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Design A Model That Encourages Innovation And Productivity In Soft Technologies

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ABSTRACT
The paper presents a model that encourages innovation as a mediator between productivity and soft technologies. The proposed methodology starts from the analysis and synthesis of the abstract to the concrete by using the inductive-deductive method and holistic approach. This model integrates as strategic to soft in organizations through collaborative networks that allow the sharing of information technologies proposed.
Keywords: Soft Technologies, Innovation, Productivity.

I. INTRODUCTION

The term refers to the product innovation, equipment, new or improved process or released to the market and the outcome of the process service. In this case, when it is already on the market is an innovation (product innovation) or has been used in the production process of goods or provision of services (process innovation) [1]. Innovation is a tool for performance measurement and control resource allocations. Accordingly, the company expands to maximize not only their financial results but also its social and environmental performance [2].

Speaking of productivity refers to the concept of average productivity of a factor. That is, the number of output units produced per unit of the factor used. Productivity and efficiency are different concepts but in the economic literature, the idea of average productivity of a factor is often synonymous with efficiency [3]. As for the selection of equipment, there are two types of situations. The first, related to the acquisition of material with obsolete technology. This situation presents little flexibility when having to deal with unusual demands products. The second, concerning the purchase of equipment with the latest technology. This context exceeds the requirements of the product line and consequently the equipment operates well below its nominal yields [4].

The efforts of companies to assume a new paradigm based on the information and flexibility changes the characteristics of work in organizations. The previous leads to recognition of the leading role of technology creating destroying or changing the nature of work and productivity. This intellectual effort structured as a set of elements to characterize the new soft technologies and their potential impacts on innovation and productivity [5].

The book "From Hard Technology to Soft Technology" soft technology mentions that occurs through the conscious use of the laws or common experiences in economic, social and humanistic activities. Soft technology shapes the rules, mechanisms, means, institutions, methods and procedures. This technology contributes to the improvement, adaptation or control of subjective and objective [6].

The research aims to identify which model or which model types stimulate more innovation in the application of soft technologies. Also, given that productivity improvement organizations, the following question arises: What influence does the use and management of soft productivity is mediated by technology or innovation? The role of innovation as a mediator in the relationship between productivity and soft technologies is little studied in the literature. Moreover, everything becomes more interesting when taking into account Crossan and Apaydin (2010) [7], who argue that a possible way forward in innovation research be to test the connection between the determinants identified innovation, innovation performance, and company results.

II. STATE OF THE ART

Innovation is one of the key factors for the long-term success of business in today's competitive markets. There is growing interest in deepening the determinants of innovation. Currently, the focus is on the determinants related to people and behavior and emphasizes the use of soft as a factor that can stimulate or stifle innovation technologies and

therefore affect the performance of companies. However, there is little empirical research linking these variables [8]. Since then, Hoffman and Bansal (2012) indicated that companies should take them into account as a strategic problem, focusing on enterprise, innovation and environment relationship [9]. Cornell University, the Institut Europeen d'Administration des Affaires (INSEAD) and the World Intellectual Property Organization presented the Global Innovation Index 2015. Top 6 innovative countries: Switzerland, United Kingdom, Sweden, the Netherlands and the United States. This index analyzes 141 economies around the world based on 79 indicators and reflects the group of the top 10 is composed of eight European nations, an American and an Asian. Table 1 shows the overall index rating.

Table 1. Overall index. Source: Cornell University, INSEAD, World Intellectual Property Organization.

