

# Understanding the concept of the entrepreneurial university from the perspective of higher education models

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**Abstract** Over the last few decades, globalization and ever-increasing demands of the knowledge-based economy have caused higher education in most countries around the world to undergo significant transformation. Notwithstanding the dramatic changes in higher education, it is clearly noticed that the influence of the European higher education models is still present despite the fact that the American model has then become dominant on higher education in Europe or even worldwide. The changes have been seen in the evolutionary roles of universities, which share the common trend from traditional missions of teaching and research to the third mission for economic development. Despite various viewpoints about the third mission, the common one concerns the entrepreneurial role of university for socio-economic development, underlying the concept of entrepreneurial university in which the collaboration between university and external stakeholders is emphasized. This paper is aimed to present a review of the taxonomy of the three European higher education models, namely the Humboldtian, Napoleonic, and Anglo-Saxon model, which is followed by a discussion on the emergence of the Anglo-American model of higher education. The paper then presents the third mission in relation to the roles of a university in developed countries, which is followed by the elaboration on the transformation from mode 1 to mode 2 in knowledge production, and a pathway toward entrepreneurial universities.

**Keywords** University · Research · Third mission · Entrepreneurial university · Globalization · Knowledge-based economy/society · Mode 1 · Mode 2

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## Introduction

The rise of the knowledge-based society and the competitive labor market in both local and global context has made higher education become even more important for individuals and society to survive. “Higher education is no longer a luxury; it is essential for survival. Higher education is essential to national social and economic development,” (Task Force on Higher Education and Society 2000, p. 14). Gillis (1999) emphasizes that, in today’s world, higher education plays an even more crucial role than ever before in the history of mankind as the quality of higher education determines the wealth as well as poverty of nations (cited in Task Force on Higher Education and Society 2000). Higher education significantly contributes to the skilled labor force and responds to the changing labor market demands in knowledge-based economies (Enders 2010). Bloom et al. (2006) emphasize the importance of higher education to enable countries to catch up with technologically advanced societies in the knowledge-based economy, as Welch (2011, p. 4) writes “... higher education is universally acknowledged as a key pillar in constructing the new knowledge economies of the twenty-first century.”

Therefore, governments and international organizations such as the Organization for Economic Cooperation and Development (OECD), the World Bank and the Asian Development Bank regard higher education as a vital tool to produce highly-skilled people to be well-prepared for the new knowledge-driven economies (Welch 2011). More importantly, the role of higher education has been widely acknowledged in research and government policy in the global knowledge-based economy (Marginson 2010). Such necessity and ever-increasing demand in the contemporary society are now challenging the status quo of higher education in many countries around the world, leading to the expansion of higher education and causing traditional universities to undergo reforms and restructuring to be responsive to the needs of the knowledge-based economy. Scott (1998) indicates, “All universities are subject to the same processes of globalization—partly as objects, victims even, of these processes, but partly as subjects or key agents of globalization” (p. 122).

Due to the rapidly changing needs of the knowledge-based society and the local and global competitiveness, people’s knowledge, skills and resourcefulness have become increasingly important. The competitiveness and rise of the knowledge-intensive economy have posed great challenges to governments in both developed and developing nations to overcome and encourage them to also make higher education (more) responsive to the competitive labor market in the globalized society. Hence, governments are challenged to enhance the higher education system in order to produce more highly-educated people for social and economic development (Maassen and Cloete 2006). At the same time, it has affected the role of and funding by the government in (higher) education (Carnoy 1999). The unit cost of mass higher education has made governments unlikely to fully fund higher education in the same amount as the elite education (Clark 1997). Steier (2003) points out that the growing cost of the expansion of higher education system has posed a challenge to the developed countries for a change as their higher education institutions are originally largely dependent on the government’s financial support. Clark (1998a) suggests that all universities should adapt and become more entrepreneurial, responding in “entrepreneurial” way to the growing demand for higher education, meaning that universities should be able to be more financially independent (of the government) as they are expected to seek funds from the external sources through their knowledge exploitation. Thus, universities are encouraged to act entrepreneurially by finding new sources of income through their activities to secure their place in the knowledge-based economy. In brief, universities have

been undergoing fundamental changes over the last few decades from the traditional missions of teaching and research to encompass the entrepreneurial role as the third mission to fully realize their potentials to contribute to the socio-economic development.

Despite a large body of literature on higher education, the four higher education models, namely the Humboldtian, the Napoleonic, the Anglo-Saxon, and the Anglo-American model, have yet to be discussed in conjunction with most recent development: the entrepreneurial university. The paper will bring the four models of higher education together into an extensive discussion in relation to the entrepreneurial university. The paper first provides a review of the four models, followed by the new challenges to higher education. In the last section, it discusses how these challenges have their roles in the models of higher education. The paper aims to describe how the idea or concept of an entrepreneurial university relates to the “classic” models of higher education and how developments in the twentieth and twenty-first century are dealt with.

