



Contribution Title

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Abstract. At the beginning of the 90s, digital transformation was presented, as a result to important innovations and technological advances transforming the way of consuming goods and services. This transformation marked the knowledge economy, through servification, Term used to indicate that companies achieve leadership positions in the market thanks to specific knowledge, which generates competitive advantages as considered international markets. The objective of this study is to explain through the deductive method, the problematic situation that exists in Mexico related to exports of knowledge-intensive services (KIBS), due to the lack of linkage between government, companies and universities. For this purpose, the research subjects will be presented as the IJALTI Guadalajara Cluster, Government and Higher Educational institutions. A theoretical proposal is presented through the descriptive study of three variables to promote the strengthening of the three agents: the increase in investment in ICT R&D, formulation of legal frameworks for appropriate regulations and evaluation; and proper management of intellectual capital. The theoretical results show that for developing economies, such as Mexico, it is necessary the stimuli of public investment to increase private investment. This scenario results as a balance and independence in investment that will expand the R&D area, as well as a chain reaction in the export of intellectual forces. An additional gain, will be preventing and avoiding the flee of these forces to other countries and enhance nearshoring as an advantage to the proximity with great neighboring powers, and will help carry out regulatory and evaluative processes between the related parties.

Keywords: KIBS, Innovation, R&D, Exports, Nearshoring.

1 Introduction

At the beginning of the 90's, the digital transformation took place, due to important changes in innovations and technological advances that transformed the way of consuming goods and services. This transformation has marked the knowledge economy, through servification, this term was initially coined by some authors such as Vandermerwe & Rada (1988), which means that companies achieve leadership positions in the market thanks to specific knowledge generating competitive advantages.

For this reason, companies should not only focus their value on physical products, but should also provide a differentiating value by offering services. More and more

firms have been able to detect needs in the market, causing a rise on the creation of new business models that integrate the digital era from the generation of knowledge.

In this respect, Casalet (2018) considers that there is a new industrial paradigm as the protagonist of a disruptive stage due to the convergence of knowledge and creation of new areas. In manufacturing, the impact on the digital supply chain can be observed, as well as, on the smart manufacturing, digital products, services, business models, and data analytics as core competency in this matter. (Schrauf and Bertram, 2016).

Therefore, servification has enabled modern companies to offer added value through the combination of goods, services, support and knowledge. However, the services sector is beginning to dominate (see Fig. 1). The year 2019 indicates that services accounted 56 % of the total output of developing countries and were the main contributors to the economic output of these countries, as explained at the seventh session of the UNCTAD Multi-year Expert Meeting on Trade, Services and Development.

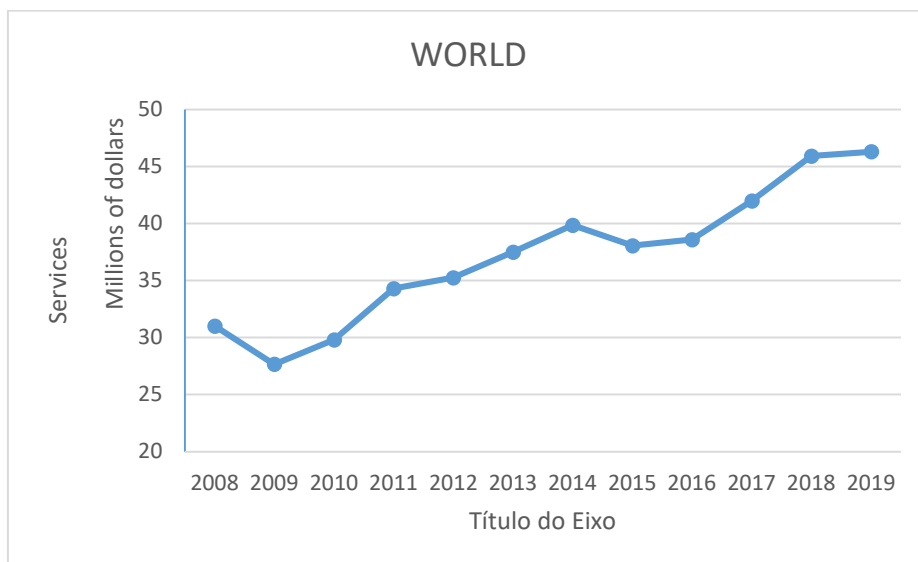


Fig. 1. Services Exports at World Level, 2008-2019

In this direction, service exports comprise various subsectors, on one hand traditional subsectors, and on the other subsectors referred to by some authors as knowledge-intensive services (KIS) (Miles et al., 1995).

