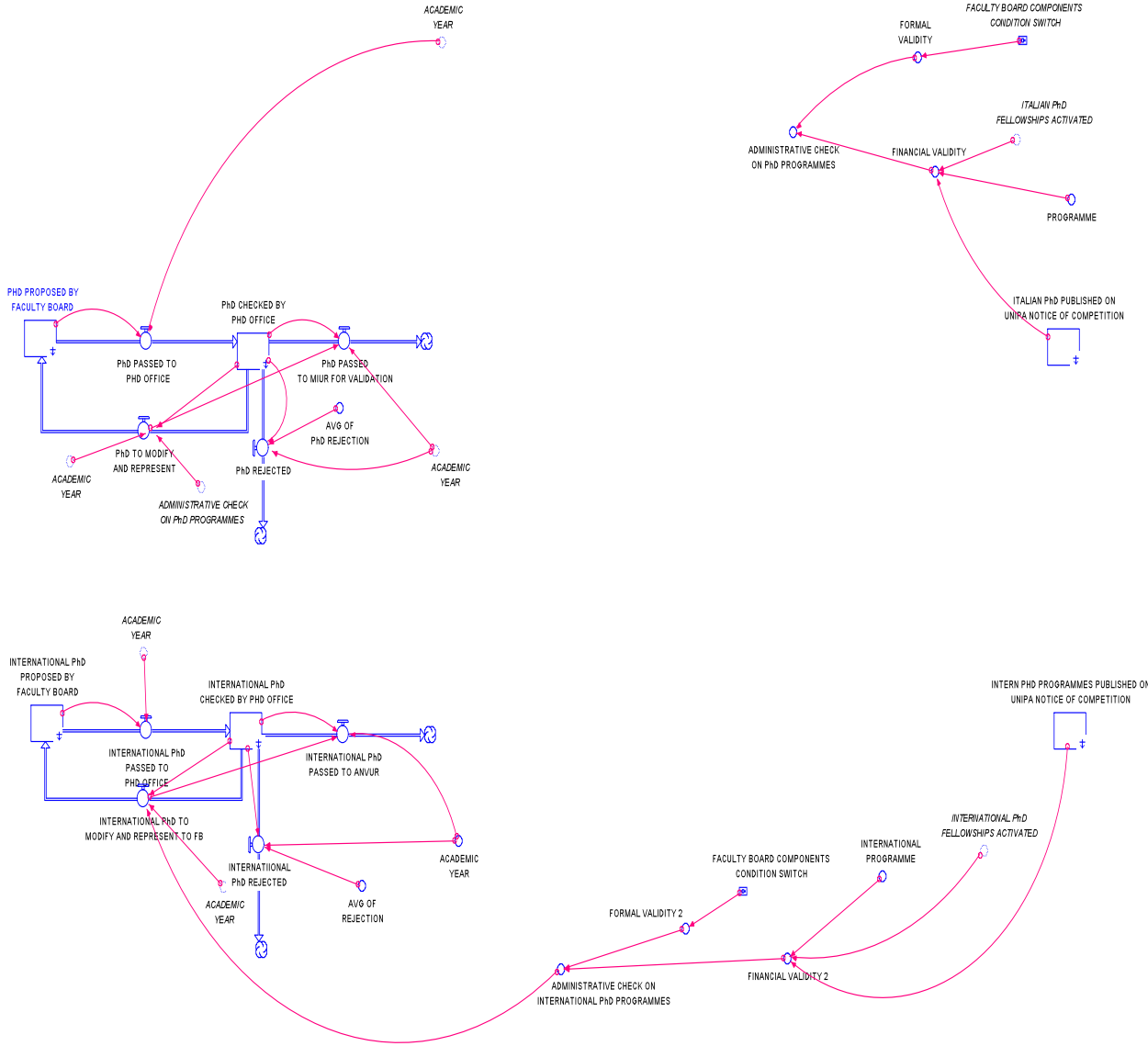


Figure 4.7 –Doctorates checked by the Ph.D. office– SFD

In both cases, the solution adopted was to model the financial and formal validity as auxiliary variables that vary from 0 to 1. Consequently, the Ph.D.s that fail the control must be modified and then submitted again. After this, a few number of doctorates will be rejected and the others will be passed for the following steps of validation process.

The detail of these phases are shown in figure 4.8:

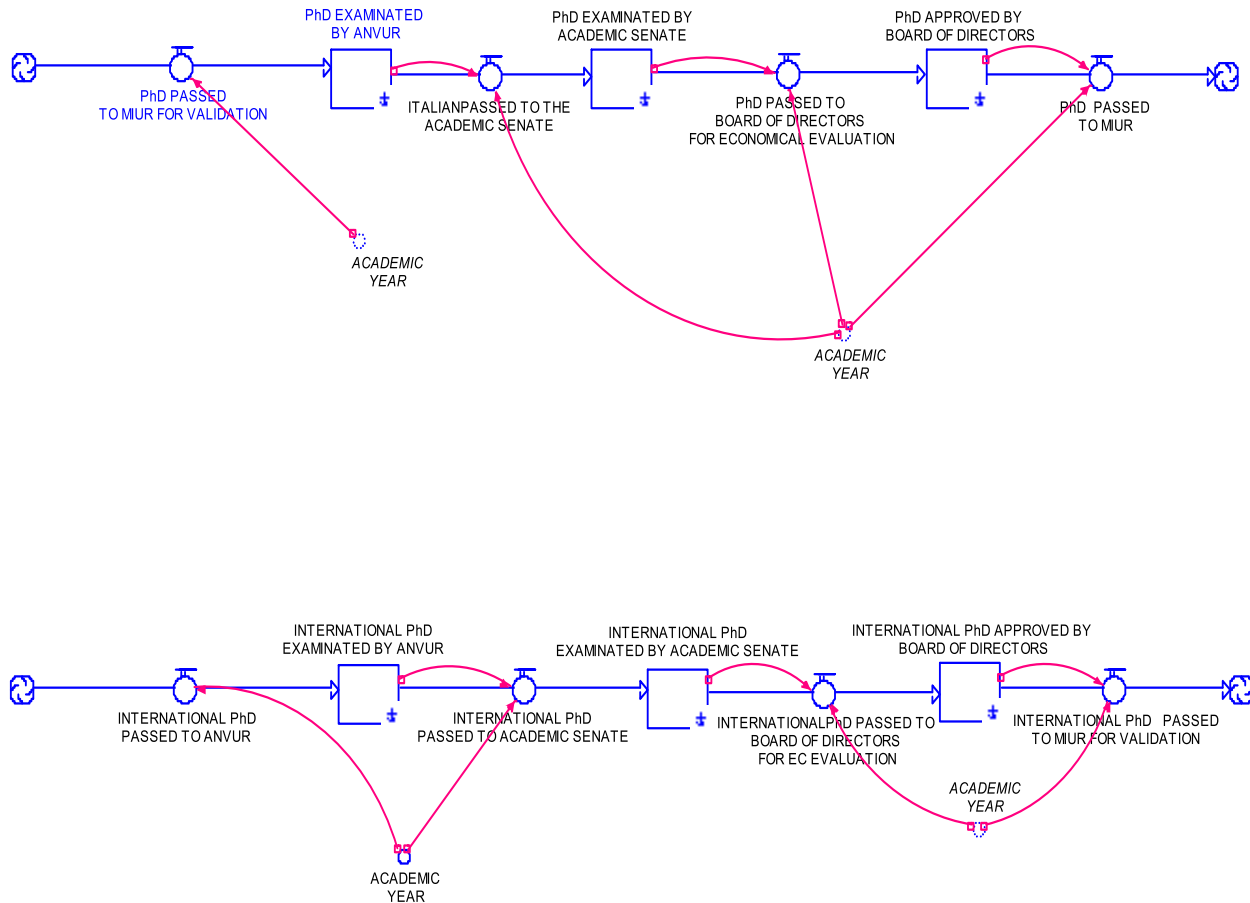


Figure 4.8 –Validation process central phases– SFD

After the opinion expressed by ANVUR and following the check made by UNIPA Academic Senate and Board of Directors, the proposals are passed to MIUR for validation. The controls made by MIUR are focused on financial, formal and the scientific validity of the Ph.D.s proposed; moreover, in this case the solution adopted in the model was to represent the MIUR conditions for validity as auxiliary variable that varies from 0 to 1. In particular, the scientific validity is linked to the Ph.D.candidates scientific production and on the Ph.D. coordinators’ scientific production, both represented as stocks. If the Ph.D. proposals do not pass MIUR assessment, they are not rejected but passed on to the Ph.D. Office for a redefinition of the proposal. The Ph.D.s approved, instead, are translated by the Ph.D. Office for their publication

on the UNIPA notice of competition. The outflows represent the number of Ph.D. activated per year.

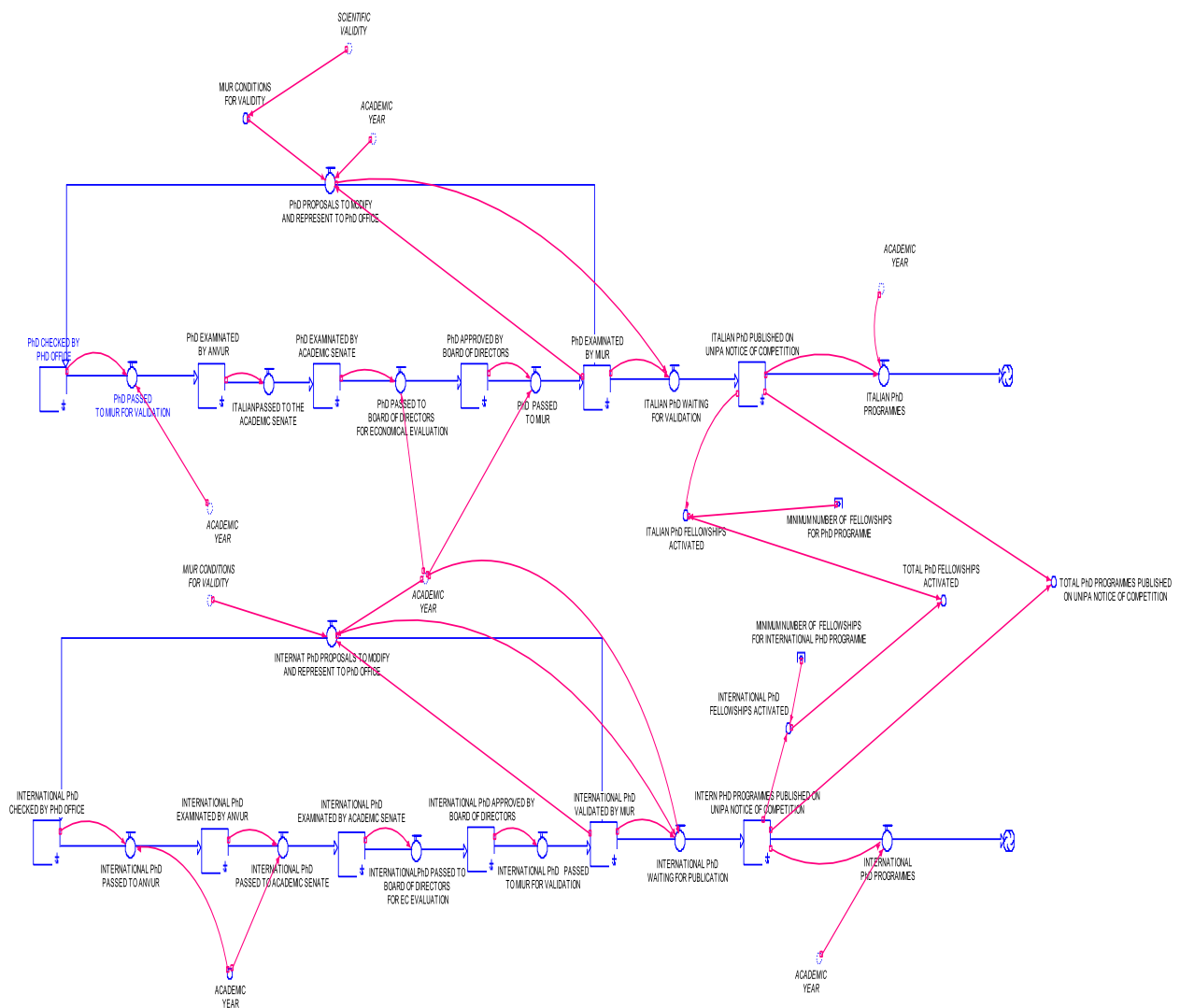


Figure 4.9 –Ph.D. programmes published on UNIPA notice of competition – SFD

The sum of Italian and International Ph.D. programmes activated is fundamental because it influences the number of international Ph.D. candidates' subscription.

