

Dependencia de la innovación de los cursos de capacitación al personal en empresas

Innovation dependency of training personnel in Companies

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Resumen

Los cursos de capacitación al personal en las empresas pueden ser un factor clave en el desarrollo de la organización en general y del proceso de innovación en particular. El objetivo del presente trabajo fue probar la relación entre la capacitación continua al personal y el proceso de innovación en las empresas. El método se basó en una encuesta a una muestra aleatoria de 158 empresas chihuahuenses pequeñas, medianas y grandes de servicio y manufactura. Las variables de interés fueron capacitación de personal, proceso de innovación y desempeño de la empresa. Para ello, se aplicó el cuestionario empleado en la Unión Europea para medir la innovación en las empresas (CIS_4), el cual considera los diferentes tipos de innovación del manual de Oslo. Asimismo, las pruebas estadísticas entre los dos grupos se basaron en la prueba de dependencia Chi cuadrada de Pearson. Los resultados arrojan diferencias significativas en las variables de innovación y de desempeño de la empresa a favor del grupo de empresas que imparten los cursos de capacitación de manera continua, lo que permitió comprobar la hipótesis planteada.

Palabras clave: cursos de capacitación al personal, innovación del producto, innovación del proceso, desempeño de la empresa.

Abstract

Training courses for personnel in companies can be a key factor in the development of the Organization in general and the innovation process in particular. The objective of the present study was to test the relationship between the continuous staff training and the process of innovation in companies. The method was based on a survey of a random sample of 158 Chihuahua companies small, medium and large manufacturing and service. The variables of interest were personnel training, innovation process and performance of the company. To do this, the used in the European Union questionnaire was applied to measure innovation in enterprises (CIS_4), which considers different types of innovation of The Measurement of Scientific and Technological Activities, Proposed Guidelines for Collecting and Interpreting Technological Innovation Data", also known as the Oslo Manual. Also, statistical tests between the two groups were based on the dependence of Pearson Chi-square test. The results show significant differences in the variables of innovation and performance of the company in favour of the group of companies that offer training courses on an ongoing basis, that allowed us to verify the hypothesis.

Key Words: staff training courses, product innovation, process innovation, company performance.

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Introduction

There is almost a consensus among those responsible for the areas of human resources of enterprises, in the sense that the staff training exerts a favorable influence on productivity, the quality of the product and the improvement to the working environment in the industry (Drucker, 84). Also companies with one greater training activity, presents a lower rate of rotation of its operators, which suggests that this may stimulate rooting of personnel by involving it, creating the feeling of "be taken into account" and the stimuli perceived as a result of increasing their job skills (Ollivier, 2005).

Research on training in Mexico have found that companies that strive for training, are also that allocated more resources to this end in absolute terms (increased investment). This corresponds with the larger companies that have a greater number of workers, mostly companies of foreign capital, in which the culture of their country of origin must weigh to take such a decision. Worth noting that these companies rely more on internal training which in the outer, which suggests that they seek to have an organizational structure (human and physical) that enables them to provide more internal training and rely less on the external (Ollivier, 2005).

On the subject of innovation, looking at the current scenario of global competitiveness, we find that Mexico is not only far from the top, but also worsens the situation to be increasingly lagged in recent years, of According to the measurement of the Global Competitiveness Index (IGC) in 134 countries (World Bank, 2013). Within the three main causes that have given the lowest score in this index IGC in our country, innovation is an activity with a large gap, below the average of the other indicators of competitiveness.

Paradoxically, it has been observed that given the dynamics of globalization, innovation is one of the most important parameters that determine the competitiveness of countries, which is why countries are at the top in competitiveness, they have developed in recent decades policies to foster innovation activities in their organizations, both public and private (Jacobsson, 2006).

The evolutionary theory of technological change, which is best known theorist Joseph Schumpeter (1934) argues that innovation is the main engine of economic development, being the entrepreneur innovator. This author is given the paternity of the concept of innovation, considering this as the invention of a product that has been introduced to the market, that is, at the marketing stage. Within this current, feature prominently the concepts of paradigms and technological trajectories related to the long cycles of economic development (García, 2010).

Moreover, innovation of products and processes, which are considered for most of the last century as an almost exclusive activity of large firms (Schumpeter, Galbraith 1934 and 1956), is widespread today under the new economic context Empirical studies have shown that

virtually all enterprises (including small and medium) have made significant contributions to the overall process of innovation (Rothwell and Zegveld, 1978; Pavitt et al., 1987).

In recent decades, the growing internationalization of economies and globalization, coupled with the rapid advance of technology, particularly in information and communications technology (ICT), has influenced the creation of a competitive environment that has generated a growing demand for innovations companies of both countries at the center and the periphery, mainly due to a reduction in the life cycle of their products and technologies (Ollivier, 2009).

