

Entrepreneurial Universities: The Role of Knowledge Service Innovation

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Abstract- The complexity of today's world is constantly creating new challenges for higher education institutions, and they must continually be consistent and accountable to maintain standards of excellence and compete in international education markets. Being or becoming an entrepreneurial higher education institution is a response to these challenges. There is no "unique" approach, but there are different ways in which higher education institutions behave in an entrepreneurial and creative way. The purpose of this article was to explain how universities can become more entrepreneurial by changing how they provide knowledge. This article is based on the results of a literature review in the fall and winter of 2020 and is in line with the doctoral dissertation that is currently being done in the "Virtual School, Medical Education and Management, Shahid Beheshti University of Medical Sciences." After 1989, a review of the limited, focused literature on service innovation, with an emphasis on knowledge-based service innovation, was done. Service innovation is multidimensional and interactive in nature and can be examined from both technological (information and communication technology developments) and non-technological (organizational innovations) aspects. Accordingly, knowledge-based services include services based on professional knowledge and technology knowledge. Universities need to focus on innovation in both aspects of knowledge-based services. If universities are to become entrepreneurial universities, it is important to explain the comprehensive model of entrepreneurial universities by focusing on the dimensions, concepts, opportunities, challenges, and requirements for knowledge service innovation and then apply it to medical universities to fit their needs. © 2022 Tehran University of Medical Sciences. All rights reserved.

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Introduction

Over time, a dramatic change has been made in the concept of universities. Universities were originally created to teach, but two major revolutions took place, known as the academic revolutions. The first academic revolution took place in the late nineteenth century and employed research universities in addition to the traditional teaching task. Then, a second academic revolution turned the university into a university of education, research, and economic development, and the university is fundamentally changing from a knowledge-based state to what is referred to in the literature as a third-generation, entrepreneurial university (1).

Entrepreneurship is an objective and practical concept that emerged at the same time as the beginning of human life on earth and the pursuit of income and supplying the necessities of life. But the design of this category as a scientific concept has little history. The word entrepreneurship, like other terms used in the humanities, is not similar to the relatively definite concepts and terms of the physical sciences. Entrepreneurship is the discovery and exploitation of business opportunities to create wealth and social value. Entrepreneurship is a process of developing and bringing a new perspective to life, a vision that may be a creative idea, a simple opportunity, or a better way to do something. Economic texts have paid much attention to entrepreneurship as an engine for economic growth and development, increasing

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wealth and creating added value. Therefore, the university, like other social, cultural, and economic entities of the society, is expected to fulfill its new mission (entrepreneurship) by adopting an entrepreneurial approach to education and research activities, in addition to performing the previous missions properly (educational and research missions) to become an entrepreneurial university (2). In fact, the third generation university is a university with a third mission. The third mission, in a broad definition, highlights the participatory role of the university in the socio-economic development of society. In fact, in the third mission, universities must demonstrate their scientific results in the local economy. In other words, the third mission of universities is related to the economic and social development of society, and the concepts of innovation and entrepreneurship play an integral role in this development path (1).

A knowledge-intensive service is another concept that has been considered recently and is considered one of the prominent features of a "knowledge-based economy" (3).

In fact, with the increasing understanding of the importance of services, measuring innovation measures (research and development, patents) and technological differences (advanced and low-tech) becomes less important, and being knowledge-based is a useful way to draw distinctions in the innovation of service and products.

Knowledge-intensive services are an approach to intellectual capital management that transforms information management, knowledge management, and strategic learning into a single enterprise-level discipline (4) and generate and disseminate knowledge that is critical to innovation processes (1); and knowledge-intensive services are mainly activities related to providing knowledge-based inputs to the business processes of other organizations, including the private and public sectors (3).

There is a mentality that if universities really want to be involved in the economic and social development of their fields, they have to provide knowledge-based inputs to companies, government, and society, and in many cases, they should act as knowledge-intensive service providers (1).

The aim of this article was not to present a descriptive study based on scientific literature about entrepreneurial universities and the relationship between universities and (knowledge) service innovation and to analyze the studies. Rather, the purpose of this study was to present a brief overview of what is known about entrepreneurial universities and the innovation of knowledge services, and become more and more familiar with the subject and create more knowledge about the subject.

Entrepreneurial university

In the new economic age, the economic system has moved away from a resource-based economy and closer to a knowledge-based economy (5). In fact, it can be said

that a knowledge-based economy is an economic system in which the knowledge capacities of different economic actors (individuals, enterprises, government, and interactions between them) are used efficiently in different sectors and regions to increase the productivity of economic activities through process innovations and the product/service (6). According to the definition of the Organization for Economic Co-operation and Development (OECD), a knowledge-based economy is based on the "production, distribution, and application of knowledge," and a high level of investment in it is allocated to "innovation" (5).