The second unit of the model shows that international students are positively influenced by the number of new international Ph.D. programmes activated. However, there are many factors which can influence the decision of an international student to enrol in UNIPA Doctorates, such as:

1. the number of available places in international programmes;
2. the services offered by UNIPA for international students, such as the subscription material in English or the UNIPA website translated in English;
3. the number of fellowships exclusively directed to international Ph.D. programme;
4. UNIPA image.

As shown in the following figure, all these elements influence the determination of the ‘new international Ph.D. candidates’ inflow. In this case, as international Ph.D. candidates, we considered all those candidates with an international degree subscribed to the first year of Doctorate. This inflow acts on the stock ‘international Ph.D. candidates subscribed to the first year’ whose outflow is represented by the candidates which after the first year of courses pass to the second one.

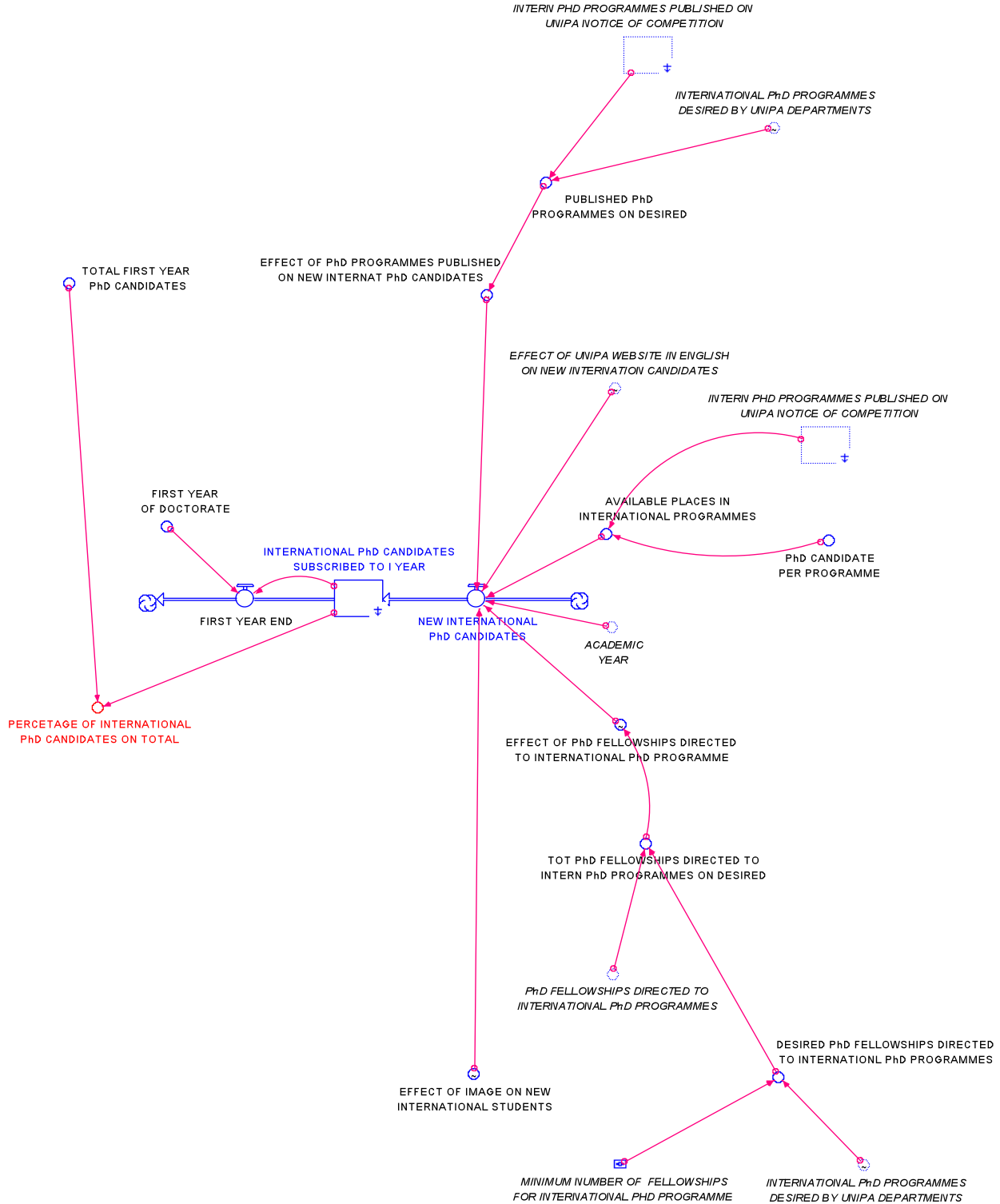


Figure 4.10 – International Ph.D. Candidates – SFD

The definition of the number of international Ph.D. candidates enrolled in UNIPA Doctorates is crucial for two reasons:

1. The definition of the International Ph.D. Candidates Subscription Driver. As said above it is the ratio between the number of Ph.D. candidates with international degree subscribed to the first year of doctorate and the total of Ph.D. candidates subscribed to the first year;
2. The definition of UNIPA image.

In particular, UNIPA image is one of the main variables of the entire model. In addition to the international Ph.D. candidates the other variables which influence its determination are:

- The number of agreements stipulated with external bodies or foreign Universities;
- The services offered by UNIPA for international students. In the specific case of the model, represented as the UNIPA website translated in English;
- The scientific production, calculated as the sum of Doctorates Coordinators papers/articles and Ph.D. candidates' scientific production.

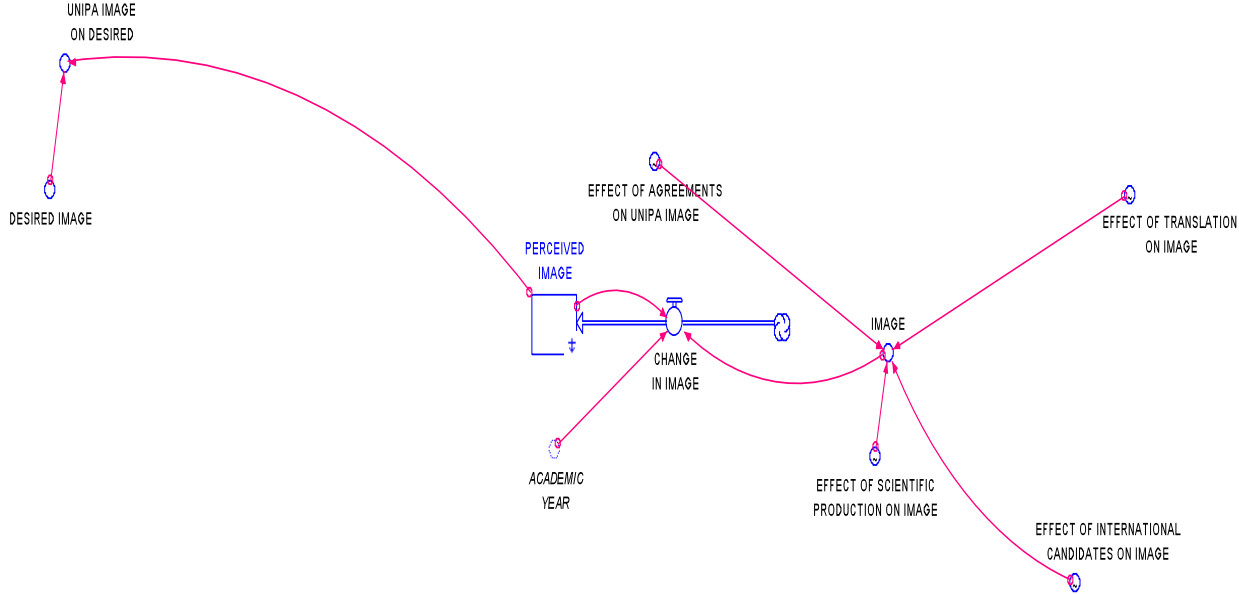


Figure 4.11 – UNIPA Image – SFD

Therefore, the image is given by the following equation:

$$IMAGE = (EFFECT_OF_AGREEMENTS_ON_UNIPA_IMAGE * EFFECT_OF_INTERNATIONAL_CANDIDATES_ON_IMAGE * EFFECT_OF_TRANSLATION_ON_IMAGE * EFFECT_OF_SCIENTIFIC_PRODUCTION_ON_IMAGE)$$

As shown in Figure 4.12, it influences the definition of the perceived image. The image is an intangible and abstract value and therefore very difficult to represent in the model. However, it is easily represented as a perceived value which influences the UNIPA attractiveness expressed as

the capability to attract more international Ph.D. candidates and the number of agreements stipulated with external bodies. The first aspect was analyzed above.

Therefore, we will start to analyze the third unit of the model which is the attractiveness of external funders in relation to the funding of Ph.D. fellowships. The ratio between the image and its desired level, which is the maximum level therefore 1, give us the possibility to calculate the influence of the image on the stipulation of new agreements with on the one hand private bodies and, on the other hand, with foreign Universities.

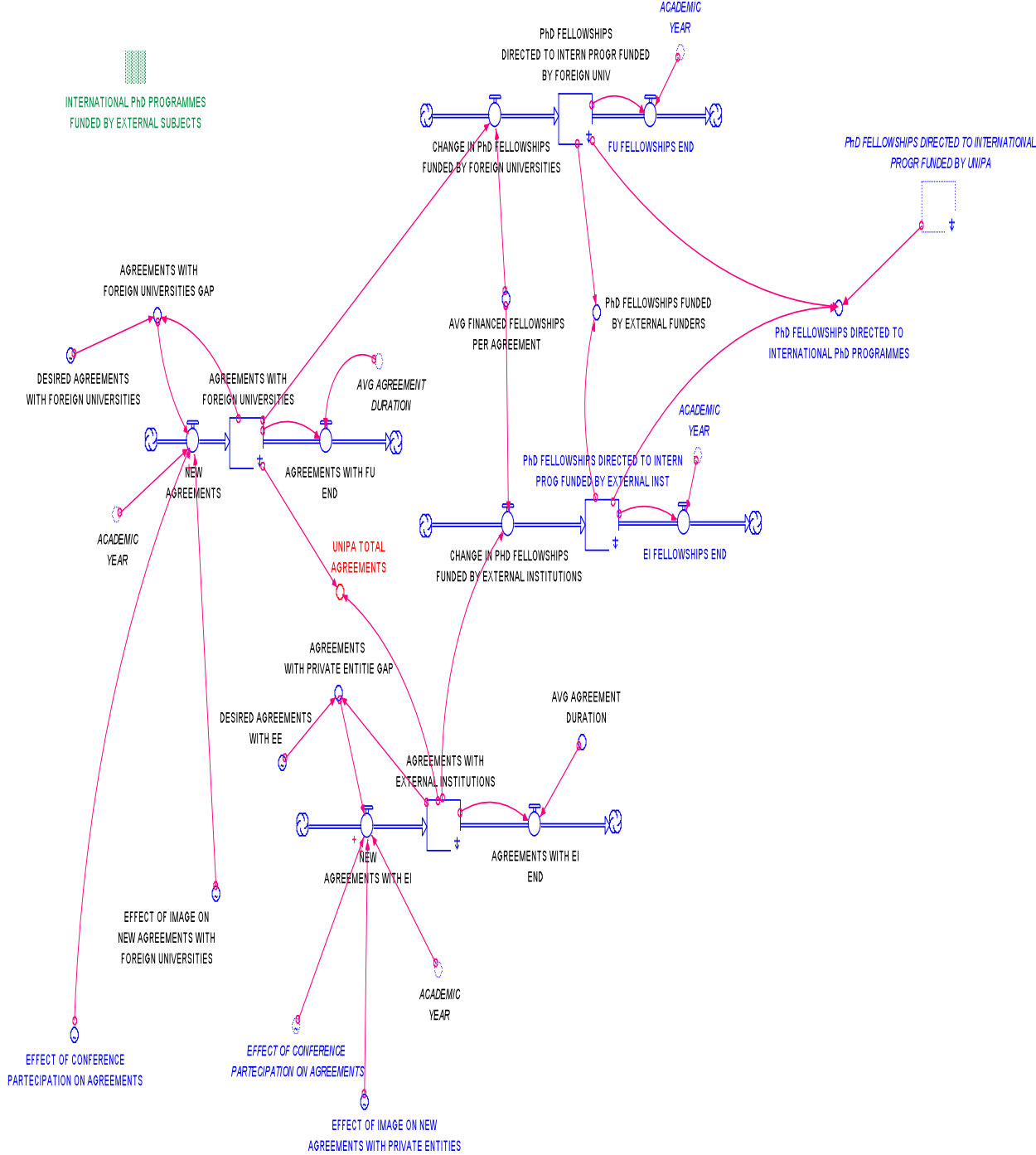


Figure 4.12 – UNIPA Agreements – SFD

In the above figure, we can see that both cases are very similar, for this reason we will analyze just the stock “Agreements with foreign Universities”. Its inflow is “new agreements” which is influenced, not only by the image but also by the participation of Ph.D. coordinators in international conferences. We will see later that this conference participation may be stimulated by the “investment in internationalization policies”. Anyway the target for higher education UNIPA defined by the “UNIPA planning in the period 2013 – 2015” is to Increase the European project and consequently the external agreements in the next three years. The comparison between the number of agreements with the target is verified by the agreementsgap. Moreover, this gap contributes to determinethe “new agreements” inflow as shown in the equation below:

$$\text{NEW_AGREEMENTS} = (\text{AGREEMENTS_WITH_FOREIGN_UNIVERSITIES_GAP} * (\text{EFFECT_OF_IMAGE_ON_NEW_AGREEMENTS_WITH_FOREIGN_UNIVERSITIES} + \text{EFFECT_OF_CONFERENCE_PARTICIPATION_ON_AGREEMENTS})) / \text{ACADEMIC_YEAR}$$