### Higher education models

Higher education is generally categorized into three models. These three models are of European origin: the Humboldtian, the Napoleonic, and the Anglo-Saxon model. These models were spread around the world during the colonial period—the nineteenth and twentieth century period (Arthur and Little 2010) and have remained influential on the current higher education, although they, to some extent, have been modified or contextualized to fit an individual country’s higher education system. Gellert (1993b) refers the Humboldtian, Napoleonic, and Anglo-Saxon model to as research, training and personality respectively.

The Humboldtian model, the German higher education model, emerged by the end of the nineteenth century and is named after the famous scientist called Wilhelm von Humboldt (Gellert 1993b), whose ideas created the University of Berlin in 1810 based on the two basic features of research-like learning and academic freedom of research and teaching (Elton 2008). This model is often seen as the origin of the present-day “research university” (Elton 2008). Higher education under this model attaches great importance to academic freedom for teaching and research together with the freedom to learn without the interference from governments. It also involves institutional classification and boundaries between vocational education and training, and university education (Arthur and Little 2010). Teaching is directly based on the research of the professors, who are required to conduct their research for teaching purposes (Gellert 1993a). There is a unity of teaching and research regarding learning as a collaborative enterprise in which “the professors are not there for the students, but rather both are there for science (Humboldt 1809/1990, p. 274 as cited in Ash 2006). In other words, both professors and students are supposed to work together to produce new knowledge. Ash (2006) also notes that there is basically no difference between the natural sciences and the humanities as the concept of science can be applied to both; pure science is considered much more important than specialized professional training. Gellert (1993b) asserts that in the Humboldtian model, knowledge creation and transmission are put at the center of the university’s mission; it is thus a “research model”. Universities are mainly funded by the government (Gellert 1993a), which makes higher education system under this model rather centralized. By 1900, the research mission of university originated from the model had influenced higher education worldwide (Scott, 2006). Though the integration of research and learning at universities has become one of the features in the contemporary higher education in developed nations,

the complete features of the model are not fully adopted due to the massification of higher education and limited funding from the state.

In the Napoleonic model, the French model, according to Schwartzman and Klein (1994), higher education institutions are regarded as public entities, authorizing the students to apply their professions and enjoy the rights and benefits from their degrees, and the degrees are provided by colleges under the assumptions that the graduates are equally qualified. Neave (2003) notes that degrees or diplomas are accredited and validated by the state. As it is a highly centralized system, the professional practice is controlled by professional councils organized and directed by the government (Schwartzman 2001), which makes it impossible for higher education institutions to become institutionally autonomous for curriculum design, staff recruitment, objectives, and organizational structure. Schwartzman (2001) also points out that the model is relatively formal and relies on rote learning rather than research and independent thinking—research tends to take place outside universities. Vocational education (in mathematics and engineering sciences) is deemed more important than humanities and basic sciences (Schwartzman, 2001). The high-level education particularly refers to the training taking place at the (France's) *grandes écoles*, in which professional education is emphasized as a vital tool for professional formation and positions (Arthur et al. 2007). In this sense, Gellert (1993b) claims that this model emphasizes high-level vocational skills, and professional education, and it is thus basically known as a “training model”.

The Anglo-Saxon model, the British model which emerged in the nineteenth century with Oxford and Cambridge University, has the basic feature of personality development through “liberal education” in which there is a close relationship between teachers and students (Gellert 1993b). Unlike the above two models, the Anglo-Saxon model of higher education is a less well-developed system of *vocational training and higher education* because it provides instead a broad educational base with less emphasis on subject-specific and skill-related content (Little 2001), and is not intended to prepare students for a specific profession after graduation. Arthur et al. (2007) argue that this type of educational base can be used subsequently for further professional education and training often provided by industry. This model tends to put more emphasis on *professionalism*, rather than technical (and vocational) knowledge and skills as the students' focus is to deal flexibly and intelligently with the changes and challenging situations (Arthur et al. 2007). Gellert (1993b) asserts that the model focuses on development of a person's personality or character since “character formation” played a more crucial role in the British system than in any other university system besides research and professional training; the model is therefore generally known as “personality model”. Universities under this regime are institutionally autonomous with regard to courses, recruitment procedures, objectives and organizational structure (Felt and Glanz 2002). Such an autonomy promotes competitions among universities to attract the students, which results in more professional management and effectiveness in institutional financing and staff employment (Clark 1995). The universities operate within the general framework defined by the government and with quality control and supervision conducted by independent institutions (Herbst et al. 2011). In other words, it is a model of self-governing institutions and autonomous academic disciplines, unlike the Humboltian and Napoleonic models of universities, where governance by the state is the case. The Anglo-Saxon model follows the two-cycle degree program of undergraduate (Bachelor's) and postgraduate study (Master's and PhD), which is more structured, compared with the system used in the Continental Europe before the Bologna process (Cardoso et al. 2008).