To achieve a knowledge-based economy, we need a set of basic principles and foundations, including:

-The first basis is a proper institutional and economic regime that encourages innovative entrepreneurship.

-The second is education, which states that the manpower needed for a knowledge-based economy includes those with special skills and creativity, and critical thinking.

-The third is the technology and information infrastructures, and they say that the development of technology and Information is needed in the knowledge economy.

-The fourth basis is innovation, a high level of investment in the knowledge-based economy is allocated to "innovation," and the meaning of innovation in the knowledge-based economy is an innovation that ultimately leads to added value (7).

Universities are one of the best places to offer innovation and services because they are in contact with the clients, and in order to provide these services as best as possible, they need to have innovation in the field, and they play the most important role in achieving a knowledge-based economy and have clearly become tools of economic growth in a knowledge-based economy (5).

Educational institutions are vital in a knowledge-based economy as creators and consumers of knowledge, and as knowledge creators, knowledge, skills, and innovation, which have become the source of comparative advantage for business prosperity, are essential to creating "intangible assets."

They are very important in creating intellectual assets and knowledge in national and local economies by transferring academic knowledge and expertise to improve productivity and create new products and services. Universities also develop human capital dealing with the economy (8).

UNESCO defines modern universities in the global vision of higher education for the 21st century as follows: It is a place where entrepreneurial skills in higher education are developed in order to enable graduates to become entrepreneurs. Clark defines an entrepreneurial university as a kind of modern university standing on its own two feet to balance itself in a very complex and very

uncertain world. Clark called his model an entrepreneurial university and concluded that the university follows five basic components on the path to the transformation towards adaptation to the external environment and becoming an entrepreneurial university.

1. Increasing the power of leadership: means using new tools of management and leadership of the university so that it can effectively manage the university and also be compatible with the scientific core of the university; 2. Expanding the development environment: responding to the need of many universities to expand their borders; 3. Diversifying university revenues: The university must have multiple ways to raise funds, and 4. Simulation of the Scientific Vital Area: Research and teaching at the core of universities. When a university can create an environment where traditional values are combined with managerial capabilities and development capacity, that university will succeed, and 5. Acceptance of Entrepreneurial Culture: This idea is a value system that encourages the desire for change. He pointed out that in order to become an entrepreneur, a university must follow these 5 trajectories during its organizational reform (9).

Organization for Economic Cooperation and Development (2014), in an article entitled Guideline for Entrepreneurial Universities, presents essential elements for entrepreneurial universities, including leadership and administrative processes, motivation of individuals and organizational capacity, entrepreneurship development in teaching and learning, entrepreneurship entry paths, communication of university with industry, the Entrepreneurial University as an international institution and measurement of the effect of the Entrepreneurial University (10).

According to Gibb and Hannon, the entrepreneurial university has the flexibility to respond to socio-economic needs and the strategy of focusing on environmental opportunities, preparing people to seek and seize opportunities for innovation and development. Academic entrepreneurship means creating an

environment for the application of knowledge and stimulating entrepreneurial behavior among all members and structures of the academic and academic community. Universities should focus on factors and responsibilities other than income incentives (converting scientific knowledge into socio-economic utility) (11).

Florida and Keny (1998) believe that three factors can affect academic entrepreneurship: 1. Access to venture capital, 2. Legislation of inventions 3. Legislation and knowledge infrastructure in the region.

Shin (2004), in his research, has identified four factors as environmental factors affecting the level of academic entrepreneurship activities: 1. Access to capital 2. Location of property rights engineering 3. Academic labor market flexibility 4. Industrial composition of the geographical area.

According to Robertson (2008), an entrepreneurial university is described by a number of key factors as follows:

1. Strong leadership that develops the entrepreneurial capacity of all students and staff throughout its campus; 2. A strong relationship with external stakeholders that create added value; 3. Providing entrepreneurial achievements that may affect individuals and organizations; 4. Innovative learning techniques that induce entrepreneurial action; 5. Game boundaries that encourage effective flows of knowledge between organizations; 6. Multidisciplinary approaches to education that mock the real-world experience and focus on solving complex world challenges; 7. Stimulation to enhance the application of entrepreneurial thinking and leadership (12).

There are several reasons for the demand for moving toward entrepreneurial universities, which can be summarized as follows (5).

