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MANAGEMENT SUCCESS FACTORS OF WORLD CLASS RESEARCH UNIVERSITIES

FACTORES DE ÉXITO EN LA GESTIÓN DE LAS UNIVERSIDADES DE INVESTIGACIÓN DE CLASE MUNDIAL

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Abstract

This article presents the results of research whose principal purpose was to identify factors affecting the successful performance of research universities.

The study examined the highest ranking universities in the Academic Ranking of World Universities (ARWU). Statistically significant success factors were identified for each category defined in the initial theoretical framework: Strategic thrust, institutional resources and competencies and access to foreign advantages.

Research universities constitute the basic point of reference for advanced institutions within each national higher education system (HES). They play a substantial role in nurturing the system as a whole, by providing new knowledge as a result of the publication of articles and books by the researchers who work in them. Moreover, research universities train the researchers and professors who work in the entire HES, as they are connected through global research networks.

Currently, in the era of the knowledge society, countries face the challenge of fostering and sustaining research universities in order to secure national development and wellfare. By identifying the key management factors employed by these universities, the article contributes both to the design of appropriate public policies and to the implementation of more effective strategies by higher education institutions (HEIs).

Keywords: Research universities, success factors, higher education public policies, university strategies, development.

Resumen

Este artículo presenta los resultados de una investigación cuyo objetivo principal fue identificar los factores que determinan el éxito en el desempeño de las universidades de investigación.

El estudio examinó las universidades de más alto rango en el Ranking Académico de Universidades del Mundo (ARWU). Se identificaron los factores de éxito estadísticamente significativos para cada categoría definida en el marco teórico inicial: Empuje estratégico, recursos y competencias institucionales y acceso a ventajas extranjeras.

Las universidades de investigación constituyen el punto de referencia fundamental para las instituciones de cada sistema nacional de educación superior (SES). Éstas desempeñan un papel relevante en nutrir el sistema como un todo, proporcionando nuevo conocimiento, como resultado de la publicación de artículos y libros por los investiga-

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dores que trabajan en ellas. Además, las universidades de investigación forman a los investigadores y profesores que trabajan en todas las instituciones de educación superior (IES), quiénes están conectados a través de redes globales de investigación.

En la actualidad, en la era de la sociedad del conocimiento, los países se enfrentan al reto de fomentar y sostener las universidades de investigación con el fin de asegurar el desarrollo y bienestar nacional. Mediante la identificación de los factores claves de gestión empleados por estas universidades, el artículo contribuye tanto al diseño de políticas públicas adecuadas y a la ejecución de estrategias más eficaces por parte de las instituciones de educación superior (IES).

Palabras clave: Universidades de investigación, factores de éxito, políticas públicas de educación superior, estrategias universitarias, y desarrollo.

Introduction

Two principal driving forces have shaped higher education around the world in recent decades. First, the emergence of the knowledge society, in which science and technology are emerging as important driving forces that affect all dimensions of human life, generating multiple and rapid social, economic and political changes.

The competitive advantages of countries are strongly based on the success of their national institutions in creating wealth: due as much to their ability to organize the use of the assets that are created as to increasing them (Dunning, 1988). First, HEIs play an important role in the creation and application of knowledge, transferring technology and training researchers, professionals and technicians capable of using it (Gitlow & Gitlow, 2013; Perkmann & Salter, 2012). Second, as a force for change, globalization has increased integration between countries to an unprecedented degree. Currently, there is enormous movement of people, goods, technology, capital and services between the countries of the world. Geographical limitations, distances and major obstacles to commercial flows are being overcome. The HE sector has been affected by both these forces, often all of them simultaneously.

First, major demands are being made of the different kinds of HEI, because people are aware that it is difficult to maintain a comfortable standard of living if they have not graduated from HE. The lowest income sectors of the population aspire to overcoming the limits of their parents' education, as they do not have sufficient resources to pay for the training they desire. Governments, on the other hand, face the political challenge of offering real opportunities to a large number of students who are of an age to enjoy HE. Moreover, it is recognized that access to HE is an important moral challenge for the whole of society. Consequently, public and private institutions, and governments, have notably increased student enrollment in an attempt to meet their aspirations and those of their parents (Brinkman & Morgan, 2010).

Second, companies increasingly demand scientific knowledge, new technologies and management capacities to enable them to innovate and increase their potential to grow their national and international competitiveness (Guloglu & Tekin, 2012).

Third, society and governments alike demand support and commitment from HEIs if they are to maintain and increase the economic, social and cultural development of the country or preserve and enhance national identity (Kurre, Ladd, Foster, Monahan & Romano, 2012).

Consequently, HEIs have attained an important and decisive influence on the central aspects of national life (Altbach & Salmi, 2011; Brunner, 2009; Mahani & Molki, 2011). From their point of view, this scenario has generated many challenging demands, involving a wide range of socially interested stakeholders, including governments.

To the extent that HEIs have been able to satisfy these demands they have grown rapidly, but their nature, mission and organization have been affected as a consequence (Deem, 2008; Mohrman, Ma & Baker, 2008).

Over the last decade student enrollment has grown rapidly, a phenomenon that may be explained by the fact that students are increasingly drawn from a wide range of geographic, socioeconomic and ethnic backgrounds (Brinkman & Morgan, 2008).

Paradoxically, affected by cyclical economic and financial crises, governments have responded to the growing financial requirements of the HE by reducing financial support to HEIs, and forcing them to diversify their sources of funding.

Most HEIs have offset this reduction in public funding by charging higher tuition fees. However, this approach

is not appropriate to the production of public goods (Altbach, 2007; Mok, 2005). Other institutions have increased efficiency by improving the cost-to-income ratio (Brinkman & Morgan, 2008).