Therefore, the growth trend of open economies is largely determined by low cost and high quality services along with the effectiveness of government and private institutions (Hoekman, 2008), inputs in the production of many goods and services play an



important role in exports of these, not to mention being an important source of export diversification (OECD, 2005).

These actors, in an optimal scenario, converge and unite capacities, knowledge, organization and investments, which translate into a strong linkage between government, business and academia which are currently lacking in Mexico.

Therefore, this article integrates a theoretical proposal through the relationship of three variables that promote the strengthening of the bonds between government, business and academia: the increase in investment in ICT R&D, the formulation of appropriate legal frameworks for regulation and evaluation, and the proper management of intellectual capital, in order to carry out knowledge management, innovation and / or research and development programs will allow to boost exports of knowledge-intensive services, particularly ICT.

This proposal is carried out through the descriptive method for the diagnostic design and the deductive method for the theoretical research, analyzing the generalities of the subject and developing a framework, to finally carry out a reflective analysis of the proposed theories. Finally, a reflective analysis of the proposed theories, landing in a discussion on the proposals and implications that formulate future empirical research to study the causes of the lack of linkage of government, business and academia, to enhance exports of SIECs in ICT clusters, through field work and through the operationalization of the exposed variables. the UNCTAD Multi-year Expert Meeting on Trade, Services and Development.

1.1 Problem Situation

The importance of knowledge in conjunction with Information Technologies (ICT) is a relevant aspect in international trade has been focused on the exchange of goods and the accelerated growth of services has been ignored. Exports of services hold various subsectors; on one hand, traditional subsectors, and on the other hand, subsectors referred to by some authors as knowledge-intensive services (KIS).

Miles et al. (1995), pointed out two kinds of SEIC. The KIS I are those traditional professional services that tend to use ICT, such as advertising, legal services, consulting, etc. KIS II are those based on ICTs, KIS represent important inputs for the production of goods and services and this is due to the intensive use of knowledge and technology.

Hereafter, it shows ICT and telecommunications services have reduced their share, while consulting and R&D services have increased their contribution (see Fig. 2). Both belong to KIS type I. This raises the question if this reduction is due to the deficient linkage between the actors for the implementation of policies that allow for an increase in exports.

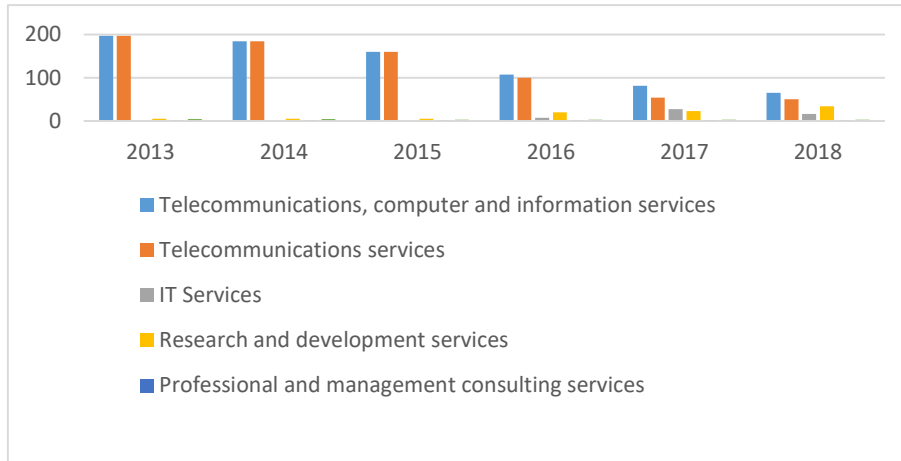


Fig. 2. Structure of modern services exports in Mexico, 2013-2018

Related to policies that promote the export of services, the Mexican government designed a six-year national development plan to guide the policies and programs of the Mexican government. This document, referred as the National Development Plan (PND) 2013-2018 (Government of the Republic, 2013), outlines the objectives of public policies, specific actions and specifies indicators to measure the progress achieved.

In the National Development Plan 2019-2024, there are changes in the design and structure of the document, it is known as a popular and social mandate, called "the Fourth Transformation". This plan marks a difference in the design, execution, measurement and evaluation of the policies that had been worked six years ago, focused on the linkage of public and private sector actors as drivers of economic growth, mainly in the generation of KIS, and as a consequence, an impact on the exports.

One of the main problems identified in the design of the PND 2019-2024, is the lack of follow-up on programs or public policies that promote the generation of knowledge through research and development, the specialization of knowledge-intensive services through education and the transfer of knowledge through business.