Table 1. Reasons for the demand for moving toward entrepreneurial universities

Heavy research costs and insufficient government budgets
Globalization and competition in student admissions, faculty, and research contracts
Changing the community's view on the role of the university: University is a center for the growth of new knowledge and technology-based business activities for the active and efficient exploitation of the knowledge produced
The division of university education into standard education and education for elite students
Interdisciplinary research teams and complexity
Increase in government-sponsored independent research institutions

These factors and forces have been very influential in moving universities towards entrepreneurial universities, although the demand for entrepreneurial universities is very high. But it should be noted that an entrepreneurial university is not a business organization whose every activity is related to maximizing profitability. This type of university continues to create knowledge and conduct education as a part of the knowledge creation process, and what is central and the characteristic of the entrepreneurial university is to include the third mission to serve the community in the form of integrating its knowledge achievements in the engine of economic development (13). This third mission includes all activities related to the creation, use, application, and disclosure of knowledge and other capabilities of the university in the outer circle of the academic environment (1).

Innovation and service innovation

In today's evolving world, knowledge and innovation are the most fundamental factors for progress in the industrial and economic fields. A country's economy thrives when the groundwork is laid for innovation and presence in competitive global markets. Moving towards innovation and making changes in the composition of products and services is in the realm of a knowledge-based business. Therefore, knowledge-based businesses play an important role in the effectiveness of production, the crystallization of knowledge in new products and services, the promotion of the economy and welfare, the production of wealth, and added value to society (7).

Innovation is one of the factors of economic growth, along with skills, investment, and competition (14).

There are different interpretations of innovation in the text of the academy because different disciplines define and classify innovation in completely different ways. Here are some examples of definitions and classifications in different studies:

Sociologists define innovation as "the process of introducing new elements to a culture through discovery or imitation" (15).

Researchers in the field of business management emphasize various aspects of innovation and claim that innovation is "the invention and implementation of a management method, process, structure or technique which is new to the country and is more in line with organizational goals" (16).

Schumpeter argues that innovation is a new combination of knowledge, ideas, technology, and pre-

existing markets that meet economic needs and add value.

Various studies have mentioned several forms of innovation:

"Product innovation" - a change in the products/services offered by an organization

"Process innovation" - a change in the methods of their creation and delivery

"Position innovation" - changes in the introduction of products/services

"Paradigm innovation" - change in the mental framework and people's perception of products (17).

Gallouj and Weinstein (1997) identified six cases of innovation: Fundamental Innovation, Improvement Innovation, Gradual Innovation, Case Innovation, Combined Innovation, and Formalization Innovation (18).

A more comprehensive classification classifies innovation into two categories: technological innovation and non-technological innovation (organizational innovation), and it is stated that technological innovation includes product innovation and process innovation. Non-technological innovation (organizational innovation) includes management performance (teamwork, knowledge management), production approach (quality management), and external communications and interactions (interaction with customers or other networks and organizations) (19).

The debate over knowledge-based economics from the mid-1990s onwards gradually began to expand its focus from innovation and research and development of hard technical knowledge production to service innovation and other types of knowledge in the manufacturing and service industries. Until then, most research and experimental studies in the field of innovation have considered technological innovation in manufacturing companies as their starting point, and since the 1980s and 1990s, the dominant technological view of innovation has been questioned (20).

In its analysis of the knowledge-based economy, the Organization for Economic Co-operation and Development (OECD) stated in one of its first reports that economies are significantly more dependent on the production, distribution, and use of knowledge than ever before, and the knowledge-based service sectors (especially education, communications, and Information) are the fastest-growing part of Western economies, which in turn attract large amounts of public and private capital (1), such that in developed countries, one of the most important sectors and one of the trends in the field of

innovation and knowledge-based economy is the service sector, and the key to success in many developed countries is paying special attention to the service sector and innovation in service businesses. The importance of this issue is to such an extent that, according to statistics, the service sector accounts for about 75% of production and output in the United Kingdom, and service innovation is seen as a specific economic activity that is distinct from the production of goods and as one of the important sectors in developed countries and modern economies, the EU Competitiveness Council in December 2006 emphasized that service innovation should be considered a strategic priority.

In the study of service innovations, the issue of how to define services is immediately raised; different definitions and perceptions of this issue have been mentioned, some of which are mentioned here (14).

According to Grönroos (1990), a service is an "activity or a series of activities whose nature are more or less intangible that is natural but not necessarily provided in the interaction between the customer and service employees, the physical resources and systems of the service provider, and as solutions to customer problems. Gadrey *et al.*, define service as "providing a service meaning; organizing a solution to create value or solve a problem that basically involves the supply of goods." Service means providing a package of human, technological and organizational capabilities and competencies to the customer in order to organize a solution that may be provided to the customer with varying degrees of accuracy and quality (21).