These new sources of funding for public goods developed by the HEIs have seen the establishment of strong bonds with new stakeholder groups. HEI faculties members express the fear that these commitments weaken the autonomy and freedom of their institutions, affecting their historical values (Lange, 2013; Mohrman *et al.,* 2008).

The diversification of university financial sources and the new commitments derived from it have required important changes in the organization and management of HEIs (Slaughter & Cantwell, 2012). These changes have led to additional concerns in faculties, expressed in discussions centered on two tendencies, "managerialism" and "collegialism".

"Managerialism" refers to the tendency of professional managers to play a significant role in HEI decision-making. "Collegialism", on the other hand, involves the institutionalization of the aspirations and practice of collegiality among faculty members. It involves shared decision-making on academic affairs, provides the mutual support required to sustain the academic integrity of the members of the group, and ensures the conservation and practice of a specialized knowledge domain (Davies, Douglas & Douglas, 2007; Himanka, 2012).

Many faculty members feel that the change in the notion of the university, from a "Republic of Scholars" to a "Stakeholder Organization" under centralized management in the hands of an individualized leader and a corporate board – is an organizational arrangement that restrains their autonomy and academic freedom (Bleikie & Kogan, 2007).

The Context of Higher Education and Research Universities

Meanwhile, new institutions are emerging in the global scenario of HE, seeking to attend to the growing demands. Increasing differentiation between institutions may be observed, obeying the proliferating demands that are being made of the HES. This differentiation responds to some or several of the factors mentioned above.

The mission of the university has altered throughout history, a factor that without doubt underlies the differentiation currently observable in HEIs. McCaffery (2010) synthesizes these different conceptions brilliantly. The vision of Cardinal Newman, rooted in Greek classical culture and scholasticism, conceives the main mission of the university to be the pursuit of knowledge for its own sake. This is liberal knowledge, untainted by even a hint of utilitarianism, that allows students to cultivate the values of civilized reflection, free of any commitment to the state, business, or even the Church.

The conception inspired by Wilhelm von Humboldt holds that the scientific and philosophical research carried out by graduate students should be given priority over the teaching of undergraduates, within a regime of complete academic freedom for professors and students alike.

Karl Jaspers considered the university to be a community of scholars devoted to the task of seeking the truth. This approach does not exclude the provision of professional education. The Napoleonic tradition conceives of the university as serving the interests of the nation, training professionals, and developing techniques.

The conception of the modern university, associated with Flexner, combines the views of Newman and Von Humboldt, emphasizing the search for excellence in order to improve what he considered to be the mediocre research and teaching of his time.

Clark Kerr's concept of the "multiversity", which conceived of the university as a city of intellects that responds to the demands of different stakeholders: Community, faculty members, alumni, government, business and other external actors. According to this conception, faculty members and students identify with specific subcultures rather than with a single unique culture.

Finally, Mohrman *et al.* (2008) Mohrman, Ma & Baker have developed the concept of an emergent global university generated by the accelerated process of globalization. The emerging global university exhibits eight characteristics: A global mission; intense research; changing roles for professors; diversified financing; recruitment from all around the world; growing complexity; new relations with government and industry; and global collaboration with peer institutions. In consequence, nation states are now able to exert less influence over global research universities than in the past, as their interests are not the only ones that need to be taken into account.

Thus, a large number of new universities has emerged that are dedicated to research, the liberal arts, technical and vocational training, responding to the needs of companies and allowing students to learn while working or at a distance. HEIs fulfill different missions according to their particular orientation (Kurre *et al.,* 2012; McCaffery, 2010; Thieme, Araya & Olavarrieta, 2012).

In general terms the central mission of HEIs is to create and spread knowledge, educate new generations of researchers and professionals and serve the community through the application of knowledge, transfer of technology and by contributing to cultural and social development (Altbach, 2007; Kerr, 2001).

There are currently around 17,000 HEIs in the world (Hazelkorn, 2008), but though only a reduced number -the research universities- fulfill the entire mission described above, it is they that drive the whole system. Research universities represent a small part of the entire HES, but they exert considerable influence within it (Mohrman *et al.,* 2008).

Most research universities are located in developed countries, given that developing countries have rarely been active in the creation of new knowledge and have frequently been isolated from the main currents of scientific activity, affecting their development and wealth creation (Altbach, 2007).

In consequence, developing countries frequently lack sufficient scientific capabilities to investigate their own problems and to confront the challenges of their social, cultural and economic development (Deem, 2008; Joseph & Abraham, 2009). Research universities play a principal role here, implementing appropriate strategies and forging direct links with public institutions and companies. At the same time, HEIs need adequate support from the state (Gwynne, 2014).

International Rankings

The main international rankings, the ARWU compiled by the Shanghai Jiao Tong University and the Times Higher Education Supplement's World University Rankings, are based principally on research indicators (Deem, Mok & Lucas, 2008; Hazelkorn, 2008). These rankings allow the world's highest performing research universities (or "World Class Universities") to be identified.

Many universities criticize the rankings, arguing that they fail to take into account the diversity of institutions and that they enhance the impact of competitive forces and the market, promote the concentration of research and standardize the characteristics of world class universities (Deem, Mok & Lucas, 2008; Hazelkorn, 2007). However, according to Salmi (2009), rankings could be used in a constructive way, to improve institutional analysis and strategic development.

From the institutional point of view, rather than discussion on how the rankings are constructed, what really matters is the impact on their stakeholders and their long-term consequences for each HEI (Bowman & Bastedo, 2011). The rankings are a part of the HE scenario and in consequence universities are required to live with them while remaining cautious concerning the indicators they contain and their potential effects.

