

The international doctorate in design and innovation: a model for European-Mediterranean education and research¹

O Doutorado Internacional de Design e Inovação: um modelo inovador para educação e investigação europeia-mediterrânica

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Abstract

The contribution has the intention to describe the development and articulation of the International Doctorate in Design and Innovation, an innovative third level educational model in the field of design. The International Doctorate is also a European-Mediterranean network of education and research in design, characterized by a strong experimental approach, directed towards emerging economies, including Latin American nations. The proposed educational model is developed through a dynamic, multidisciplinary approach, defining an original and innovative pathway with the simultaneous effects of research and education as valid intervention tools.

Key words: product innovation, process innovation, creativity, network, multidisciplinary, knowledge.

Resumo

Este artigo tem a intenção de descrever o desenvolvimento e articulação do Doutorado Internacional de Design e Inovação, um modelo inovador em nível educacional no campo do design. O Doutorado Internacional também é uma rede europeia-mediterrânica de ensino e pesquisa em design, caracterizado por uma forte abordagem experimental, dirigido para as economias emergentes, incluindo as nações latino-americanas. O modelo educacional proposto é desenvolvido através de uma abordagem dinâmica e multidisciplinar, definindo uma via original e inovadora com os efeitos simultâneos de pesquisa e educação como ferramentas de intervenção válidas.

Palavras-chave: inovação de produto, inovação de processo, criatividade, rede, multidisciplinaridade, conhecimento.

Why an International Doctorate in Design and Innovation

Daily confrontation with emerging economies highlights a substantial divide between the extensive European productive tradition, supported by solid cultural foundations. These same foundations are, nevertheless, still anchored in older schemes and logic that limit the ongoing transformational process and the more dynamic

approach that characterizes emerging countries. This confrontation makes it necessary to implement collective initiatives able to redirect policies in the areas of development and innovation, at the same time bridging the gap between science and the marketplace, favoring transformation in the invention of products.

The causes of the innovation difficulties that afflict particularly the Euro-Mediterranean system and the failure to initiate appropriate policies in regards, is compounded by

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the inability to implement immediate or short term innovative processes, not to mention the time required to configure worthy and creative processes that would lead to a strong focus on product innovation, services and processes for the enhancement and growth of the production sectors.

In reference to Euro-Mediterranean areas, the need to renew production systems with the aim of competing on the international scene requires a methodological approach which not only encompasses the systemic integration of diverse skills, but also responds to the need to incorporate and make use of talent. This crisis is forcing them to renew their systems and processes, which also extends to vocational training intended to equip people with the skills they need to support manufacturing systems and guide businesses towards change, and a knowledge-based economy. More than ten years after the Presidency Conclusions of the European Council (Lisbon 23 and 24 March 2000) whose stated objective was the transition towards a knowledge-based economy and society to be achieved through targeted investment in research and innovation, many Mediterranean countries are only just embarking on a process of growth to achieve these aims.

The Mediterranean region in particular, as a bridge between North and South, still has to produce its own programmes and concrete answers, and is thus at a disadvantage within the European Community compared to the countries of Northern and Central Europe. The role of the Mediterranean is often marginalised when it comes to the EU's development policies, among other things.

At the same time, research centres and universities are losing their power of attraction when it comes to research and development, due to shortage of courses geared to meet new demands, and the lack of dialogue with businesses and local governments. There is, thus, a pressing need for a more profitable collaboration among businesses, universities, research centres, and local governments, including joint research projects and innovative courses with the specific aim of developing young researchers' cultural and scientific skills through specific multidisciplinary projects, and of meeting industry's need for updating and valorisation. To kick-start this process, cooperation policies must be pursued, among local systems (universities, local authorities and businesses) which should be thought of as communities, by sharing experiences linked to research and innovative training models.

Therefore, in line with the need for renewal and transformation of processes of knowledge generation and transfer, the European Program Erasmus_Mundus - 2009-2013 was founded with the specific objective of promoting structured cooperation between European and non-European universities, creating high level educational opportunities with distinctive European added value, focusing particular attention to the creation of centers of excellence with international character.

Starting from the Erasmus Mundus Program, and in line with the initiative of the European Commission incentivizing research in the fields of design, with innovation playing a key role in the disciplined research, the model of International Doctorate in Design and Innovation course was also developed with the objective of contributing to the definition of a third level educational model in the

field of design distinguished from current European models with Anglo-Saxon foundations