Carlsson et al. (2009) state that the research university in the United States was modeled after the German model (von Humboldt's University of Berlin) when this model was imported to the United States in the nineteenth century. In this sense, the German university is frequently claimed to serve as a model for American research university, which then started to influence the university system around the world (Ash 2006). Moreover, unlike its European predecessor, the United States quickly turned its university into a "decentralized, pluralistic, and intensely competitive academic market place fueled by federal research dollars" (Graham and Diamond 1997, p. 2). Turner (2001) asserts that:

"The American universities which emerged in the late nineteenth and early twentieth centuries were far too diverse to be described as imports from any single country. Rather, they were unique creations which combined elements from the British, German and other European university systems with local inventions" (as cited in Ash 2006, p. 249)

As of the early twentieth century, the United States started to introduce mass higher education and "Americanize" higher education to form its own model, known as the Anglo-American model, which has unique features and has strongly influenced on higher education systems around the world. Gellert (1993b) points out that the Anglo-American model places an emphasis on the liberal arts as well as on multi-disciplinary education at the undergraduate level, following the Anglo-Saxon model, and research in the graduate level, patterned after the Humboldtian model. The American influence can be found in the British higher education, such as the development of a British version of the Massachusetts Institute of Technology (MIT) and the transition from an elite to a mass system (Bocock et al. 2003). Salmi (2001) claims that many higher education institutions worldwide have adopted the US credit-based system in order to increase flexibility in the design and organization of their academic programs. The Anglo-American system has more structured teaching and learning approach, which helps students to better plan their study, and to have a shorter period to complete their studies compared to the European-style system of higher education (Buchori and Malik 2004). The Anglo-American model of higher education is derived from the European models, and is then imported back to the European countries and influences higher education around the world. In this sense, the Anglo-American model can be referred to as a "hybrid model", in which the necessary elements of all the three European models are integrated to constitute its own unique features.

To sum up, the three European models are known to shape the universities throughout the world although modifications have been made to fit the specific needs and/or situations of a particular country. However, there appears to be no specific model to which the government of a particular country adheres for its higher education as there is a continuous evolution of the functions of university to respond to the rapidly-changing needs of the society and globalization. Simply put, the European models of higher education are important as they have remained influential on the current higher education worldwide. Though the higher education system in Europe and worldwide is dominated by the Anglo-American model, the roots go back to its European predecessors. The Anglo-American system has gained its popularity among higher education institutions around the world since it makes the massification of higher education possible, introduces a de-centralized system to ensure flexibility to keep pace with the rapidly growing knowledge-based economy. In this regard, none of the models really took the new development into its model, but moulded the new tasks as well as they could into the Anglo-American model (Table 1).

**Table 1** Higher education models, their basic features and impacts on transformation

Higher Education Model	Basic features	Impacts
Humboldtian Model	Research-based learning Academic freedom of research and learning Centralized system of governance	Research becoming a central area of study in modern higher education
Napoleonic Model	High-level vocational training Professional education Centralized system of governance	Vocational and technical training becoming crucial to prepare students for the rapidly-changing labor markets
Anglo-Saxon Model	Personality development through liberal education Professionalism Institutional autonomy or self-governing institutions	Soft skills being emphasized in modern higher education to enable students to act flexibly and intelligently in a changing and challenging environment
Anglo-American Model	All the basic features of the European models integrated  Decentralized system of governance Massification of higher education	Research, technical training and professionalism being incorporated in contemporary higher education worldwide  Entrepreneurialism model of higher education institutions becoming critical for the competitive academic market place

## Twentieth and twenty-first century developments

Each of the models described above has to incorporate requirements (“developments”) imposed by the ever changing environment of higher education. In the next sections three of those developments, connected with the three basic missions of a university, are:

- Education: lifelong learning and entrepreneurship education;
- Research: from mode 1 to mode 2;
- Role of the university in the knowledge society

### Education: Lifelong learning and entrepreneurship education

With regard to education, many changes took place as impacts of the knowledge society. For instance, lifelong learning was introduced: “... the university degree is regarded as no longer a voucher for lifelong employability but merely an entry ticket into the world of work” (Gibb and Hannon 2005, p. 5). Universities are, therefore, under great pressures to work harder to prepare students for lifelong learning so that they will not be left behind by the rapidly-changing demand of the labor market (European Commission 1996). Maassen and Cloete (2006) claim that it is important for higher education institutions to be “entrepreneurial” to successfully cope with this challenge. The adoption of the Anglo-American university model provides a structure to deal with this issue, although life-long learning is not (yet?) common practice—at least in Europe.