Furthermore, we supposed that each agreement has an averageduration of three years, equal to the Ph.D.period;consequently, the outflowis given by the ratio between the agreement in the stock and the average duration of the agreement. Each agreement generates for UNIPA new fellowships necessary for the activation of new International Doctorates. Therefore, they affect the definition of the stocks “Ph.D. fellowships directed to international programmes funded by foreign universities/external institutions”. These fellowships act on the inflows of Ph.D. fellowships Fund stocks. Each kind of agreement feeds on a fund. Therefore, the model represents, on the one hand,the foreign University Ph.D. fellowship fund, which is augmented by the inflow “change in foreign universities Ph.D. fellowship fund” which, in turn, is given by the multiplication of Ph.D. fellowships directed to international programmes funded by foreign Universities – the first year Ph.D. fellowship economic value is equal to 20.000 Euros.On the other hand, there is the “external institutions Ph.D. fellowship fund” which is augmented by the inflow “change in external institutions Ph.D. fellowship fund” which is given by the multiplication of Ph.D. fellowships directed to international programmes funded by external institutions and the first year Ph.D. fellowship economic value, also in this case, is equal to 20,000 Euros. Both these funds act on the cash flow. It is an inflow given by the following equation:

$$\text{CASH_FLOW} = ((\text{EXTERNAL_INSTITUTIONS_Ph.D._FELLOWSHIP_FUND} + \text{FFO} + \text{FOREIGN_UNIVERSITY_Ph.D._FELLOWSHIP_FUND} + \text{TOTAL_Ph.D._CANDIDATES_FEES}) - (\text{COST_OF_TRANSLATION} + \text{COSTS_OF_CONFERENCE_PARTICIPATION} + \text{UNIPA_COSTS_PER_Ph.D._PROGRAMMES} + \text{UNIPA_COSTS_FOR_INTERNATIONAL_Ph.D._PROGRAMMES})) / \text{ACADEMIC_YEAR}$$

From the above equation we can define the variables which positively affect the cash flow and those which negatively act on it. This is also shown in figure 4.13:

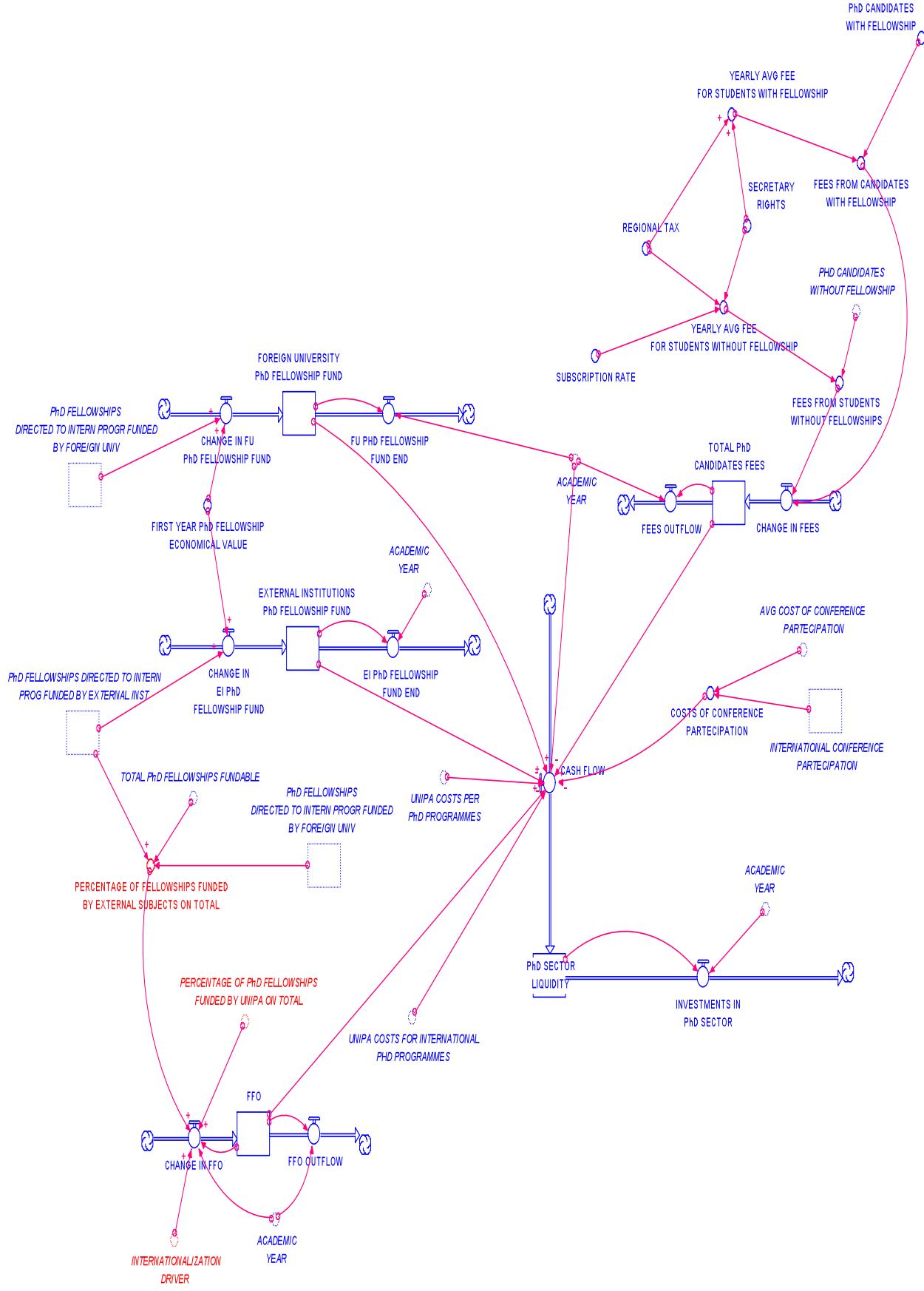


Figure 4.13 – UNIPA Liquidity – SFD

In the first category we must define the ‘total Ph.D. candidates’ fees’ and the ‘FFO’. The first is a stock whose inflow ‘change in fees’ is given by the sum of fees from candidates with fellowship and fees from students without fellowship. For both kinds of Ph.D. candidates, the fee is the sum of regional taxes and secretary rights. The unique distinction is that the Ph.D. candidates without fellowship have to pay a subscription rate of almost € 300,00.

As for the FFO, instead, it is represented as a stock whose inflow is defined as follow:

$$FFO = (FFO * (\text{PERCENTAGE_OF_FELLOWSHIPS_FUNDED_BY_EXTERNAL_SUBJECTS_ON_TOTAL} + \text{PERCENTAGE_OF_INTERNATIONAL_Ph.D._CANDIDATES_ON_TOTAL} + \text{PERCENTAGE_OF_Ph.D._FELLOWSHIPS_FUNDED_BY_UNIPA_ON_TOTAL})) / \text{ACADEMIC_YEAR}$$

In this case the value of FFO of the previous year is multiplied for the sum of three percentages. These are the indicators defined by MIUR which influence the definition of FFO given by the Ministry to UNIPA. Of course, the higher their value, the higher will be the percentage of FFO achieved by UNIPA. In this case the timing takes into consideration the academic year which is the denominator of the equation.

But the cash flow is also affected negatively by various variables which can be divided into two groups. The first is composed by the ‘UNIPA costs per Ph.D. programmes’ plus the ‘UNIPA costs for international Ph.D. programmes’. Both these kinds of costs are given by the product of the Italian/International programmes activated multiplied for the cost of Italian/International Ph.D. cycle.

The second group, instead, is composed by the sum of the costs of translation and the costs of conference participation. It is strictly linked to the activation of investment in internationalization policies as we will see further on.

The cash flow is the inflow of the ‘Ph.D. sector liquidity’ stock the outflow of which is represented by the investment in the Ph.D. sector. It is the amount of Euros that each year UNIPA decides to invest, fundamentally, in the funding of the ‘UNIPA Ph.D. fellowship fund’. This stock has one inflow which is named ‘change in UNIPA Ph.D. fellowship fund’ and is represented by the following equation:

$$\text{CHANGE_IN_UNIPA_Ph.D._FELLOWSHIP_FUND} = \text{IF}(\text{UNIPA_INTERNATIONALIZATION_SWITCH} = 0) \text{ THEN}(\text{INVESTMENTS_IN_Ph.D._SECTOR}) \text{ ELSE}(\text{INVESTMENTS_IN_Ph.D._SECTOR} - \text{INVESTMENTS_IN_INTERNATIONALIZATION_POLICIES})$$

Consequently its value depends also on the decision whether to invest in internationalization policies or not. The stock permits UNIPA to fund the fellowships directed to Italian/International Ph.D. Programmes. Moreover, their product for the ‘average economical value of fellowships

per I year Ph.D. programme’ permits to calculate the inflow of the stocks ‘Ph.D. fellowships funded by UNIPA’ and ‘Ph.D. fellowships directed to international programmes funded by UNIPA’.