The model of International PhD in Design and Innovation meets the needs described above, by building a Mediterranean network of universities, research centres, businesses and local authorities in Mediterranean Europe, with the specific aim of shaping outstanding figures in the field of design, product and process innovation and other creative disciplines by implementing innovative, multidisciplinary research and study programmes. The aim of these programmes will be to emphasise the creative process and the development and transfer of knowledge: core elements in achieving innovation. The International PhD in Design and Innovation will be a platform from which shared development strategies can be experimented and implemented, initially among partner regions. Later, they will also be transferable to other contexts, in order to develop innovation using multidisciplinary design instruments, meet the need for renewal in manufacturing areas, and satisfy the demand for high-level training from countries with cultural similarities to those on the South Bank of the Mediterranean and the regions of countries within the Consortium. The PhD course will also give young researchers access to the tools they need to contribute to any manufacturing chain in the world, in both developed and emerging economies. As part of the advanced study pathway proposed on the course, students will acquire a rigorous methodology for analysing and exploring complex modern scenarios, elaborating, developing and implementing product systems, innovative, high-impact projects, identifying new markets and areas of intervention, and creating new business models and spin-offs. They will achieve this using design, creativity and integrated skills, which offer them the chance to contribute to diverse areas of production in an effective, wide-ranging way that will increase their competitiveness on the international scene. The research topics covered on the PhD course will follow a dynamic, multidisciplinary approach, thanks to the skills involved in innovation processes. Compared to traditional study programmes, the course has a more original, broader approach, as the coexistence of research and study is considered to be a valid tool.

The structure of the model is a result of various considerations on the role of research in design, intended as a producer of knowledge in relation to innovation processes, different parties and their roles, and to the system of relations which time and again is established within these processes.

If it is true that today, *the dynamics of innovation is the force that can shift history towards an improvement of living standards [...] [then it is also true that it can not be a linear dynamic experience, and it cannot be described as a simple succession of causes and effects [...] or as a part of an ideology that can be rationally or completely defined. It is an array of human, cultural, technological, scientific, economic phenomena not measurable as a double entry [...] an ecosystem in which each element is connected to every other* De Biase, 2009.

Within this "ecosystem", a major role is assigned to knowledge, *in a knowledge-based economy; goods are produced using knowledge as the primary fundamental factor. Knowledge is used in production processes and also as an*

independent factor, in the form of knowledge provided by people, as well as by objects and services that contribute to the productive outcome Rullani, 2004.

The ability to create awareness and use it in the best way is, without a doubt, one of the factors that determine the development and prosperity of an area, so that the area becomes, as evidenced by Rullani, a “cognitive multiplier”, able to contain and propagate all knowledge including implied knowledge, which combine to define its identity, *the knowledge based economy is a flowing economy, which in its propagation, requires a network of areas (territorial systems) on which to rely. The areas organize the complexity in a steady, durable way: the organizational strength and identity of areas allows the flow to be flexible, experimental and swift in the propagation process* Rullani, 2004.

In order for areas to be able to generate and disseminate knowledge for welfare and development, they need the presence of one or more generating systems and of an environment that encourages the disclosure processes, but the mechanisms that allow both circumstances to exist are not always clear and replicable. In the so-called “cases of excellence”, there is an overlapping of factors such as creativity, ambition, curiosity, willingness to find shared solutions as well as the social and environmental context, method, tools, the network of relationships, infrastructure and its available resources, which are all crucial for the establishment and development of the innovation process, *the animal instinct of the innovator, investment in research, training costs, the flexibility of the workforce, the amount of capital, creativity and imagination, are all important factors for the ecosystem of innovation*, De Biase 2009.

Crucial to achieving this result, is the relationship between research centers, businesses, institutions and the cultural and values system. An important point within this relationship is the investment and the quality of research and training.

Investing in research in all its forms, as well as in training, in turn means a continuous cycle of creation and transfer of knowledge from the theoretical- experimental field to the applied field, using and improving resources, local vocations and talent. It is an open and complex course, characterized by trans-disciplinarity and a continuous exchange of knowledge and different skills, decipherable and implicit; *training and research in science and technology are levers that allow the reproduction of these processes. The production of new methods, tools and strategies for developing training and research is therefore a work priority*, Bertola, Maffei, 2007.

In this scenario, the role of research in design, because of its trans-disciplinary nature, and because of its link with the industrial world and thanks to the design approach of this discipline, takes on a fairly defined position, *in today's world where everything changes so rapidly, an increasing number of individuals and collective groups are confronted with new problems and opportunities never before experienced. There is an obvious demand for skills and expertise in design; a discipline able to dialogue with all sectors involved in the development processes through a methodology that allows a continuous comparison* Bertola e Maffei, 2007

The creative and transverse approach to design involves the development of strategies applied by both the

world of industrial production and that of research. In this context the local dimension deals with the global system through a permeable connection between nodes - an active and controllable system capable of generating goods and services of international importance, with close connections to the local territory.

In this sense the Innovation Union is one of the flagship initiatives of the Europe 2020 strategy, and the programme of the European Commission defines a strategic approach to innovation. Its objectives include reorienting research, development and innovation policies in order to address the main challenges, while also bridging the gap between science and market as a way of transforming invention into products. To close the gap between invention and production, one of the key points envisaged by the Innovation Union is that, by the end of 2011, the Commission will establish a European Design Leadership Board and a European Design Excellence Label, based also on the indication of the European Union, which has asked the Member States to promote experience and good practice in the area of design as innovation performance and an instrument to provide a competitive edge. Today, ascertainment of the success of this model and thus the demand for professional figures who can implement it, alongside the social demand for a new generation of products and services that are consistent with current economic and sociocultural transformations but are also environmentally sustainable, mean that it is time to take a “quantum leap” and offer a high-quality educational pathway aimed specifically at transferring the competencies required in the design field.