To find companies increasingly involved in global competitive markets, either due to their incorporation into supply chains or expansion (Cagliano et al., 2001), the innovation activities of both products and processes They are a key factor for increasing their ability to compete in new markets, which is consistent with studies that show that innovations are one of the major determinants in the export performance of companies (Beise-Zee, 2006) .

In short, innovation is widely recognized as a key factor driving economic growth. The need to innovate grows with time and focuses on the most competitive and globalized production sectors in which they are disadvantaged businesses in developing countries in general, but particularly its most vulnerable strata are small.

The concept of innovation seen in the latest version of the Oslo Manual of the OECD (2009), which considers four types of innovation in enterprises is adopted: 1) in the product (or service); 2) in the process; 3) marketing and 4) in the organization of the company, which defines this concept as follows:

"The introduction of a new or significantly improved product (good or service), a process, a new marketing method or a new organizational method in the internal practices of the company, organization or workplace external relations. "

It is noteworthy that, besides the Oslo Manual, which deals with the measurement of innovation, the OECD also found that of Frascati for measuring R & D and Canberra for measuring resource activities humans involved in R & D.

Today, innovation policy is broader than the scientific and technological objectives activities also includes changes in the organization of the company and in the market area, which can also generate significant economic consequences, and sometimes not taken sufficient account in policies promoting innovation. (Sancho, 2007)

The literature of industrialized countries on the issue shows the importance of human resources as a driving factor (in English driver) of innovation (Gobble, 2010). Also, companies with greater innovation are also those with higher learning mechanisms (Von Hippel, 2005). Other specifically show that staff training has a favorable influence on the greater organizational performance (Erickson, 2003, Rosli, 2013) and particularly in the innovation process (Lorenz, 2011, Nazarov, 2012, Torugsa, 2013).

However, the importance granted to them to training and innovation in companies (Tether, 2005), are relatively few studies linking these two activities in companies in general and almost nonexistent in developing countries (INSEAD, 2011). Considering the above, the research question has resided in the lack of information on the influence of the training staff throughout the process of innovation in companies in developing countries, making us ask ourselves the following question : What is the influence of the training staff during the process of innovation in companies?

Therefore, the overall objective proposed in this study was to provide evidence to identify the relationship between staff training and process innovation in companies.

In addition to the implicit learning in any research process developed within a university graduate level and dissemination of the results in academia, they are the two major players that can be widely benefit as users of this research:

- The government sector of Chihuahua at three levels, to have current and objective information to enable it to base the design of policies and programs to promote personnel training and innovation in enterprises.
- The Chihuahua business, to become aware of their reality, the importance now of staff training and innovation in our increasingly global world, as well as the measures that can be taken to develop or intensify, either in products, processes, marketing or in the same organization of the company.

Closely related to the research question, the following hypothesis was formulated as an alleged response to it:

H1. Dependence exists between innovation and continuous delivery of training to staff in companies.

Method

2013, in the city of Chihuahua and its area of influence (Delicias and Cuauhtemoc - an empirical study based on a survey of small, medium and large companies, essentially quantitative transversal approach, not experimental, in the period 2012 developed). It is estimated that the population of established companies is about 14,000 in the city of Chihuahua and its area of influence. To calculate the size of the sample was considered a binomial distribution, with the proportion of companies that have made some innovation by 50% (p = 0.5, critical case), with 10% error and 95% confidence (using the formula $n = Z^2 pq / E^2$), resulting in a calculated size n of 94 companies. Below, Table 1 shows the sample of 158 companies raised in the survey until the month of October 2013, according to its size and main line is presented.

Table 1. Sample survey companies by size and rotation

		Giro					Total
		Comercial	Servicios	Industria	Otros	Construcción	
Tamaño de la empresa	micro	13	30	44	1	6	94
	pequeña	3	6	22	2	6	39
	mediana	1	4	12	1	1	19

	grande	0	0	6	0	0	6
Total		17	40	84	4	13	158

In terms of size, this was considered according to the number of workers; 1 to 10 micro; 11 and 50, small; from 51 to 250, median; and more than 250 large.

The main variables of interest considered in the study of the companies were:

- the types and areas of the company involved;
- training to innovation-oriented personnel;
- main characteristics of innovation in the product, process, marketing and organization;
- investments in R + D + i, internal and external;
- the acquisition of licenses, patents or know-how;
- costs in different areas;
- Intellectual property records;
- use of the support programs;
- partnerships with other companies or institutions;
- economic effects on sales and employment generation, growth of the company.

In order to have a standardized method for measuring innovation activities in enterprises instrument, the survey was conducted using a questionnaire developed by the European Union (EU), called Community Innovation Survey (CIS). The main advantage of using this tool is its reliability and validity, as has, over more than ten years of use in Europe, a purification and evolution in which they have included more sectors and activities, so that the fourth and final version is known as CIS-4, to be in its fourth version, instrument being applied in the survey project. Another advantage of using this tool is to allow comparison with results Europeans who use it.