Crespi *et al.*, (2006) review relevant texts and describe services as intermediation activities such as transportation, which is a separate production and consumption, or contact services such as medical services and haircuts, where production reaches the consumer directly; in this definition, an important aspect of services is the "correlation" of production and consumption (22).

In various studies of service innovation, services provide a basis for identifying dimensions of service innovation based on their degree of standardization versus expertise for specific customers (23), based on the severity and frequency of work versus customer engagement or customization (24).

In this regard, the classification of service processes by Johnston and Clark (2005) based on volume versus diversity also provides a framework for understanding the scope of service innovation (25). Service innovation can also be categorized by type of service: physical services, human services, and information services. Innovation in

physical services such as transportation and restaurants requires physical reform, often through the adoption of new technologies, for example, radio frequency identification and refrigeration equipment. Innovation in human services refers to advances in the processing of administrative data in public sector services and dedicated IT systems in medical services. Information services are mainly characterized by innovations in information technology, such as online banking in financial services and interactive digital media (26).

In addition, the type of service innovation varies depending on the level of newness or the degree of change varies, from the major service innovations for new markets to relatively minor innovations such as improving available services (27). Another salient aspect of service innovation is that it has the potential to create new business models that can transform an industry sector, and this can also be the basis for classifying different types of service innovation (28).

Knowledge-intensive services

Knowledge-intensive services are another concept that has been considered recently and is considered one of the prominent features of a "knowledge-based economy" (1).

In fact, with the increasing understanding of the importance of services, measuring innovation measures (research and development, patents) and technological distinctions (advanced and low-tech) becomes less important, and being knowledge-based is a useful way to draw distinctions in the innovation of services and products, and a new classification framework has been developed in the same way (4).

Many efforts have been made to define and clarify knowledge-intensive services. In various studies, the term "Knowledge-intensive services" (KIS), "Knowledge-Intensive Business Services" (KIBS), "Professional Knowledge-Intensive Business Services" (PKIBS), and "Technological Knowledge-Intensive Business Services" (T-KIBS) are used.

It can be stated that different categories are available. Some are clear, and some have not been undefined. Also, in reality, the boundaries between them are not clear. In addition, this industry is young and changing rapidly. Therefore, trying to create clear classifications is challenging.

Knowledge-intensive services are traditionally defined as "services that involve economic activities leading to the accumulation or dissemination of knowledge" and distinguish between "Professional

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Knowledge-Intensive Business Services" (P-KIBS) and "Technological Knowledge-Intensive Business Services" (T-KIBS). P-KIBS includes services such as legal and accounting activities, as well as business and management services, market research, etc. While T-KIBS is mainly related to Information and Communication Technologies (ICT) and other technical service activities related to technology, engineering consulting, research, and development (1).

Knowledge-intensive services is an intellectual

capital management approach that transforms information management, knowledge management, and strategic learning into a single enterprise-level discipline (4) and generates and disseminates knowledge, which is critical to innovation processes (1) and knowledge-intensive services are mainly activities related to providing knowledge-based inputs to the business processes of other organizations, including the private and public sectors (3).

Table 2. Classification of products and services

Products	
Aerospace; medicines; Computers, office machines; Electronic communications; Scientific tools	High tech
Electric machines; Motor vehicles; chemicals; Other transport equipment; Non-electric machines	high medium technology
Coke, refined petroleum products and nuclear fuel; Rubber and plastic products; Non-metallic mineral products; Shipbuilding; basic metals; Made of metal	Low medium technology
Other manufacturing and recycling; Wood, paste, paper products, printing, and publishing; Food, beverages, and tobacco; textiles and clothing services	Low technology
Post and Communication; Computers and related activities; research and development	High-tech knowledge-intensive services
Water transportation; Air transport; Real estate activities; Rental of non-operating machinery and equipment and personal and household goods; Other business activities	Knowledge-intensive market services (excluding financial intermediation and high-tech services)
Financial intermediation, except insurance and pension budgets; Insurance and pension budgets, except compulsory social security; Ancillary activities for financial intermediation	Knowledge-intensive financial services
Education; Health and social work; Recreational, cultural and sports activities	Other knowledge-intensive services
Maintenance and repair of motor vehicles and motorcycles/car fuel retail; Wholesale trade and commission trade, except motor vehicles and motorcycles; Retail trade except for motor vehicles and motorcycles / Repair of personal and household goods; Hotels and restaurants; Land transport/transport via pipelines; Activities and activities of auxiliary transport and travel agencies	Low knowledge intensive market services
Public Administration and Defense / Compulsory Social Security; Sewage and waste disposal; hygiene and similar activities; Activities of membership organizations; Other service activities; Private households with employees; Organizations and institutions abroad	Other low knowledge-intensive services

Three main features of knowledge-intensive services have been identified:

- They rely heavily on professional competence and knowledge;
- They are either the main source of Information and knowledge themselves or use knowledge to produce intermediate services for their production processes.
- They are of competitive importance and are primarily supplied and produced for trade (1).
- There is intensive interaction between the customer and the service provider. It makes it possible to distribute and create new knowledge.