Therefore, the model of International Doctorate in Design and Innovation has been developed in response to need for market innovation, particularly on a European level, the demand for high-level educational offering in the area of the design and, lastly, the initiatives of the European Commission promoting design research, giving this discipline a key role in achieving innovation.

A model for European-Mediterranean education and research

The International Doctorate in Design and Innovation was established in 2009 between the Second University of Naples and the University of Malaga (Spain), in the 2010 the partnership was extended to the Technical University of Lisbon (Portugal). In relation to the Erasmus Mundus Programme, the proposal model of doctorate has the dual objective of creating a European network – with special reference to the Mediterranean area – of universities, research center, local bodies and business revolving around design and well as product and process innovation, while also training people with a highly developed professional background who can provide support to any production environment in order to develop innovative products, systems, service and processes.

The doctorate structure assimilates the powerfully experimental character of the discipline and is proposed as an international multidisciplinary workshop in which young researcher can conduct research projects in collaboration with partner businesses, research centres and

trade associations. The aim of the program is to bring young researchers into initiatives that are already under way to define innovative products or processes that can be patented.

The model here proposed is the result of a desire to channel the two paths of research and training into a “friendly” and open container, which is able to create strong connections and a continuous offer both in terms of education and knowledge.

The creation of a network connection between companies and international academic realities will allow the activation of a system of relations, involving skills and production realities of a different nature. This will facilitate the construction and integration of a space for collaboration to identify development opportunities, areas of research, design themes, areas for process and product testing. An order designed to overcome the spatial and territorial dimensions, and enable a prompt response to the requirements and changes that come from the outside.

The goal of the network is to facilitate the circulation of knowledge, ideas and creativity among involved parties, and at the same time, create a system of shared innovation, intended to provide quality research and training and introduce a innovative research-training system.

In such a manner, a flexible and dynamic system would be established, where the involved parties discuss and decide together how to resolve any arising issues, to create a shared project and then separate and join different networks to achieve new goals.

The constant element, in this case, would be the academic institution which in fact has the role, from time to time, of identifying a network of expertise in response to specific requests from different businesses.

The structure

The objective of the International PhD course is to produce outstanding figures skilled in the field of design, product/process innovation and creative disciplines: individuals able to work in any production environment. The multidisciplinary, wide-ranging approach will allow young researchers to find employment in various fields, thanks to their ability to interpret and analyse contemporary phenomena, add value to the production systems of various countries, identify new markets and areas of intervention, develop high-impact products and solutions, interact with a range of skills and finally to translate the know-how and skills necessary to compete on the global market into process and product systems. The multidisciplinary approach will also help to shape professionals who can act as a link between the different divisions of a company that have a more direct involvement in product development (marketing, design, planning and manufacturing).

As was anticipated, the International Doctorate in Design and Innovation was established by the IDEAS (Industrial Design, Environmental and History) Department of the Second University of Naples, in collaboration with the Art History Department of the University of Malaga and the Faculty of Architecture of the University of Lisbon. The following chart shows the pattern of evolution of the phd program and the gradual expansion of the network:

To respond effectively to the needs expressed by the Erasmus Mundus Call, the first step was a benchmarking on master and doctoral degrees in the area of the design in Europe. The benchmarking has been implemented and extended worldwide.

