Higher Education in Europe
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/chee20

Third Mission Ranking for World Class Universities: Beyond Teaching and Research

Patricio Montesinos , Jose Miguel Carot , Juan-Miguel Martinez & Francisco Mora

Published online: 01 Sep 2008.

To cite this article: Patricio Montesinos , Jose Miguel Carot , Juan-Miguel Martinez & Francisco Mora (2008) Third Mission Ranking for World Class Universities: Beyond Teaching and Research, Higher Education in Europe, 33:2-3, 259-271, DOI: 10.1080/03797720802254072

To link to this article: http://dx.doi.org/10.1080/03797720802254072

Higher Education in Europe, Vol. 33, No. 2/3, July–October 2008

Third Mission Ranking for World Class Universities: Beyond Teaching and Research

PATRICIO MONTESINOS, JOSE MIGUEL CAROT, JUAN-MIGUEL MARTINEZ and FRANCISCO MORA

'World class universities' (WCU) are an issue of intense debate among the academic community. To define a WCU supposes that only those universities that fit the 'quality' criteria established under benchmarking conditions can be considered as such. The good news is that several dimensions could be used to defined excellence, not only classical academic and research criteria. This paper intends to address conceptual aspects of WCU with regard to relations between university 'mission' development and why, how and when an institution is considered a WCU from non-classical criteria. The main purpose of this paper is to propose new dimensions to rank University Missions. Going beyond teaching and research, the University Third Mission – services to Society – has at least 3 dimensions: a non profit – social – approach; an entrepreneur focus; and an innovative approximation. This paper will consider the various implications that a third mission measurement and benchmark could introduce in the controversial ranking business.

Introduction

Universities have been at the centre of social evolution since their creation in medieval times. Universities are part of world history. Universities modelled Europe and from Europe, universities participated in modelling the world and its development. It is well assumed in the literature that universities were created as a social entity able to create, store, and transmit knowledge. The ways, models, and tools used to develop these three basic functions have evolved from their creation to this day, adjusting to socio-economic and political circumstances. The university's 'main reason to exist', i.e. the university's mission, has become an 'impossible mission' anytime it used a single variable approach. There has become a need to include a multi-linear approach or at least, a multi-typology approach in order to identify several ways of defining the main purpose for universities to exist.

Several approaches have been developed during the last decade to understand how university and society interaction takes place. At least three approaches try to define how these interactions happen; how the non-academic or non-research activities are organised and delivered to society, and how university missions are executed. First is the 'triple helix' model of university-industry-government relations of Etzkowitz and Leydesdorff (2000). This approach is, in fact, an actualization of the Sabato Triangle (Sabato and Botana, 1968) model, well known in Latin America. This model tries to define the mission of the university based on the fact that there are three basic missions (teaching, research, and transfer of knowledge to society) that have a sequential consideration in the university's evolution (Etzkowitz, 2001). The second approach is based on how the knowledge is created. Gibbons describes two modes (Gibbons, 1994)

ISSN 0379-7724 print/ISSN 1469-8358 online/08/02/30259-13 © 2008 UNESCO
DOI: 10.1080/03797720802254072

for knowledge production. Each approach implies a challenge to the traditional academic structure and again, a conceptual change to be managed. The third approach (Solé et al., 2001) is based on what a university's values are and how the institution is organized internally. It is therefore worth examining how each of these 'post-academic' explanatory models view the evolution of the university, its academic disciplines, structures, and communication patterns.