The radical change in the objectives and lines of action established from one six-year term to the next is quite remarkable, since some programs have disappeared, such as the Innovative Development Program (PRODEINN), under the responsibility of the Ministry of Economy, which was aimed for the growth of the service sector based on knowledge and innovation. Precisely, it pursued to rethink public policies targeted to regulation, promotion and use of ICTs through an industrial policy with the development of suppliers, regional clusters, innovation and human capital as its central axes.



In contrast, and considering this point as an obstacle for boosting the knowledge economy in our country, the PND 2019-2024 leaves aside the digital economy and the strong linkage between public and private sector institutions. The former replaces it with the welfare economy. This fact, although it presents a work objective, does not offer detailed lines of action.

The association between schools, universities, research centers and the private sector is affected by the cancellation of the Innovation Stimulus Program (PEI), due to lack of budget during the management of the six-year term 2019-2024, a program aimed at Mexican companies registered in the National Registry of Scientific and Technological Institutions and Companies (RENIECYT), that carry out research, Technological Development and Innovation (RTDI) activities in the country, individually or in association with national public or private Higher Education Institutions (HEI) and/or national public Research Centers and Institutes (CI).

The National Software Program (PROSOFT), operated through the Ministry of Economy (SE), is introduced in an international context in the global software scenario. PROSOFT appeared in 2002 as a novel instrument with some noteworthy characteristics: (a) it was a program with diversified objectives; (b) it contained short and long-term approaches; (c) it proposed a collaboration of public and private actors, mainly companies and business chambers, federal and state (regional) public agencies and academic instances such as universities and research centers; (d) it also proposed a decentralized action scheme with the participation of the above-mentioned actors; and (e) it provided for an annual evaluation of the program, which in practice was entrusted to different academic institutions (UAM-Xochimilco, Universidad Nacional Autónoma de México, Instituto Tecnológico Autónomo de México -ITAM-, among others).

The current stage of PROSOFT places much more emphasis on the topic of talent and innovation, highlighting the need to detect early abilities in Information Technologies among students in the basic school system, and to intensify the curriculum of mathematics, logical and scientific thinking and other areas of knowledge associated with Information Technologies in educational programs. However, some of the challenges mentioned by the Ministry of Economy give an idea of the limitations of the software and IT sector in Mexico. In addition, the following are pointed out: more than half of the companies have difficulties in finding qualified personnel; only 25% of IT companies innovate (12% of all companies in Mexico); only 25% of the companies export and what is exported represents between 7% and 27% of their total sales spending on IT services and software in Mexico is 41% lower than in developed economies; only 1% of government IT services are provided by local suppliers.

Another significant problem is that support is not unbiased, since it continues to be provided only to a small part of ICT companies. Despite the fact that the strengthening of regional clusters through the coordination and collaboration of different actors has



allowed great progress in the growth of exports, not all technology companies belong to this category, however, Mexico has an important presence of these clusters. Table 1 shows the main characteristics of the six largest clusters in Mexico dedicated to the generation and export of SEICs, out of the 28 established. The difference in the number is significant, which indicates the lack of interest in promoting the growth of this sub-sector.

Only two levels of headings should be numbered. Lower level headings remain unnumbered; they are formatted as run-in headings.

Table 1. Main characteristics of the largest clusters in Mexico (2017).

No.	Location	Features
1	Aguascalientes, Ags. Aguascalientes Information Technology Cluster A.C (INNOVATIA)	KIBS
2	Baja California Baja California Information Technology Cluster A.C. (IT@Baja)	KIBS
3	CDMX Dsoftware	With Mexico-First, specific actions are being taken to improve human capital.
4	Guadalajara, Jalisco Information Technology Export Consortium Instituto Jalisciense de TI (IJALTI)	Largest center specialized in software design, Coecytjal and Ijalti are leaders in sector development and KIBS.
5	Monterrey, NL Software Industry Development Council NL	The Nuevo León Software Council has played a decisive role in the associativity of the sector's players. It has great human talent and the presence of important national and international companies.
6	Queretaro, Qro. InteQSoft Queretaro Information Technology Cluster	Availability of qualified human resources.

1.2 Problem

Based on the analysis above, it is determined that ICT services exports are a sector that has presented a behavior in constant growth. However, the participation of knowledge-intensive services has not appeared, being this, a potential subsector for the intensification of such exports, precisely from technological clusters, due to the lack of linkage



between public and private actors, which according to the results present clear-cutting issues in their design, implementation, management and evaluation.

Therefore, the problem presented in this article is: "The lack of linkages between government, business and academia to enhance exports of knowledge-intensive services in ICT clusters". The following research question is presented: How can the linkage between government, business and academia be strengthened to enhance exports of knowledge-intensive services in ICT clusters?