Global Innovation Index rankings

Country/Economy	Score (0–100)	Rank	Income	Rank	Region	Rank	Efficiency Ratio	Rank	Median: 0.71
Switzerland	68.30	1	HI	1	EUR	1	1.01	2	
United Kingdom	62.42	2	HI	2	EUR	2	0.86	18	
Sweden	62.40	3	HI	3	EUR	3	0.86	16	
Netherlands	61.58	4	HI	4	EUR	4	0.92	8	
United States of America	60.10	5	HI	5	NAC	1	0.79	33	
Finland	59.97	6	HI	6	EUR	5	0.77	41	
Singapore	59.36	7	HI	7	SEAO	1	0.65	100	
Ireland	59.13	8	HI	8	EUR	6	0.88	12	
Luxembourg	59.02	9	HI	9	EUR	7	1.00	3	
Denmark	57.70	10	HI	10	EUR	8	0.75	49	
Hong Kong (China)	57.23	11	HI	11	SEAO	2	0.69	76	
Germany	57.05	12	HI	12	EUR	9	0.87	13	
Iceland	57.02	13	HI	13	EUR	10	0.98	4	
Korea, Republic of	56.26	14	HI	14	SEAO	3	0.80	27	
New Zealand	55.92	15	HI	15	SEAO	4	0.77	40	
Canada	55.73	16	HI	16	NAC	2	0.71	70	
Australia	55.22	17	HI	17	SEAO	5	0.70	72	
Austria	54.07	18	HI	18	EUR	11	0.77	37	
Japan	53.97	19	HI	19	SEAO	6	0.69	78	
Norway	53.80	20	HI	20	EUR	12	0.73	63	
France	53.59	21	HI	21	EUR	13	0.75	51	
Israel	53.54	22	HI	22	NAWA	1	0.83	20	
Estonia	52.81	23	HI	23	EUR	14	0.86	17	
Czech Republic	51.32	24	HI	24	EUR	15	0.89	11	
Belgium	50.91	25	HI	25	EUR	16	0.74	59	
Malta	50.48	26	HI	26	EUR	17	0.95	7	
Spain	49.07	27	HI	27	EUR	18	0.72	67	
Slovenia	48.49	28	HI	28	EUR	19	0.82	22	
China	47.47	29	UM	1	SEAO	7	0.96	6	
Portugal	46.61	30	HI	29	EUR	20	0.73	62	
Italy	46.40	31	HI	30	EUR	21	0.74	57	

Horizon 2020 is the new research framework in the European Union (EU) program. This program will strengthen the primacy of Europe in innovation by encouraging research excellence and innovative technologies. In the period 2014-2020, almost 80,000 million euros will be invested in research and innovation. Also, they help create in the EU new competitive products and services in the international market [10]. Switzerland is the most innovative country globally in 2015. Table 2 presents characteristics:

Table 2 Characteristics of Switzerland. Source: University Andorra, 2016.

Elements	**Characteristics**
Population	7.6 million Inhabitants. 8.6 million visitors per year
Quality of life	7.8 / 10
Life Expectancy	83 years. 85 years female and male gender 81 years
Security	76.1% of immigrants say it is a safe country to live
	82% have more positive experiences than negative on a normal day
	80.3% of people feel safe walking at night
	94% believe they have to count on in difficult times
Contamination	22 micrograms per m^3 of air pollutants
Leisure	14.78 minutes per day to leisure and personal care
Languages	German (64% of the population)
	French (20% of the population)
	Italian (7% of the population)
	Romanche (less than 1% of the population)

Political institutions	71% of Swiss citizens say they trust their political institutions
Education	84.9% of the population is satisfied with the country's education
	17.2 years on average Swiss study
	86% of the population has secondary education
	35% of the population has a college degree
	One teacher for 15 students
	95.7% of Swiss children study daily
	517/600 in reading, mathematics and science in PISA
	16% of government expenditures are devoted to education
	The most popular universities are ETH and EPFL
	University of Lausanne and University Luzern in the ranking of the most sustainable. The University of Basel is the oldest (1460)
	Diversity is the most prominent feature in teaching
Job	79% of the population has paid work
	85% are men and 73% women
	1.632 hours is the amount a person works in Switzerland
Group	Switzerland does not belong to the European Economic Community

The product of soft technologies is not a tangible object. These technologies are intended to improve the functioning of institutions or organizations for the fulfillment of its objectives. Such organizations may be industrial, commercial and service enterprises or institutions with or nonprofit. Soft technology is related to the knowledge, talent and applied in the innovative process of a product or service learning. Among the branches of soft technology education is highlighted (in the course of teaching), organization, management, accounting and operations, production logistics, marketing and statistics, the psychology of human relations and work and software development [11].

The Athabasca University of Canada reports that there is no a priori reason to prefer hard or soft technologies. Most technologies are a set of both. Softly is hard and hard is easy: learning technologies and consistency. Soft technologies give flexibility, creativity, malleability and adaptability. The degree of softness or hardness necessary in any individual case varies depending on the context. Soft technologies require creative thinking to represent them. They need a power greater than the technologies hard decisions. That makes them more difficult. By contrast, hard technologies are easier to use and require less responsibility for decision-making [12].

Soft technology refers to technology that involves human factors and facilitates flexibility and human initiatives. Soft technology emphasizes human needs rather than objects. It is essential to include soft technology because a wider knowledge of the technology required to meet the technological society of today. The current emphasis on hard technology can not satisfy the needs of a changing society. It is important to educate the next generation soft knowledge and skills necessary technology for a future technological world [13].