A related development is the introduction of entrepreneurship education in higher education. Entrepreneurship is a complex topic to which increasing attention is recently been paid (Shane and Venkataraman 2000; Wright 2012). As entrepreneurship is an extensive field of study and consists of a wide range of purposes and objectives, various definitions can be found in contemporary literature on entrepreneurship. Mars and Rios-Aguilar (2010) have found that not many studies gave similar definition of entrepreneurship when it concerns “academic entrepreneurship”. Many authors (see Rothaermel et al. 2007) operationalize it as based on the following activities: “faculty consultation, university-industry collaboration, intellectual property protection, and technology transfer”. Analyzing the entrepreneurial activities using the 44 studies in their sample at the national/regional, institutional, professional/disciplinary, and individual levels, Mars and Rios-Aguilar (2010) have found that most studies place a great emphasis on national, institutional, and professional rather than individual levels, which are observed through research on American, Australian, and Canadian higher education. In this regard, Mars and Rios-Aguilar (2010) have observed the common use of entrepreneurial terminology in a certain number of academic behaviors and activities that include technology transfer, intellectual property protection, and university-industry collaboration.

The advent of entrepreneurship education has intrigued scholars in conducting research on the development and status of entrepreneurship education (Kuratko 2005; Pittaway and Cope 2007; Vesper and Gartner 1997). It has begun to gain traction as a distinct field of study (Drucker 1985; Shane and Venkataraman 2000). Although it can hardly be maintained that entrepreneurship education was introduced resulting from the emerging knowledge society, Katz (2003) established that the first course in this domain (in the USA) was taught in 1947. However, the knowledge society is for a large part responsible for the breakthrough in the 1990s. Entrepreneurship is being taught to students in science, engineering and technology, as well as in business schools and as part of the humanities curriculum (see Levenburg et al. 2006) with the result that thousands of students worldwide are continuously introduced to entrepreneurship via longer or shorter courses. Although the academic legitimacy of this subject is still under debate (see Lewis 2011), students are educated to be entrepreneurial as a professional or become an entrepreneur (at some point in life). The legitimacy debate can be understood as many universities changed from the Napoleonic or the Humboldtian model towards the Anglo-American model and view on education.

Due to the rapidly-changing demands of the labor market in the global market economy, it is clearly noticed that universities cannot be merely the institution providing higher learning with work skills as it will make the students unprepared for the future careers in the global knowledge economy. The advent of the entrepreneurial university has more or less led to the changes of university curricula, one of which is the incorporation of entrepreneurship education in order to equip students with entrepreneurial competence to apply upon their graduation. In this sense, universities are encouraged to incorporate ability to use new technology, access new markets, develop new products, practice management of enterprises and develop skill levels in job market (Klofsten and Jones-Evans 2000), which are all the important elements in entrepreneurship education with which the students need to be well-equipped to be entrepreneurial. Mars (Mars et al. 2008; Mars and Rhoades 2012) raised the case of academic capitalism which promotes entrepreneurial spirits among students, particularly in science and technology closely linked to the knowledge economy, contributing to the values added to the society or/and economy. Mwasalwiba (2010) points out that the academics, on the supply side, view entrepreneurship education as a tool to establish entrepreneurial societies and to have more innovation programs for the students.



On the demand side, the policymakers believe that enterprise culture will lead to more new jobs and business ventures and the students will need entrepreneurship education for their self-employment or for competition in the challenging labor market. Entrepreneurship education can be an important element in any business venture support system (Hansemark 1998), which comes along with incubators, innovation centers, technology transfer offices, science parks, and venture capital operations, as part of job creation (McMullan and Long 1987). Matlay and Westhead (2005) assert that entrepreneurship education is also an effective way to enable the growing graduate population to move from higher education to self-employment or salaried work. Equipped with entrepreneurship knowledge university graduates are expected to be able to act entrepreneurially in their careers, which is what is needed in the rapidly-changing needs of the labor markets within the context of globalization.

