VALORISATION OF UNIVERSITY RESEARCH. IS RESEARCH WORTHWHILE FOR MORE THAN JUST PUBLICATION BY RESEARCHERS?

Francesc Solé Parellada* Mireia de la Rubia and Raquel Egea*****

Over the past two centuries, universities and government-sponsored research laboratories have become institutions for the creation of knowledge and built a space for support for the production system. However, the transfer of that prior knowledge to society has not always been assured. At this crucial point in history, the production system cannot compete without the contribution made by the scientific and technological system as a whole and we therefore need to foster a new culture of creation of prior knowledge that includes its valorisation.

What are the conditions for transfer from research to competitive edge via innovation? Does our science and technology system fulfill those conditions? If not, what do we need to do and what resources do we need to dedicate to the task?

In this article, we take a critical look at how research is organised here and we provide guidelines for how it can be valorised.

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* Francesc Solé Parellada is Professor at UPC and Academic Director of the Innova Research Valorisation Programme.
** Mireia de la Rubia is Technical Director of the Innova Research Valorisation Programme.
*** Raquel Egea is Assistant Director of the Innova Research Valorisation Programme.

1. Introduction

Our surroundings are changing. The economic organisation of the world has changed. Different regions of the planet with different resources and capacities are competing in existing products and processes and in the flow of innovation. The globalised world has placed the different functions of production into contact. Different cost structures oblige the more complex economies to expend their efforts on focussing their industrial fabric on products with higher value and therefore invest in knowledge. Globality, technological evolution and in general the economics of knowledge have called the parameters of competitive edge into question.

Over the past two centuries the economies of what we call the first world have created, even if not always intentionally, a set of institutions that generate knowledge, such as universities and public research laboratories that, in practice, constitute a space for support for the production system. Those institutions have contributed a copious flow of information and knowledge thanks to research structures that tend to be highly sophisticated. In parallel, those agents of the support space have created their own organisation, a working culture and a specific system of incentives within a given legal framework. As a result of that effort, which has often been shared with enterprises, society has obtained a stock of scientific and technological knowledge with an importance that could hardly have been foreseen by the entrepereneurs who drove the industrial revolution. However, the transfer of that prior knowledge to society has not always been assured. The difficulty of directing the flow of prior information and knowledge[1] from academe to society can be attributed largely to a lack of effective systems for transmittal and a culture of isolation on the part of both sides.

We need to co-ordinate the systems for creation of prior knowledge with the production system and with public organisations and succeed in having those two worlds co-operate.

The creation of codified information or prior knowledge has not always had a direct effect on the production system and it has therefore not reached the majority of citizens in the short-term. It is true that until only recently prior knowledge was not so necessary for the production system, whether in terms of amount or sophistication, and consequently the transfer of the prior knowledge created by academe to enterprises was not so urgent. At this crucial point in history, the production system cannot compete without the contribution made by the scientific and technological system as a whole and we therefore need to foster a new culture of creation of prior knowledge that includes its valorisation. In short, we need to co-ordinate the systems for creation of prior knowledge with the production system and with public organisations and succeed in having those two worlds co-operate.

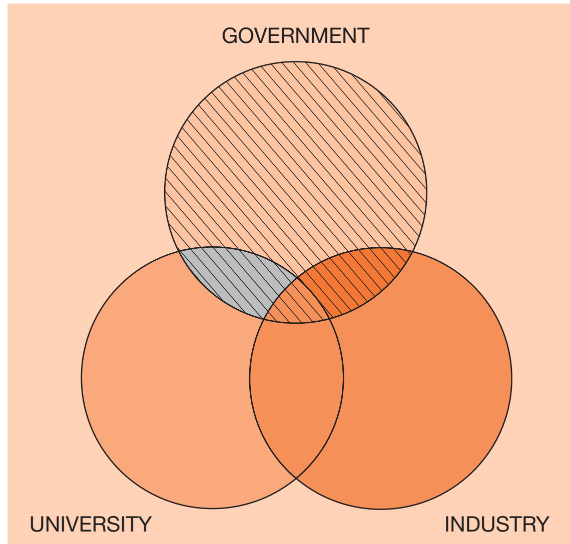
[1] We will also refer to information generated through university research and transmitted through the conventional channels of journals, conferences, congresses and books as prior knowledge.

In middle-income countries, the most substantial element of the science and technology system of the support space is precisely the university system. For universities, the pursuit of creation and valorisation of knowledge has become a social obligation. Any country that wishes to prosper must construct a university system that clearly focusses on excellence and valorisation. That valorisation does not need to be immediate, only effective, whether in the short, medium or long term. Government has the duty of acting to ensure that that circumstance is possible and, where feasible, to facilitate matters. Government must create a legal framework and a system of incentives and permit organisation in such a way as to ensure that research and its valorisation can occur without unnecessary effort. As has been made evident[2], there is an increasing awareness of that challenge, and even economics literature has created new models that have met with success, such as that of the triple helix (figure 1)

Research, knowledge and innovation are the keys to competitive edge and university is one of the vital agents in the system.

Briefly and simply, we can sum up what we have been saying in the following line of reasoning: Knowledge is the basis for innovation. Innovation is the only way to compete with other countries. Research is the source of knowledge. In middle-income countries, most research is accomplished at universities. Therefore, university research is the answer for the future competitive edge of the production system. Research, knowledge and innovation are the keys to competitive edge and university is one of the vital agents in the system.