Productivity is "the manner of use of production factors in the manufacture of goods and services for society". Productivity seeks to improve the efficiency and effectiveness of resource utilization. Integral Model Productivity (Figure 2) seeking the highest levels of performance in the market and allows the entire company to work on achieving business goals. Integral Model determines the optimum operation of the enterprise. Also, displays the excess or missing resources and take actions to achieve them or for their optimum use. The model is a methodology management key to optimizing productivity and takes into account the following variables [14] factors:

- The diagnosis of the process of value creation and value proposition for customers.
- The diagnosis of business strategic management.
- The alignment of corporate resources around the objectives and strategies.

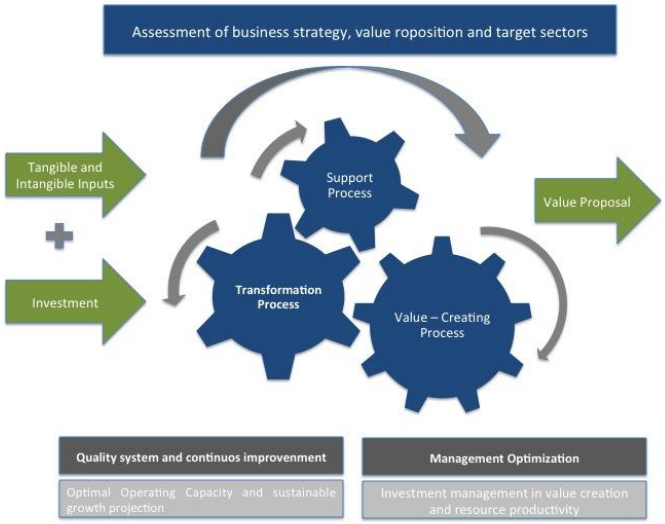

Figure 2. Integral Model Productivity Source: Medina, J. Productivity Integral Model, essential for its implementation aspects, 2010.

Over the past three decades' growth in Mexico, it has been very low, just 2.4% annually. The forecast of an increase of the Mexican economy published by the Secretariat of Finance and Public Credit (SHCP) for 2014 was a range between 2.1 and 2.6%. However, as recorded by the National Institute of Statistics, Geography and Informatics (INEGI) during the first three-quarters annual growth of approximately 1.9%. Such behavior could not be overcome even with inflation is relatively low and an increase in foreign trade as a percentage of Gross Domestic Product (GDP) [15].

A study by Hanson (2010) [16] reviewed the possible explanations of why Mexico has not had high rates of economic growth. The results indicate that the input that contributes to the production value corresponds to capital services with 1.58% a year. This value is divided mostly in contributions of machinery and equipment and the remainder in computer hardware and communications. Energy is the input that contributes to a lesser extent with 0.09% a year. The average annual growth rate of production in the period is 3.58%, and a total factor is 3.97%. Therefore, the result is that during this time the PTF - is the relationship between the volume of production and the combined contribution of inputs used - growing at a negative rate (-0.39%) and very low productivity. Hyper specialization obscures the global and the essential. However, the core problems are never fragmented, and global challenges are increasingly essential. Also, all particular problems can not properly consider whether it is not in context and the context of these challenges should arise increasingly in a systemic context. A holistic approach to handling such situations. This method is global and inclusive [17].

III. METHODOLOGY

The methods used in this study correspond to the holistic, inductive-deductive, analysis and synthesis of the abstract to the concrete. The information processing by is reflected binary matrix indicating the presence or absence of the variables studied. From this information, a frequency distribution analysis and Pareto diagram shown. This chart identifies the variables most repeated and which form the basis for the design of the proposed new model. Table 3, called Matrix Model - Indicators showing the relationship between different existing models and innovation, flexible technologies, productivity, control evaluation and strategic planning. 1 is the presence of the variable in each model and 0 in his absence.

Table 3. Matrix Model – Indicators

			Indicators						
Model	Authors	Year	Collaborative network	User Innovation	Control-Assessment	Productivity	Soft Technologies	Collective innovation	Strategic Planning

Open Innovation model of Mozilla Firefox [18]	Mozilla Firefox	2008	1	1	0	1	1	1	1
Organizational Innovation and creativity extended for open innovation [19]	Markhorst	2009	1	0	1	0	0	0	0
Model of integration of knowledge in IA [20]	Wallin y Von Krogh	2010	0	0	1	1	0	0	0
General analysis model based on Open Innovation Knowledge Management [21]	González y García	2010	1	0	0	0	1	0	0
Innovation model from the perspective of knowledge flows between organizations [22]	Chiang y Hung	2010	1	0	1	1	0	1	0
Integral model Productivity [14]	Medina	2010	0	0	0	1	1	0	1
Model of Open Innovation Open Basque [23]	Open Basque	2012	1	1	0	0	1	1	1
Specific explanatory model: an integrative proposal [24]	Acosta y Fischer	2013	1	0	0	1	0	0	1
Innovation Model in unfavorable environments [25]	González y Granados	2013	1	0	1	1	0	0	0
Change model for implementing open innovation to the services sector [26]	Bravo, Castro y León	2015	0	0	0	1	1	0	1
Total			7	2	4	7	5	3	5

Based on the frequency distribution analysis and Pareto chart it is developed.