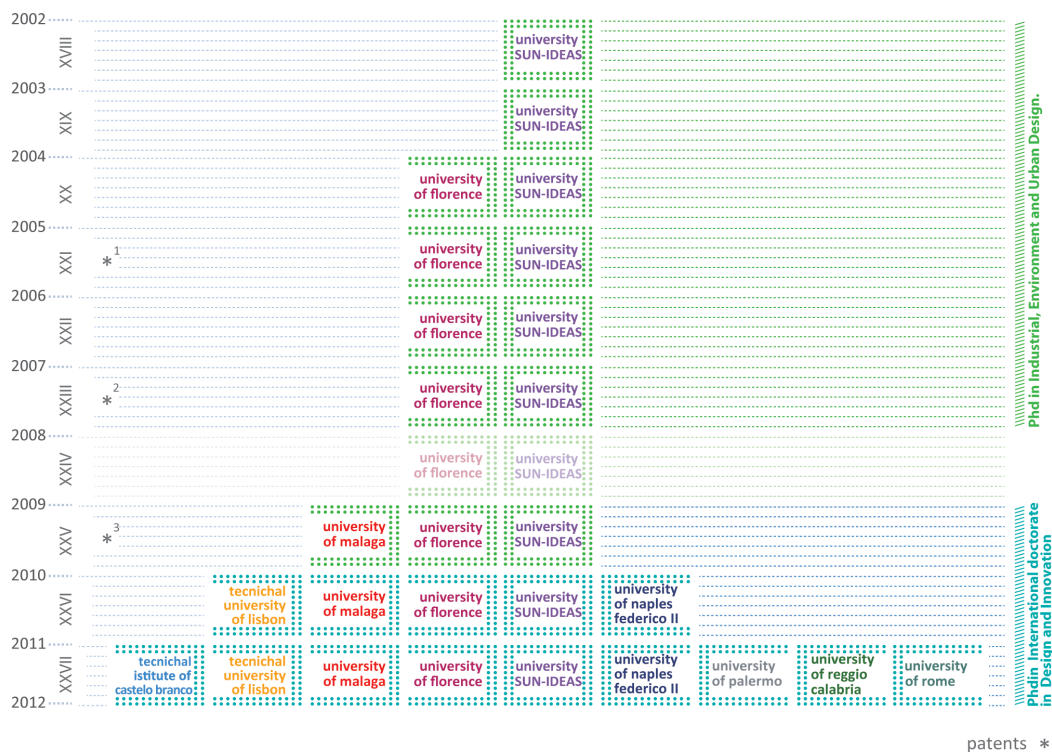


Figure 1. PhD history

Research in the design field is expanding enormously in European Countries, thanks to the presence of a solid cultural background in disciplines correlated with creativity and the manufacturing tradition. In Europe, and particularly in Northern Europe countries, there are numerous graduate programmes in industrial design (master's and doctorate degrees) that focus on specific aspects such as design for environmental sustainability, visual communication design, automotive design and so on, imparting specific competencies for defined areas, as can be noted from the benchmarking that follows:

In relation to the analysis that has been conducted, the model of International Doctorate strives to respond effectively to the weaknesses that have been noted. It aims to do this through an innovative and flexible educational approach and, from a scientific standpoint, by addressing all aspects of this discipline, from product design to management, communication, graphic, and the definition and different fields of application of design and various scientific fields.

For the specific objectives of the Erasmus Mundus programme the project provides for the expansion of the consortium that follows:

The new consortium is characterised by the presence of academic partners specializing in various design areas. The following diagram summarises the areas of specialization covered by the universities and by corporate partners and research institute that have expressed an interest in participating to the project.

As can clearly be noted, various fields are covered, ranging from art history to the design history, criticism, social and economic sciences, fashion design, graphics, communication and product design. Furthermore, the presence of expert on materials and of experts and researcher in the energy sector will orient specific cross-cutting studies in sectors that are strategic for Europe.

This results, in regard to the scientific aspect, in the singularity of the proposed model, compared to courses analyzed.

The program is structured in the form of training modules and design activities. The aim of the training modules is to give PhD students a common set of skills and knowledge in order to help them grasp the system-product and get to the heart of design activities. Design activities constitute the bearing structure of the program and are conducted throughout the two years that follow the initial training year, ending with an internship at one of the partner business/research centres that are members of the Consortium. The training modules for the first-year activities are constituted by face-to-face lectures on the various areas of design, criticism and history of design, communication, management, technology, social sciences, design for the energy industry and design for the fashion industry, product design, architecture, art history, sociology, material science, engineering, environmental, physics, innovation, marketing.

The proposed training program is developed through a dynamic and multidisciplinary approach, thanks to the competencies that come into play in innovation processes, defining an original and innovative pathway with respect to traditional ones, and viewing the simultaneous action

of research and training as a valid instrument for this approach. The model of doctorate is distinguished by its experimental nature, with the convergence of research and teaching in order to guarantee – through hands on experience – the training of people with a highly developed professional background who are able to work critically in different production scenarios for research organization and in academic settings, in the area of product design, design for fashion oriented production system, innovative processes and communication. From a scientific standpoint, the educational contents are set up so as to provide basic know-how and the instruments needed for research and design activities. The training modules that constitute the background of the design and research activities refer to four main topic areas. The four main topic areas as follows:

Product design, innovation and new product system

The aim is to train students to identify new scenarios and areas of intervention for manufacturing contexts, by using industrial design tools and creative processes and identifying strategies, innovative planning solutions and new products. They will also be given the ability to interpret, decipher and analyse possible restrictions and opportunities, and use their specific knowledge and skills to identify and utilise new materials and technological applications to plan the entire process by which an industrial product is developed: from the identification and analysis of potential problems through to the project itself and the final prototyping/industrialisation stage, with a guarantee of continuity and quality along the entire pathway

Design ideas and visions

The aim is to acquire a methodology for the interpretation and critical analysis of an industrial product and its aesthetic/formal properties as an extra value that impacts on the emotional relationship with the end user. A further objective is to develop the ability to focus on the historical development of the industrial product, in particular by studying the way it has evolved since the 19th century until the present day, from an aesthetic, formal and functional point of view, and the way the product interacts with the end user and is incorporated into society