Considering the *customers of rankings* issue, there are several first mission rankings whose customers are students and parents. Newspapers and journals all over the world try to orientate their target group every year with a titanic effort classifying parameters related to first mission development. Universities are also 'consumers' of this material, but the main orientation for this specific classification are those who put their future in the hands of one university or another. The second ranking category corresponds to those rankings that focus effort on measuring 'research performance'. Regarding the second mission, it is also commonly accepted (and of course contested and debated for those universities not present) that the well known 'Shanghai Ranking' is a 'second mission ranking'. Second mission (research) is measured and classified according to classical parameters which represent excellence in scientific production: quality of researchers on the Nobel scales (faculty and alumni devoted to research), productivity on N&S (Nature & Science) and on SCI (Science Citation Index), and finally, publication productivity related to the size of the institution. The university classification 'authority' also helps society to classify professionals and recognise their professional competences and attributes. Over the last few years these rankings have internationally classified the most solid activity of universities, i.e. their research productivity. Criticisms of the Shanghai Ranking are based on its simplicity, but to measure productivity is something that has always terrified those institutions devoted exclusively to developing their second mission. What happens if they are not ranked? Does that mean there is no future for them? Clearly, the customers of second mission rankings are closer to the academic community than to the rest of society.

These rankings represent, measure, and classify the efforts of higher education systems around the world to achieve World Class references and activities. This article will describe which other dimensions could be considered to establish a third mission ranking focussed on the activities that are *not considered teaching or research*. This article will particularly address the type, relevance, and finance of activities in universities which go beyond teaching and research at the so-called WCUs. Examples of activities of third mission are enormously diverse and comprise several degrees of funding and human resources. Continuing education and professional development courses, workshops, and seminars are the most common examples that demonstrate a commitment to extending the service of universities to the public sector. *Technology transfer units, science parks*, *Employment Bureau and Entrepreneur Programmes* for student 'start ups', and the *internationalisation* of the university are all part of this set of activities. It is a natural evolution of the teaching role with the enlargement of the target population and diversification of curricula to establish non-traditional relations with industry and national and international institutions in this way. It is embedded in the idea of *lifelong learning* and *regional development* and should also integrate some developments of research output. Other activities of the third stream have social, cultural, and political motivations. Within the social context there are projects, for example, that are directed to economic development, the integration of minorities, the acquisition of basic skills, addressing environmental questions, and healthcare services.

Those tasks of the third stream with cultural origins include the dissemination of research results, concerts, exhibitions, seminars, radio and TV stations, literary and cinema fora, and international exchanges. In this paper the authors will also classify the activities from different perspectives in order to identify the functions developed, the different organisational and management models, and the assessment indicators that could describe the activities and allow fro some form of benchmarking.

A corporate or institutional mission is accepted as a statement (or a set of statements) that define the basic purpose of the organisation. Humboldt established the universities as a space where logical and critical thinking could be complemented with the tasks of transmitting knowledge. These two basic purposes, teaching and research, can be considered as the common mission for practically all higher education institutions in the world. A new dimension (the third mission) appeared thirty years ago when universities began to design their future in a globalised world, operating on a local basis to an open operational space. Justifying public budgets or looking for new imaginative financing formulas became a must for those higher education institutions with strong social and industrial links. A new relational style emerged among WCUs and their respective settings. The Carnegie Classification (a university taxonomy), the Etzkowitz Universities missional approaches, and finally Sole's 'Tecnolpol' models for organising University missions, tried to define in more detail how the first and second missions could be defined and how the third mission (a natural evolution but often considered as a revolution) is organised in WCUs all over the world.

In sum, the aims of this paper are to develop a *state of the art* revision of the university third mission development modelling, to identify the specific relations WCUs have established to develop the *third mission* concept and the possibilities of establishing a *ranking* to measure the 'third mission of the university'. Despite the structures, functions, organisational models or indicators defined to measure a university's third mission, the definition of a world class university should be *expanded* to consider not only excellence in teaching and research, but also in third strand activities that allow universities to cover social, entrepreneurial, and innovation objectives in order to help and encourage the regional development of their local environments and the social cohesion and the competitiveness of their nations.