Figure 1
The triple helix (Henry Etzkowitz)



Unassailable logic, but it is actually true? And if it is true, what are the conditions for the transfer from research to competitive edge via innovation? Does our science and technology system fufill those conditions? If not, what do we need to do and what resources do we need to dedicate to the task?

The logic of that reasoning seems unquestionable, and consequently it would appear that we need to join forces to improve the creation of prior knowledge and its subsequent use. Nevertheless, although the challenge is clear, it is not so easy to

[2] Etzkowitz, Solé Parellada and Piqué, 2006.

say exactly what we need to do, nor is it frequently the case that our real tangible efforts, even if they are adventurous and resolute, are up to the challenge.

2. Research: fallacy of distinction between the aims of pure research and applied research. Research as prior knowledge

The first factor that we need to define if we wish to ensure that the knowledge created at universities is placed at the service of society is what an enterprise or an organisation considers to be knowledge. In simple terms, we can say that "useful knowledge in a production system is held to be all the elements that enable a person, a group or an organisation to act". That definition is of the sort that we might call a hinge definition. It is a useful definition for a complex concept that might in other contexts have more facets than can be explained by this definition, but on the other hand it is the perfect definition for the area of management of both private and public organisations.

However, when we speak of the knowledge produced by universities in connection with its use by the production system, we are referring to a different sort of knowledge. What the universities and research laboratories, which are not a part of the prodution system, actually do is to feed the stock of scientific and technological knowledge and that task does not fit snugly into our definition of knowledge as given above, at least not with respect to its immediate market dimension.[3] In respect of the knowledge that we have defined above, that prior scientific and technological knowledge is placed in a store from which it can later be retrieved to be provided to the production system, and is called by that name only when it incorporated into the organisation directly or into the production system indirectly via spin-offs or via patents and intellectual property in general and allows the organisation to do things that it was unable to previously or to do things that it already knew how to do better.

Prior knowledge does not necessarily become useful information for organisations if there is not some sort transfer and transformation of that knowledge into something that can be transmitted to society in the broadest sense.

Consequently, the creation of prior knowledge, even if it is highly sophisticated and even if a wide range of means has been used to obtain it, does not necessarily become useful information for organisations if there is not some sort transfer and transformation of that knowledge into something that can be transmitted to the processes, product organisation, production system or society in the broadest sense.

This leads to a debate that can be helpful to break down the prejudgments and simplifications that the discourse often obliges us to make. That debate deals with basic and applied research, the importance of the basic support sciences and the

[3] It might be argued whether or not the information or prior knowledge disseminated in articles is in fact knowledge that enables researchers themselves to act. In that sense, it is definitive knwoledge for them but not for the production system or the public institutions that need it to operate in the supply of new products or services.

need for science to reach the production system and finally society. That debate, when it is carried out rigorously, is very worthwhile because it provides parameters for decisions on science and technology policy, although it often becomes a smokescreen, and when it is slanted it can also be harmful, since it serves as an excuse for conduct that does not serve the public interest. We must therefore take time to examine the subject at length as an aside to our discourse and discuss, for example, the scientific and technical origin of technological innovation and the research practices of universities and public laboratories.

Competition and the incentive of recognition favour the appearance and dissemination of research results in academic, fundamental or basic research.

Scientific novelties are called discoveries. Changes to technological applications are called inventions, and changes to know-how that also give rise to changes in products and processes, if they are accepted by the market, are called innovation. When we speak of scientific and technological transformations that lead to technological information, we can distinguish between four levels:

a) The scientific level, which establishes the foundations of the technological domain or the activity concerned.
b) The level of generic technologies, which are the basic technologies required for a given activity.
c) The applicable technological concepts, which include, within the framework of a technology, the existence of certain "concepts" that may be applied, each of which requires specific skills.
d) The technical adaptations representing modifications that do not require recourse to a new technology, but instead are situated within the framework of a given technological concept.

It is therefore clear that we are not in an uncomplicated field where simplifications can be equivocal and intention may be disinterested or biased. Research is a complex activity. That complexity can be assessed from different standpoints and in different dimensions. According to Callon,[4] its nature and outcome can be analysed in terms of six dimensions namely the following:

Produce prior knowledge

Research contributes the production of knowledge whose quality and worth are judged by the scientific community. This is what is known as academic, fundamental or basic research. The scientific community peforms the tasks of production of knowledge and recognition of certain results. Researchers compete amongst themselves. Competition and the incentive of recognition favour the appearance and dissemination of research results. The only results that survive are those that pass the test of group criticism. In general terms, this production is steered by competition betweent researchers.

Address issues of general interest

Research can be directed at resolving issues of general interest through public programmes. Such general interest can be more or less clearly

[4] Callon, 1995. Michel Callon names five, namely the first five. However, his work dates from 1995 and perhaps at that time the last of dimensions listed below, namely the need for valorisation, was not so clear, or even though he does not mention it directly, he included it in the fourth or fifth dimension.

defined. An activity such as a weather satellite has clear objectives, while those of other activities may be less obvious, such as in the case of an epidemiological survey. Research activities of those types are carried out under the auspices of public organisations. The aim is not to create competitive edge or increase the stock of knowledge, but rather to contribute to certain aims of public welfare. From that standpoint, research activities are steered and guided by political judgement and the underlying debate as to what matters must be given priority for the public good.