Concerning to this research question, a theoretical proposal is designed through the relationship of three variables that promote the strengthening of the connection between government, business and academia: the increase in investment in ICT R&D, the formulation of appropriate legal frameworks for regulation and evaluation, and the proper management of intellectual capital. All of the above, in order to carry out knowledge management, innovation and / or research and development programs will allow to boost exports of knowledge-intensive services, particularly ICT.

2 Method

For the purposes of this study, the deductive method is used as a reasoning strategy for theoretical research, analyzing the generalities of the subject and developing a desk study, allowing the study of the variables proposed as a possible solution that supports the problem is that the theories support the strengthening of the link between the Government, Business and Academia, to boost exports of knowledge-intensive services in ICT clusters in Mexico, stimulating knowledge management, innovation and / or research and development programs. The study variables are: the increase in ICT R&D investment, the formulation of appropriate legal frameworks for regulation and evaluation, and the adequate management of intellectual capital.

3 Results

3.1 Linking Government, Business and Academia

Knowledge can be generated by a variety of organizations, such as universities, business and government agencies (Casas, 1997). There are three main components that create the field of knowledge generation, the economic sector translated into government, the economic sector translated into business and the educational sector translated into academia. For this association, several theoretical models have been proposed that have shown this relationship with its environment and the development and innovation as activities carried out in this research. The content in table 2 explain these relationships among the actors who have proposed different theoretical models according to the authors with the greatest contributions on the subject.

Table 2. Evolution and background of the link between government, academia and business.

Author	Model	Model Description
Etzkowitz and Leydesdorff (2000)	Triple helix	<p>This model was proposed as a result of the review of different hypotheses about the links between the university, business and state, based on the general theory of innovation, and has gone through three versions during its evolution.</p> <p>The triple helix I</p> <p>The first version of the model states that under the general administration of the government, the relations between academia and industry are directed; this version has similarities with Sábato's triangle. Some examples of this version are found in countries where there is a socialist political structure, such as some Eastern European countries and in some Latin American countries, where the State plays an important role in the industrial sector.</p> <p>The triple helix II</p> <p>The second version separates the institutional spheres, affirming their autonomy. This version is limited by the strong barriers between one sphere and the other, in addition to the pre-established relationships.</p> <p>The triple helix III</p> <p>This version establishes an infrastructure for the generation of new knowledge, in which institutional spheres overlap so that each takes on the role of the other. In these interface spaces, hybrid organizations or interfaces emerge, and an ideal area called the Trilateral and Hybrid Organizations Network.</p>

In the light of this, it is observed that the current economy moves around the generation and transfer of knowledge, it is important to consider that knowledge is created from the global interconnection thanks to Information and Communication Technologies (ICT), (McLuhan, 1989). Drucker and his predictions take this matter about the arrival of an economy based on information and knowledge rather than on the mere production of goods and services. This knowledge economy is rapidly generalized thanks to the use of ICTs, causing a dispersion of knowledge (Knowledge Spillover) that benefits the individual as well as the company and society as a whole, together with the mobility of intellectual capital, moving and collaborating between different organizations.. This is also benefited by the linkages between different actors involved in the generation of knowledge, implementing strategic alliances that allow them to obtain sustainable competitive advantages through the creation of knowledge and innovation networks.

In order to create strategies related to knowledge, it is necessary to understand how this intangible asset is created, accumulated and used (Umamoto, 2002). According to Porter (1996), strategy is the creation of a unique and valuable position, through the



deliberate choice of the activities that will be disciplined not to be performed and those that will be developed in a complementary and integrated way, in order to distinguish itself from the competition, seeking to offer a unique value combination. The critical components of a good strategy are: objective, scope and advantage; the advantage is the essence of the strategy, since it determines the distinctive characteristics of the company and defines the means through which the proposed objective will be achieved, making the organization different from its competitors (Collis and Rusktd, 2008).

Strategic positioning: a) attempts to achieve competitive advantage by preserving what distinguishes the company; b) implies developing activities that are different from those of the competition, or developing similar activities but carried out differently; c) is sustainable only if there are trade-offs between positions or alternatives, which implies choosing certain activities and forgoing others; and finally d) involves achieving a fit between the activities carried out by the organization (Porter, 1996). A company has a competitive advantage when it has a value creation strategy that is not being implemented by any current or potential competitor, and for it to be sustainable, it must be impossible to copy or imitate (Barney, 1991). Strategic assets are the aggregate result of maintaining for a given period of time, a group of policies that have consistency being the key dimension in the formulation of strategies, the one related to the identification of alternatives that invest in the generation of resources and skills that increase the strategic assets that are not interchangeable, not imitable and irreplaceable (Dierickx and Cool, 1989).