Based on the classification of knowledge-intensive

services, knowledge-intensive service industries are classified into 13 sectors, including (28);

Knowledge-intensive business services were defined as "services that provide knowledge-based inputs to the business processes of other organizations-such as computer services, research and development services, legal services, accounting and management, architecture, engineering and technical services, advertising, and market research." This definition has been often quoted and rarely challenged. But it should be noted that there is ambiguity about the meaning of "services." Does this definition mean service organizations or their activities and products?

In fact, services in organizations include routine

services (helping to improve the maintenance and management of various subsystems in organizations, for example, accounting); compliance services (enables organizations to operate within legal frameworks and regulatory regimes, such as auditing and some legal services) and network services (support communications, knowledge sharing, and flexible resource allocation, including informal personal networks, along with production-related networks) and knowledge-based activities are evident and included in all of these services (29).

Innovation and knowledge-intensive services

Today, knowledge is recognized as a key and valuable competitive asset that is the basis of sustainable growth and the key to maintaining an organization's sustainable competitive advantage, and the innovation process is highly dependent on knowledge (30) with an emphasis on defining knowledge-intensive business services, which "Includes firms emerging precisely to help other organizations to deal with cases and problems that require external sources of knowledge." Some authors argue that organizations such as universities and public research institutes should be classified as knowledge-intensive business services (because, although they are not businesses, they can produce service products and knowledge-based activities as input to other organizations) (29).

Universities are possible sources of knowledge, and other resources act as a complement or alternative (1). In particular, the role of KIBS as a major source of knowledge for innovation has been increasingly recognized.

Regional knowledge-intensive services show significant growth in developed economies. At the level of the innovation system, they play an important role as carriers, shapers, and makers of innovations.

Much of the text on knowledge-intensive service organizations focuses on their performance as an innovation factor in the innovation process and their contribution to knowledge transfer. These studies emphasized that knowledge-intensive services have a positive effect on the innovation of companies, departments, and user regions. Knowledge-intensive service organizations (technological and professional) seem to act as potential leaders in the innovation process but also as facilitators of knowledge and supporters in the innovation process (31).

Knowledge-intensive services, whether technological or professional in nature, "play an important intermediation role as carriers of innovation because they help transfer knowledge within and outside organizations and industries.

KIBS is also seen in the text as an important contributor to regional-level innovation and as a key component of local innovation infrastructure, as key knowledge intermediaries that facilitate collaboration between actors in regional innovation systems (1).

In addition, KIBS plays a key role in transforming institutions into learning organizations and contributing to the "knowledge distribution capacity" and learning capacity of innovation systems (31).

Innovation in knowledge-intensive services is the result of intense competition, with regulations such as environmental regulations, technology laws (e.g., standards), and trade liberalization (with implications for the globalization of production) largely shaping the competition. Sector trends are also important. Changes in management practices often manifest themselves through the phenomena of convergence between production and services. The "industrialization" of services and the growing emphasis on the service component of production indicate drastic changes in production. Despite convergence, innovation in knowledge-intensive services retains many of the "characteristics" of service innovation in general. For example:

- Rarely organized through R and D departments
- Often done based on a specific project
- Responsible for working closely with the customer or other services
- Very influenced by issues such as location and appropriateness.

Knowledge-intensive services are key elements in the steady increase in contemporary knowledge-based economies and should be given sufficient weight in the various policy aspects that affect the performance of the economy (32).

Universities and the innovation challenges of knowledge-intensive services

Today more than ever in history, higher education institutions are judged by the way they respond to the social and economic needs of society. That is, how to facilitate social mobility and wider access to higher education for disadvantaged groups, measures to increase graduate employment, their short-term and long-term contribution to national economic growth and local development, and ways to stimulate the birth of new institutions and innovation in existing companies. The complexity of our world is constantly creating new challenges for higher education institutions. Not all of them require a direct answer or can be solved by higher education institutions. Overall, however, these challenges raise questions about the current form of higher education institutions and their effectiveness. Some scholars ask for "profound, radical, and immediate reform."