Connection between research and training
One necessary aim of research activities is to contribute to training activities. This process allows the knowledge and know-how developed by researchers to be transformed into abilities on the part of students. The way in which knowledge is transmitted to the training system depends highly on the degree of competition existing between training institutions and their capacity for positioning themselves in respect of the employment market. This training dimension of research activities is steered by the characteristics of the teaching system.

Conventional dissemination of research results
Research cannot be carried out in a society that is hostile to science and technical progress. Researchers and engineers have always exerted themselves to present their activities in such a way as to be of interest to non-expert audiences, whether to satisfy their curiosity or to demonstrate the worth of certain results. That relationship can take a variety of forms, from the publication of books and articles to dissemination in the media, campaigns or ethics committees. The impact or success of this dimension can be assessed in many different ways, such as the sales of a book, the attention paid to expert advice in the final versions of laws, and so on. The degree of acceptance by the persons at whom it is aimed defines the importance of the matter.

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Financial dimension of research
Research can be a component of the process that leads to the production of innovations, i.e. the marketing of new products and procedures. Such innovations form a part of strategies used by enterprises to create the competitive edge that gives them an advantage over their competitors. The participation of research in industrial and service activities is driven by financial competition between enterprises on the market. Regardless of the exact nature of those strategies, what counts is the ability to transfer the discoveries and developments of researchers into innnovations. It is therefore financial competition and the wish to obtain the benefits of the micro-monopoly held by the innovator that drives research linked to industrial activities.

Valorisation of university research
The function of valorisation is not new, although its extent and, as we mentioned in the first section, its necessity are both recent developments. It consists of the efforts made to transfer, patents and stimulate the appearance of spin-offs that transmit prior knowledge to the production system or society in general. In that function, the university

acts as consultant, engineer and manufacturer of opportunities. The entrepreneurial function follows upon performance of the function of creation of applicable knowledge. The task of transfer is of a variable nature and the knowledge can reach society after a lengthy research period financed with public or private funds in rather sophisticated areas of research. That research may not appear at the outset to be applicable and is often called "basic research". Where there is a more or less direct application of the knowledge of the research group and their experience, which additionally requires the creation of knowledge, it can also be referred to directly as "applied research".

In this "model" each dimension makes its contribution to the others. For example, the production of knowledge leads to the qualification of students who will enter the employment market, while experience can lead to the formulation of standards that can have a direct impact on the qualification products.

In fact, the distinction between pure research and applied research has gradually blurred. That distinction is based upon a construct of two scientific and technical systems that operate more or less in parallel.

On the basis of this model, we can examine the distinction between pure research and applied research more closely. In general terms, pure research is understood to be the activities carried out by researchers with the sole intent of increasing the stock of prior knowledge, while applied research comprises activities that are carried out with the aim of a specific use for an industry or public organisations. In fact, the distinction between the two has gradually blurred. That distinction is based upon a construct of two scientific and technical systems that operate more or less in parallel. One of them is funded by government and its research priorities are decided by the researchers themselves in a more or less organised manner. This set of researchers are driven by scientific curiosity and knowledge for the sake of knowledge. What is sought does not need to have any immediate or recognised practical use. The type of science practised in the public or institutional system is highly sophisticated and requires substantial investments. It is decided by a committee of experts taking into account scientific progress more than the practical usefulness of the planned discoveries. Such discoveries, if they are made, will be public. The other system is made up of a set of researchers and laboratories, whether in industry or in the public system and is financed largely by private funds. The scientific level is often low, techniques are specific and innovations are made to products or processes. The subjects being researched are decided on the basis of their immediate usefulness, i.e. on their translation. Discoveries are, preferably, private. In fact, that standpoint is based upon the intention behind the research. Nevertheless, it is understood that basic research is highly sophisticated science or that it operates in the area of those sciences that are ultimately a tool for the advancement of other sciences, thus removing it even further from the market.

A further argument, and one that serves to reinforce the distinction between pure research of a public nature and private research is the acknowledgement of the fact that certain research that is considered necessary requires sizeable investment in laboratories that is beyond

Table 1
Conventional criteria for classification of research as pure or applied

	Level of scientific sophistication	Ultimate aim of research	Source of demand or initiative for research
Pure research	High	Increase store of knowledge	Public organisations or researchers themselves
Applied research	Medium–low	Develop new products and/or processes	Enterprises

the capacity of industry due to the high risk involved. In that connection, government can justify its role as patron of science because private initiative would leave important fields of knowledge unexplored due to strictly practical reasons: the aim is to use research to obtain results that are appropriate to the production system. Likewise, it would be reasonable to attribute to pure research the value of training researchers that can work for the system.