These stocks and flows are shown as follows:

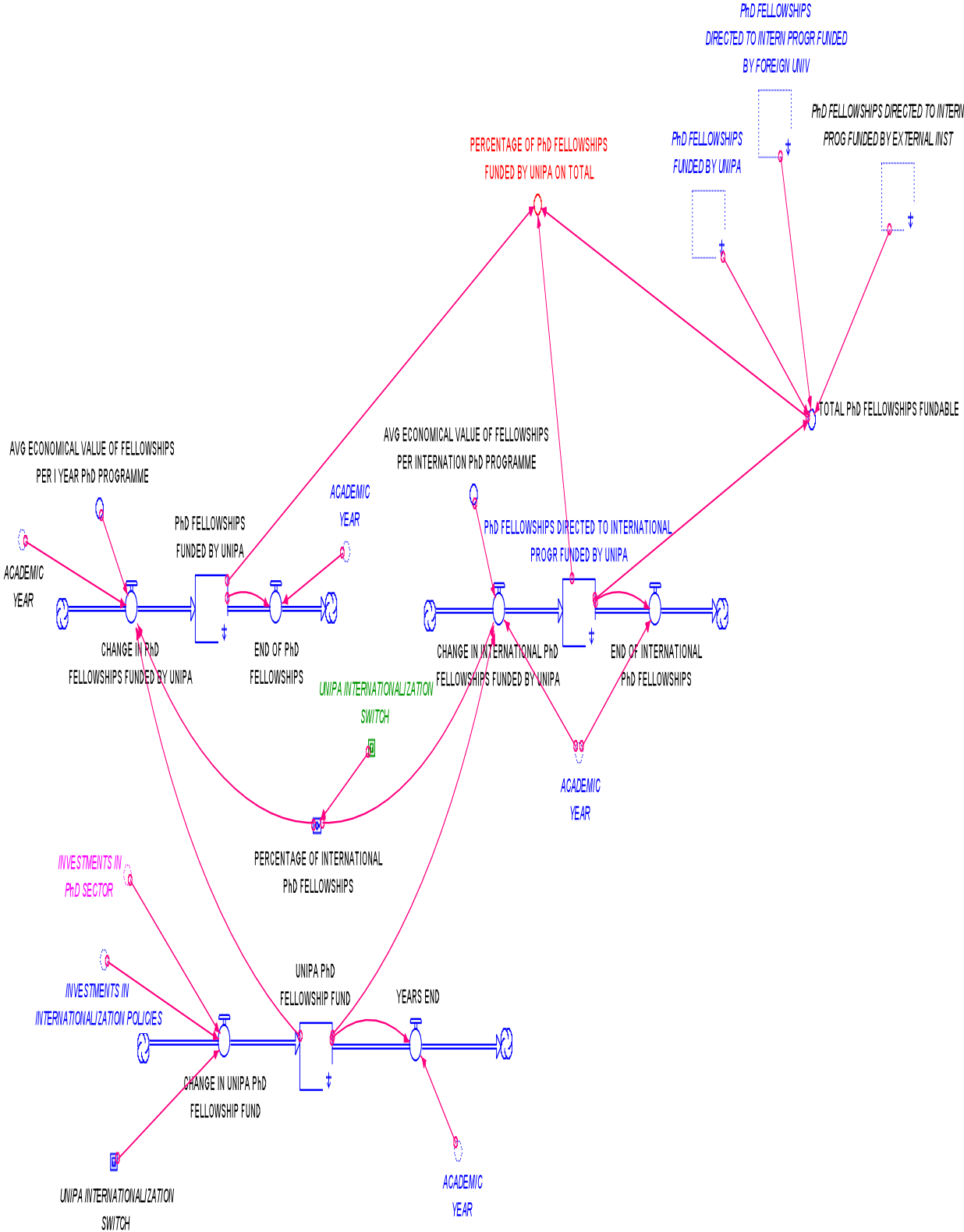


Figure 4.14 – UNIPA Ph.D. fellowships funds – SFD
151

These stocks give us the possibility, on the one hand, to calculate the percentage of Ph.D. fellowships funded by UNIPA. It is given by the ratio between Ph.D. fellowships funded by UNIPA on total Ph.D. fellowships and, as said above, it affects the share of FFO that UNIPA can receive from MIUR. On the other hand, they affect the inflows of two crucial stocks, ‘International Ph.D. programmes funded by external funders & UNIPA’ and the ‘Ph.D. programmes funded by UNIPA’. These stocks calculate the Ph.D. programmes that UNIPA could finance because of its financial capability. The inflow of the first stock is the following:

$$\text{CHANGE_IN_INTERNATIONAL_Ph.D._FUNDED_BY_EXTERNAL_SUBJECTS_\&_UNIPA} = \frac{(\text{Ph.D._FELLOWSHIPS_DIRECTED_TO_INTERN_PROGR_FUNDED_BY_FOREIGN_UNIV} + \text{Ph.D._FELLOWSHIPS_DIRECTED_TO_INTERN_PROG_FUNDED_BY_EXTERNAL_INST} + \text{Ph.D._FELLOWSHIPS_DIRECTED_TO_INTERNATIONAL_PROGR_FUNDED_BY_UNIPA})}{\text{MINIMUM_NUMBER_OF_FELLOWSHIPS_FOR_INTERNATIONAL_Ph.D._PROGRAMME}} / \text{ACADEMIC_YEAR}$$

Therefore, the sum of all the funds directed to finance the International Ph.D.s are divided for the minimum number of fellowships for International Ph.D. programme which is equal to four. In the same way, the inflow linked to the “Ph.D. programmes funded by UNIPA” stock is represented by the following equation:

$$\text{CHANGE_IN_Ph.D._FUNDED_BY_UNIPA} = \frac{(\text{Ph.D._FELLOWSHIPS_FUNDED_BY_UNIPA})}{\text{MIN_NUMBER_OF_FELLOWSHIPS_PER_PH.D.}} / \text{ACADEMIC_YEAR}$$

What differs from the previous equation is that, in this case, the minimum number of fellowships for Ph.D. programme must be at least equal to six. In both cases, however, the outflow is simply given by the ratio between the value of the stock and time represented by the academic year.

Another relevant unit of the model is represented by the Bureaucracy unit. In this case it is considered as the number of steps linked to the activation of a PhD. Programme compared to a desired level which is supposed equal to the one scheduled before the introduction of the Ministerial Decree No. 45/2013. In fact, this last reform, introducing the validation process, increased the number of phases required for the activation of a Doctorate. In fact, introducing the compulsory checks made by ANVUR and MIUR, the phases passed from five to seven. The consequence is an higher value of the stock “Perceived Bureaucracy” that further will lead to a reduction of the Ph.D. Coordinators scientific production.

Specifically Bureaucracy is an intangible value whose calculation is represented by the following figure:

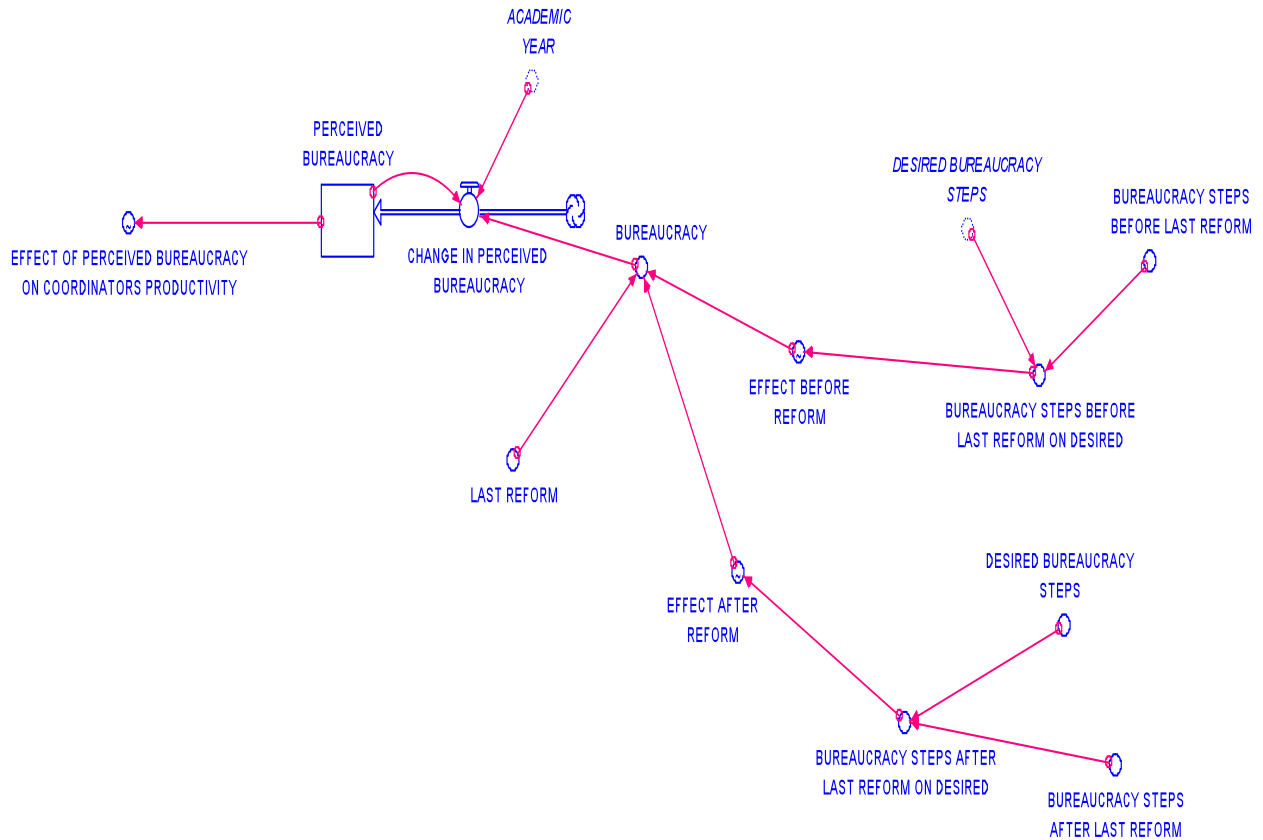


Figure 4.15 – Bureaucracy – SFD

As said above Bureaucracy is calculated as an intangible index which affects the scientific activity of the Ph.D. Coordinators. The stock of ‘coordinator scientific production’ compared to the desired UNIPA level can affect on the one hand UNIPA image and on the other hand the scientific validity of the Ph.D. programmes proposed for validation. In this case we calculated the level of bureaucracy before and after the last reform, using an exogenous variable represented by the switch: ‘Last Reform’. If the switch is in ‘*on mode*’, the Ph.D. activation process is ruled by the M.D. 45/2013 and consequently composed by seven phases. Instead, if it is *off*, the number of phases for the activation of the Doctorates decreases to five, which was the situation planned before the last reform. Less passages in this process lead to a reduction of bureaucracy with the following positive effect on Ph.D. Coordinators scientific production and, in addition, on UNIPA Image. This is evident in the inflow equation:

$$\text{CHANGE IN COORDINATOR SCIENTIFIC PRODUCTION} = \text{EFFECT_OF_PERCEIVED_BUREAUCRACY_ON_COORDINATORS_PRODUCTIVITY} * ((\text{TOTAL_Ph.D._COORDINATORS} * \text{AVG_PUBLICATIONS_PER_Ph.D._COORDINATOR_PER_YEAR}) / \text{ACADEMIC_YEAR}).$$

It is represented in figure 4.16:

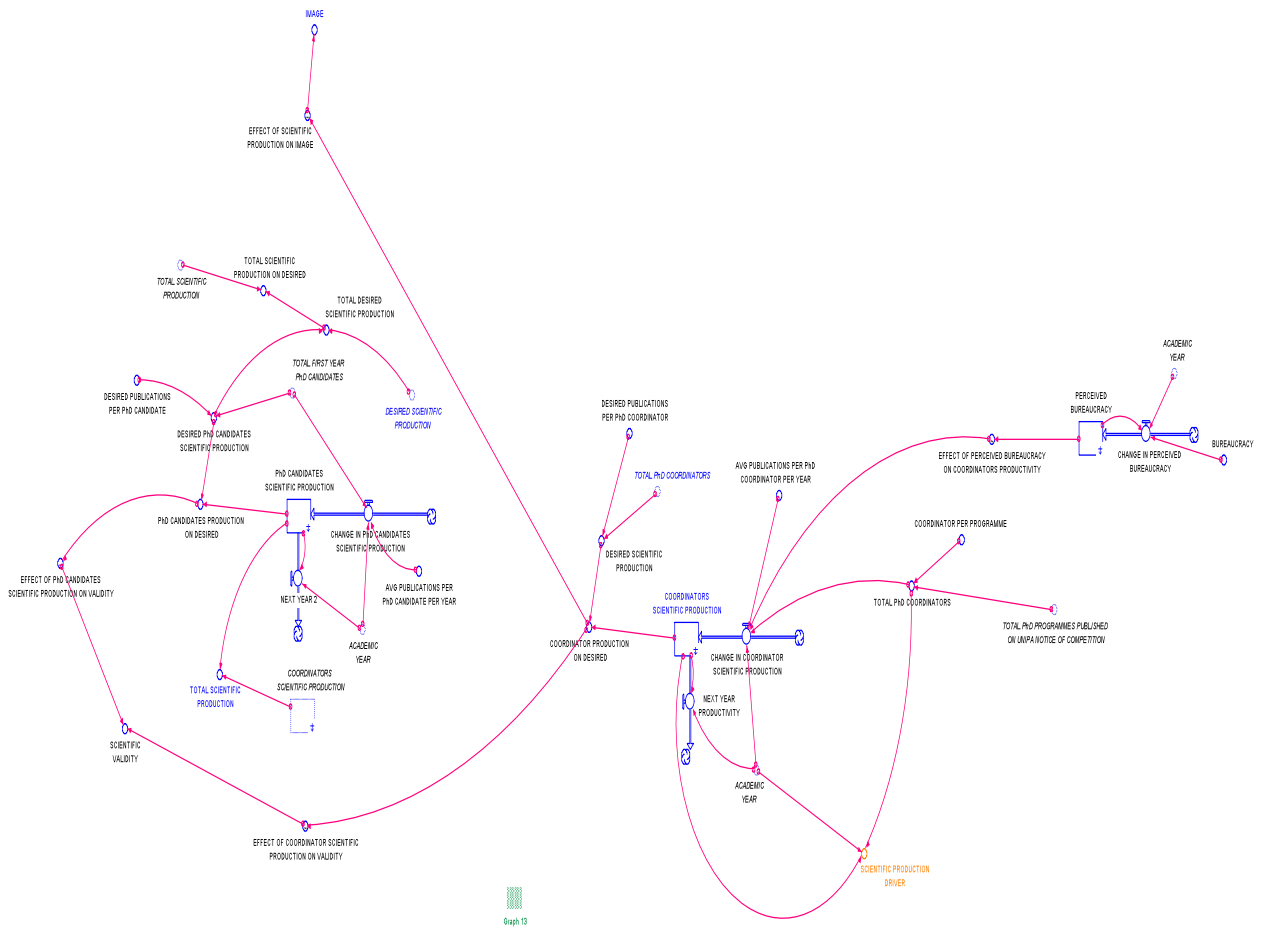


Figure 4.16 –Scientific Production – SFD

The last unit of the model is the Policies and investments for Ph.D. internationalization. It is partially represented as follow:

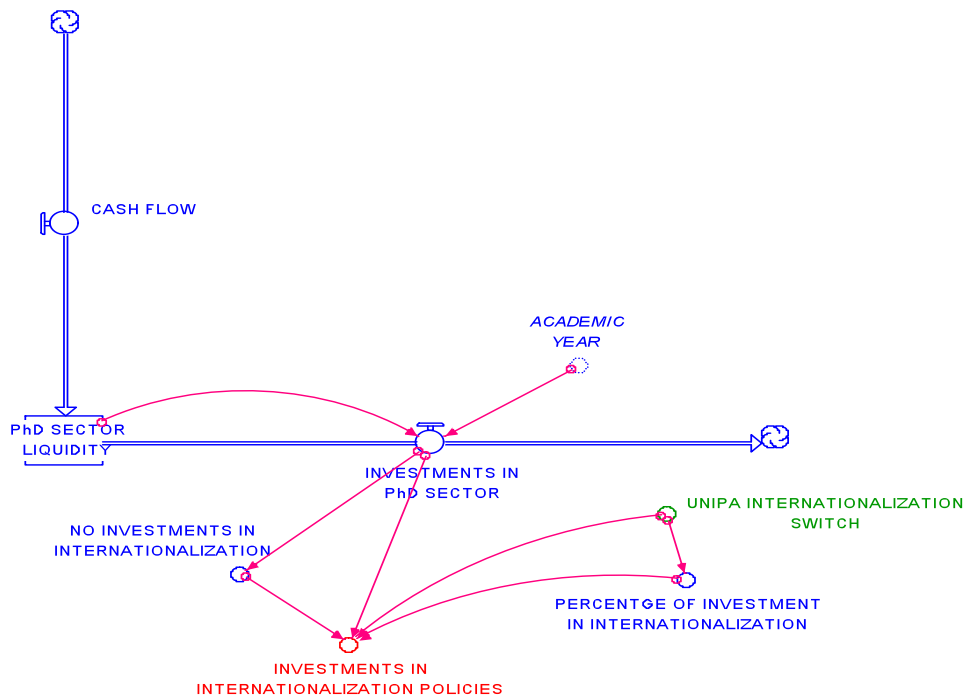


Figure 4.17 – UNIPA Internationalization Investments – SFD

In this case, we introduced a switch that permits to invest part of the total amount of investments in the Ph.D. sector in specific internationalization policies. The ‘investments in internationalization policies’ is represented as an auxiliary calculated as follows:

$$\text{INVESTMENTS_IN_INTERNATIONALIZATION_POLICIES} = \text{IF}(\text{UNIPA_INTERNATIONALIZATION_SWITCH} = 0) \text{ THEN} (\text{NO_INVESTMENTS_IN_INTERNATIONALIZATION}) \text{ ELSE} (\text{INVESTMENTS_IN_Ph.D._SECTOR} * \text{PERCENTGE_OF_INVESTMENT_IN_INTERNATIONALIZATION})$$

Consequently, when the switch is *off* there are no investments in internationalization policies. Instead, if the switch is *on*, a percentage of the total investments in Ph.D.s, that we initially supposed to be equal to 20%, are invested in internationalization policies. These policies are identified in:

1. Investment in translation. In this case, investments affect positively the ‘UNIPA Website Translated’ stock acting on its inflow.
2. Investment in conference participation. Also in this case, the internationalization investments act positively on the investments in conference participation and therefore on the inflow of the ‘International Conference Partecipation’ stock.

The first policy led to an higher UNIPA Image while the second one affects positively the number of agreements with external bodies. Therefore both policies, as we will see further, generate, in long run, an increase in term of International Doctorates activated by UNIPA and a higher number of International Ph.D candidates enrolled.

At the same time, we supposed that the decision to invest in internationalization policies led UNIPA to increase the percentage of international fellowships funded, generating an increase in the number of international Ph.D. programmes fundable and, therefore, activated accomplished by a reduction in the number of Italian Ph.D. programmes.

The results of the policies proposed are presented in the following paragraphs.

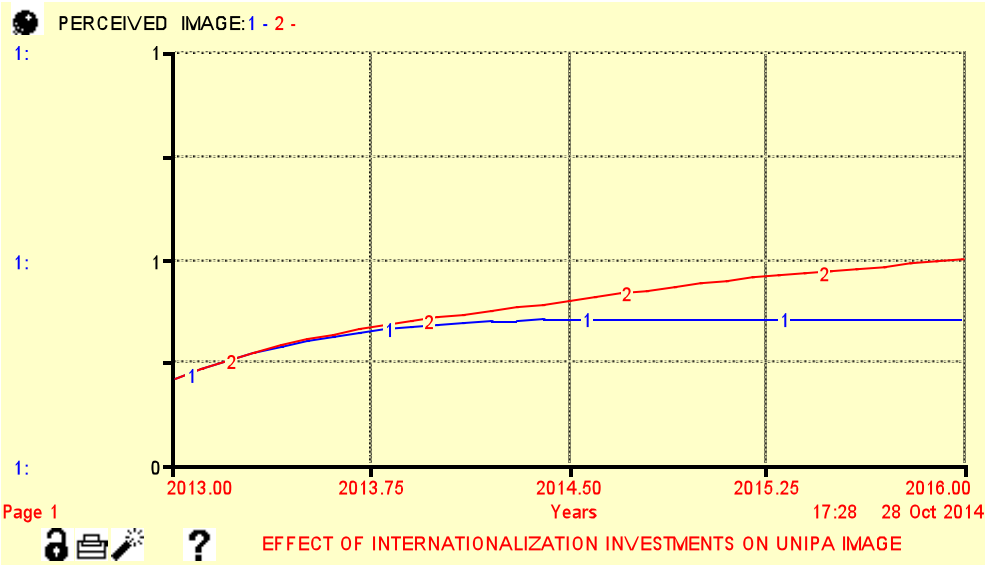
4.5 Model generated behaviour patterns

After the verification and validation tests, some simulation experiments are carried out with the model in order to show its capabilities. In particular, simulation runs are made to show the effects of:

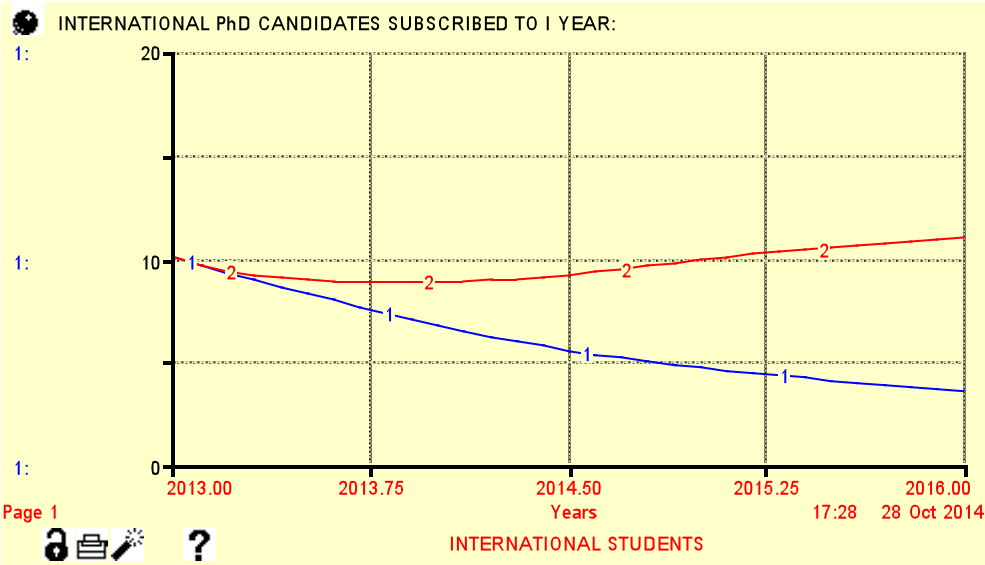
- Investments in internationalization policies;
- Bureaucracy reduction.

The simulation results of increasing and decreasing investments in internationalization policies show that investing in internationalization improves UNIPA attractiveness expressed in terms of

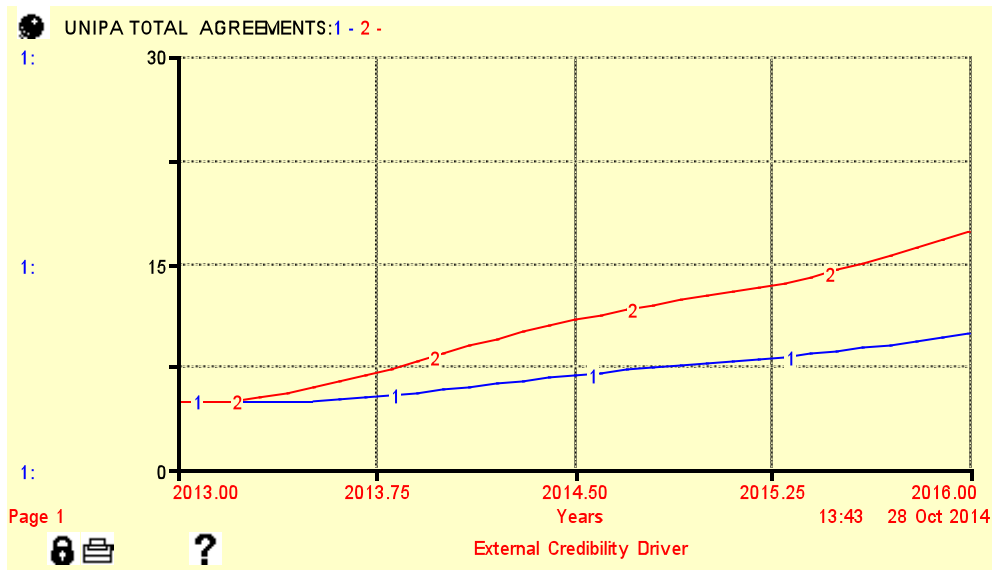
agreements stipulated and international students enrolled. As said above, these investments consist of investments in translation and investments in conference participation. The former permits to improve the services offered to international Ph.D. candidates. This will generate a higher UNIPA image and an improvement in international Ph.D. candidates who enrol. The investments in conference participation, instead, give to the Ph.D. coordinators the possibility to increase the number of contacts with external bodies and to improve UNIPA research activity advertising. This will lead to improving the number of agreements stipulated and, therefore, the fellowships per Ph.D. programmes funded. The following graphs show the results achieved:



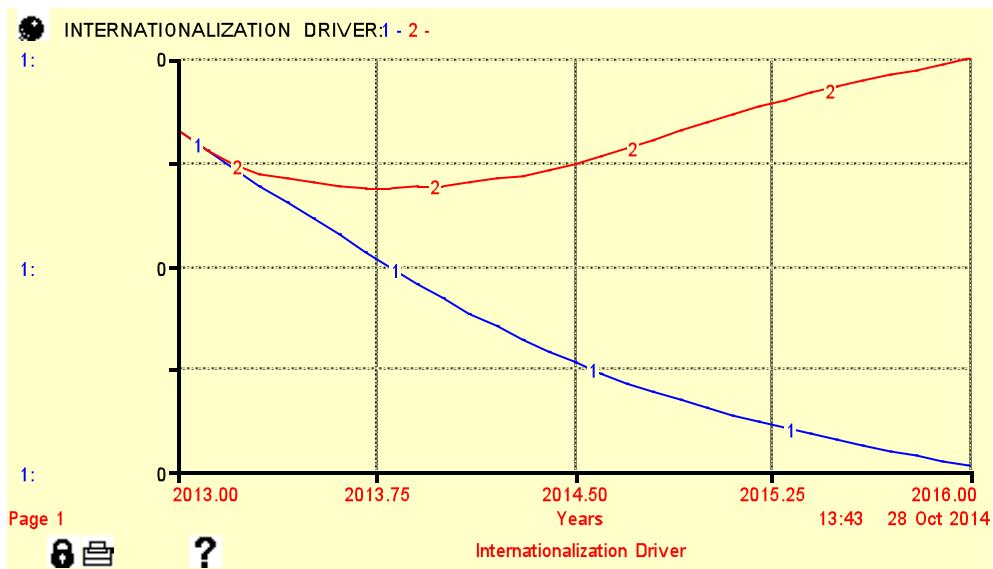
Graph 4.1 – UNIPA perceived image after internationalization investments – Simulation graph



Graph 4.2 – Effect of internationalization investments on international Ph.D. candidates subscribed to first year – Simulation graph

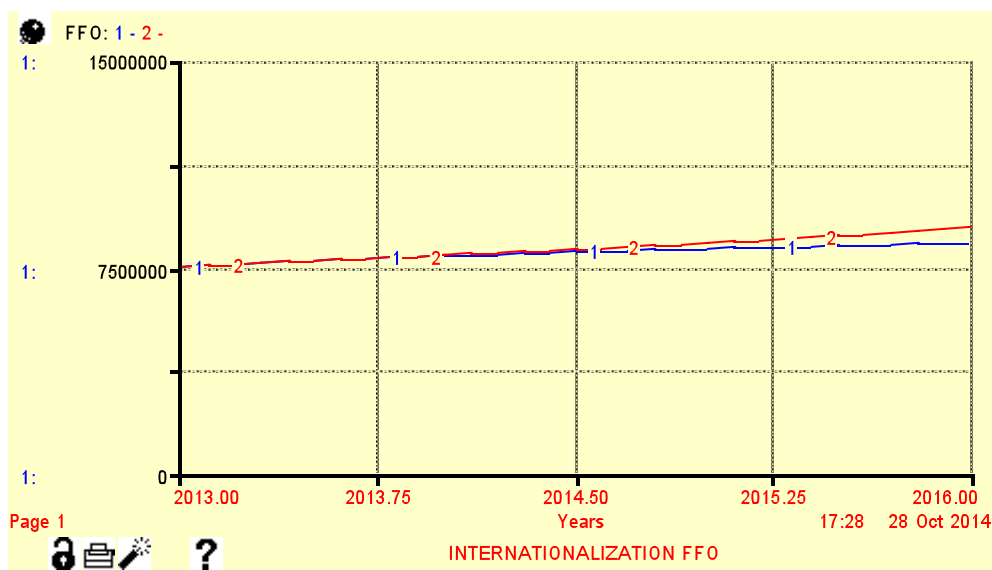


Graph 4.3 – Effect of internationalization investments on agreements – Simulation graph



Graph 4.4 – Effect of internationalization investments on Internationalization Driver – Simulation graph

Graph 4.4 testifies that improving internationalization investments causes an increase of the internationalization driver. This higher internationalization driver generates an higher amount of FFO achieved by UNIPAs as shown by the following graph:

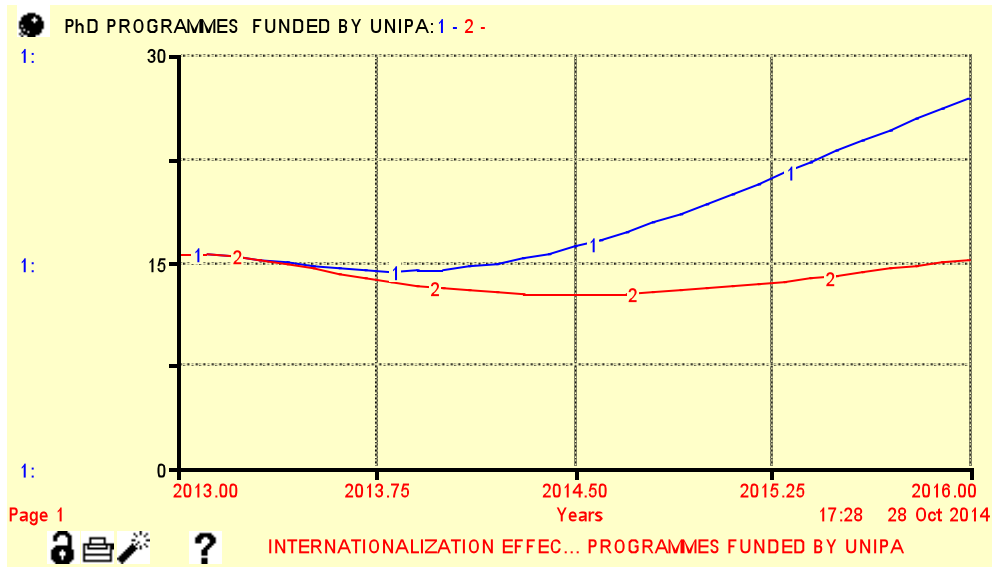


Graph 4.5 – Effect of internationalization investments on FFO – Simulation graph

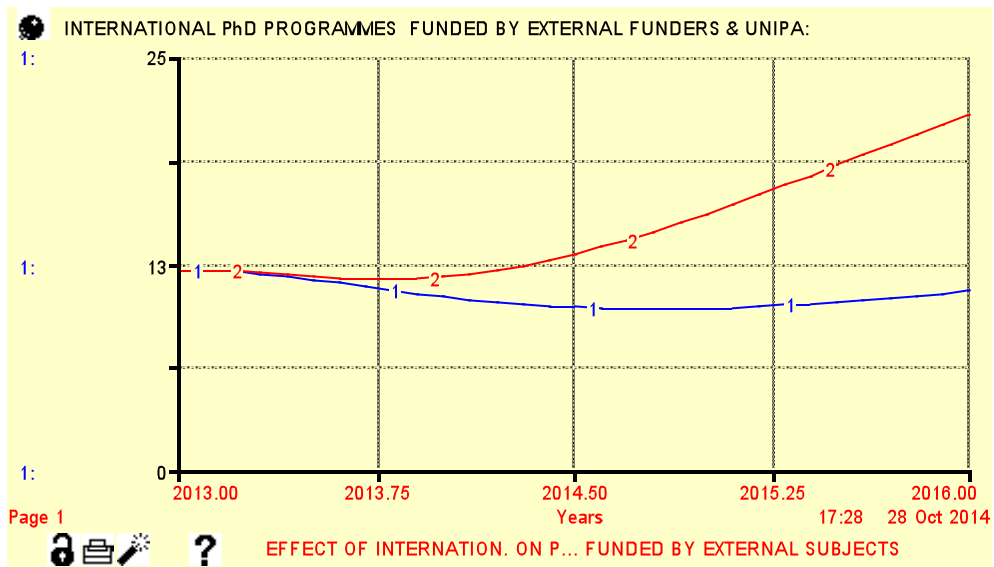
Moreover, the above graphs shown that higher investments in internationalization generate an improvement in the number of agreements stipulated with external institutions and foreign Universities. In this case we supposed that UNIPA invests a percentage of 20% of liquidity in internationalization. This investment is directed for 80% to international conference participation and for 20% to translation of the UNIPA website and subscription material. Obviously, these value can be changed increasing or decreasing the level of investment in internationalization policies.

As said in the previous paragraph, we supposed that the decision to invest in internationalization policies would lead UNIPA to increase the percentage of international fellowships funded. In particular, we supposed a passage from 0.1 to 0.4 of the percentage of Ph.D. fellowships directed to international programmes funded by UNIPA. The results shown in the following graphs point out that the number of “normal/Italian” Ph.D. programmes reduces over time. At the same time, the number of international Ph.D. programmes fundable and therefore activated will increase causing an improvement of the Internationalization Driver, as seen above, and a higher value of the Ph.D. Fellowships Fund Driver.

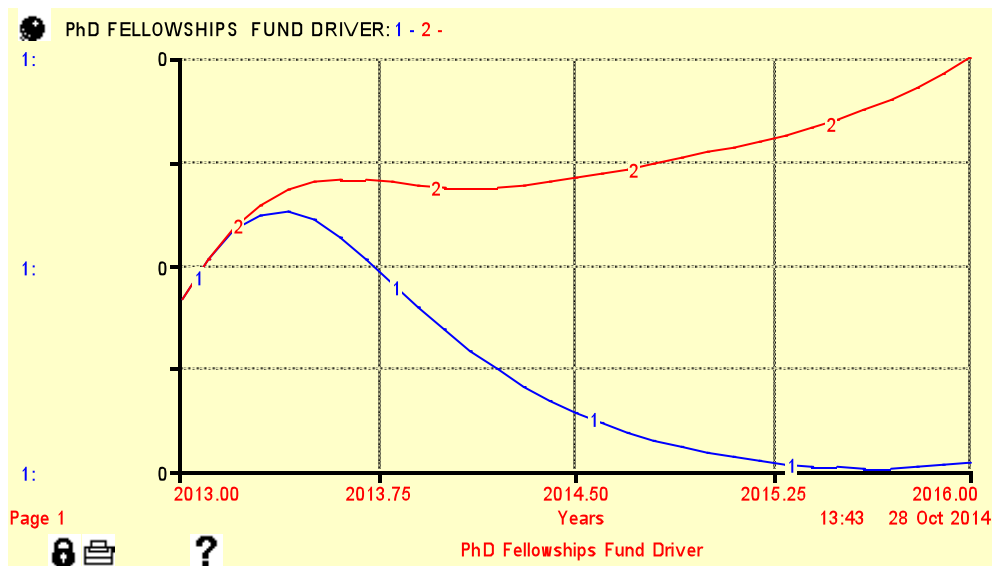
These results can be seen in the following graphs:



Graph 4.6 –Ph.D. programmes funded after internationalization investments – Simulation graph



Graph 4.7 –International Ph.D. programmes funded after investments in internationalization policies – Simulation graph



Graph 4.8 – Effect of investments in internationalization policies on Ph.D. Fellowships Fund Driver – Simulation graph

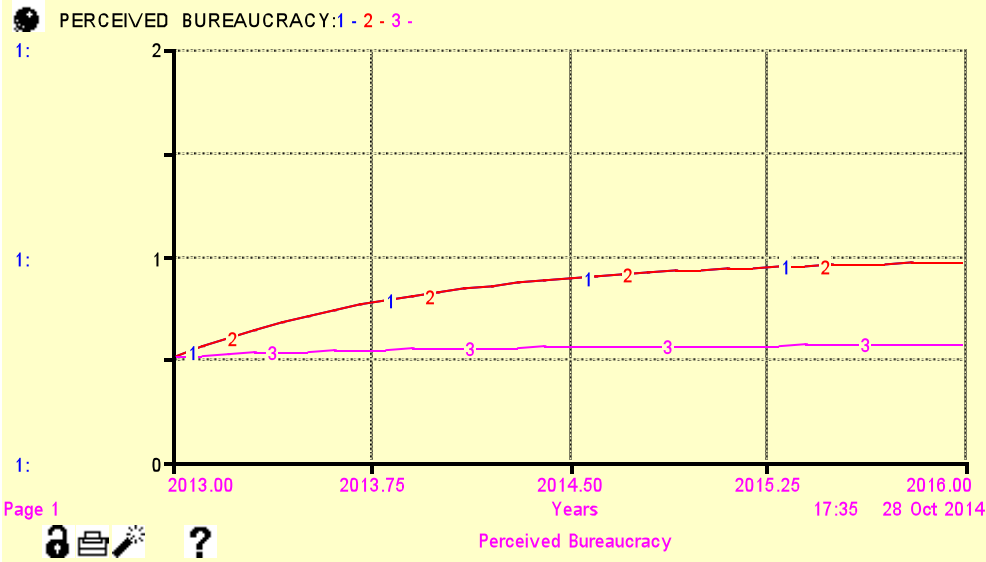
We must clarify that the blue line (1) shows the situation before the investments in internationalization while the red line (2) shows the results of this kind of investments. Moreover, in the simulation the run time chosen is of three years, equal to the duration of a Ph.D. cycle, and the initial values are those provided by UNIPA Ph.D. Office for the academic year 2013/2014.