#### Research: from mode 1 to mode 2

Whether it has changed the way academic research is executed, Gibbons et al. (1994) have changed the way we think and theorize about research. Gibbons (1998) described research as “knowledge production” in higher education as taking place in two “modes” and that there is a transformation from “mode 1” to “mode 2”. Gibbons et al. (1994) assert that mode 1 is a disciplinary-based knowledge production which is carried out within a disciplinary boundary with regard to the cognitive and social norms that govern basic research and academic sciences, implying the absence of practicality in nature. Mode 1 is a form of knowledge production that is used to control the spread of the structure of specialization to other disciplines and ensure the compliance with what is regarded as scientifically sound in research practice, which is carried out without a context of application (Gibbons 1998). In this sense, Mode 1 research (or knowledge production) fits the ideas about research in the Humboldtian model and the second tier in the Anglo-American model (postgraduate tier in the research university). However, Mode 2 is a trans-disciplinary form of knowledge production which is carried out within a context of application, requiring a wider range of considerations of the interests of various stakeholders (Gibbons et al. 1994). In this regard, this new mode is a more complex system of knowledge production which involves specialists from various disciplines to work cooperatively on problems guided by cognitive and social practices; this type of knowledge production might fit into the Napoleonic model of higher education, although it follows multidisciplinary-based instructions. Moreover, scientific and technological knowledge is not produced only within university but even beyond the university boundary, moving closer to the real world problem (Gibbons et al. 1994). This opens up the opportunities for university-business collaboration.

Gibbons (1998) points out that Mode 2 emerges as a new form of scientific knowledge production which supports the arguments that research (and teaching) cannot be undertaken in institutional isolation; thus, research has to be undertaken within the context of its application in order to understand complex systems. In this sense, university is only one of the actors in the knowledge production system, so it has to collaborate with external stakeholders. This mode challenges universities to take the lead in training skilled and creative individuals for the economy (the thoughts behind the Anglo-Saxon model of higher education). Since the concept of mode 2 has emerged, a university is regarded as one of the agents of knowledge production for innovation (Laredo 2007), suggesting that the university has lost its prerogative in knowledge production and shares this function with other actors (knowledge-producing companies or institutions in society). In this respect, mode 2 is closely related to the Anglo-Saxon model in which university is



expected to interact with external stakeholders for academic and research purposes to bring about new knowledge and to foster entrepreneurial and commercial interactions between university and external stakeholders.

### Roles of universities in the knowledge society: beyond teaching and research

In the modern society, due to the rise of knowledge-based economy, information technology, and global competitiveness, the functions of university have been expanded from its original task of preservation and knowledge transfer, to production of new knowledge and more recently to knowledge exploitation for innovation (Etzkowitz and Dzisah 2007; Etzkowitz and Zhou 2007). Etzkowitz and Leydesdorff (2000) emphasize that the university plays a critical and challenging role in leading innovation initiatives in the knowledge-based society since demands on academic institutions to meet this expectation keep growing. Mok (2005) mentions that the transformation of the role of university to adapt to socio-economic and socio-political changes is a result of the knowledge-based society. Such a role is not restricted or limited to “just” research and teaching, but includes “service to the community”. It is not a new task, as Ward and Hazelkorn (2012) state, but part of its mission after the establishment of the University of Bologna, but it received a new impetus after the World War II with the publication of Vannevar Bush of “Science: the endless Frontier”. Eventually, this led to higher education as having “a civic duty to engage with wider society on the local, national and global scales and to do so in a manner which links the social to the economic spheres” (Goddard 2009, p. 4); in other words, the “third task” was introduced.

Despite all developments, the current roles of universities have roots that can be traced back into the higher education models in several ways. First, the idea of research in academia for scientific advantage originating from the Humboldtian model is modified to “engage with wider society”; this has provoked the discussion initiated by Gibbons et al. (1994) and Stokes (1997) on the nature of research. Second, the Napoleonic model, aiming to educate and prepare students for their professional careers (outside the university, in industry and government) puts a large emphasis on (highly) scientific and technical knowledge and skills. This practice shaped the modern role of university to equip students with knowledge and skills to enter a profession upon their graduation. Last but not least, the Anglo-Saxon model has influenced the current role of university with regard to professionalism and life-long learning which are developed within individual students to enable them to act flexibly and intelligently in the changing situations in their jobs. This idea responds to the current role of university in developing an entrepreneurial spirit in students to be prepared for and cope with the rapidly-changing needs of the labor market in the knowledge-based society.