Being or becoming an entrepreneurial higher education institution is a reaction to this issue. There is no "unique" approach, but there are different approaches to the behavior of entrepreneurship higher education institutions. For example, it is performed in managing resources and building organizational capacity, engaging foreign stakeholders in their leadership and governance, creating and fostering synergies between their teaching,

research, and social participation, and promoting entrepreneurship through training and start-up support as well as exchanging knowledge to enhance the innovation capacity of existing firms (33).

In line with the prevailing understanding of the innovation process over time, as the knowledge-based economy has emerged, the role of universities and research institutes - at least in the eyes of stakeholders - has evolved. Universities and research institutes became the key institutions of the innovation system (at the national, sectoral, technological, and regional levels) in the emergence and expansion of innovation (34).

Given the third mission, what is certain is that the university contributes to the economic development of society at the regional and national levels by revealing the results of knowledge. Today, the pressure on the university to move towards the third mission has greatly increased, and society demands the university to regulate the effective path and flow of knowledge and transfer of technology and knowledge created in the academic environment to the external environment in order to allow the entry of investment (35).

Universities are knowledge-based organizations, and knowledge dynamics reflect the nature of each university, and the main competence of the university is the process of creating, acquiring, and using knowledge. Therefore, universities must develop and strengthen their core competencies.

However, implementing this is not an easy task for universities for a variety of reasons. Other reasons for the failure of universities include the following: First, senior culture is based on competitive rankings, admissions, and non-admissions, and authoritarian and hierarchical structures that do not support the development of a learning organization. Second, all academic works, such as research, teaching, and writing, except for joint projects and committees, are mainly done individually by academic staff. Third, educational organizations are reluctant to change. So, truly inspiring leadership is needed to implement the elements of innovation and adaptability. The problem with universities is that academics are great people and can rarely create communities to learn and share knowledge. In addition, academic life often fosters independence, competition, critical judgment, intellectual skepticism, power distance, and self-interest. Experimental studies show that knowledge-intensive service organizations act as knowledge intermediations and as complementary sources of knowledge compared to other knowledge providers. In fact, knowledge-based institutions provide a "second knowledge infrastructure," and universities and other professionals act as "first knowledge infrastructure" (1).

At the level of service organizations, the results of service innovation are quite clear and can be in three areas.

-Financial Benefits: As discussed by Schmookler (1962), firms determine whether ideas and inventions can

actually be turned into innovations, and as long as executive innovations are expected to pay off interest, the firm will act on them and continue in innovative activities.

There is no doubt that financial success depends on innovation. Research evidence shows that there is a direct relationship between market performance and innovation. Service companies are probably no exception. It seems that innovation, in general, and in the service industry, in particular, leads to better performance of the company in terms of revenue growth. In the case of services, sales growth arises not only from low prices but also from a variety of non-price factors such as design and quality. Therefore, innovation seems to require financial benefits at all stages of a service life cycle.

-Increased customer value: Service innovation typically leads to increased customer satisfaction and loyalty (strengthening the relationship). Both depend on the direct nature of the service as well as the relationship between the supplier and the customer. This will ultimately affect financial results due to frequent purchases by the customer and advice to other potential customers.

-Strategic success: In most firms, innovation is one of the factors of strategic success. For companies in general and service companies in particular, the competitive advantage comes from low prices and high quality, and today, it is increasingly dependent on innovative activities. Providing innovative, faster, and cheaper services with higher quality is the source of strategic success for service organizations and companies (13).

Although the (knowledge-based) service industry is recognized as the engine of growth and competition of institutions (36), knowledge-intensive services (KIS) have attracted much attention in the latest literature. However, there is no clear definition and classification in relation to the subject. This may be a result of the following items. First, different researchers and other actors use different terms, and on the other hand, they may not have the same meaning. Second, the boundaries between the knowledge services sector and other sectors, as well as the knowledge services sector itself, have blurred. Clear definitions and classifications are challenging (31).

It can be said that one of the problems with (knowledge) service innovation and its management at the enterprise, institutional and policy levels is that much of our current understanding of service innovation and its processes and patterns are still the dominant pattern of technological innovation in a biased production construction. The majority of innovation and management researchers, statisticians, policymakers, and audiences alike often associate innovation largely with technological innovation in manufacturing companies, where innovation is the result of a focused research and development effort and is essentially a linear innovation process. Similarly, policymakers have learned over the years to design and implement tools and programs to

advance research and development and innovation in industries and manufacturing networks, but they are skeptical of supporting service innovation. Given this short-sighted and prevailing view, it is not sufficiently understood that service innovation and the underlying processes of service innovation are at least somewhat idiosyncratic and multidimensional, and they include many organizational dimensions along with technological dimensions and include various disciplines and departments that are spread within the organization (and even outside the organization), including strategy, business development, marketing, and service operations.