Table 1 sets out the conventional scheme upon which the distinction bertween pure research and applied research is based. However, that scheme is no longer an accurate representation of reality. The number of researchers at industry laboratories has grown constantly, while the number of researchers funded by government has grown much more slowly. The two systems are permeable, although that permeability operates to varying degrees, depending on the sectors, development of the system and even on whether law favours or obstructs it. It would be difficult to argue today in favour of research that will not sooner or later reach society or knowledge that cannot be applied in one way or another. Nor is sophistication any longer the preserve of publicly-funded research, and consequently the boundaries are increasingly difficult to draw. We therefore need to examine in each case whether the classification as pure or applied research is appropriate or, in any event, the basis for that classification, depending on purpose, the distance in time and sophistication from its application, actual sophistication, the capacity for boosting the potential of research in an environment of costly facilities, its contribution to the production system in the short, medium or long term, and, lastly, the cost of opportunity.

This analsysis and the prospect of public intervention could lead us, with all the risks involved in a strategic view, to three levels of action relating to the six dimensions of usefulness of research set out above:

- Ensure that a certain balance is maintained between the different dimensions.
- Make relations and interconnections between the dimensions easier and more frequent (e.g. relations between universities and enterprises).
- Act on the mechanisms for stimulation and evaluation that are operational in each dimension.

3. How research is organised

There can be no transfer or valorisation of research where there is no research. It may seem obvious, but it often appears to be assumed unquestioningly that everyone at universities is involved in research, that research is carried out for a purpose, that research groups are well organised, that they have the critical dimensions, that they are well governed and that their continuity is ensured by a system of replacement of the people who run them in accordance with the aims of the research. The only factor that may sometimes be questioned is whether or not they have the resources that they need to operate on the cutting edge of science or whether their salaries are appropriate to their important social function. Those assumptions are far from unassailable. Research at our universities is in fact optional. Its organisation is often non-existent, or at best improvised. Its dimensions are insufficient and the available resources are largely unsustainable and all too often erratic.

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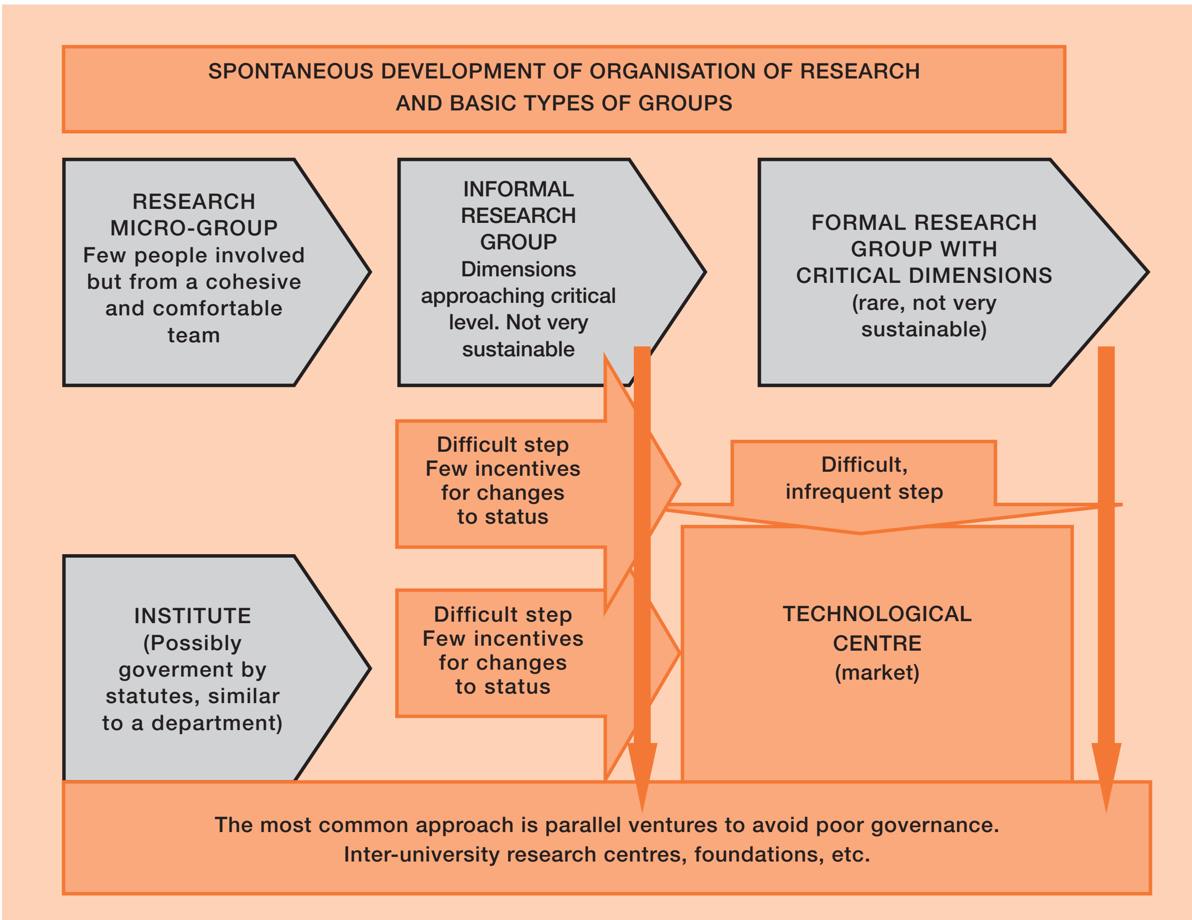
On occasion, an enterprising researcher, in addition to their academic standing and thanks to their capacity for leadership , is able to involve a large number of their colleagues. That leader seeks and obtains funding from here and there and builds up an effective research organisation that can generate more resources to make research easier, allowing attendance at congresses and making it possible for colleagues to visit and work at prestigious universities in other countries. The phenomenon is an interesting one and worthy of study in the context of the sociology of organisations, but it is spontaneous, unplanned and, in any event, neither called for in university standards and nor protected against the vagaries of regulation. It is also obvious that, given that situation, the subject of the critical dimensions of the research strategies of institutions and career plans resemble the literature more closely than they do reality.