The most important signal communicated by the rankings is the relative performance of the world's research universities. They provide a measure of how successful a given country might be in facing the challenges of development and welfare provision.

Since the rankings were first published, governments of developed and developing countries alike have taken the decision to increase investment in the sector and to implement reforms and design new policies in order to improve the achievements of their research universities, or even to create new ones (Yang & Welch, 2012).

Many universities and university leaders are making institutional and political changes in an attempt to improve their ranking positions because of the important impact they have on applicants and their parents, governments, financing agencies, benefactors, employers, companies that contract university services, academics and students (Deem *et al.,* 2008; Hazelkorn, 2008; Hunter, 2010; LEmaitre, 2009).

HEIs have applied many strategies in order to improve their performance. These include improving their academic programs and research capacities, encouraging publications, improving websites, increasing the number of highly qualified full-time professors, modifying the system of academic selection and promotion, increasing salaries, developing marketing plans, spending more money on students, raising more private and public funds and attempting to achieve the highest teaching indicators possible (Hazelkorn, 2008).

These reforms have affected HEI governance and organizational structures. They have in addition applied assessment exercises, fusion strategies, re-engineering processes, comprehensive quality assurance systems and special financial programs (Deem, 2008; Mok, 2005).

Literature Review and Theoretical Framework

The current context in which HEIs operate invites an in-depth examination of the factors affecting performance. This section provides a review of the specialized literature on the subject in order to identify the HEI success factors that have been proposed by researchers in the field.

A wide range of factors have been claimed to affect HEI performance. To reflect this diversity we have organized them into a theoretical framework consisting of three main categories: Strategic thrust, institutional resources and competencies and access to foreign comparative advantages (see Annex 1).

Strategic Thrust

Strategic thrust encompasses core strategic definitions, academic and management strategies, and strategic implementation.

Core strategic definitions. Core strategic definitions are the basis of institutional strategic thrust. Several component factors have been suggested by scholars, such as mission and vision (Deem, 2008; Hax & Ugarte, 2014; Kerr, 2003); institutional goals and scope, derived from a shared vision encompassing teaching, research, community, and cultural development (Altbach, 2007; Bleikie & Kogan, 2007; Chen, Wang & Yang, 2009; Hazelkorn, 2008); and stakeholder aspirations (Brown & Marshall, 2008).

Academic strategies. Academic strategies provide orientation to the paramount activities of the academic value chain in a HEI. The literature highlights factors related to teaching, such as learning effectiveness, a planned teaching process and provision of services to students (Chen *et al,* 2009); student diversity (Pursglove & Simpson, 2007); students from around the world, selected and enrolled on merit (Altbach & Salmi, 2011); up-to-date teaching and learning technology, and the speed at which academic programs are able to innovate (Brown & Marshall, 2008; Mistry, 2008).

Researchers have also highlighted other factors, including research orientation, which might be driven either by scientific curiosity and the drive to advance knowledge or by current societal problems (Altbach, 2007; Deem, 2008; Kerr, 2001); the global scope of the research in question, the teaching burden of faculty members (Altbach & Salmi, 2011); and the proportion of the total budget allocated to research the size of research budgets (Pursglove & Simpson, 2007).

Management Strategies. Factors related to management strategies were categorized into groups: Human resources, marketing, finance, technology management, quality assurance and partnership.

Researchers suggest many factors that should be borne in mind when analyzing the area of human resources, which is considered to be of paramount importance. Faculty (FACULTIES) must be recruited from a worldwide pool, with the aim of employing the most highly qualified professors no matter their country of origin (Altbach, 2007; Musselin, 2013; Salmi, 2009; Viswanadhan, 2006). The effectiveness of human resource management depends on aspects such as selection processes, evaluation and promotion systems, salaries and compensation policies and the proportion of professors with tenure track contracts (Ab Aziz, Harris, Richardson & Ab Aziz, 2012; Brown & Marshall, 2008; Ingvarson & Rowe, 2008).

Factors that the literature indicates to be linked to marketing strategies are the effectiveness of marketing strategies, the definition of targets for ranking position and the scope of communication strategies (Chen *et al.,* 2009; Hazelkorn, 2008).

Several authors also highlight factors associated with other management strategies. These include: The effectiveness of financial strategies (Brinkman & Morgan, 2008; Hazelkorn, 2008; McDaniel, 2002); the quality of computing and information technology strategies (Hargraves & Christou, 2002); the accuracy of measurement of the academic process and its results (Chen, *et al.,* 2009; Doherty, 2003); the quality of internal mechanisms of self-assurance (Choon, 2008; Deem, 2008); systematic processes of evaluation, accreditation and benchmarking (Brown & Marshall, 2008; Sandmann, Williams & Abrams, 2009); the effectiveness of re-engineering processes (Sohail, Daud & Rajadurai, 2006); the quality of planning systems (Cheng, 2003; Chen, *et al.,* 2009); and partnership, alliance and merger strategies (Deem, *et al.,* 2008).

Strategic Implementation. This dimension encompasses factors involved in implementing the management strategies that have been developed. The literature mentions factors associated with governance, such as autonomy from authorities (Bleiklie & Kogan, 2007; Davies, *et al.,* 2007; Deem, et al, 2008); the degree to which institutional governance is based on academic collegiality (Bleiklie & Kogan, 2007; Welsh & Metcalf, 2003) or on stakeholder views and interests (Davies, *et al.,* 2007; Sahney, Banwet & Karunes, 2004).