Third Mission of the University: Social, Enterprising, and Innovative Dimensions

The authors' proposal for understanding university missions is based on the existence of diverse dimensions in third mission development. Offering services to society are always a controversial concept under scrutiny. There is a part of the academic community that is already processing the first academic revolution, i.e. the evolution from teaching to research (Etzkowitz, 2004). Similar resistances found in the first revolution appeared over the last thirty years during the process of applying the second revolution: from teaching and research to services. The first proposal of this paper is a model to better understand the third mission before proposing new ranking possibilities.

Universities undoubtedly generate services for society, but this is always controversial, particularly when the financing of such services are considered. One valid way of organising services to society is with no economic benefit. The institution, considering its commitment to society, with their customers or their personnel,

organises services with no cost or little cost to the final service user. The benefits are largely image or relational ones. These categories of third mission services are called the **social third mission**, and have nothing to do with the first and second missions. The institution wants to offer a set of services that generates no economic revenue, or at the most, has only a partial cost for the end users. These engagement activities can be developed once the institution uses part of its budget to meet the costs or seeks external sponsors. The non-financial benefit orientation of these services clarifies several controversies around services from universities. Following the Padfield typology (Padfield, 2004), examples of these social services can take the form of non-academic dissemination, media communication, volunteer contributions to the community (of labour, expertise, educational outreach, etc.), social networking or contributions to public policy. Other activities, such as services for retired senior personnel, summer school for the staff's children, courses offered to academic staff on didactics and/or andragogy, cultural activities such as art expositions, cinema forum etc., would fit into the social third mission.

The second dimension is the *enterprising third mission*. Institutions try to diversify their incomes and generation of sources of funding by developing services to society, industry, other institutions and/or former students. This income production tries to secure funding not only to cover direct and indirect costs, but also to generate an economic benefit for the institution. These activities, accepted as normal in private institutions, generate mission controversies in public universities. The basic question of how to use public funds to generate benefits is difficult to justify for those who consider such a practice as a forbidden concept in the public arena. Yet it is a fact that universities offer the biggest concentration of knowledge resources to support local or regional development. Not to use this competitive advantage can be considered a misguided luxury in a globalized world. Clark (1998), proposed one of the key success factors of the 'entrepreneur university' as its 'differentiated sources of funding'. The author's second conceptual proposal is related to how to rank university third missions. It is clear that ranking social services is going to be different to ranking enterprising ones. Nevertheless, following again Padfield's typology, examples of enterprising activities can be found from a technology transfer point of view: consultancy to industry, patent registration, commercialisation of intellectual property, advisory work and contracts, shared development of research, problem-solving agendas or contract and collaborative research. From a continuing education point of view, the activities could be lifelong learning/teaching activities, curriculum alignment to societal needs, open and distance learning (ODL), commercialisation of facilities and conference organizing. From an employment perspective, the activities could be staff mobility (flow and exchange), student placements, former student employee links, and training for company creation and self-employment. International activities (student and teacher interchanges, doctoral and continuing education training in developing countries) require a special mention. The interchange and joint external activities require some kind of coordination. Interchange could fit in the prior category but services for developing countries fits perfectly within the enterprising third mission.

Finally, the last dimension implicit to third mission development is innovation. *Innovative third mission* services are those services, products or process that research units or institutes are able to transmit to society. These services that transcend usual technology transfer services are identified as searching for seed or venture capital,

business networking, company creation for patent exploitation, consulting for governments, joint ventures with industrial sectors, conferences for research, development and innovation in specific industries, and companies or regional innovation and networking with entrepreneurs. Science and technology parks are the logical and physical space where these services take place. These facilitation services try to generate social networking and relational capital among the research community and industry. These services also focus on generating specific and more traditional technology transfers once the relation is facilitated.

Mixing this model with the Sole one, social or enterprising services can be developed by strategic or ad hoc binding units or by strategic ones. Conventional services have notable difficulties in supporting social services and it is conceptually not possible and in some countries, non-legal if not illegal to develop enterprising services from them. Innovation services can be facilitated from ad hoc units but the natural framework for them is the Science and Technological Park. Today most universities are including Science and Technology Parks as one of their main priorities in their investment agendas.