The second policy that we supposed to introduce deals with the effects of decreasing the number of administrative phases required for the activation of a Doctorate. The aim is to prove that the last Reform increased the number of administrative steps involved in the assessment of the Doctorates generating an higher level of Bureaucracy with the subsequent negative effect on the Ph.D. coordinators activity. The results of these simulation runs show that supposing a desired number of phases equal to the one required before the M.D. 45/2013, both under the condition of non-internationalization investments and in the opposite case, the level of perceived bureaucracy decreases and the level of the Bureaucracy Driver goes down.

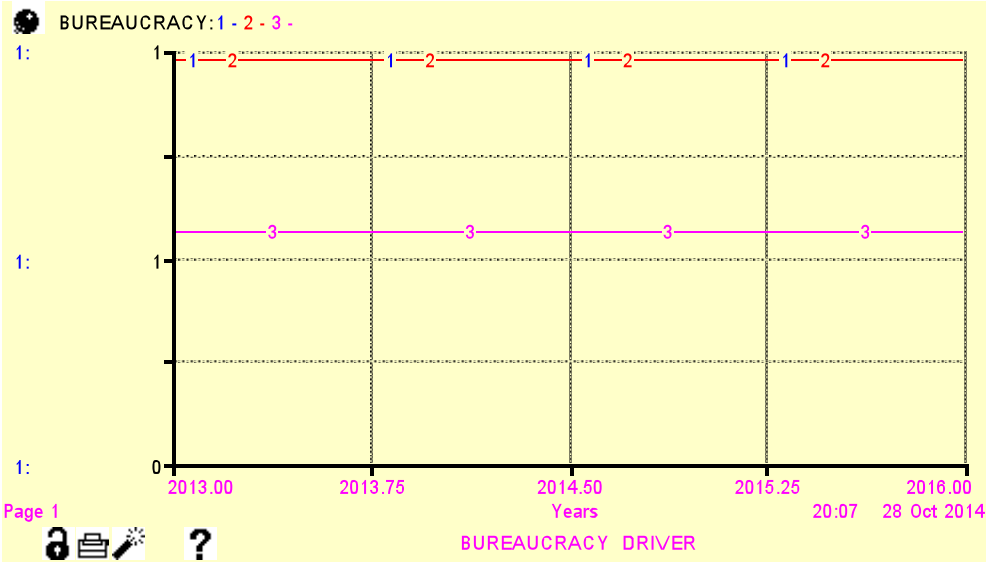
The following graphs, moreover, show how a reduction in terms of bureaucracy will generate an increase of coordinators' scientific production and, consequently, UNIPA Image. In fact, their scientific production is limited by the necessity to solve bureaucratic affairs linked to the activation and implementation of the model which should be made by the Ph.D. Office Staff. Therefore, reducing the bureaucratic passages will lead to, on the one hand, a reduction of the Bureaucracy Driver, which is the ratio between the new number of administrative steps required for the activation of Doctorates, introduced by the last reform of the sector, and the desired level which is supposed equal to the one scheduled before its introduction. On the other hand, this

kind of investment will generate an improvement of the Scientific Production Driver because the coordinators will spend more time on their scientific production.

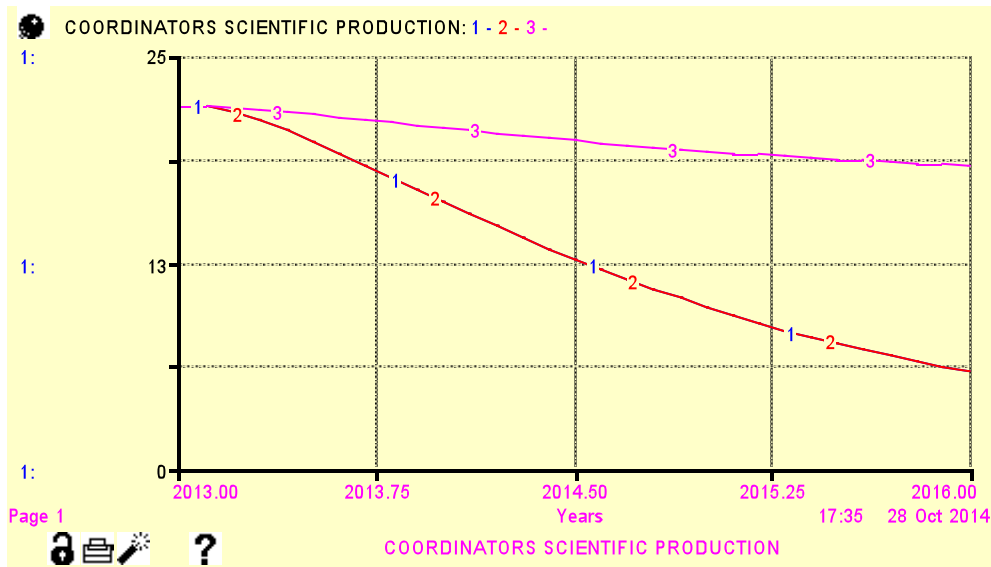
The results are shown in the following graph:



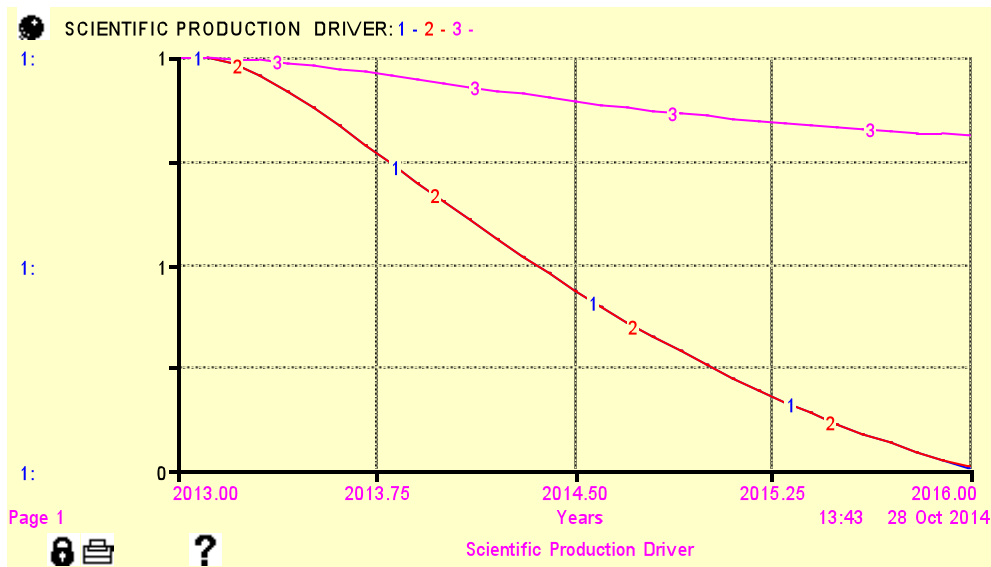
Graph 4.9 – Bureaucracy before and after the M.D. 45/2013 – Simulation graph



Graph 4.10 –Bureaucracy Driver before and after last reform – Simulation graph



Graph 4.11 –Bureaucracy reduction and Ph.D. Coordinators scientific production –
Simulation graphs



Graph 4.12 –Bureaucracy reduction and Scientific Production Driver –
Simulation graphs

Obviously, the number of phases in the Ph.D. activation process is nationally ruled by MIUR, consequently its reduction can be suggested but not applied according to the actual law.

We must make clear that the blue line (1) shows the situation before the investments in internationalization, the red line (2) shows the results of this kind of investments while the pink line (3) represents the effect of the bureaucracy reduction. Once more, in the simulation, the run time chosen is of three years, equal to the duration of a Ph.D. cycle.

Chapter V

CONCLUDING REMARKS

5.1 Conclusions

This last chapter intends to fulfil diverse purposes. Firstly, it is intended to summarize the research questions that guided the drafting of this work and to synthesize the major suggestions that have emerged from the analysis of the specific case of UNIPA Ph.D. Office trying also to identify how the future of the University may look under implementation of International programs. Secondly, the limitations of this research are highlighted on the basis of the perceived shortcomings and weaknesses. Thirdly, the contributions offered through this research are presented together with the future perspectives. More specifically, this thesis has endeavoured to evaluate how the adoption of Dynamic Performance Management can help managers of Higher Education to analyze and understand the performance of the Italian Ph.D. sector.

In particular, in this thesis we analyzed a case study focused on the link between the product ‘New International Doctorates’ and its effect on UNIPA attractiveness and consequently on the number of International Ph.D. students enrolled by UNIPA. More specifically, we attempted to identify the determinants of performance related to the areas of responsibility involved in the process that led to the publication of the ‘UNIPA Ph.D. Notice of Competition’, trying, subsequently, to understand how the final product ‘New International Doctorates’ may generate an increase of international Ph.D. candidates’ subscriptions.

Specifically, we examined the administrative process governed by the relevant regulations, making a comparison between ‘old’ and ‘new’ requirements for the design and the approval of ‘New Ph.D. Programmes’; in this way we pointed out the stages of the process, the normative constraints and the basic activities carried out by the Ph.D. office.

Then we analyzed the performance from a business management perspective. Moreover, applying a top-down approach, we started the investigation with the objective analysis of performance. The final product in relation to the class of customers to which it is addressed was defined and, proceeding ‘backwards’, we also determined the process, the back-office and front-office areas of responsibility involved trying to ascertain all the activities from the most elementary to the more critical ones.

The intersection with the organizational units has highlighted the second dimension of analysis accepted in the approach proposed here, i.e. the instrumental view. In particular, for UNIPA, the Ph.D. Office, in relation to its final outcome, and the strategic resources available, were

highlighted, defining the performance drivers, which are the intermediate performance indicators that summarize the critical success factors that affect, in a decisive manner, the values of the final results.

The analysis of the two dimensions of performance was made possible not only through the study of the relevant legislation – the Law 240/2010 and the Ministerial Decree No. 45/2013 – but also through a research conducted through semi-structured interviews submitted to some of the key players. Through the explanation of the two-dimensional performance analysis, it was possible to build a System Dynamics model capable of emphasizing the logical relationships between the variables, including the non-linear ones, identifying the levers relevant for the system investigated. Therefore, we demonstrated that the introduction of a dynamic performance management system in combination with the use of System Dynamics methodology might represent a useful tool in the hands of University managers. The use of this tool permits singling out the criticalities linked to the Ph.D. sector and to drive the University performance towards the sustainable achievement of the objectives formulated in the phase of strategic planning. To sum up, in order to give a clear answer to the questions to which this thesis aims to respond, in the light of the analysis conducted, it can be argued that:

1. The first conclusion is strictly connected to the laws which regulate the Ph.D. sector in Italy. The last reform, represented by M. D. 45/2013, in particular, does not represent a real evolution in the nature and purpose of the Doctorate. It is still seen as the third level of the Italian higher education system, based on teaching and research activities, aimed at learning the *'job of research'* to be spent on the labour market. Nonetheless, compared to the previous Reforms, significant novelties and criticalities can be identified:
 - First of all, the introduction of a new validation process for Ph.D. programmes. It limits the number of Doctoral programmes validated on the basis of two numerical parameters: the number of professors within the Ph.D. Faculty Board and the number of fellowships available beyond those covered by University. Moreover, there must be a minimum number of at least *'sixteen professors between full and associate professors of the sector or of the scientific and disciplinary course'* in the Ph.D. Faculty Board. Furthermore, as a requirement for the validation of Ph.D. programmes, *'the availability, in relation to each cycle of Doctoral course, of at least six fellowships or other forms of financing that are, at least, equivalent'*. These conditions represent a real obstacle for the activation of new international Doctorates. In effect, it links the positive MIUR evaluation to the personal capability of Ph.D. coordinators to involve, on the one hand, many Italian and foreign professors in the faculty board and, on the other hand, to find other external funders

interested in financing new fellowships. This undeniably also leads to an increase in the level of bureaucracy required by the entire process, heavily burdening the activity of the coordinators, giving them the responsibility of an activity which should be developed by the administrative back office as this is not directly involved in teaching. For this reason, in the model we proposed the reduction of bureaucracy as a possible solution. In this way, the Ph.D. coordinators and the entire faculty board would be partially unrestricted by the activities which should be made by the University administration and consequently increase their proper work in term of scientific production, satisfying another requirement introduced by the new validation/accreditation process. It requires, in fact, that the faculty board members must be characterized by *'A specific, large, original, qualified and continuous activity, both in teaching and research, in the doctorate areas of interest, also internationally recognized'*¹¹⁵.