Figure 2 shows how research occurs at our universities, given their system of government. That system imposes upon us the peculiar legal framework and the no less peculiar system of accountability and the employment status of lecturers, as “perfected” on the basis of the chain of statutes from those governing the university as a whole through those governing faculties, schools, departments and sections.

Research at universities and in their research environs is organised around six types of groups:

The research micro-group. The commonest type of group, made up of a senior lecturer who, thanks to their career, leads a small group of researchers, who are, as a rule, lecturers, doctoral candidates and grant-holders. The group is assembled through the endogenous recruitment of its members by the leader (from grant-holder to doctor, and from there to tenure-track lecturer and perhaps even to full professor). That leader, in addition to sustaining the group’s science, also sustains its funding, whether through agreements or application for grants. The group is further cemented by its confidence in the ability of the leader, who will, as a rule, be a full professor with a certain prestige in their area, to ensure the academic promotion of the group members. The group operates quite independently of department decisions and therefore of department regulations, with certain conflicts in connection with the hiring of grant-holders and with certain reporting obligations, which are increasingly

Figure 2
Types of university research



unlikely. Consequently, the group is sheltered from any more or less erratic decisions on the part of the university.

The informal research group. Where leadership is very powerful and when demand so requires, the micro-group will evolve into a more numerous informal group approaching the critical dimensions required to sustain the facilities and implement a certain hierarchy with division of tasks above and beyond performance of the basic chores to ensure production of the artices or papers required by agreement. Such a group needs to procure ongoing funding and the leader's work, in both academic and commercial terms, tends to increase. The group will come under pressure from the department because its dimensions bring it up against the department's statutory restrictions and system of governance. The leader is obliged to maintain frequent contacts with the university government and they are therefore subject, for reasons of hiring of administrative staff and services and facilities, and even for reasons of organisation, to changes relating to replacements of rectors and vice-rectors and their different views of new governments. What is more, since their leadership position depends on such easily questionable or avoidable factors as their academic, commercial or promotional prestige, any dimension could result in the break-up of the group. Their leadership capacity, then, is limited and they are frequently involved in disputes between team members due to circumstances of university sociology, or the psychology of the group members.

The main option for a formal or informal group with critical dimensions is to distance itself from the university organisation.

The formal research group. The type of research group described above is highly unstable and its maintenance within the structure is difficult. Consquently, the leader and the central core of the group tend to solve that problem either by seeking a certain degree of formal recognition without losing their group status, which will, furthermore, ensure better prospects for funding or by seeking recognition in the form of a different legal status. Therefore, a formal research group is a third type of group that, nevertheless, is not essentially different from an informal group.

The research institute. The institute is a way in which a group can be consolidated that, in theory, will provide it with stability, reliable resources and a position in the university's governing bodies. On the other hand, however, it brings the group fully into the statutory framework. That circumstance is seen by many informal or formal groups as a problem in the medium term, since all statutes without exception provide that the director of the institute must be elected by all its members, a category that includes administrative and service staff and students. Thus, unless the group is exceptionally cohesive and small, the department's problems can be reproduced within the context of the institute.

The composite research group outside the university. The main option for a formal or informal group with critical dimensions that works in transfer or has academic interests and facilities that require substantial funding is to distance itself from the university organisation through the creation of different figures, as a rule of a composite nature, with groups from other universities, research institutes or entities operated by ministries or other administrative bodies of autonomous communities. There is a variety of legal forms for such groups and the form taken will depend on available opportunities. Such a move will allow groups to consolidate and attain a certain degree of liberty from the actions required by university statutes. These groups are somewhat more closely linked to the market than the informal and formal groups mentioned above. Of course, the financial risk of such groups for the universities and institutions that support them in their boards of trustees or co-ordinating entities is the same as when they were formal or informal groups with employees and large outlays.

The research centre. Lastly, some research groups can turn to research centres. This entails total independence from the university and the financial risk for the university is then, in theory, non-existent. Public funding differs for the different groups but is estimated at 40%, and in any event research centres are considered to operate on the market, with all the corresponding consequences.

Of course, there are more or less ingenious variations on the situation as described above, but we believe that the six groups quite accurately represent the ways in which research is organised.

Might we say then that our country is a desert and research groups are oases? Who does research and why? It is not a desert, nor are there so few groups. In approximate terms, the percentage of university lecturers who perform research that is roughly on a level with international stardards is 30%,[5] and if we were to add a number of doctoral candidates, not necessarily all of them, and a number of grant-holders, the number of people involved is anything but negligible. In any event, the erratic and largely unorganised nature of that research can only produce an output that is also highly irregular, particularly insofar as concerns the functions of valorisation involved in transfer, patents and creation of technology based enterprises as the outcome of researchers' efforts.