Ranking Third Missions: Dimensions, Magnitudes, and Indicators

Previous Concepts

After developing a revision on the historical interaction of the university with the environment and after revising university third mission development modelling, the final part of the paper will expose different magnitudes to consider in a 'university third mission' ranking approach. In fact it is possible to rank the different missions and different process in each mission. This approach is based on the services and processes the university is able to organise and execute. For this reason there is more than one ''third mission ranking''. At least three rankings, measuring the third mission, could be created: a social ranking; an entrepreneur ranking; and an innovative ranking. Each ranking should also include different services under each classified magnitude.

To develop in more detail these specific proposals, the authors have selected the European Foundation for Quality Management (EFQM) awarded by the European Foundation for Quality Management conceptual model and terminology (EFQM, 2007). EFQM, a non-profit membership foundation, is defined as ''the primary source for organisations in Europe looking to excel in their market and in their business''. Created in 1989 by the biggest and most prominent Europe-based companies, EFQM is now a hub of excellent, globally minded organisations of industry and activities, both private and public. The authors' institution has adapted and customized several EFQM tools originating from the private sector. This customization has also demonstrated its efficiency and power in the field of university management. The EFQM-defined conceptual framework is useful in understanding any kind of organization. The EFQM Excellence Model is a non-prescriptive framework based on nine criteria. Five of these are 'Enablers' and four are 'Results'. The 'Enabler' criteria cover what an organisation does with 'staff' that develop 'processes', under some kind of 'leadership', following an implicit or explicit 'policy and strategy', using 'partnership and resources'. The Foundation defines excellence ''as the outstanding practice in managing the organisation and achieving results'' oriented to produce customer, staff, and society satisfaction. Any organisation generates 'results' running 'processes'. EFQM defines

'process' (or services) as a ''sequence of activities which adds value to customers by producing required outputs from a variety of inputs''. Processes can be 'critical' – those which produce customer satisfaction; 'support' – those that are needed to develop the critical processes but which don't involve direct customer interaction; and 'strategic' – those processes that only the organisation's leadership is able to operate.

The authors are acutely conscious of the difficulties posed by adapting private sector tools and concepts to the university arena. And of course, they are conscious of the first difficulty faced under any model adaptation to universities, due to the complexity of the Higher Education Institutions. Each university mission has different beneficiaries and under this consideration, it is possible to identify as many customers as missions. This is one of the main reasons it is nearly impossible to reach a unanimous consensus identifying HEIs, since individuals read the mission of a university from different perspectives. Considering again Sole's recommendation about risky simplifications and modelling (Sole et al., 2001), EFQM offers the definition of stakeholders as ''all those who have an interest in an organisation, its activities and its achievements. These may include customers, partners, employees, shareholders, owners, government, and regulators''. Customers are those who get direct added value from the organisation's critical processes. So, who are the university's customers? The authors consider customers according to the mission under consideration. With no exhaustive purpose, customers of the first mission (teaching) could be current students, future students, parents, and industries that will contract future professionals.

Second mission research could generate benefits to those who contract it (companies, industry, government), to the researchers' curriculum, and of course, to students who participate directly or indirectly in this knowledge generation. Following the third mission typology – services – the social third mission will have different customers from entrepreneurial mission services (former students, professionals, small and medium-sized companies, big companies, sector representatives, students, academic staff) or from the innovative third mission (companies, business angels – private investors who invest in unquoted entreprenurial companies – seed capital companies, investors, governmental or industrial political representatives, research staff or research structures).