In addition, researchers highlight other factors related to strategic implementation, such as the design of organizational structures; institutional values such as pride and honor (Hazelkorn, 2008); the strengths of organizational culture (Brown & Marshall, 2008; Mok, 2005) and leadership quality (Calvo-Mora, Leal & Roldán, 2006; Cheng, 2003; McDaniel, 2002).

Resources and Competencies. The theory of advantages, focused on organizational resources, considers factors such as: Value-creating assets and competencies (Hunt, 2000); the availability of qualified human resources, the number of students per faculty member, the percentage of foreign professors and personnel (Deem, *et al.,* 2008; Salmi, 2009; White, James, Burke & Allen, 20122009); intangible resources such as knowledge, idiosyncrasy, trademarks and prestige (Chen, *et al.,* 2009; Steiner, Sundström & Sammalisto, 2013); the trust of benefactors and attractiveness for applicants (Hazelkorn, 2008); competitive intelligence and the quality of the information system (Hughes & White, 2006; Mok, 2005); procedural management (Pursglove & Simpson, 2007); the competencies of the organization in institutional learning and in taking advantage of opportunities for innovation (Hamel, 2001; Hunter, 2010; Teece, Pisano & Shuen, 1999; Sahney, *et al.,* 2004); links with industry and research networks (Brinkman & Morgan, 2008; Joseph & Abraham, 2009); availability of physical resou-

rces (Mohrman, *et al.,* 2008; Viswanadhan, 2006); adequate budgets and public funds (Salmi, 2009; Brinkman & Morgan, 2008); and location advantages (Rugman & Verbeke, 1993).

Access to foreign advantages. This dimension groups factors mentioned in the literature that are related to the internationalization of HEIs: The scope of its world vision (Altbach, 2007; Salmi, 2009); foreign funding (Moharman, *et al.,* 2008); foreign student enrollment (Altbach, 2007; Naidoo, 2009; Salmi, 2009); the number of foreign faculty members and personnel (Deem, 2008; Salmi, 2009); international relationships (Boyle, McDonnell, Mitchell & Nicholas, 2012; Mohrman, *et al.,* 2008); the number of courses offered in foreign languages (Altbach & Salmi, 2011); the number of programs and courses taught abroad (Naidoo, 2009); and global networking strategies (Choon, 2008; Harman & Harman, 2008).

The Study

The aim of the study was to identify empirically which of the factors cited in the literature are statistically significant in explaining the success of HEIs. The research sample was drawn from universities included in the ARWU, elaborated annually by the Jiao Tong University in Shanghai.

The hypotheses, drawn from the literature reviewed above, were defined as follows:

1. Hypotheses concerning the strategic thrust of HEIs
   H1.1: A broad-scope institutional strategy influences HEI success positively
   H1.2: Research focus influences HEI success positively
   H1.3: Human resources strategy influences HEI success positively
2. Hypotheses concerning the resources and competencies of HEIs
   H2.1: Control and operational processes influence HEI success positively
   H2.2: Organizational assets influence HEI success positively
3. Hypothesis concerning access to foreign advantages
   H3.1: A broad-scope international strategy influences HEI success positively

Factors identified in the literature review were treated as independent variables, grouped into three categories: Strategic thrust, resources and competencies, and access to foreign advantages.

The score of the HEI in the ARWU ranking was taken as a dependent variable, serving as a proxy for the relative success measurement, since it is based on the research achievements of HEIs.

As stated earlier in this article, in as much as HEIs have been engaged in increasing their levels of diversity, the task of establishing a construct capable of measuring success has, generally, been a complicated one. However, the purpose of this study is to identify factors that ensure successful management in the outstanding research universities of the world. Thus, we assume that all of the 500 universities that appear in the ARWU ranking do so because objective and relevant indicators were used to determine their success in research.

The target sample used in the study consisted of the 500 universities included in the ARWU. The study sample itself involved 400 of these universities – those occupying the first and the last 200 places in the list.

The data were collected using a questionnaire, addressed to the president or rector of the selected universities. The response rate was 20.25 %, corresponding to 81 universities (see Annex 4).

The questionnaire consisted of 59 questions related to factors identified in the literature review, and five questions concerning HEI identification. Before application, the questionnaire was tested on senior managers at the University of California, the University of Ottawa and the University of Oakland (New Zealand), in order to check its reliability and the quality of the translation.

Data were processed using the statistical technique of structural equation modeling, enabling factors to be grouped in a statistically significant model.

Results

The statistically significant model created by using structural equation modeling met all the tests of goodness of fit (see Annex 2). Regression weighting factors were also derived (see Annex 3).

The results of the research, shown in Table 1, confirmed the hypotheses: significant factors were found for each category defined in the initial theoretical framework, that is: Strategic thrust, institutional resources and competencies, and access to foreign advantages.

Strategic Thrust

Institutional strategy (3) is a significant latent variable affecting HEI success, confirming hypothesis 1.1. The variable groups factors such as high quality strategy, shared vision, world scope of research and leadership. These factors have been proposed by a large number of resear-

Table 1

Dimensions	Questionnaire Factor Number	Factors
1 Control and operative processes	10	Learning Strategy Effectiveness
	15	Teaching and Technology Update
	22	Human Resources Strategy
	31	Performance Indicators
	33	Planning System
2 Scope of international strategy	4	World Strategic Scope
	56	Global Networks
	57	International Reputation
	58	International Relations
3 Institutional strategy	1	Strategy
	3	Institutional Shared Vision
	17	Worldwide Scope of the Research
	20	High Quality Strategy
	47	Leadership
4 Research focus	40	Autonomous Governance
	6	Focus on Research
	18	Research for Knowledge Advancement
	19	Institutional Support to Research
5 Organizational assets	8	Culture Oriented by Citizenship
	43	Proud and Honor
	49	Intangibles Resources
6 Human resources strategy	23	Worldwide Recruitment of Teachers
	24	Stringent Selection System
	25	Defined Promotion System

chers (Altbach & Salmi, 2011; Bernasconi, 2011; Calvo-Mora *et al.,* 2006; Hughes & White, 2006; Mok, 2005).