- Secondly, the last reform of the sector introduced a more complex system for the activation of a Ph.D. increasing the administrative bureaucratic phases. With the introduction of the M.D. 45/2013 the MIUR aim was to guarantee an higher qualitative assessment. In fact, the allocation of funds, nowadays, is determined by the MIUR, on a proposal of ANVUR, including the assessment of various qualitative criteria. Anyway, as shown in the thesis, this risk to complicate the administrative bureaucracy causing an higher involvement of the Ph.D. Coordinators in administrative activities, with a negative effect on their teaching and research activity.
- The Doctorate financing, at the same time, according to this reform, is provided by Universities or other bodies; MIUR plays the role of contributor only for Universities. The Ministry contributions, in particular, would be distributed on the basis of a qualitative assessment. Moreover, the allocation of funds is determined by MIUR, on a proposal by ANVUR, including the assessment of various qualitative criteria such as the quality of research carried out by members of the faculty board, the Internationalization level of the Doctorate and attractiveness of the Doctorate itself. Obviously, this risks creating a multiplier mechanism in advantage of those Universities with greater availability of funds for research and equipped with own Doctoral fellowships. To demonstrate this point, for example, there is an emphasis on the availability of Universities to find fellowships for Doctoral degrees and, even

¹¹⁵ “L’accreditamento dei corsi di dottorato”, 21/02/2014. Approved by ANVUR - Board of Directors.

more, on the economic contribution that is expected from companies and private bodies. This, of course, seems to be in contradiction with the Italian economic reality if we take into consideration that, in recent years (data 2009), the percentage of fellowships funded by private companies was less than 10% and those paid by private institutions was equal to 5.6%. Moreover, in times of recession and crisis, the private financing mechanisms acknowledged appear difficult to find and, perhaps, only the strongest Universities and research institutions in the more developed areas of the country, or in disciplines closer to the requests of the private sectors may benefit. However, the model demonstrated that University image plays a crucial role for the attractiveness of external funders. Moreover, stimulated by specific investments in internationalization or by a reduction of administrative bureaucracy or also by an increase of international Ph.D. candidates, University image improves affecting positively the number of agreements stipulated with external bodies. More agreements means a higher level of the image generating a positive loop which will increase the number of Ph.D. fellowships fundable and, consequently, the number of Doctorates activated.

- Lastly, Art. 10 of M.D. 45/2013 favours the activation of international Ph.D. programmes for Italian Universities. Moreover, it underlines the importance for the Italian Universities to cooperate with International ones, in order to improve the quality of research and also to introduce best practices in the Italian Ph.D. system. Thanks to the reform, therefore, Italian Universities and international partners are pushed to establish study programmes in which students can work and deepen their research abroad. Starting from this shy opening to international Ph.D. programmes, we tried to highlight the strengths and weaknesses linked to internationalization in consideration of the fact that, today, the Higher Educational system is becoming more and more global and competitive.
2. The second conclusion, takes into consideration the fact that we live in the context of globalisation and that globalisation affects Universities and the preparation of researchers (Altbach, 2009). Governments worldwide are embracing the economic theories of the knowledge economy. These theories argue that knowledge is crucial to national economic growth and necessary to increase prosperity; to increase economic growth, it is necessary to introduce novel ideas leading to scientific, technical, organisational, environmental or health innovations (Slaughter & Rhoades 2004). As argued in the thesis, the knowledge economy theory has spread around the world, and many national governments have turned to Doctoral education and postdoctoral preparation as one of the principal ways to sustain economic

growth and international competitiveness. Doctoral education and academic research are now global endeavours. Not only nations, but also supranational organisations such as the United Nations Economic, Scientific and Cultural Organisation (UNESCO) (Meek *et al*,2009), the European Union (EU) (Kehm *et al*,2009) and the World Bank are developing policies to enhance the contribution of Doctoral education to national and regional economic growth.

As a response to this necessity, we argued that Doctoral training has recently gained greater importance on the European higher education and research agenda. Changes in research practices and, more widely, within European societies, have highlighted the need to adapt Doctoral systems to meet the new challenges of a knowledge-based society, a global labour market of highly qualified professionals, and new profiles and demands of Doctoral candidates. There has been a steady increase in the number of Doctoral students trained throughout Europe during the last two decades, although this increase has been unevenly spread across discipline groups and countries. In Italy, however, Universities still offer programmes based on the traditional apprenticeship model and perceive the Doctorate as mere training *for* research. Instead, if the doctorate were to be seen as a professional experience acquired through the management of an original research project, it would become qualitatively different from the bachelor and master degrees. In this context, the possibility to achieve this on the basis of an international agreement, involving foreign Universities or external institutions, gives the possibility to provide a high-quality research environment ensured by a critical mass of strong research groups or communities as a source of input and support. Nevertheless, while worldwide governments are allocating substantial funds to increase the research and development capacities of their countries, in Italy the decision to invest deeply in the Ph.D. system, as a crucial sector for the Italian economic and social revival, is still waiting for attention. My research debated that this lack of the Italian government can be partially replaced by the involvement of international and external partners in order to receive that funds which will permit the activation of more doctorates improving the number of international Ph.D. candidates and consequently University image. This will increase the University attractiveness of external funders assuring a long-term sustainable development for Italian Universities.

3. From what briefly said before we can introduce another relevant thesis conclusion, which is the importance of University image and its positive effects on internationalization. All organisations with a favourable corporate image are more likely to benefit from consumer-organisation identification, positive product evaluations, increased customer loyalty and increased customer extra-role behaviours, such as positive word of mouth (Wilkins and

Huisman, 2013). Like any other type of organisation, HE institutions are now increasingly interested in developing and maintaining a positive image in order to influence potential students' choice of institution. A favourable image can also help Universities in the attraction of the best students and more resources, including fellowships and research funding (Treadwell and Harrison 1994; Alves and Raposo 2010). In order to design a specific organizational identity, University managers need to know how their institutions are perceived by external stakeholders. In the case study, we pointed out how an improvement of the University perceived image generates a higher credibility *versus* the external funders. In this way, a relevant number of external institutions, such as foreign Universities or research institutes, are always more interested in the activation of agreements with UNIPA. Each agreement increases the fellowships funded by external bodies. More fellowships will lead to an increase in one of the drivers that positively influences the FFO distribution and, therefore, with more FFO, an increase in UNIPA liquidity. At the same time, a higher UNIPA image will improve its capability to attract the best international students searching for an international Ph.D. This will lead to an increase in the number of the best international Ph.D. candidates that, with good probability, will generate qualitatively relevant articles. The consequent improvement in terms of research quality will increase UNIPA's position in the University international rankings affecting positively, in turn, UNIPA image. Thus, the thesis demonstrated the crucial role of the Ph.D. sector in the improvement of University image and attractiveness.

4. Lastly, the thesis discussed and demonstrated that combining PM with System Dynamics modelling may allow academic decision-makers to better identify key-performance drivers for pursuing a sustainable performance improvement in Universities. In particular, we have shown that SD can improve the academic performance management ensuring better results, in terms of awareness of relevant environment and of the key results, compared to those provided by traditional business information systems. This may occur because the explanation of the feedback that affects the relevant variables and the clarification of drivers allows to show the trend of the results over time and to provide a new interpretation of the determinants of performance. This thesis has also emphasized how modelling feedback relationships between end-results, performance drivers and strategic resources, may support decision-makers in managing and measuring the performance of academic institutions. In addition, the intent to link back-office units to the front-office in performance evaluation, has led us to observe how crucial it is to call attention to administrative products, mapping the underlying processes and matching them to key-responsibility areas. Actually, the recognition of processes, internal clients and related products, available resources, policy

levers, and responsibility areas, provide the *backbone* for an effective implementation of performance improvement programs in academic institutions. Therefore, the use of *System Dynamics* approach, has given us the possibility to analyze how investments in internationalization and in the development of international agreements play a strategic role for University. Indeed, it enables the exploration of the dynamic complexity included in internationalization in order to test how it can contribute to a sustainable development and improvement of the HE system, the image of the University and, consequently, its capability to acquire new funds.

5.2 Limitations and recommendations for future research

The major motivation for undertaking this study was to show that a greater internationalization of the University of Palermo would allow an increase of funding sources, both public and private, a consequential enhancement of the University image, its attractiveness and competitiveness and, thus, the definition of a way to assure a long term sustainable development without reducing the quality of students' supply. The objective was to develop a learning model using system dynamics, which could help managers of higher education to analyze and understand the dynamics of the Italian Ph.D. system. The simulation developed by iThink© is mainly a prototype. Several elements, for the sake of simplification, were not incorporated in the model. Some are due to the inability to establish all the relationships and links between variables in the real system. Others deal with the lack of formal measurement of several indicators, such as pent-up demand and the attractiveness of other Universities. In particular, we can summarise the limitations of the model as follow:

- Agreements. We supposed that each agreement can be used just to finance international Doctorates, but, in particular, the stipulation of agreements with other Italian University can create the basis for the funding of Italian Ph.D.s. Moreover, agreements can also be made for the exchange of students and professors without the involvement of fellowship funding.
- Ph.D. office activities. In the model, we focused on Ph.D. Office activities linked to the activation of new Doctorates; still, this unit carries out various activities that in this context were not taken into consideration.
- Bureaucracy reduction. We proposed a reduction of the phases required for the activation of a Ph.D. suggesting a number equal to the one required before the M.D. 45/2013. It was supposed as a possible solution to reduce the level of administrative bureaucracy and its negative effect on the Ph.D. coordinators' activities. However, this solution is not so easy

to develop. For example, we simplified this decision to reduce the steps of the process. In fact the number of phases in the Ph.D. activation process is nationally ruled by MIUR, consequently its reduction can be suggested but not applied according to the actual law.

- Image. It is the central topic of the entire model, but its determination as an intangible variable is not easy. In particular, in the model we considered just a part of the variables it influences. Specifically, we excluded plenty of elements taking into consideration just those variables linked to internationalization.
- Other Universities. The model focuses on the activity developed by the UNIPA Ph.D. Office. Obviously, there is a risk of limiting the results to the reality analyzed. Italian law, for the validation process, is applied in all Universities but the definition of the single Ph.D. offices can change from one University to another. Moreover, if we were to consider private or foreign Universities, we could obtain other results. Therefore, the application of the model must be attuned to the features of each single University analyzed.

At present, the model is in a process of validation after being totally verified. However, it is possible to confirm that the use of System Dynamics has offered a useful and flexible learning tool to understand the very complex dynamic behaviour of the Italian Ph.D. sector.

Future research will be directed towards the expansion of the model through the refinement of some assumptions and limitations, particularly to investigate and implement Ph.D. candidates' demand, perceived attractiveness of other Universities, the comparison with other public and private Universities, the role of international rankings and administrative bureaucracy. Further research will be necessary to develop more applied knowledge on academic Performance Management systems. It is also suggested to expand the model to incorporate internal efficiency performance indicators, such as spending *per* administrative human resources and other quality indicators established by the Ministry of Education.

Another target for future research can be the comparison with other Italian and foreign Universities both in terms of internationalization and bureaucracy level. In this comparison we must be care, in fact comparing institutions that belong to different systems, without making the appropriate distinctions, can produce wrong results. Anyway comparisons and benchmarks will represent important tools to raise the bar of performances and engaging Universities in productive competition.

Lastly, the thesis demonstrated that internationalization is a complex phenomenon and it is strongly influenced by the context in which it takes places. As a multidimensional concept, the realization of internationalization widely varies in different higher education settings. This means the context, and the varied ways in which it has developed, need to be taken into account

when assessing internationalization. Consequently, it would be interesting to differentiate between different types of Higher Education systems analyzing and comparing Universities of other countries. Certainly, measuring and assessing internationalization outcomes and their impact will attain greater importance as they continue to become more central to the definition of quality in teaching, research, and employment. The future challenge is, therefore, to create a manageable and meaningful approach that takes into account multiple dimensions using multiple measures and assessment tools to draw on the benefits of internationalization in all its richness and complexity.

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