Each service process will produce different results. In order to identify university *critical processes,* it is vital to identify different and sometimes simultaneous customers for each mission typology. Critical processes (those which produce added value for customers) are identifiable using third mission typology. In the last part of this paper, the authors will describe in detail the ranking possibilities of three third mission services: international student interchange (a social service), continuing education (an entrepreneurial service), and science and technology parks (an innovative service). Following EFQM recommendations, ''truly excellent organisations are those that strive to satisfy their stakeholders by what they achieve, how they achieve it, what they are likely to achieve and the confidence they have that the results will be sustained in the future'' (EFQM, 2007, <http://www.efqm.com>). Universities are permanently looking for excellence in all their missions. To measure third missions and benchmark results will be a critical success factor in becoming a WCU.

Social Third Mission. The International Activity Dimension

As defined previously, international activity at universities is an essential part of the mission statement and one way that non-pure first and second mission activities are

developed. In an increasingly globalized world, where trade barriers are disappearing and new technologies are providing better communication with no frontiers, not only does such activity benefit the university itself, it also benefits the wider society. Benchmarks, good practices, and new cultural perspectives are acquired with international activities. International activity at a university level will enable its graduates to compete and develop their careers in a global environment. These activities will also enrich and promote the exchange of experiences to improve the daily tasks of university staff. Generically, international activities in higher education could be defined as those partnership activities developed between at least two or more institutions in different countries, the objectives of which are to generate academic networking, co-operation, graduate and postgraduate interchanges and relational capital among the academic community (students and university staff). International co-operation activities have been based on good will and reciprocal understanding among HEIs, and are considered under this social third mission as 'institutional activities' as a whole, not the specific activities developed among research networks or between specific research groups or units.

As a result of their experiences and the international projects they have already carried out, universities have been and are still learning about which working methods and processes achieve the best results. For that reason, the staff in many universities now includes personnel specifically devoted to managing the international activities of the university. These specialised personnel, together with the academic staff, should form the basis of a team that works on establishing and developing international activities. A good non-academic support team, which includes technical and administrative personnel who are thoroughly versed in international co-operation matters and who know other languages, is fundamental for success. We can identify three main services to be considered under this international activities social third mission: staff exchange projects; university networking; and cooperation and projects for developing countries.

In *staff exchange* projects, services include actions and programmes that promote and improve student and staff exchanges. On the one hand, students are able to obtain credits for studying abroad; on the other, academic staff can join a university abroad to teach and to gain experience in a different system and work environment. The Erasmus programme in Europe is an example of student and staff exchange programmes.

Within the category *networking and co-operation* it is possible to include all those international activities that result in some sort of relational benefit to the universities involved. In the European context, there are several ways of financial cooperation: Erasmus (within Europe), Alfa (with Latino-America), and Tempus (with Eastern Europe), for example. In other cases, financial aid can come from the university's own resources, such as thorough the organization of a tailor-made PhD programme or other joint activities.

Finally, international *projects for developing countries* can include all those international actions where the university contributes with (or manages) resources for activities or projects with partner institutions not only universities that have no specific resources for financing co-operation. Some of these activities may be financed by the World Bank or other regional, national or international financial institutions, while others may be financed by the university's own funds. Possible magnitudes and related indicators could be the *staff magnitude* (number of exchanges per year – students

and staff, number of active exchange agreements, number of subjects taught in exchange students' first language and the percent of incoming and outgoing students/staff on exchange programmes), the *networking magnitude* (number of interchange associations and university linked networks, the percentage of the university budget used for international activity, the number of university offices abroad, the number of countries and institutions with which the university has agreements and the percentage of work placements within international companies) and finally, the *academic magnitude* (number of joint bilateral academic degrees, number of academic programmes abroad, percentage of university staff participating in international activities, and the number of foreign languages offered by the university). More detailed indicator proposals are represented in Table 1.