### Academic revolution: inclusion of the “third mission”

It took several “academic revolutions” (Etzkowitz 2003) before the university took the shape as it is today. A first academic revolution concerned a change of the university from a *teaching* institution into the one that incorporated *research into teaching*. Universities were conducting research, but the research was basically seen as a means to prepare (educate) people (students) to work in other spheres than the academic (Etzkowitz 2008). A second academic revolution emphasized the interrelations between teaching and research in which the combination of both tasks are assumed to be creative and productive for the socio-economic development (Etzkowitz 2003, 2008). This “revolution” was at the

foundation of the third task or mission of the university and evolved from a focus on teaching and research into a role of a university in social and economic development (Etzkowitz and Leydesdorff 1999; Gunasekara 2006; Wissema 2009). The first mission of education inspires the second mission of research that in turn leads to a university's third mission for social and economic development (Etzkowitz 2008). Although it has been noticed that the third mission has been criticized for how it turns the institutions away from conducting basic research (Nedeva 2007), it has been widely adopted in many universities in developed countries to secure their place in the contemporary society.

The third mission is broadly defined as all institutional activities excluding traditional teaching and research; therefore, Vorley and Nelles (2009) state that the term "third mission" remains unclear and multi-interpretable. In narrow terms, it is described as "technology transfer" (Hackett and Dilts 2004) or "university-business cooperation" (Adamsone-Fiskovica et al. 2009). Whether it is defined in broad or narrow terms, the third mission is related to the involvement of universities to contribute to socio-economic development; traditionally referred to as "service to the community" and "outreach". Implementing the third mission (and extending its "traditional" tasks), a university becomes actively involved in a wide range of activities such as patenting and licensing (see Baldini, 2006; Henderson et al. 1998; Mowery et al. 2001, 2004; Mowery and Sampat 2001; Sampat 2006; Shane 2004), spin-out formation based on results of research (Etzkowitz 2008), contract research (see Clark 1998b; Etzkowitz et al. 2000; Gulbrandsen and Smeby 2005; Welch 2011), and continuous professional development (Fink et al. 1999; Zukas 2012).

Despite the positive findings from many studies on the third mission of university in entrepreneurship and its relation to the other two tasks (see Van Looy et al. 2004), the practice of the mission at universities has been challenged from different viewpoints. Many scholars argue that university best fulfills its mission by performing the first two tasks of teaching and research rather than the third mission (Etzkowitz 2008). Sorlin (2002) agrees that university will achieve its third mission for socio-economic development in its fulfillment of the first two tasks. Brooks (1994) even states that this "entrepreneurial behavior" of a university can be seen as a threat to the traditional academic missions: the university tends to become commercially-oriented and have business-like objectives; as a result, the (independent) role of university as a critic of society will therefore be under pressure (Krimsky et al. 1991). Philpott et al. (2011) note that the third task has turned the university management from the practice of the bottom-up approach to that of top-down approach, which is seen by some academic disciplines as a potential threat to the traditional missions of teaching and research. Nevertheless, by incorporating the third mission in a university, there is a significant change in its relationships with its main stakeholders: government and business. The knowledge-based society is the impetus which drives a university to play an entrepreneurial role as its third task by interacting closely with industry and government for socio-economic development (Etzkowitz et al. 2000).

### **Toward an entrepreneurial university**

That the idea of an entrepreneurial university is widely accepted, but not always understood is a telling observation by Rae et al. (2012). The doubt may arise as to whether an entrepreneurial university is a "university [that] actively seeks to innovate in how it goes about its business" (Clark 1998a, p. 4) or a university that undertakes "entrepreneurial activities with the objective of improving regional or national economic performance as

well as the university's financial advantage and that of its faculty" (Etzkowitz et al. 2000, p. 313), or, maybe, as Davies (1987) formulates, a university which is adaptive and innovative to the needs of the outside world. Martin and Etzkowitz (2000) point out that the third mission has been viewed as a unique opportunity for the universities to be the key players in research, teaching and training to respond to the emergence of the knowledge-based society and as such they are underwriting Clark's definition of an entrepreneurial university. Tuunainen's (2005) conclusion that "developing an entrepreneurial university is not as straightforward as it may seem from a more generalized perspective" is definitely a truism. The concept of the entrepreneurial university is broader than just the incorporation of the third task and new governance models. Universities in many countries are inclined to adopt the third mission and shifting their traditional institutions based on teaching and research to the entrepreneurial ones in order to respond to the rapidly-changing demands of the knowledge-based economy in the global context. The issue arises as to whether this has to do with universities becoming entrepreneurial or "just" incorporating its obligation into a society, making this issue "a global phenomenon with an isomorphic developmental path" (Etzkowitz et al. 2000, p. 313). We propose to make a distinction between entrepreneurial universities and entrepreneurial activities of universities, suggesting that universities may follow the one or the other path in their institutional development; the one path being "entrepreneurial", the other fostering institutional entrepreneurship as well as being entrepreneurial.