The output of research achieved through the initiative of individuals or micro-groups often leads to articles of quality. However, it is clear the other deficiencies in respect of insufficient organisation of the group do not lead to reliable experiments or, of course, prototypes. These are individuals or small groups who, in view of the possibilities offered by the legal framework and the statutes of the universities, have chosen to work in contexts where articles, and even high-quality articles, are possible. Nevertheless, unless there is an effort to change the framework, the system cannot evolve towards laboratories where production follows a sequence that can easily be transmitted to society, whether through transfer, patents or spin-offs.

Deficiencies in the organisation and governance of laboratories and research groups, as rule, are an insurmountable obstacle to specialisation, consideration of long-term planning, and sustainability of both human and material resources.

In such cases, which are in the majority, transfer also occurs on a minor scale and is very closely based on the individual, and patents, which are scarce, for the most part need subsequent technical treatment involving substantial effort, and their eventual exploitation is highly complicated.

In the cases of research carried out by personal initiative, efforts at transfer, as well the other forms of valorisation, are small-scale. In short, the deficiencies in the organisation and governance of laboratories and research groups, as rule, are an insurmountable obstacle to specialisation, consideration of long-term planning, sustainability

[5] That figure of 30% is, of course, only approximate and it varies, although not greatly, from one university to another and particularly depending on qualifications and therefore faculties and schools. The figure is the result of a sociology that is imposed by the aforementioned framework. There are no rigorous studies on the subject but if we look at the data given by different information systems, the figure appears convincing. For example, that is the figure arrived at on the basis of the PAR points according to the system used to assess research at UPC, as well as at Jaume I University in Castelló and the universities of Andalusia. The figures for the University of Valencia do not vary greatly from that percentage, and we can therefore reasonably assume that the same is true in general for Spanish universities overall.

of both human and material resources, and ultimately the reliability of the process of the article, experiment consolidation, regularity in transfer, prototypes, patents and spin-offs.

4. Valorisation

Valorisation must be understood as the set of actions required to ensure that research results can contribute to the country's economic and social development in the form of wealth and occupation in the most efficient way. This is an important component of the social commitment of research, especialy when it is publicly funded. Research, even the variety that, as we have seen,

Figure 3
Standard programme for valorisation of research

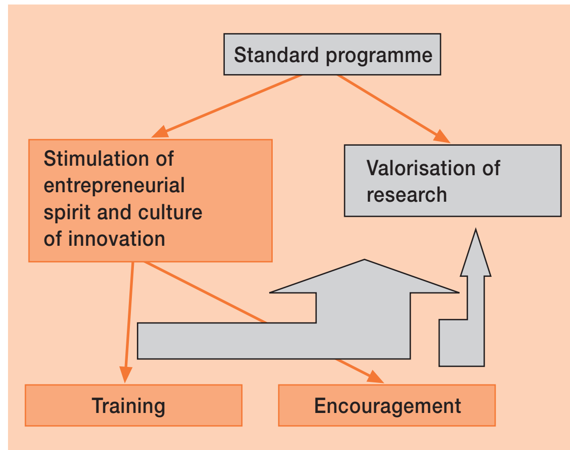
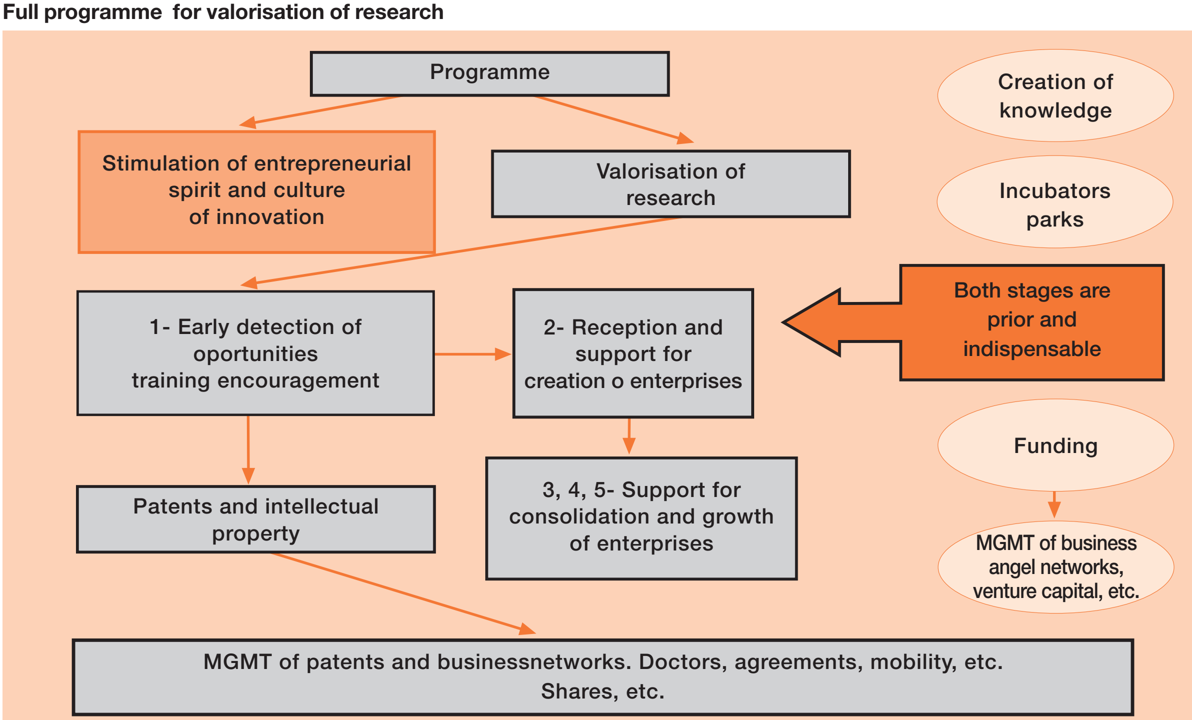