Product design and innovation within fashion-oriented systems

The aim is to train students to identify new scenarios and areas of intervention related to the design of fashion-oriented systems by defining innovative design solutions and production processes. By acquiring specific skills, students should be able to follow the entire process by which a fashion-oriented product is developed, with an advanced ability to critically analyse and interpret modern phenomena, identify and utilise new materials and technological applications in the fashion sector, elaborate innovative projects and follow the entire product development process through to the industrialisation and launch phase, by producing a communications plan.


top universities phd in design			phd programs								specifications																	
			industrial & product design	innovation design	design history & theory	fashion design & textiles	user-centered design	energy & environment	communication & interaction	design strategy & service design	design science	mobility design	international phd programs	collaborations with universities	multidiscipline studies	innovative products&solutions	patterns & spin-offs	business partnerships	practice based	theory based	research centers	academic services	int. exchange programs	web site available in english	career and stage support	advanced in technology		
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Figure 2. Benchmarking

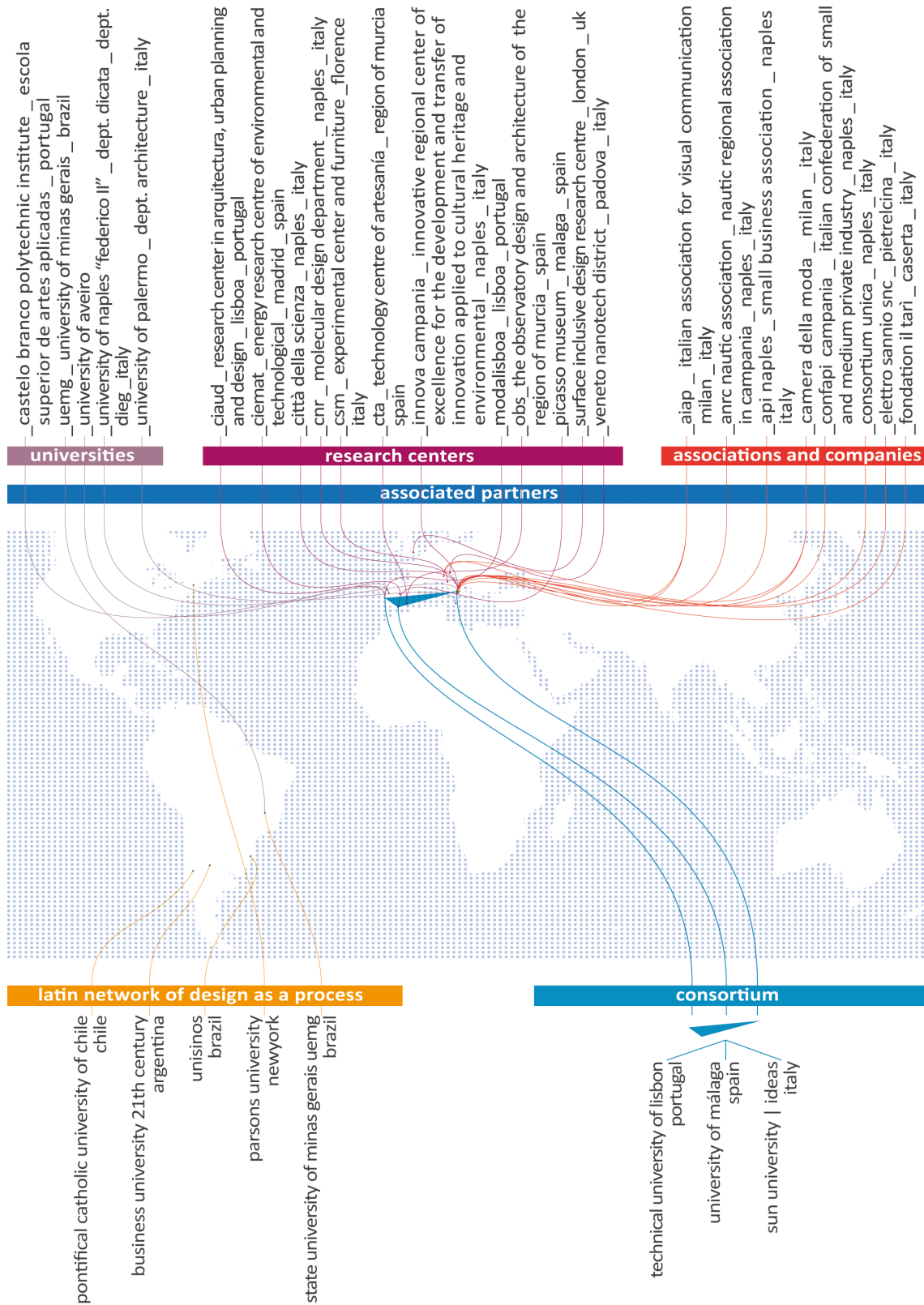


Figure 3. PhD consortium

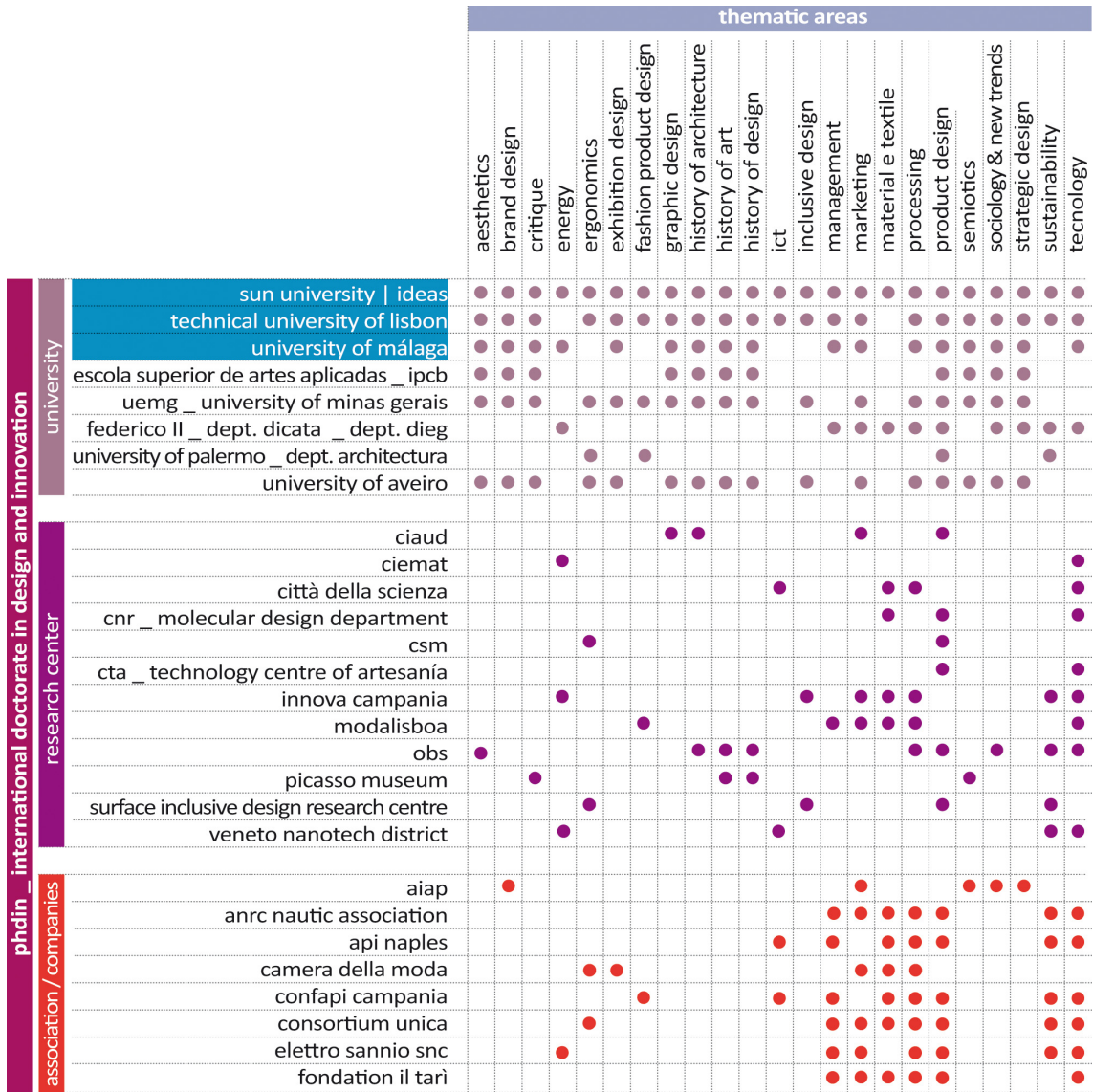


Figure 4. Areas of specialization

Communication, image, consumption patterns, new lifestyles

The aim is to develop analytical and design skills in relation to brand design, communications and media. The programme relates to the acquisition and exploration of theoretical and methodological issues related to communications and the exercise of skills intended to work in synergy with product and/or service designers as part of a process geared towards constructing and promoting the identity of a product, service or company. It will also explore issues and projects related to local development, including tourism, and will therefore cover the advertising of cultural, environmental and natural heritage. Specific tools will be deployed in each area of research, to bypass the consolidated logic of the market and communicate with other players from diverse backgrounds with the aim of rationalising and proposing innovative solutions and experimenting with new combinations of research and development.

The four main topic areas cover all design-related fields, starting with the history and criticism of the industrial object and going on to the design of innovative products, visual communication and design management. In the field of industrial production, a further distinction has been drawn between product design and design for the fashion industry, diversifying the professional profiles offered. Following the first year of basic courses, there are the examining all four topics, investigating a subject common to two or more areas. The main topics also respond to the demand tied to university design training, with the presence of master's degree in product design, design and communication and specific university degree in fashion design.