As a result, it can be boldly stated that service innovation and service innovation processes cannot be analyzed, managed, and supported using models and tools that are primarily developed for analyzing, managing, and advancing technological innovation in manufacturing (36).

Edwardson *et al.* stated that "the development and innovation of new services require its own framework and tools." We are still in the early stages of developing concepts, models, and theories to describe, analyze and explain the prerequisites and mechanisms for the development of new services" (37). Similarly, Ganz recently stated that "there is little knowledge of how to systematically develop, design, and model service-based innovation processes" (38). Hovels also notes "insufficient description and measurement of processes, flows, and transactions related to service innovation, and the need for further analysis of the components that make up service innovation" (36). In addition to pointing out the problem of using categories such as process and product innovations in services, Toivonen also states that innovation processes have not been well understood at the service company level (39).

From the point of view of the service management community, specific approaches and new frameworks should be provided that is compatible with the multidimensional and interdisciplinary features of service innovation. Innovation policymakers also strive to adapt to innovation patterns in which services play a more prominent role. A recent document from the European Commission on service innovation policy states that "in recent years, interest in service innovation policy has been growing at the same time as economic growth and the economic importance of services. But at the same time, policies to support service innovation in many member countries and regions remain relatively underdeveloped.

By creating a service innovation framework and identifying its dimensions, the first problem of misunderstanding and somewhat anonymity of service innovation is resolved. This framework is also used to accurately define service innovation and identify and mention different patterns of service innovation (36).

Innovative activities, on the other hand, need to be relevant to the service sector and call for a more dynamic approach to organizing service innovation relative to

production (25).

Success in innovation does not happen by accident. This requires systematic management of the influential components in the organization. An organization can only innovate if it has innovation capability. The innovation capability is the prelude to the talent and competence to achieve innovation in the future. A set of organizational skills, knowledge, and experience to formulate and apply an innovation strategy, including the creation, development, and optimization of innovation resources, is called innovation capability (40).

Dynamic capabilities have been defined as "the capacity of renewal of qualifications to achieve the coordination and adaptation with a changing business environment." This encourages organizations to focus on coordinating internal structures with their capabilities; at the same time, they seek to make the connection between dynamic capabilities and the external environment. Organizational decision rules, knowledge management practices, and governance mechanisms for asset and resource management are identified as some of the basic foundations of dynamic capabilities (41).

Cirera and Maloney (2017) also suggest that the key to not investing significantly in the innovation activities observed in developing countries is the lack of important complementary factors, elements such as appropriate skills, access to foreign technologies, competition, a feasible environment, and, most importantly, appropriate management and organizational measures, innovation projects are likely to fail and reduce the return on investment in innovation in developing countries.

Today, service innovation is becoming a broad field that includes the study of the dynamic interaction between technological and human systems that drive managerial and organizational change in services (24).

Service innovation is a complex activity and requires resources with potential long-term benefits for service and manufacturing companies (42).

Maloney will also present a graphic representation of the national innovation system in 2017, identifying some of the elements and complementarity that influence innovation. At the center of the company's national innovation system, there is the knowledge demand side, which collects and implements knowledge in the form of improved products, processes, and the adoption of existing or new technology. In the field of knowledge provision, there are all institutions and universities that produce knowledge that produces the process of innovation (43).

Key factors in creating innovation in the university include structure, stakeholders, external communications, and rules and regulations, each of which is subdivided into subscales including external communications (physical and service), stakeholders (management staff, faculty, and students), and rules and regulations (participation in research, knowledge transfer, rational and logical appropriateness) that ultimately outlines a system.

In most studies in the field of Innovation University, certain dimensions such as individual, structural and environmental dimensions have been so far considered for the innovative university, each of which includes specific components. For example, Individual dimensions include courage, ambiguity tolerance, risk-taking, independence and structural dimensions, structural change, cultural and human resource components, and other factors. And finally, the environmental dimensions are very broad and include society, natural environment, competitive environment, and economic and social conditions, which are a kind of subset of society.

Universities need to be creative in their structure, process, product members, and performance in order to be innovative. Therefore, universities need to have a strategic approach to play their role in the regional innovation process. This means that a greater understanding of specific local needs and structural strengths and weaknesses needs to be achieved, and regional needs and the internal capacities of universities need to be aligned (44).

Since economists believe that innovation activity is sector-specific and context-dependent, and as mentioned, the form of innovation and the boundaries between different policy areas are changing due to different factors. Therefore, we cannot imagine that the policies and patterns specified for innovation are appropriate to the new conditions and context (45).