Entrepreneurial Third Mission: Lifelong Learning Dimension

As defined in 1994 by the ELLI (ELLI, 1994, p. 1), lifelong learning is ''a continuously supportive process which stimulates and empowers individuals to acquire all the knowledge, values, skills and understanding they will require throughout their lifetime and to apply them with confidence, creativity and enjoyment in all roles, circumstances and environments''. At the same time, as technology transfer is considered a 'one-to-one' knowledge transfer activity (researcher to company), lifelong learning (LLL) can be consider as 'one-to-several' knowledge transfer and adaptation. LLL is not related to pedagogical or didactical issues, but is directly related to the knowledge professionals need in order to compete with other regions. The university's first mission only touches five years of its students' adult lives. What happens in the other forty years of professional life? Where can graduates and postgraduates complete their technical and scientific knowledge, skills, and understanding throughout their professional lifetimes? Where are the most significant knowledge concentrations in any country? Who trained them to be professionals? Who can help former university students with their competitiveness and their market sustainability? It is possible to argue that universities are part of the answer to all of these questions.

It is not only former students who are potential customers of a university's LLL activities. University LLL programs can provide professionals with different backgrounds the opportunity to change their professional orientation, and new possibilities to complement their background with the new knowledge, skills and/or understanding needed to improve within their own organisations. In the 1980s, universities in Europe and the US established units, programmes, centres or schools to organise LLL for the market, in some way competing and copying the traditional business school orientation. Centralised units (one unique centre for the whole university) or decentralised programmes (different units per faculties or schools) were chosen in order to organise not only business management LLL but also LLL for engineers, lawyers, medical personnel, economists, urban planners, historical heritage advisers, and university managers. Any field of activity needs LLL due to social, technological, and legislative evolution and changes. These 'continuing education' activities can be considered as one of the key factors contributing to regional competitiveness.

As Mora describes (Mora, Montesinos, and López, 2005), the main processes of these LLL units are demand analysis, course design, marketing, economic management,

teaching activities, and certification and quality control. On the other hand, the main services or products offered are LLL teaching and learning activities open to the market, tailor-made LLL for industry or institutions, logistical services, open and distance learning (ODL) material production and delivery and finally, among others, the commercialisation of facilities.

In some cases, these units organise LLL activities for professorial support. In other cases, these units promote LLL activities with no contact with the university's academic staff. In such cases, the academic community often distrusts their university's LLL activities (Mora, Montesinos, and Lopez, 2005).

Considering the possibility of ranking this entrepreneurial aspect of the third mission, LLL teaching/learning activities open to market and tailor-made LLL for industry or institutions has at least two magnitudes: *academic* and *economic*. From the academic point of view, the number of hours or days per year the teachers are committed to LLL from the total hours committed to the institution, the number of courses organised each year, the number of teachers involved in LLL activities or the registered number of participants in LLL activities are significant enough to rank LLL activities. The economic magnitude, among other possible indicators, could be represented by the global revenues generated by these mission development services. More detailed indicator proposals are represented in Table 1.

Innovative Third Mission: Science and Technological Parks Dimension

Science and technological parks (STP) were political tools used by governments during the 1980s to promote regional development. In the first few years of this century, universities faced a problem of maturing research groups choosing STPs to offer the university community other options. When research, development and innovation (R&D&i) university groups grow, the traditional technology transfer centres (or technological liaison and binding offices) become small and slow to help offer solutions to the 'growing situation'. The competitiveness of R&D&i groups, potential joint ventures of companies, and university entrepreneurs need new relational spaces for facilitating the economic and social growth of cities and regions. These new innovation arenas contribute to global economic development through innovation, entrepreneurship, and the transfer of knowledge and technology. STPs are defined by the International Association of Science and Technology Parks (IASP) as "an organisation managed by specialised professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions" (IASP, 2002). Considering innovation as the art of 'introducing something new', university science and technological parks (USTPs) appeared as the natural physical and logical place to host the most innovative university staff (researchers and managers) in order to stimulate, produce, and manage the flow of knowledge and technology amongst universities, companies, other R&D&i institutions and markets. USTPs not only provide physical space for university R&D&i groups but also logical and legal framework (complementary to the university's own one) that facilitates the creation and growth of innovation-based companies through incubation, spin-off, and start-up processes coming from products, patents exploitations, and technological services. USTPs also provide other institutional networking added value services together with high quality space and facilities.