The educational contents are organized so as to provide basic know-how and instruments needed for research and design activities. Special attention is paid to developing creativity and openness to change and to problems connected with managing design processes. Below is the timeline for the educational activities over the three year program. As the PhD students will already become part of ongoing research project of the end of the second year, they may also have the opportunity to co sign patent applications for industrial invention, PCT patents or interna-

tional patents and may also help for academic spin-offs.

The lecture will be held in cycles, according to a timeline established. The first-year courses will be held by the professor at their respective universities through the interactive platform. This will allow the students to hear the lecture at any university campus. The educational plan for the first year has been designed to cover all fields common to the four profiles.

The International Doctorate uses the virtual platform, through which students can exchange information, manage the programme of activities, follows the lectures and seminars that form part of the course held at all the Consortium Universities and hold web meeting with all the members of the lecturing team, including those at other sites, carry out administration, upload articles, research project and slides to be discussed with external partners. Specifically this is an integrated platform for team collaboration and social software. It can be accessed by the researchers, teachers, international experts and representatives from business and research institutes.

The program provides during the year of the PhD program, and with the faculty's approval, that the young researcher must also complete an internship at one of the consortium partners. In reference to the set-up of the mobility plan, the aim of the doctorate is to build "customized pathways" for each candidate, starting with aptitudes, interests and the researcher activities involved in this training. The diagram presents a model of mobility plan that includes an internship of the three months at a partner company. The internship is essential to enable any collaboration at the end of the PhD program.

The Faculty included professors from the universities that are part of the Consortium and a teaching staff with several professors from partner universities and researchers from the partners' research centre. The model provides that also use qualified experts in the scientific sectors and fields related to those of the programme. These experts may be from outside or from universities other than those that are part of the Consortium, in order to conduct teaching activities and hold seminars, and to serve on the final Examination Board.