Institutional strategy is also important to the ranking of HEIs in relation to their pursuit of academic excellence. The variable involves research intended to attend to major world problems, guided by a shared vision of faculty members about the kind of institution they hope to build under a defined leadership model.

Research focus (4) is another significant latent variable affecting HEI success, confirming hypothesis 1.2. The variable encompasses factors such as the autonomy of institutional governance, research emerging from the advancement of knowledge, and institutional support and commitment to research activities. These findings confirm the suggestions of Altbach (2009), Deem (2008) and White *et al.,* (2012).

Autonomous institutional governance means that universities are able to define their own goals and strategies, independently of government and other external influence. In their decision-making HEIs take into account aspects that are important for faculty members, the strategic environment and stakeholders.

Research is fostered and guided mainly by a desire to advance knowledge, regardless of whether it is likely to be suitable for immediate application. Finally, institutional support and commitment with research activity means that HEIs have followed a strategy to set up a core research capability through institutional allocations of human and material resources.

The latent variable *human resources strategy* (6) was also significant, confirming hypothesis 1.3. The variable highlights relevant strategies followed by HEIs aiming to develop their highly specialized human capital. First, faculty members are recruited from around the world, based, as Altbach (2007), Salmi (2009) and Ab Aziz *et al.,* (2012), have pointed out, on the capabilities and merits of the applicants; second, HEIs must have a formal, rigorous, clear and well-publicized system for the selection and promotion of faculty members. This position confirms the suggestions of authors like Altbach

(2007), Brown & Marshall (2008), Hazelkorn (2008), and Ingvarson & Rowe (2008).

Resources and Competencies

The latent variable *control and operative processes* (1) is significant, confirming hypothesis 2.1. It encompasses five factors. First, effectiveness of the learning strategy (Chen *et al.,* 2009); second, up-to-date technology for teaching and learning (Mistry, 2008; Viswanadhan, 2006), enabling HEIs to take care of teaching quality, despite their strategic focus on research; third, human resources strategy; fourth, performance indicators used by HEIs, as posited by Chen *at al.,* (2009) and Deem (2008); and, fifth, quality of the planning system (Chen, 2003).

Organizational assets (5) is a significant latent variable affecting HEI success, confirming hypothesis 2.2. It includes three significant factors. First, HEI culture, oriented towards citizenship (Brown & Marshall, 2008; Mok, 2005); second, pride and honor felt by faculty (Steiner *et al.,* 2013), both of which are values of paramount importance for the academic community and, third, intangible HEI resources, a factor highlighted by Chen *et al*. (2009).

Access to Foreign Advantages

Scope of international strategy (2) is a significant latent variable affecting HEI success, confirming hypothesis 3.1.

International strategy encompasses four factors: The scope of international strategy; integration with global research networks; international prestige; and quality and world scope of international relationships. Those four factors are coherent with proposals advanced by researchers such as Choon (2008), Harman & Harman (2008), Altbach & Salmi (2011) and Boyle *et al.* (2012).

Implications

The design of institutional strategies capable of meeting the success factors identified above requires significant resources and effort.

A strategy focused on high quality research for the advancement of knowledge and an organizational culture oriented towards citizenship requires qualified human talent and resources if high quality public goods with broad coverage are to be produced. Even more resources are needed when the scope is increased to encompass the entire world.

Bearing in mind that most of the findings of this research refer to public goods produced by HEIs, where externalities are high, the state -or some international institution- should act to benefit society by supporting their research activities. Thus, appropriate public policies, at national and international level, are essential to developed and developing countries alike, in order to strengthen existing HEIs or establish new research universities.

The model established as a result of SEM could also be used by accreditation agencies to assess the management of relevant performance factors at research universities. Standards could be established for each factor defined in the model.

Considering that the success of HEIs needs to be measured according to their missions and their different objectives, and that the HE sector is increasingly diverse, future research should be oriented towards establishing more complex constructs for measuring success in different kinds of HEIs. This is particularly important for HEIs from developing countries, which are usually constrained by limited resources.

Conclusions

This study has identified relevant factors that should be taken into account in the design of strategies that are appropriate for an institution aspiring to become a leading HEI.

World class research universities have autonomous strategic management structures that define their strategies for achieving excellence; they are guided by a shared vision for producing globally important research andcontributing to the advancement of knowledge.

A crucial role is played in the implementation of strategies by rigurous processes for the selection of professors and systems of qualification and promotion, as well as by the culture of responsible citizenship and the honor and pride felt by faculty members.

The study found that learning effectiveness and up-to-date teaching technology are significant, despite the strategic focus on research that characterizes HEIs.

Human resources management, performance indicators and HEI planning systems were shown to be significant factors as they are vital to the motivation of faculty members and encouraging their initiatives and capabilities.

The worldwide scope of international strategies has become an important factor for HEIs seeking to access the comparative advantages associated with international links. Prestige, integration with global research networks and managing international relationships are key aspects of any international strategy.

The development of a knowledge society brings with it challenges for individual countries and for the interna-

tional community: to improve the quality of life of the world's population by supporting research universities.