TABLE 1. THIRD MISSION DIMENSIONS, SERVICES, MAGNITUDES AND POSSIBLE INDICATORS

3rd Mission Approach: Dimensions	Financing and Leadership	Process (Services)	Magnitudes and Possible Indicators
Social: International Activities	Financed with internal resources + occasionally specific external funds; non-financial benefit generation + managed with part-time academic staff	Staff and students exchange networking & cooperative projects with developing countries	*Staff magnitudes:* – number of exchanges per year (students/staff); – number of active exchange agreements; – number of subjects taught in exchange students' first language; – percent of incoming and outgoing students/staff on exchange programmes. *Networking magnitudes:* – number of interchange associations/networks which university is member of – percentage used for international activity; – number of university offices abroad; – number of countries and institutions with which the university has agreements; – percent of work placements within international companies. *Academic magnitudes:* – number of joint bilateral academic degrees; – number of academic programmes abroad; – percent of university staff participating in international activities; – number of foreign languages offered

TABLE 1. CONTINUED

3rd Mission Approach: Dimensions	Financing and Leadership	Process (Services)	Magnitudes and Possible Indicators
Enterprising Lifelong Learning	University support with partial self financing. Financial benefit generation + full-time managers	Offered and tailor-made LLL, E-learning material production, E-learning delivery, conference organisation	*Academic magnitudes:* – number of courses/LLL activities, hours/days committed; – number of university teachers involved; – percentage of university's teachers; – number of course participants. *Economic magnitudes:* – global incomes; – global expenses; – non-academic staff expenses; – academic staff expenses.
Innovative: Science & Technology Parks	Self-financing with partial university support + full-time academic staff & full-time non-academic staff	Seed or venture capital networking, company creation, patents exploitation, conferences for R&D&i in specific industries	*Entrepreneurship magnitudes:* – number new companies created per year (spin-offs/star-ups); – number of students trained in entrepreneurship per year; – number of companies located in USTP shared by academics – number of companies located in the USTP; – number of international patents registered per year *Networking magnitudes:* – number of events open for industry organised per year; – number of new projects per year; – number of non-academic agreements with mature companies. *Knowledge-based jobs magnitudes:* – number of non-academic staff – number of academic staff; – number of yearly grants; – total USTP sq.m.; – sq.m dedicated to R&D&i groups; – sq.m. dedicated to companies.

Source: The authors.

Companies and enterprise organisations find USTPs especially useful in exploring innovative relations with R&D&i groups. USTPs identify different added-value services based on economies of scale. Financial support via seed or venture capital or business angels networking is one of the main services organised based on the scale economy. Company creation for patent exploitation, consulting for governments, joint ventures with industrial sectors, conferences for R&D&i in a specific industry, individual training, companies or regional innovation, and networking with external entrepreneurs and business owners are part of the different added-value services that formal USTPs are able to organise. The USTP is a tool that promotes innovation development and the competitiveness of regions and cities by the intensive use of the university's potential. It is possible to foster entrepreneurship and incubate new innovative companies among students and academic staff, due to concentrated singular knowledge-based entrepreneurship possibilities. To measure *entrepreneurship magnitude,* indicators related to the number of new companies created per year (spin-offs/start-ups), the number of students trained in the entrepreneurial spirit and tools, the number of companies located in a USTP shared by academics and, of course, the global number of companies located in the USTP can be used. Also, the number of international patents registered per year will give an estimation of innovation. The USTP is also an attractive place for emerging knowledge workers.

The capacity and ability to generate and maintain *knowledge-based jobs* can also be measured by the number of non-academic staff contracted inside the USTP, the number of active academic staff, and the number of yearly grants offered to promote future knowledge-based jobs. In these specific case, 'size matters'. The total area of a university devoted to an activity is a significant indicator of the priority assigned to the activity itself. The *physical space* devoted to emerging knowledge workers could also be ranked measuring the total USTP area. Of special significance is the area dedicated to R&D&i groups and the area dedicated to companies.