According to the knowledge-based theory of the firm, the critical element in the production and primary source of value creation is precisely this intangible asset (Grant, 1996). According to the resource-based theory, tacit knowledge can be a source of competitive advantage, since it is a valuable, unique, non-substitutable and imperfectly movable organizational resource (Ambrosini and Bowman, 2001). Since organizational tacit knowledge is complex and difficult to imitate, it has a greater possibility of generating sustainable competitive advantages (Dyer and Hatch, 2004).

Since the late 1990s, a line of research has begun to develop that focuses on the study of knowledge creation and transfer as well as learning in strategic alliances. A substantial body of empirical work has analyzed knowledge transfer through alliances (e.g., Swap, Leonard, Shields, Abrams, 2001; Shenkar and Li, 1999; Tsai, 2001; Dyer and Nobeoka, 2000; Simonin, 1999; Inkpen and Dinur, 1998; Lane and Lubatkin, 1998; Lam, 1997; Inkpen, 1996; Powell et al, 1996 Hagedoorn and Schakenraad, 1994; Hagedoorn, 1993; Hamel, 1991) on the premise that its effective external transfer, i.e., between collaborating firms, can constitute a source of competitive advantage (Eisenhardt and Santos, 2002). The development of knowledge in the management of alliances (collaborative know-how) has also been studied (Simonin, 1997).

The theoretical approach most commonly used in the study of strategic alliances has been the Transaction Cost Theory (Narula and Duysters, 2004; Yasuda, 2004; Chen and Chen, 2003; Tsang, 2000; Madhok and Tallman, 1998; Gulati, 1995; Garcia-Canal,



1993). The logic behind this theory is the minimization of transaction costs. Under this theoretical framework, it only makes sense to use alliances when the costs incurred by firms in cooperating are lower than the costs they would face if they operated as autonomous firms. Although the Transaction Cost Theory has proven to be valid as a conceptual framework on which to study cooperative agreements, some of its limitations are evident. For example, it does not take into account the strategic advantages of alliances such as learning or rapid market entry (Eisenhardt and Schoonhoven, 1996).

The importance of knowledge, its creation, exploitation and transfer, has been emphasized, to the point of constituting its own theoretical body, the Knowledge-Based Approach (Grant, 1996a,b; Spender, 1996; Nonaka and Takeuchi, 1995; Nonaka, 1994). The Knowledge-Based Approach stresses the relevance of knowledge as a source of competitive advantage, to such an extent that it is considered the most important strategic asset in the firm (Grant, 1996b; Quinn, 1992). Claycomb, Dröge and Germain (2001) identify five characteristics that distinguish knowledge from tangible resources: it is not easily divisible, it is not easily appropriated, it is not inherently scarce, it is regenerative and its value can increase with its use.

Knowledge management programs, innovation and research and development programs are the necessary infrastructure for the processes of creation, transfer, storage and interpretation to be carried out so that new knowledge can be generated. The management capacity of this infrastructure is embedded in certain organizational routines and processes.

The company's participation in strategic alliances can promote the implementation of knowledge management programs, innovation and/or research and development programs. Cooperation agreements thus become the instrument through which an organization can both internalize certain routines of the companies with which it cooperates, and refine and configure together with the partner, routines that will allow it to promote the generation of competences for knowledge management. These routines and organizational processes make up the capacity to lead and implement knowledge management and research and development programs. There are even numerous cases in which the creation of this type of competencies jointly (Kahna, Gulati and Nohria, 1998) is precisely the objective of the alliance.

3.2 Increase in ICT R&D investment

Investment is the set of ideas that seek to explain the movements, directions and volume of investments within an economy, as well as the factors that determine them, i.e., investment is one of the possible destinations of money. Therefore, it is a fundamental element of economic development and growth; advanced countries are characterized by high savings and investment rates. Savings and investment are intimately linked in the development process, so that savings are oriented towards investment.



According to Samuelson and Nordhaus (2010), investment, as one of the main elements of economic theory, refers to the inputs required for the production of goods and services which, for the purposes of this research, would be allocated to ICT knowledge-intensive services.

Several economic theories highlight the role of investment as one of the fundamental drivers of economic growth. From the classical political economy of the 19th century, under the scheme of the growth model developed by Harrod (1939) and Domar (1946), based on mathematical rigor; the neoclassical theory of growth (Solow and Denison); Kalecki (1956), like Keynes, maintains that savings and investment are automatically equalized ex post, that is, investment finances itself, at any interest rate; and finally the theories of endogenous growth.