Figure 4
Full programme for valorisation of research

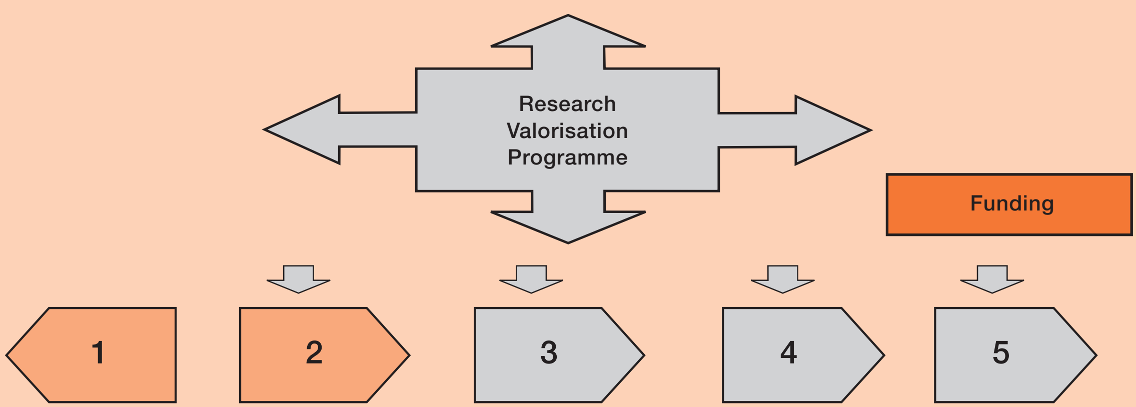


is often inaccurately referred to as “pure”, must eventually reach society.

Thus awareness, the identification of opportunities on the basis of publications, their transformation into prototypes or valorisable objects, analysis of their value, protection of results and their valorisation, whether through grant of licenses for industrial property rights or creation of technology-based enterprises, will ensure that the transfer of the results of prior knowledge represented by articles or experiments has the greatest possible impact in terms of social and economic development.

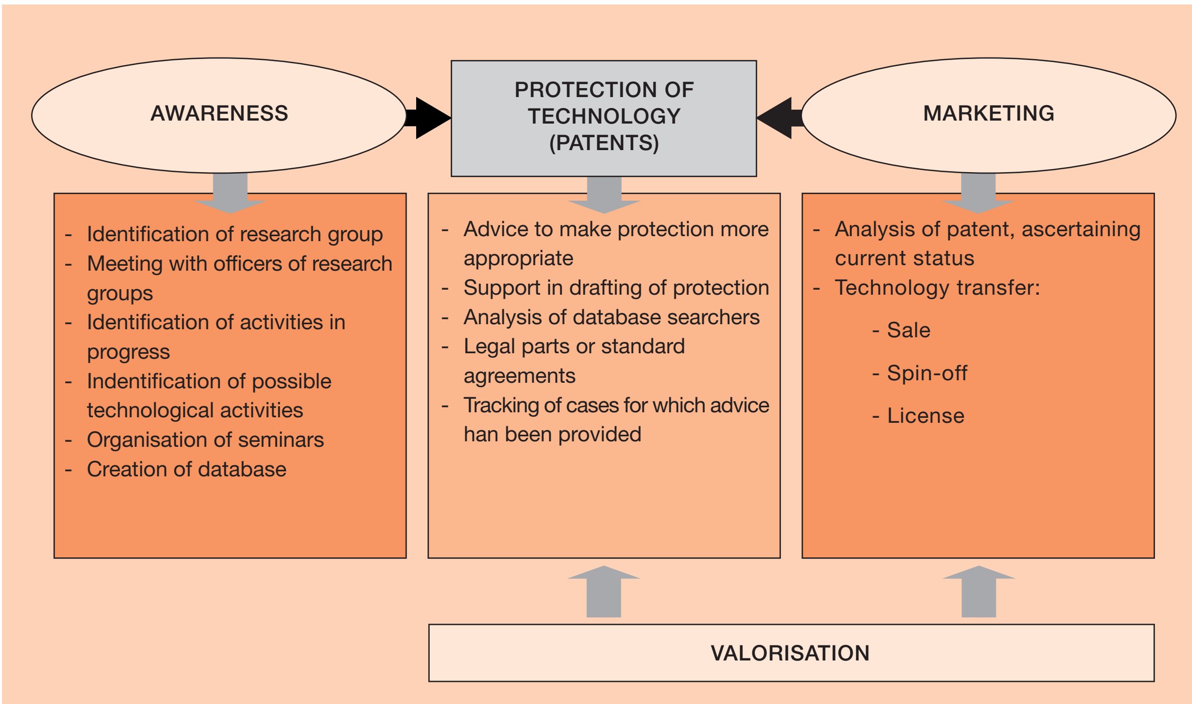
This is a highly professional task that requires a specific unit. If laboratories were properly organised, that work would be much easier, but as long as research remains personal and research groups remain small, valorisation units will continue not only to have the task of gathering technological opportunities and assessing their suitability for patenting or for a spin-off, but also that of helping to transform ideas into objects that can go through the valorisation process. Thus, valorisation units and programmes have two tasks, the first of which is aimed internally at the university. Here, they need to seek out and identify opportunities and attain the commitment of researchers at the place where they are performaing their research and then work with the researchers to transform those proto-opportunities into valorisable objects. The second