Table 4. Frequency

Frequency of Classes	fi	fr	fr%	Fi	Fr	Fr%
1. Collaborative network – Productivity (7)	2	0.2856	28.56%	2	0.28	28.50%
2. Soft Technologies – Strategic Planning (5)	2	0.2856	28.56%	4	0.57	57.10%
3. Control – Evaluation (4)	1	0.1429	14.29%	5	0.71	71.40%
4. Collective innovation (3)	1	0.1429	14.29%	6	0.85	85.70%
5. User Innovation (2)	1	0.1429	14.29%	7	1	100%

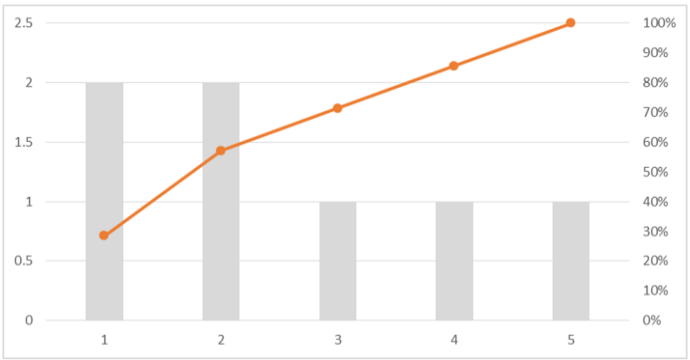

Figure 3. Pareto Chart

IV. DISCUSSION

Innovation is the transformation of an idea into a product or a new or improved marketable service. Also, it refers to a method of operating a new or improved manufacturing or distribution or to a new method [27].

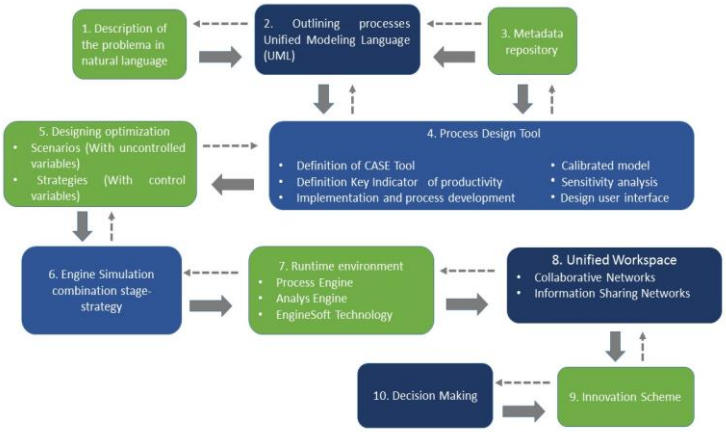

Figure 4. Model that encourages innovation and productivity based on soft technologies

Technology is an independent variable that strongly influences organizational characteristics (dependent variables). The technology performs operations and tasks of organizations. The adopted technology can be rough and rudimentary (such as grooming and cleaning the brush or broom) and can also be sophisticated (such as data processing). Soft technology contributes to innovation in two ways. First, it provides the tools and means of technological innovation. Each country and each region must create and use tools that fit their reality. Second, knowledge of soft technology expands the space for innovation. The integration of hard and soft technology is necessary. The following model (Figure 4) is a strategic proposal to integrate soft technology to increase productivity and foster innovation in organizations.

V. CONCLUSIONS

The innovation is based increasingly on many forms of knowledge. Innovation is a learning process that involves elements of both internal and external. Managing this process involves costs in terms of time, investment in equipment and training. However, the potential long-term benefits are substantial: efficiency and management of real-time information that includes internal functions, suppliers, customers and partners [28]. The proposed model combines a very diverse set of actors that fosters innovation as a mediator between productivity and soft through collaborative networks and information exchange technologies. The elements allow both activities and interactions modify and disseminate new technologies. The model presents new contributions and incorporates alternative perspectives. Well, perfect knowledge about the way in which innovation takes place in the organization.

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