Countries intending either to set up a new research university or to transform current HEIs into world class research bodies should design appropriate policies by focusing incentives and resources on the success factors identified in this article.

References

Ab Aziz, K., Harris, H., Richardson, S., & Ab Aziz, N. A. (2012). Drivers for university research performance: Investigating the researchers' dynamics. *IBIMA Business Review 1*, 1-16.

Altbach Ph.(2007). Peripheries and centres: Research universities in developing countries. *Higher Education Management & Policy, 19*, 111-134.

Altbach Ph., & Salmi, J. (2011). *The road to academic excellence: Emerging research universities in developing and transition countries* (unpublished manuscript).

Andrews, K. (1971). *The concept of corporate strategy*. Chicago, Il: Dow Jones-Irwin Homewood.

Bernasconi, A. (2011). Private and public pathways to world-class research universities: The case of Chile. In Ph Altbach & J. Salmi (Eds.), *The road to academic excellence: Emerging research universities in developing and transition countries* (pp. 386-440). World Bank.

Bowman, N. A., & Bastedo, M. N. (2011). Anchoring effects in world university rankings: Exploring biases in reputation scores. *Higher Education*, *61*(4), 431-444.

Bleiklie, I., &Kogan, M. (2007). Organization and Governance of Universities. *Higher Education Policy, 20,* 477-494.

Boyle, B., McDonnell, A., Mitchell, R., & Nicholas, S. (2012). Managing knowledge in internationalizing universities through foreign assignments. *The International Journal of Educational Management*, *26*(3), 303-312.

Brinkman, P.T., & Morgan, A. W.(2008). Financial Planning: Strategies and Lessons Learned. *Planning for Higher Education*, *38, 5-15.*Brown, J. F., & Marshall, B. L. (2008). Continuous quality improvement: An effective strategy for improvement of program outcomes in a higher education setting. *Nursing Education Perspectives, 29*, 205-212.

Brunner, J. J. (2009). *Educación superior en Chile, instituciones mercados y políticas gubernamentales.* Santiago: Universidad Diego Portales.

Calvo-Mora, A., Leal, A., & Roldán, J. L. (2006). Using enablers of the EFQM model to manage institutions of higher education. *Quality Assurance in Education, 14*, 99-122.

Chen, S. H., Wang, H. H., & Yang, K. J. (2009). Establishment and application of performance measure indicators for universities. *TQM Journal, 21*, 220-232

Cheng, Y. C. (2003). Quality assurance in education: Internal, interface, and future. *Quality Assurance in Education, 11, 202-214.*

Choon, F. (2008). Understanding quality assurance: A cross country case study. *Quality Assurance in Education, 16*, 126-142.

Davies, J., Douglas, A., & Douglas, J. (2007). The effect of academic culture on the implementation of the EFQM Excellence Model in UK universities. *Quality Assurance in Education, 15*, 382-403.

Deem, R., Mok, R. K., & Lucas, L. (2008). Transforming higher education in whose image? Exploring the concept of the 'World-Class' University in Europe and Asia. *Higher Education Policy, 21*, 83-98.

Deem R. (2008). Producing and re/producing the global university in the 21st century: Researcher perspectives and policy consequences. *Higher Education Policy, 21,* 439-457.

Doherty, E. M. (2003). Understanding faculty productivity: Standards and benchmarks for colleges and universities. *The Journal of Higher Education, 74*, 112-116.

Dunning, J. (1988). The eclectic paradigm of international production: A restatement and some possible extensions. *Journal of International Business Studies*, *19*, 1–31.

Gitlow, A. L., & Gitlow, H. S. (2013). The globalization of america's research universities: Does the globalization mission pose a moral dilemma? *Journal of Leadership, Accountability and Ethics, 10*(4), 11-18.

Guloglu, B., & Tekin, R. B. (2012). A panel causality analysis of the relationship among research, development, innovation, and economic growth in high-income OECD countries. *Eurasian Economic Review*, *2*(1), 32-47.

Gliner, J., & Morgan, G. (2000). *Research methods in applied settings* (1st ed.). Mahwah, NJ: Lawrence Erlbaum.

Gwynne, P. (2014). Research universities face fresh challenges. *Research Technology Management, 57*(2), 6-7.

Hamel, G. (2001). Innovation's new math. *Fortune, 144*(1), 130-133.

Harman, G., & Harman, K. (2008). Strategic mergers of strong institutions to enhance competitive advantage. *Higher Education Policy, 21,* 99-121.

Hargraves, J., & Christou, A. (2002). An institutional perspective on QAA subject benchmarking. *Quality Assurance in Education, 10,* 187-192.

Hax, A., & Ugarte J. (2014). *Hacia la gran universidad chilena*. Santiago, Chile: Ediciones Universidad Católica de Chile.

Hazelkorn, E. (2008). Learning to live with league tables and ranking: The experience of institutional leaders. *Higher Education Policy*, *21*, 193-216.

Himanka, J. (2012). The university as a community of selves: Johan vilhelm snellman's "on academic studies". *Higher Education*, *64*(4), 517-528.

Hughes, S., & White, R.T. (2006). Competitive intelligence in higher education: Opportunities and threats. *Academy of Educational Leadership Journal, 10*, 67-82.

Hunt, S. (2000). *A general theory of competition* (1st ed.). Thousand Oaks, CA: Sage Publications.

Hunter, F. (2010). Bologna beyond 2010: Looking backward, looking forward *International Educator, 19,* 60-64.

Ingvarson, L., & Rowe, K. (2008). Conceptualising and evaluating teacher quality: Substantive and methodological issues. *Australian Journal of Education, 52*, 5-36.