Figure 5
Sequence of processes in programmes for valorisation of research



1.- Early detection of opportunities and encouragement.
2.- Reception and selection of technological opportunities.
(Possible patent or possible enterprise)
3.- Business plan and coaching. Creation.
4.- Tracking through initial consolidation.
5.- Tracking and support for growth and internationalisation.
Use of the network for the universities end.

Figure 6
Valorisation: cross-section of the protection and marketing process



is aimed at the market. Once something valuable and tangible has been obtained, the process begins of realising value on the market through the design of a logical route for patenting, i.e. obtaining a patent and bringing it to the market, or advising and procuring financing for creation of a technology-based enterprise to make use of the technological opportunity once it has been prepared for valorisation.

That is evidently not easy work and it requires substantial human and financial resources, which is the only way to obtain the benefits that, as experience shows, will provide an economic and social return that is much greater than the investment of public funds and efforts.

5. Valorisation in Catalonia

It is important that a country can rely upon the ability of its agents to absorb information, transform it and convert it into knowledge. That ability will depend on the relations between the different players in the territory, namely universities, governments and enterprises, i.e. the triple helix mentioned in the first part of this article. The production system must gradually increase its capacity for innovation at an ever more sophisticated level, in other words a system must be created based on intensive knowledge. In short, the aim is to become what is known as a “learning region”.

For that purpose, research at universities must be connected to the production system in order to improve the quality of transfer and contribute to creation of a system of technology-based enterprises with global aspirations, but also to guide the different lines of research. It is not so much a question of the hierarchy deciding what is to be researched, if that were possible, but rather of connecting the two realities so that they can exchange their guiding information and knowledge.

Spain, and particularly Catalonia, occupy an increasingly strong position in the world of publications of proven quality, albeit one that is among the lowest ranked in Europe in terms of marketing of research. That circumstance is due to, among other factors, lack of investment in research activities by enterprises, lack of systematic searches for opportunities with commercial potential, and low investment in patents and creation of spin-offs.

Action has been taken in recent years, at the European level as well as in Spain and Catalonia, to improve the system. That action includes a budget increase for the 7th Framework Programme, larger budgets dedicated by Spain to investment in R&D and Innovation, as seen in the implementation of the National Research and Development Plans and the policy on technology parks, increased funding for implementation of the Catalonia Research and Innovation Plan, and so on.

Nevertheless valorisation requires direct resources and then professionals who, logically, given that this is relatively new field, will have to be created and trained. In recent years the units for creation of spin-offs at Catalan universities have been consolidated and lines of funding have been established to finance new technology-based enterprises. However, more work remains to be done on the subtler details of valorisation of knowledge obtained through university research and there has often been confusion as to what instruments are needed, and even though it may sound clichéd, insufficient resources have been dedicated to the matter.

Catalonia occupies an increasingly strong position in the world of publications of proven quality, albeit one that is among the lowest ranked in Europe in terms of marketing of research

6. Current views

In order to attain a valorisation of research that leads to an increase in competitive edge and in prosperity and the quality of life in Catalonia, we need to ensure the existence of an environment that is particularly favourable for creation of technological opportunities. We need to improve the organisation of research where it is carried out, consolidate research valorisation units and provide them with resources so that they can systematically identify opportunities early on, enhance the reception of those opportunities and stimulate market orientation and assumption of risk in their marketing.

In addition, the production system must improve its ability to formalise demand at universities and in order for that to be feasible there must be a sustained increase in R&D efforts.

In order to apply those reasonings, certain specific actions need to be taken, including the following:

– Strengthen the function of assessment of university research to facilitate creation of models for a share in the benefits of marketing by universities.
– Create units and networks specialising in knowledge for valorisation of research.
– Create technology prospecting structures based on close co-operation between universities and enterprises, setting up system for feedback between the production system and universities.
– Increase investment in patents and creation of spin-offs.

In short, we need to attain both the soft and hard competencies that universities need so that they can anticipate the necessities of a changing and globalised world. Nevertheless, without a joint effort on the part of governments, universities, enterprises and researchers themselves, we will not be able to achieve the genuine cultural change that must serve as the basis for the knowledge economy.

In other words, we need an extensive, complete and professional valorisation system that will contribute to peformance of the third function of universities, which is indispensable for an innovative and competitive production system, in which universities and enterprises share common ground.

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