*"Entrepreneurial activities"*: Most universities nowadays perform "entrepreneurial activities". Massification of education, limited (and decreasing) public funding, global competitiveness and the ever-changing demands of the knowledge-economy have more or less driven higher education institutions to become more sensitive towards economic development and deploy (more) entrepreneurial activities. Benner and Sandström (2000) assert that these developments are significant opportunities for change and development in higher education. As a recent European study (Davey et al. 2011) shows that a majority of academics consider themselves involved in some entrepreneurial activity. Most universities nowadays have an "expanded developmental periphery" (Clark 1998a) such as a technology transfer office that initiates, coordinates and manages the entrepreneurial activities. Yokoyama (2006) has noted that universities involved in entrepreneurial activities have undergone organizational changes to respond to the changing internal and external demands, and based on self-support and autonomy, the institutional responses come in the form of commercial activities like the corporation formation and partnership with the private sector and change in an academic organization. Performing entrepreneurial activities does not automatically transform a university into an entrepreneurial university, only when the entrepreneurial activities create added value for education and research and vice versa. In this regard, Dill (1995) has placed an emphasis on the increasing knowledge of the organization and management of university technology transfer activities in order that universities can contribute to the economic development while maintaining the core functions of teaching and research; otherwise, the university-industry collaboration may result in negative impacts on the core values and functions of universities.

*"Entrepreneurial university"*: An entrepreneurial university is a university that is able to take on several roles in society and in the innovation (eco) system. Although the use of the concept "ecosystem" has been critically discussed by Mars et al. (2012), it is a useful metaphor to describe the "complex networks of actors, such as private industries, financiers, universities, and governmental agencies that are linked together through the pursuit of common technological goals and/or mutual economic gains" (Mars et al., 2012, p. 274). In this sense, a (modern) university is expected to have close relationships and interactions

with stakeholders to produce and to develop (new) knowledge/technology as well as to strengthen its position in the knowledge-based society and to generate new sources of income.

As one of the key players, the university is a supplier of human capital (graduates), knowledge (research) and in the provision of (incubation) space for new enterprises (see Marques et al. 2006). In entrepreneurial universities, students are exposed and subjected to a conducive (study) environment in which they can take risks, explore responsibilities in a project (a protected environment, but in the “real” world) and identify business opportunities (Laine 2008). This reflects the current situation in which the changing and ever-growing role of the university in the new economy tends to go beyond the (two) traditional tasks, incorporating the third task to provide and to translate into use knowledge for society and industry. An entrepreneurial university actively identifies and exploits opportunities to improve itself (with regard to education and research) and its surroundings (third task: knowledge transfer) and is capable of managing (governing) the mutual dependency and impact of the three university tasks. This description goes beyond earlier quoted researchers, since it emphasizes the interrelatedness of the three academic missions.

### **University in modern society: beyond entrepreneurial university**

In the present-day society, a university, an entrepreneurial as well as any other university, is part of the innovation (eco) system, together with industry and government, which is viewed as its major challenge to the economic development of its environment. A university is expected not only to perform its traditional functions, but also to take part in the role of the others (Etzkowitz 2006). Under certain circumstances, the university can take roles of industry and government in assisting new firm formation in incubator facilities, providing consultation, and helping to foster entrepreneurship (Etzkowitz 2008). A university plays a crucial role in collaborating with industry in order to expand research and (co-creating) knowledge and jointly obtain funds with industry for further development. According to Wissema (2009), university-industry interactions can be seen as the collaboration between university and science-based enterprises in conducting (fundamental) research as these enterprises start to focus more and more on product development. This type of cooperation is a potential warrant to successfully cross the valley of death (Markham 2002) and to overcome the “knowledge paradox”. This reflects the role which the university plays in knowledge commercialization.

Whether or not universities are becoming entrepreneurial universities, all universities seek and are challenged to seek opportunities to collaborate with stakeholders in their innovation ecosystem as well as to commercialize their knowledge. The concept of the entrepreneurial university has become a desirable good, but forces the universities to integrate its three missions (and the developments within those missions) to achieve their objectives and to perform their roles entrepreneurially and commercially to respond to the competitive knowledge-driven society and to overcome the cutback in the government funding respectively, coping with global developments. In this sense, the interaction has blurred the boundaries between university, government and industry. Such an interaction is assumed to make universities become the key actors in promoting the national economy in the knowledge-intensive society. However, Kauppinen (2012) has raised the theory of transnational academic capitalism to challenge such an assumption in order to shed light on the dynamics of academic capitalism as higher education is expected to be a system involving various higher education systems in many other countries rather than an isolated

one. Academic capitalism suggests the power of global trend over the work of higher education apart from the influence of the local and national trend (Marginson and Rhoades 2002). In this sense, in addition to the interaction between government, university and market within the boundary of a nation state, Kauppinen (2012) has placed a great emphasis on the blurring of transnational boundaries, for example, through Transnational Corporations (TNCs) and transnationalisation of Research and Development (R&D). Slaughter and Cantwell (2012) also assert how academic capitalism is applied in various European nation-states and how it blurs the transnational boundaries between government, university and industry through intermediating and interstitial organizations.