Joseph, K. J., & Abraham, V. (2009). University-Industry interactions and innovation in India: Patterns, determinants, and effects in select industries. *Seoul Journal of Economics*, *22*, 467-499.

Kerr, C.(2003). *The gold and the blue. Berkeley and Los Angeles*. CA: University of California Press.

Kerr, C. (2001). *The uses of the university*. Cambridge, Mass: Harvard University Press.

Kurre, F. L., Ladd, L., Foster, M. F., Monahan, M. J., & Romano, D. (2012). The state of higher education in 2012. *Contemporary Issues in Education Research*, *5*(4), 233.

Lemaitre, M. J. (2009). Nuevos enfoques sobre aseguramiento de la calidad en un contexto de cambios. *Revista Calidad en la Educación, 31,* 170-89. Retrieved from http://www.cned.cl/public/secciones/seccionpublicaciones/doc/64/cse_articul o838.pdf.

Lange, D. E. (2013). How do universities make progress? Stakeholder-related mechanisms affecting adoption of sustainability in university curricula. *Journal of Business Ethics*, *118*(1), 103-116.

McCaffery, P. (2010). *The higher education manager´s handbook*. New York and London: Routledge.

Mahani, S., & Molki, A. (2011). Internationalization of higher education: A reflection on success and failures among foreign universities in the united arab emirates. *Journal of International Education Research*, *7*(3), 1.

McDaniel, E. A. (2002). Senior leadership in higher education: An outcomes approach. *Journal of Leadership & Organizational Studies, 9*, 80-89.

Mistry, V. (2008). Benchmarking e-learning: Trialling the "MIT90s" framework. *Benchmarking, 15*, 326-338.

Mok, K. H. (2005). The quest for world class university: Quality assurance and international benchmarking in Hong Kong. *Quality Assurance in Education, 13, 277-295.*

Mohrman, K., Ma, W., & Baker, D. (2008). The Research university in transition: The emerging global model. *Higher Education Policy, 21, 5-28.*

Musselin, C. (2013). Redefinition of the relationships between academics and their university. *Higher Education*, *65*(1), 25-37.

Naidoo, V. (2009). Trade commitments in education services: The need to move out of the current impasse. *Journal of World Trade, 43*, 621-641.

Perkmann, M., & Salter, A. (2012). How to create productive partnerships with universities. *MIT Sloan Management Review*, *53*(4), 79-88.

Pursglove, J., & Simpson, M. (2007). Benchmarking the performance of English universities. *Benchmarking*, *14*, 102-116.

Rugman, A., & Verbeke, A. (1993). Foreign subsidiaries and multinational strategic management: An extension and correction of Porter's single diamond framework. Management International Review, 33(2), 71–84.

Salmi, J.(2009). *The challenge of establishing world-class universities*. Washington D. C.: World Bank.

Sandmann, L. R., Williams, J. E., & Abrams, E. D. (2009). Higher education community engagement and accreditation: Activating engagement through innovative accreditation strategies. *Planning for Higher Education*, *37*, 15-27.

Sahney, S., Banwet, D. K., & Karunes, S. (2004). Conceptualizing total quality management in higher education. *The TQM Magazine*, *16*, 145-157.

Slaughter, S., & Cantwell, B. (2012). Transatlantic moves to the market: The united states and the european union. *Higher Education*, *63*(5), 583-606.

Sohail, M. S., Daud, S., & Rajadurai, J. (2006). Restructuring a higher education institution: A case study from a developing country. *The International Journal of Educational Management, 20,* 279-291.

Steiner, L., Sundström, A. C., & Sammalisto, K. (2013). An analytical model for university identity and reputation strategy work. *Higher Education*, *65*(4), 401-415.

Teece, D., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, *18*, 509–533.

Thieme, C., Araya, L., & Olavarrieta, S. (2012). Grupos estratégicos de universidades y su relación con

el desempeño: el caso de Chile. *Innovar: Revista de Ciencias Administrativas y Sociales*, *22*(43), 105-116.

Viswanadhan, K. G. (2006). Quality assessment of Indian engineering programs: An outcome-based perspective. *South Asian Journal of Management, 13*, 76-95.

Welsh, J. F., & Metcalf, J. (2003). Faculty and administrative support for institutional effectiveness activities.*The Journal of Higher Education, 74*, 445-465.

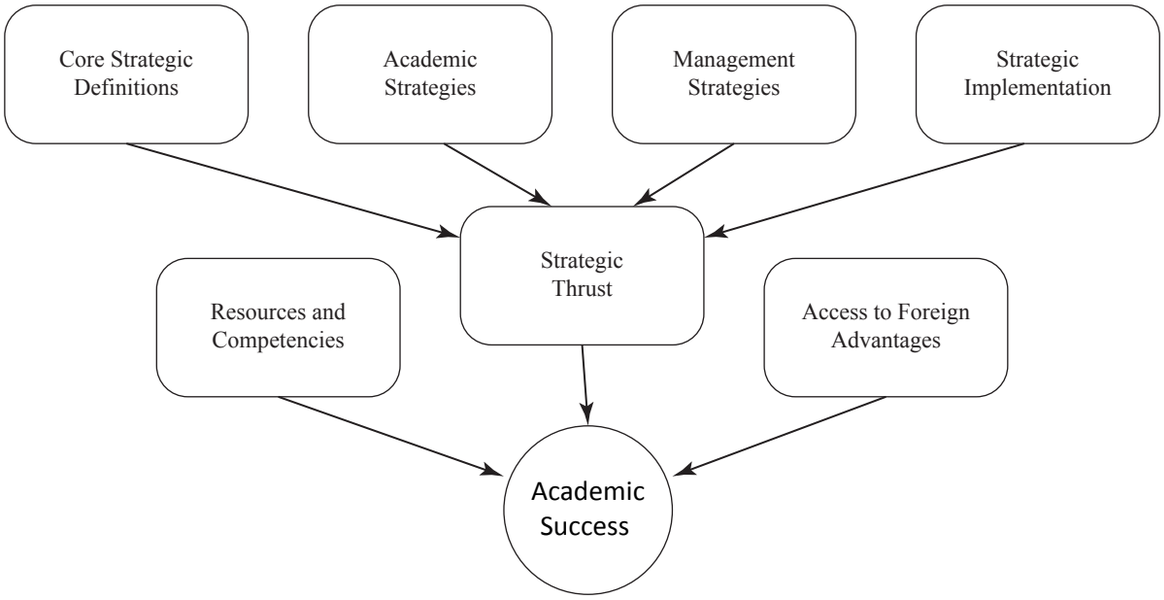
White, C. S., James, K., Burke, L. A., & Allen, R. S. (2012). What makes a "research star"? factors influencing the research productivity of business faculty. *International Journal of Productivity and Performance Management*, *61*(6), 584-602.