Another major problem with service innovation and its management at the enterprise and policy level is that we do not have the necessary knowledge about effective organizational procedures for managing service innovation. In other words, we need to gain the necessary knowledge and insight into organizational procedures, capabilities, and incentives to successfully introduce service innovation, and, given that research on service innovation and its measurement at the organizational level is biased towards technological innovation, this insight and awareness can be useful in service innovation policies (36).

Discussion

It should be noted that the move towards a knowledge and service economy is a process that has been going on for several decades, and it is obvious that the development and delivery of innovative services, technological and non-technological innovation, includes a variety of knowledge and capabilities, and there are reasons why universities in different countries have not entered the field of services strongly and have not done vigorous research in this field, and although good works have been published in the field of service innovation, universities have been designed not to accept rapid change. Although the longevity of universities, which is one of their strengths, is also rooted in this resilience to change in nature, when economic activities change their

nature, this feature becomes a weakness. Knowledge boundaries around production have grown in most universities and have become somewhat rigid and frozen. For this reason, the fields of research are very wide today (46), and despite the valuable achievements, it can be said that most of the efforts in the field of service innovation to date have been scattered and pursued separately in various academic disciplines, and their participation in innovation and competition is still completely unknown to analysts and politicians.

Therefore, according to the evidence presented, there is no doubt that the role of services in contemporary economies in terms of efficiency, employment, and their importance as input to other sectors has increased and has grown rapidly in the economy of our country in recent years and has exceeded the total share of industry and agriculture and in a general process, implementing the first to fourth development programs and looking at the knowledge-based economy, compiling the scientific map of the country and the scientific map of the country in the field of health, cause the stimulation of instrumental rationality and mastery of supply and demand in higher education and move towards the third generation university in the 2000s. In fact, compiling and communicating the reform document in the field of medical sciences and the formation of science and technology parks and growth centers, and hundreds of knowledge-based companies and start-ups in the country have paved the way for moving to the third-generation university (32). Therefore, according to what has been said and considering that the third mission of the third-generation universities, which is beyond their education and research missions, is the "exploitation of product knowledge for society" (35). And as Ernest L. Boyer has pointed out, universities need to address current issues and the needs of society and apply knowledge to problem-solving (47). Therefore, third-generation universities have to create value for a society based on the internal structure and the knowledge they create and play a role as their economic driving force (35).

Universities are considered the most important educational institutions, centers for the production of science and culture, as well as the training of specialists needed by the country, the creation and production of new knowledge, and the advancement of the frontiers of science and knowledge. The three main missions of the university, including education, research, and services, have been emphasized for them (48), and in medical universities, health services and departments include not only medical care but also social care, health promotion, and disease prevention strategies by maintaining and promoting health through education and identifying health problems, and its comprehensiveness can be divided into three levels: the first level-disease management, the second level - risk factor management, and the third level-health-related social factors management that, the further we go from the first level to the third level, the more the connection between the

sector and the health of the community will be found (49) and activities based on knowledge have been evident and included in all these services.

On the other hand, according to the definitions related to knowledge management (the systematic and continuous process through which the knowledge of employees and managers is identified, created, maintained, shared, and used and leads to learning, innovation, personal development, team development, and organizational development) (50) and according to the presented discussion confirming that knowledge services are the basis of innovation and added value in organizations and institutions and, based on the dimensions and concepts of knowledge management and functional levels of the innovation system, i.e., 1. Creation and acquisition of knowledge that oversees the research and development activities and the absorption of grants in medical universities, including basic research, clinical research, and management research of institutions and health and policy research; 2. Dissemination and transfer of knowledge that is based on and oversees the provision of educational services at various levels to learners, managers, policymakers, and society; 3. Application of knowledge that universities should address current issues and needs of society and use knowledge in the service of problem-solving. This application can be in the field of diagnosing a disease, solving an environmental problem, or using the latest learning theories in universities and ultimately providing new services to clients.

There are many definitions, concepts, approaches, and models in relation to the transition to entrepreneurial and innovative universities and knowledge service innovation, and ambiguities in this regard are observed in different texts due to the nature of services; on the other hand, the components, opportunities, and strategic plans that educational institutions must consider in order to develop and improve their competencies in this field are not clear, and little literature focusing on the effect of innovation on service organizations can be found, and many studies are focused on the effect of innovation on production. Therefore, study and identification of the patterns and models of service innovation by relying on knowledge service innovation in different universities to achieve a comprehensive model of entrepreneurial universities with an emphasis on knowledge service innovation and identifying dimensions and concepts related to service innovation and opportunities, challenges, and requirements for development and providing the necessary models and policies for the country's medical universities in the transition and the formation of entrepreneurial and innovative universities with an emphasis on the innovation of knowledge services in this regard are necessary.

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