Public and private investment. Several authors have found empirical evidence in favor of the positive effect of government investment on private investment, and others obtained a substitution relationship. The empirical results have considered a variety of criteria such as the study of developing and developed economies; short and long term; productive and non-productive public investment; and government investment in public and private goods. Empirical studies in developing countries showed complementary relationships between public and private investment (Barro, 1981; Blejer and Khan, 1984; Greene and Villanueva, 1991; Oshikoya, 1994; Odedokun, 1997; Ramirez, 2000; Ghura and Goodwin, 2000; Erden and Holcombe, 2005; Leipziger, Pradhan, and Rajaram, 2007; Arslanalp et al, 2010; Xu and Yan, 2014; Moreno-Brid, Sandoval, and Valverde, 2016; Gutiérrez, 2017).

Among the main contributions considered for this study is that of Leipziger et al. (2007), who, by studying public spending on infrastructure, education, health and water, determined that public investment encourages private investment and generates economic growth in low- and middle-income countries. Low-income economies, such as Rwanda, Madagascar and Uganda, which are characterized by obsolete infrastructure in airports, energy and water; lack of labor skills; and low productivity, require public investment to encourage private investment and thus achieve growth in production and improve the living conditions of the population.

Moreno-Brid et al. (2016), analyzing the Mexican economy, concluded that public investment encouraged private investment and led to real GDP growth in the period 1960-1981. In contrast, in the period 1988-2015, public investment in infrastructure contracted significantly which caused lack of competitiveness and low growth of Mexico's economy. They established that without sufficient investment in infrastructure it is impossible to put an economy on the path of high and sustained growth.

3.3 Legal Frameworks

Regulatory framework for the evaluation of social development policy and programs at the federal level in Mexico. The evaluation of public policies and programs



is gaining importance under the so-called Management for Results (MfR) approach (García López and García Moreno, 2010; González Arreola, 2012), which, as its name suggests, aims to provide information on the results of government actions to inform decision making and thus allocate budgets and priorities based on their performance.

In the last four decades, institutions have adapted and regulatory frameworks have been shaped towards a results-based approach to public management, based on medium-term objectives and goals, with instruments that point to the relevance of public policies, programs and projects, as well as the magnitude of the resources required to achieve their purposes; likewise, progress has been made towards establishing timely elements to identify the degree of linkage between the strategy implemented and its observed results.

MfR bases public policy, planning and expenditure allocation decisions on evidence of the effectiveness of the measures implemented; in other words, this vision focuses the dialogue on results for learning about government actions and decision-making by promoting intra- and inter-institutional coordination, decentralization and the use of medium-term strategies and objectives. In MfR, objectives and goals must be precise and defined at the planning stage, always considering the resources available for implementation. By focusing on results, coherence of policies, programs and projects is sought from the strategy and planning phase through implementation and evaluation (World Bank and OECD, 2012).

Mechanisms to ensure that public management is based on results and, from there, is directed towards strategic planning, require instruments, the construction of methodologies and common systems, the establishment of procedures that facilitate the incorporation of recommendations in decision making, the creation of mechanisms for the dissemination of information and the identification of the participating actors, as well as their obligations and attributions. The implementation of these measures implies constitutional and political modifications in public sector administration.

In this sense, the authorities must be accountable for their actions and the results derived from them -under the principle of citizen democratic delegation-, for the constitutional regulation of the use of public funds and for the attributions conferred to the corresponding authorities (Emery, 2005). Following García López and García Moreno (2010) and Kaufmann, Saginés and García Moreno (2015), five pillars can be highlighted for the construction and implementation of MfR: i) planning; ii) Results-Based Budgeting (RBB); iii) monitoring; iv) evaluation and; v) transparency and accountability (T&A).

These five elements, form an integral system in which each of the pieces plays a role that contributes to the functioning of the others. Evaluation is a priority element since it provides evidence regarding the implementation of government policies and



programs, which is - or should be - incorporated in the planning and formulation stages of the RBB; likewise, evaluation contributes both to transparency by generating information and publishing it, and to accountability by scrutinizing the results attributable to a given action and reinforces monitoring by explaining the causes of the progress observed.

The monitoring system systematically collects quantitative information on the degree of progress in the objectives linked to a policy, program or project and the use of resources, in order to provide information to policy makers and the general public. Such information not only quantifies results, but also activities, outputs and inputs (González Arreola, 2012). In addition, the monitoring system should report on performance, i.e., it should indicate whether public entities and interventions are acting within the norms and criteria defined in the goals and plans (OECD, 2002).