World Economic Forum (2011). *Global competitiveness report 2010-2011*. Geneva, Switzerland.

Yang, R., & Welch, A. (2012). A world-class university in china? The case of tsinghua. *Higher Education*, *63*(5), 645-666.

Annex 1

Academic Success Theoretical Framework



Annex 2

Goodness of Fit of the Model

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	54	365,322	246	0,000	1,485
Saturated model	300	0,000	0		
Independence model	24	1605,706	276	0,000	5,818

Annex 3

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
F1	<---	E	0,529	0,078	6,742	***	
F2	<---	E	0,498	0,081	6,133	***	
F3	<---	E	0,634	0,073	8,649	***	
F4	<---	E	0,548	0,088	6,215	***	
F5	<---	E	0,393	0,089	4,434	***	
F6	<---	E	0,624	0,101	6,176	***	
Learning Strategy Effectiveness	<---	F1	1,000				
Up-to Date Teaching and Technology	<---	F1	0,899	0,134	6,729	***	
Human Resources Strategy	<---	F1	0,878	0,114	7,678	***	
Performance Indicators	<---	F1	1,016	0,147	6,901	***	
Planning System	<---	F1	1,087	0,154	7,063	***	
World Strategic Scope	<---	F2	1,000				
Global Networks	<---	F2	1,278	0,172	7,432	***	
International Reputation	<---	F2	1,168	0,154	7,567	***	
Strategy	<---	F3	1,000				
Institutional Shared Vision	<---	F3	0,874	0,115	7,622	***	

(Continued)

Annex 3

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
Worldwide Scope of Research	<---	F3	1,024	0,141	7,243	***	
High Quality Strategy	<---	F3	1,048	0,123	8,529	***	
Leadership	<---	F3	1,005	0,128	7,860	***	
Autonomous Governance	<---	F4	1,000				
Focus on Research	<---	F4	1,053	0,177	5,961	***	
Research for Knowledge Advancement	<---	F4	1,030	0,170	6,078	***	
Institutional Support to Research	<---	F4	1,109	0,182	6,104	***	
Culture Oriented by Citizenship	<---	F5	1,000				
Pride and Honor	<---	F5	1,542	0,346	4,458	***	
Intangible Resources	<---	F5	1,202	0,282	4,258	***	
World Recruitment of Teachers	<---	F6	1,000				
Stringent Selection System	<---	F6	0,947	0,131	7,205	***	
Defined Promotion System	<---	F6	0,824	0,121	6,828	***	
International Relations	<---	F2	1,364	0,164	8,336	***	

*p < 0.05; **p < 0.01; ***p < 0.001

Annex 4

Respondent Universities

University of California, Berkley	University of Konstanz	Technical University of Denmark
Northwestern University	University of Nevada - Reno	University of Genova
University of California, Santa Barbara	University of Pompeu Fabra	Ecole Normale Superieure - Paris
University of North Carolina at Chapel Hill	University of Southern Denmark	Clemson University
Vanderbilt University	University of Szeged	Drexel University
University of Pittsburgh	University of the Witwatersrand	Georgetown University
The Australian National University	University of Turku	Indian Institute of Science
The Ohio State University - Columbus	University of Warsaw	Nanyang Technological University
King's College London	University of Wollongong	University of Bremen
Uppsala University	Eindhoven University of Technology	University of Graz
University of Helsinki	Kyungpook National University	University of Porto
University of Arizona	National Yang Ming University	Universidade de Santiago de Compostela
University of Rochester	Swinburne University of Technology	Concordia University
University of Nottingham	The University of Texas at San Antonio	Kent State University
Michigan State University	University College Cork	University of Exeter
University of Basel	University of Canterbury	Yale University
The University of Sheffield	University of Eastern Finland	University of Essex
University of Sydney	University of Lisbon	University Of Bath
Aarhus University	University of Ljubljana	University of Tennessee
Georgia Institute of Technology	University of Pavia	George Mason University
Lund University	University of Surrey	Iowa State University
National University of Singapore	Niigata University	University of Maryland, Baltimore
Oregon State University	University of Bristol	University of Waterloo
Swiss Federal Institute of Technology of Lausanne	King Fahd University of Petroleum & Minerals	
	The Chinese University of Hong Kong	
The University of Western Australia	The University of Montana - Missoula	
University of Leeds	Weizmann Institute of Science	
University of Miami	Catholic University of Chile	
University of Sussex	Chiba University	
University of Tuebingen		