Figure 5. Thematic areas

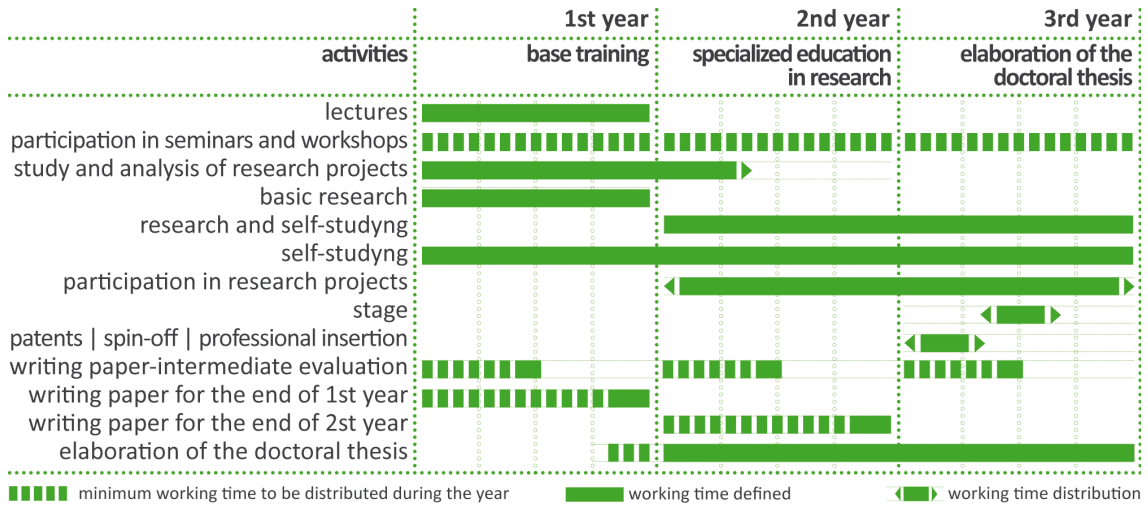


Figure 6. Activities timeline

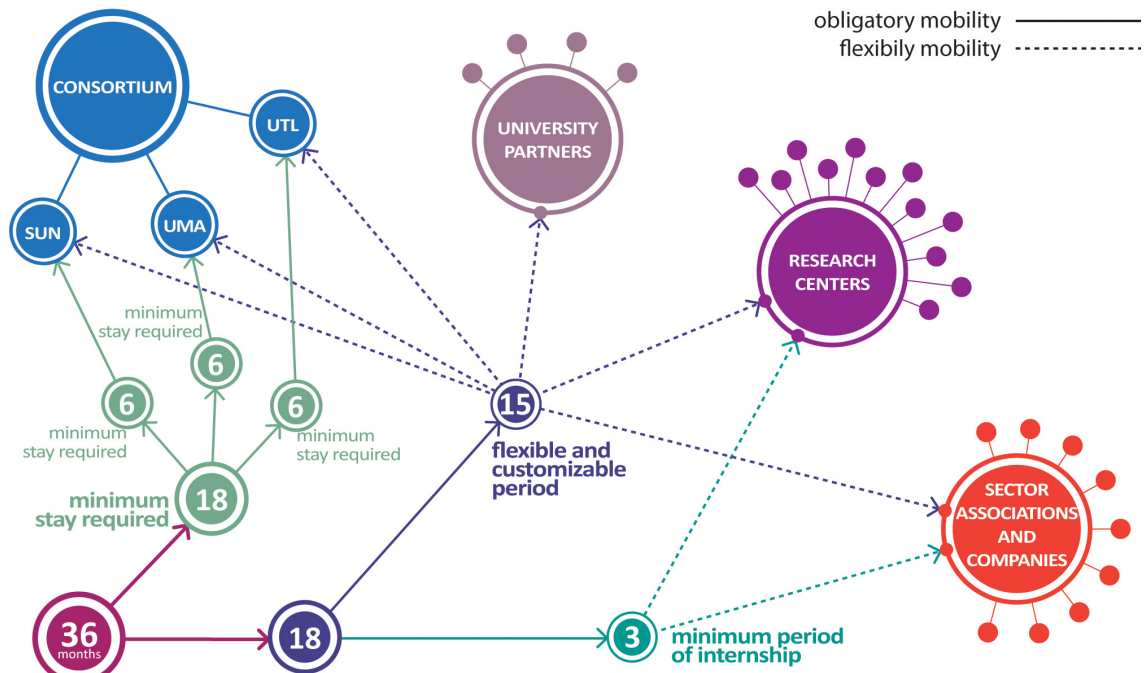


Figure 7. Mobility plan

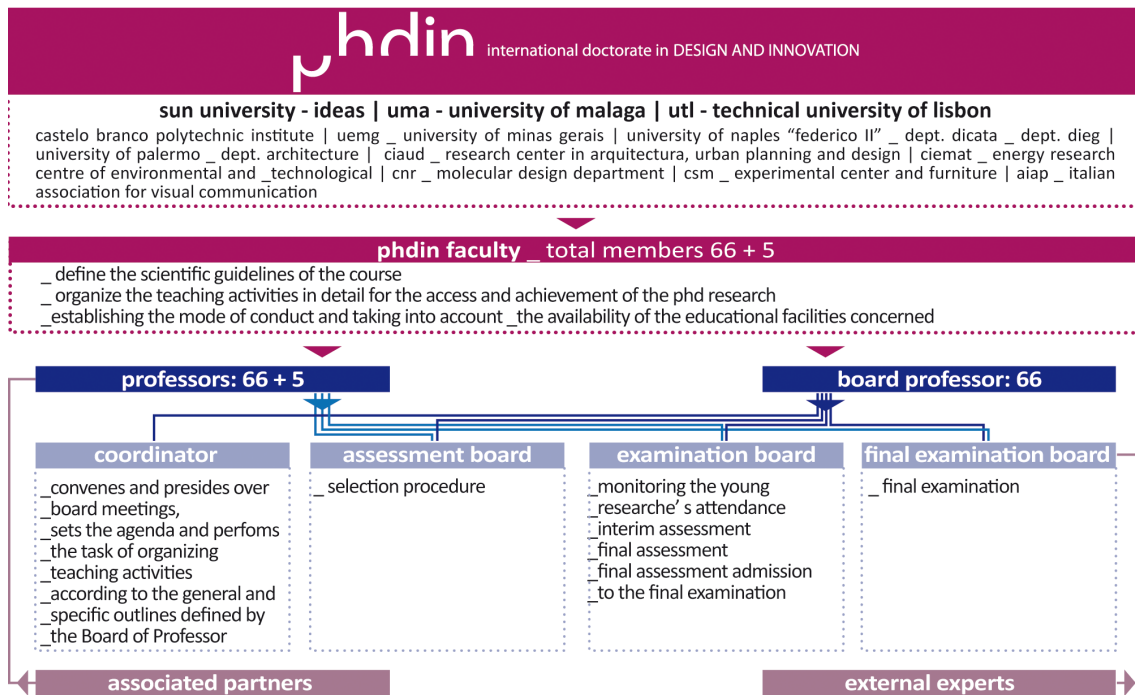


Figure 8. PhD faculty

The concept of simultaneous research and training actions, here proposed, together with simultaneous development of a research project and the ongoing confrontation between different areas, would allow a reduction in time because the information is shared.

The model results in a friendly and creative environment, in which subsystems circulate, and that, from time to time, unite in a spontaneous order to achieve common goals. Information sharing, a continuous comparison and the use of processes to transfer knowledge and to generate and manage creativity, are the constants for the conduct of research in design and make these environments flexible to accommodate the new sub-systems and generate new knowledge. The establishment of this model, where agents and the processes of research and training blend, involves a detachment from strict academic rules in favor of innovative models, in line with modern ideas on the role of universities in the development of territory and the need for a renewal of the aca-

demical system. A renewal, especially for research in design because of the nature of this discipline, can not be separated from the production process and the constant comparison with territorial vocations.

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