Similarly, evaluation, understood as the systematic, objective and impartial analysis of a public intervention, makes it possible to determine the relevance, sustainability, impact and achievement of objectives and goals. Evaluation and monitoring are implemented within the framework of public policy analysis, in the sense that they seek to produce relevant information for decision making and problem solving. Both functions, monitoring and evaluation, are complementary and require different instruments and institutional and legal arrangements. Monitoring and evaluation differ in that the latter explains the causes of the observed results associated with the intervention, while monitoring presents progress towards the objectives set (García López and García Moreno, 2010).

MfR seeks to align programming, monitoring and evaluation with results, so that M&E indicators and strategies are linked to the expected effects, thus making it possible to analyze whether the planned results are being achieved and, if not, to make the necessary adjustments (IDB, 2007; Ramos, Sosa, and Acosta, 2011). Depending on the objective of the evaluation, it can focus on various government actions: public policies, public programs, results management and public entities (Bonney and Armijo, 2005). Similarly, proposed programs can be evaluated to determine their relevance and identify their goals and objectives, or programs in operation to assess their results, processes, coverage and the advisability of their continuation.

The purpose of evaluations is to provide timely information to drive the improvement of policies, programs and institutional performance. To this end, evaluations are carried out at different times: those carried out before the public intervention begins are called *ex ante*; those carried out during the execution of the public action to examine the fulfillment of objectives and the use of resources are intermediate evaluations; and those applied after its implementation to assess the results obtained are *ex post* (Cardozo Brum, 2006; Stufflebeam and Shinkfield, 1987).



Achieving the objectives set by governments and obtaining better results in the use of public resources involves knowing and analyzing the starting point of social problems, estimating resources, political, economic and social costs, identifying a variety of solutions, defining the goals that can be reached and planning the route to follow to achieve them, which is why evaluation becomes a necessary practice in governmental activities. In this sense, evaluation and monitoring systems, in accordance with national planning and the PbR, provide information for decision making, make it possible to make the use of resources transparent and promote accountability to citizens. In addition, these instruments make it possible to improve programs, policies and projects not only in terms of resource management, but also in terms of results.

Generation of Regulatory and Evaluation Legal Frameworks. The evaluation of public policies is a key element for analyzing the effectiveness, efficiency, impact and sustainability of the measures implemented and, on the basis of the evidence generated on their design, implementation and results, for taking the necessary measures aimed at improving them. Therefore, evaluation makes it possible to identify what works and to what extent it does, the effects of public interventions, the progress of objectives, as well as the bottlenecks that impede their achievement, among other issues.

The road traveled in Mexico to make the evaluation exercise a fundamental element in the formulation of public policies, particularly social policy, has been long and has required the impulse of different factors and actors. Currently, the country has a regulatory framework within which the evaluation of social development policy, programs and actions is framed. The enactment of the General Law for Social Development (LGSD) in 2004, with the consensus of all political actors, established the National Council for the Evaluation of Social Development Policy (CONEVAL) as the body responsible for regulating and coordinating the evaluation of Social Development Policies and Programs executed by federal public agencies and entities, in addition to establishing the guidelines and criteria for the definition, identification and measurement of poverty.

Since the LGSD, a series of normative documents have been enacted that have strengthened the institutionalization of evaluation. These documents not only designate those responsible, but also identify the processes for carrying out evaluation, the criteria for improving its quality, the types of evaluations and mechanisms to promote the use of evaluation recommendations.

3.4 Intellectual Capital

Intellectual capital (IC) is a term of an economic nature coined by economist John Kenneth Galbraith in 1969, who suggested that it means intellectual action rather than pure knowledge (León, 2009). In the 1980s, a small group of companies including Skandia, Dow Chemicals and the Canadian Imperial Bank began to link the term IC to intangible assets, arousing interest in those companies whose profits derived mainly from



innovation and SEICs (Sánchez, Melián and Hormiga, 2007). However, at the same time Dierickx & Cool (1989), say that IC is simply the stock of knowledge in the firm.

In 1997, Sveiby conceptualized IC as the combination of intangible assets that generate growth, renewal, efficiency and stability for the organization, and it is also made up of all the tacit or explicit knowledge that generates economic value for the company. Later, in 2000, Sveiby transformed the concept by saying that the most important asset of companies is the group of people who work in them, this group of people has a set of knowledge and skills that are the factors that allow an outstanding performance in the execution of their tasks. Organizations have perceived the importance of this set of intangible factors called IC and have resorted to strategies such as programs that allow the continuous training of employees in order to obtain greater competitiveness based on their knowledge and skills.