## Discussion

The ever-increasing demands for higher education in the knowledge-based society have changed the objectives of universities considerably to become the centers of knowledge creation, lifelong education and service providers and to incorporate the third mission for socio-economic contribution. Research universities have incorporated an economic mission and become entrepreneurial, not only in patenting and licensing technology to an industry but also in “spinning-off” commercial enterprises to utilize their own discoveries (Fisher and Atkinson-Grosjean 2002). For instance, the Enterprise Accelerator of Satakunta University of Applied Sciences (SUAS) in Finland reflected the role of the university as an actor in the innovation eco-system as the “creator” or “initiator” of new enterprises and new business activities (Laine 2008). Through research and development projects with the industry, SUAS created an enterprise accelerator to support entrepreneurship to enable and facilitate its students to start their enterprises during their study and give them support. Another case in point is that of the University of Coimbra in Portugal. It shows the interaction between university and industry in order to achieve “third mission” objectives, and the transfer of knowledge is then seen as a means of obtaining resources (Marques et al. 2006). Marques (2007) describes the active cooperation between university and industry as the cornerstone of the entrepreneurial university model in Portugal. To foster the entrepreneurship within the university, the City University of Hong Kong (CityU) has set up a Technology Transfer Office as the technology-marketing arm to reach out to the industrial and business communities, and established a CityU Business and Industrial Club to enhance the relations between university and industrials and business sectors to transfer knowledge and technology of the university into commercial applications (Mok 2005).

The higher education models are undoubtedly affected to adapt to the new situation by moving toward the Anglo-American model, in which no boundary among the three European models are strictly defined. For instance, the main role of university following the Humboldtian model to focus on research for the scientific development has been adapted to the utilization of research for commercialization and knowledge transfer. Such a change is reflected in Marginson and Rhoades (2002), pointing out that there is currently a substantial influence of the American model exerted over higher education in some of the European countries which Gornitzka (1999) examines in terms of their organizational changes—e.g., Austria, Finland, the Netherlands, and Norway, which previously followed the German model. In the Napoleonic model in which the role of university was to serve the government by educating the elites for a country’s economy, it has been adjusted to the practice of training the public to serve not only the government but also the society as a whole. Interestingly, the Anglo-Saxon model remains relevant without noticeable changes

as universities following this model are granted institutional autonomy with respect to their academic and financial policies with no interference from the government. The concept has now been applied in many universities in developed countries due to the financial cutbacks from the government and massification of higher education, which forces modern universities to seek various sources of funding and act entrepreneurially. Socio-political and economic changes have shaped the trend of university to become entrepreneurial and to encompass the third mission besides the traditional missions of teaching and research. This is also how the Anglo-American model has become dominant over the modern universities as it incorporates all the main features of all the three European models, on which the concept of entrepreneurial university is based.

## Conclusion

Higher education has undergone reforms and restructuring over the last few decades. Despite the changes, the European models have remained influential in the current system of higher education worldwide. The Anglo-American model of higher education, originally created from the European models, has been imported back to Europe and now has become the dominant system in the world as a whole in terms of massification, governance, program structure, and (independent) funding, though there remains diversity in the implementation of the system within each country. It is clearly noticed that knowledge-based society has shaped the role of university. Despite the various definitions of the third mission, the one related to entrepreneurship for economic development has been commonly used, which corresponds with the idea of entrepreneurial university to a certain extent as a response to the global knowledge-based society, massification and reduction in public funding. In other words, entrepreneurial university is not merely a university executing the third mission in promoting entrepreneurship, but it also incorporates it into teaching and research to maintain its academic identity. A transition can partly be described as the transformation from mode 1 to mode 2. The challenges described in this paper shares the common trend of higher education around the world despite some diverse implementations within each country. Since the roles of university have undergone significant transformation over the last century to respond to social and economic situations, a question may arise as to what the next role of university will be if our society keeps advancing endlessly.

Since the paper discusses mainly the concept of entrepreneurial universities in the context of developed countries, it does not reflect much about the overall situation of the universities in developing countries. It is suggested that a review about the trends of universities in developing countries toward entrepreneurial universities be conducted for better understanding. Similarly, an empirical study is also needed to add to the existing body of knowledge due to the limited literature on entrepreneurial universities in developing countries. All in all, the paper will help provide better insights into the concept of entrepreneurial universities for future researchers who wish to conduct their study in this area.

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