And finally, the other important process present in the USTP is the creation of new business opportunities and adding value to mature companies. A *networking magnitude* could be ranked by identifying the number of events organised per year for specific industrial sectors, the number of new projects developed per year within the USTP R&D&i groups, and perhaps, the number of non-academic agreements signed with mature companies. Networking with the already established companies is a doorway to obtaining finance for new ideas and companies.

Conclusions

Universities have three complementary missions: teaching, research, and knowledge transfer to society. Knowledge transfer not only happens with traditional consulting, paper production or patent work. Student placements, continuing education, international cooperation, liaison and binding units, and university science and technological parks are sophisticated tools for fostering third mission activities and knowledge dissemination and transfer. The university has at least three dimensions to consider in its third mission development. The social, entrepreneurial, and innovative dimensions should be considered when ranking university third mission development. Excellence should be fostered in all these aspects, as well as in the first and second missions. Excellence in the third mission is not a natural consequence of excellence in the first and second ones. Third mission ranking could help society to measure the

quality of the services the university gives back to its stakeholders. Several magnitudes can be measured to rank third mission indicators, but the Berlin Principles must help to establish and select the most significant ones.

References

CLARK, B. *Creating Entrepreneurial Universities*. London: Pergamon, 1998.

EUROPEAN FOUNDATION FOR QUALITY MANAGEMENT (EFQM). Available at <http://www.efqm.com>, 2007.

EUROPEAN LIFELONG LEARNING INITIATIVE (ELLI). *Lifelong Learning Developing Human Potential. An Action Agenda for Lifelong Learning for the 21st Century*. World Initiative for Lifelong Learning, 1995.

ETZKOWITZ, H. and LEYDESDORFF, L. "The Dynamics of Innovation: From National Systems and 'Mode 2' to a Triple Helix of University-Industry-Government Relations", *Research Policy* 29 (2) (2000): 109–123.

ETZKOWITZ, H. "Innovation in Innovation: the Triple Helix of University-Industry-Government Relations", Universities and Regional Development Conference, November 2001.

ETZKOWITZ, H. "The Evolution of the Entrepreneurial University", *International Journal of Technology and Globalisation* 1 (1) (2004): 64–77.

INTERNATIONAL ASSOCIATION OF SCIENCE AND TECHNOLOGY PARK (IASP) "International Association of Science and Technology Parks, Science and Technology Parks Definition", IASP International Board, 6 February 2002. Available at <http://www.iasp.ws/publico/index.jsp?enl=2>.

GIBBONS, A. *The New Production of Knowledge: the Dynamics of Science and Research in Contemporary Societies*. New York: Oxford University Press, 1994.

MORA, J., MONTESINOS, P. and LÓPEZ, M. "Strategies for Lifelong Learning Analysis and Development in Europe. Indicators for Continuing Education", Spanish Ministry of Education. Program for Analysis and Studies MEC, EA2005-02021, 2005.

MONTESINOS, P. and CLOQUELL, V. "Models for Universities Relationship Units. Building Bridges with the Environments and Settings", EAIR 25th Forum on "Building Bridges and Enhancing Experience", 2003.

PADFIELD, C. "The Impact of the Collaborative Learning in the Engineering Learning Process", Presented at the European Society for Engineering Education (SEFI) Annual Conference, Valencia, September 2004. Available at <www.cfp.upv.es/sefi2004/keynotes.html>.

SABATO, J. and BOTANA, N. "Science and Technology in the Future Development of Latinoamerica". *Integration Journal* 3 (November 1968).

SOLÉ, P.F., COLL, J. and HERNÁNDEZ, T.N. "University Design and Development", *Higher Education in Europe* 24 (3) (2001): p. 341.