Bradley (1997), defines IC as the ability to transform knowledge and intangible assets into resources that create wealth, both in companies and in countries. Bontis (1998) says that IC refers to all the intangible resources of the company, and further notes: "IC has been considered by many, defined by some, understood by few and formally valued by practically no one, which is one of the most important challenges for managers and academics of the present and the future" (p.63). In 2008, López and Nevado, interpret capital with two equations:

$$CMV = BV + IC + ME + SF \quad (1)$$

$$IC = HC + SC + UC \quad (2)$$

Where:

CMV = Comprehensive Market Value

BV = Book Value

IC = Intellectual Capital

ME = Measurement Errors

SF = Speculative Factors

HC = Human Capital

SC = Structural Capital

UC = Unexplained Capital

In the scientific literature, the terms "intangible resources" and "intellectual capital" are often used as synonyms (Lev, 2001), the truth is that the term resources or intangible assets is more related to the accounting area and the term IC to the area of business organization, Lev adds that IC represents the main relationships, generating intangible assets, between innovation, organizational practices and human resources. The above concepts have two essential characteristics in common: the intangibility of resources and capabilities; and their capacity to generate value for the organization. It should be noted that not all intangible resources and capabilities are included in IC, only those



capable of generating competitive advantages and, therefore, creating value in the company (Caredda et al., 2004).

Dimensions of Intellectual Capital. Some authors, in their eagerness to define intangible resources and IC, suggest categories and taxonomies. One way of measuring IC is through its dimensions; under this scheme, the most widely used and well-known multidimensional model is that proposed by Bontis, Know and Richardosn (2000), who divide it into three dimensions: human capital, structural capital and relational capital, and for which there are methodologically consistent empirical studies.

Human capital. Human capital has been defined as a generator of value and a potential source of innovation for the company, i.e., it is the source of the organization's ideas (Viedma Martí, 2003).

Structural capital. It is another dimension of IC and refers to the knowledge that the company has been able to internalize and that remains in the organization, whether in its structure, processes or culture, and even when employees leave it (Bontis et al., 2000; Petrash, 1996, 2001) and that, for this reason, is the property of the company (Edvinsson, 1997).

Relational capital. Relational capital is the perception of value that customers have when they do business with their suppliers of goods or services (Petrash, 1996). It can be said that some indicators that show the development of this capital within the organization are: the rate of customer repeat business, market share or the number of alliances established with other organizations (Petrash, 2001). Sveiby (1989) classifies this dimension into external components and includes relationships with customers and suppliers, product names, trademarks, reputation and image.

Each of these dimensions has been divided into different subcomponents (Moon & Kym, 2006). Within human capital, employee capability or satisfaction (Kaplan & Norton, 1996); in relational capital, organizational culture and processes (Saint-Onge, 1996), information systems (Stewart, 1997) and intellectual property (Brooking, 1998) have been included; and in relational capital, the subcomponent of customers or partners (Knight, 1999) is included.

4 Discussion

The above studies show that, for developing economies such as Mexico, public investment is necessary to stimulate private investment in research and development, in the national scenario the idea predominates that this work must be supported by public funds, determining that the institution responsible is CONACYT, this situation contradicts the global scenario. According to UNESCO, in countries with successful experiences, private investment in research and development is of the order of 70%; in Mexico, it is of the order of 30% and has been demonstrated for several years.



Making a comparison with South Korea, in 1998 it occupied the same place as Mexico in terms of investment in R&D, according to UNESCO for 2019 South Korea invests 4.2% of its GDP in scientific and technological infrastructure. This investment translates into more and better paid employees for postgraduate graduates and researchers in the productive sector, however, government participation is lower and is limited to facilitating development issues, due to the fact that the private sector in South Korea invests 78.11% of investment in R&D, while public investment is 11.13% (UNESCO, 2019). In contrast, Mexico only invests 0.5% of GDP in the aforementioned areas, of which 38.5% is public investment and less than 30% in private investment.

Other examples presented by UNESCO with the same case as South Korea and that exceed investments of 1% of their GDP in R&D are: Japan with 77%, the United States with 71.51%, Sweden with 67.04%, England with 65.1% and France with 63.63%.

The cases presented show that in developing countries such as Mexico there is a phenomenon of "brain drain" to developed countries, which implies the need to design better public investment plans that promote private sector investment in the area of R&D, providing better employment opportunities and intellectual capital, as well as stimulating exports of technological SEICs. If private investment in R&D in Mexico were multiplied by a factor of 3.5, its participation would correspond to 60% of the percentage of investment oriented to these strategic areas, without modifying the public proportion.

The stimulation of public investment to increase private investment, according to the theories put forward, causes a balance and independence in the R&D area, which encourages the export of brains, in this case the ICT SEICs in Mexico, and not their flight.

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