The strategy analysis was first introduced to the general aspects of the companies in the sample, later divided into two groups according to the practice of training aimed at innovation:

- Group 1 companies that perform continuously training courses focused on innovation in any of the four types.
- Group 2 companies that do not conduct these training courses continuously.

Thus the main features and results are compared between the two groups to highlight the influence of the training staff in the innovation process, through contingency tables, statistical tests of Pearson chi square and compare half with "t student".

Developing

Results

General features

Below are shown in Table 2 the main characteristics of the companies in the sample as a whole and in some of the variables associated with innovation.

Table 2. Average innovation some features of all the companies in 2012 (monetary amounts are given in Mexican pesos)

<i>Característica</i>	
Número de trabajadores	98
Gastos en I+D dentro de la empresa	\$151,814
Gastos en I+D fuera de la empresa	\$320,416
Compra de patentes, licencias	\$243,094
Ventas anuales	\$21,032,633

In all the companies in the sample (the two groups) shows that spending on research and development (R & D) subcontracted outside the company is around double the R & D within the company .

As for the sector and the group they belong to, it was found that a higher proportion of industrial enterprises (68.4%) found in group 1, the percentage of service companies (63.3%) found in this group .

As for the size and the group to which they belong, they are found to lie in group 1, 53.2% of micro enterprises, 84.1% of small companies, 84.8% of medium companies and 100% of large companies. This result shows a correlation between the number of workers and frequency of training to innovation.

Influence of training on innovation

Table 3 shows the percentage of companies in each of the two groups with different characteristics related to innovation is.

Table 3. Percentage of companies with innovative features

Característica	Grupo 1 (% empresas)	Grupo 2 (% empresas)
Nuevos productos para la empresa	65.0	49.1
Nuevos productos para el mercado	59.6	50.0
Innovación en el proceso	66.1	33.9
I+D dentro de la empresa	65.7	43.4
I+D subcontratado	39.4	43.4
Compra de patentes, licencias, Know How	36.2	32.1

It is noted that while indicators for product innovation to the process, are favorable to the group 1, which can be explained by the R & D within the company and buying technology. The area in which the percentage of companies in the group 2 is higher, refers to R & D outsourced, which is consistent with the need to lower innovation-oriented training.

As for the results of innovation from the point of view of protection of intellectual property, Table 4 shows the percentage of companies of the two groups analyzed.

Table 4. Percentage of companies that have applied to some copyright registration

Registro	Grupo 1 (% empresas)	Grupo 2 (% empresas)
Patente	13.3	7.5
Diseño industrial	10.5	3.8
Marca	27.6	26.4
Derechos de autor	7.7	1.9

Group 1 also presents favorable results, with a greater number of companies that have made a record of intellectual property in the Mexican Institute of Industrial Property (IMPI) the first three items, or the National Institute of Copyright (INDAUTOR) the fourth category. As for the trademark, not a significant difference, which can not be explained by this category closely linked to product innovation, but a distinction to be generally make for marketing it is observed.

Regarding the influence of the training focused on innovation on the performance of the company, then Table 5 presents the Chi Square Pearson contingency tables of different variables and the two groups that split the sample.

Table 5. Chi square test (X²) Pearson friendly group 1 on group 2 variables related to the performance of the company (significancias de P<0.05)

Variable	Valor de X ²	Significancia (Valor de P)
Mejora la flexibilidad de la empresa	16.12	0.002
Aumenta la capacidad productiva	14.16	0.007
Mejora la gestión de información	5.4	0.023
Mayor cumplimiento de requisitos legales	27.25	0.000
Mejora la satisfacción laboral	15.77	0.003

Dependence is observed variables through the chi-square test in contingency tables among different performance variables and the two groups of companies, the five characteristics that the group 1 is superior to group 2, which shows the influence (or dependence) that training exercises focused on innovation in enterprise performance.

Hypothesis testing

The "H1. Hypothesis There is dependence between innovation and continuous delivery of training to staff in companies ", it is checked considering the variable of innovation

Table 6. Table contingency against the two groups performing R & D continuously within the company (values in number of companies)

		I+D dentro de la empresa continua		Total
		No	Sí	
Capacitación para	No	43	9	52

activity, realization of R & D continues within the company, pro group 1 which imparts continuous training in innovation, as shown in Table 6 with the test unit square Chi (X) 2, 10.75 and a P value of 0.001 (P <0.05), which is presented graphically in Figure 1.

innovaciones	Sí	56	44	100
Total		99	53	152

In this contingency table clearly shows that the number of companies that provide training and have R & D is much higher (44) the number of companies that do not provide training and have R & D, which shows the dependence of the variables that suggests the influence of training on the innovation process.

Below it is shown in Figure 1 the comparison between the two groups in relative terms (% of firms) related training and its impact on the achievement of R & D at the company.

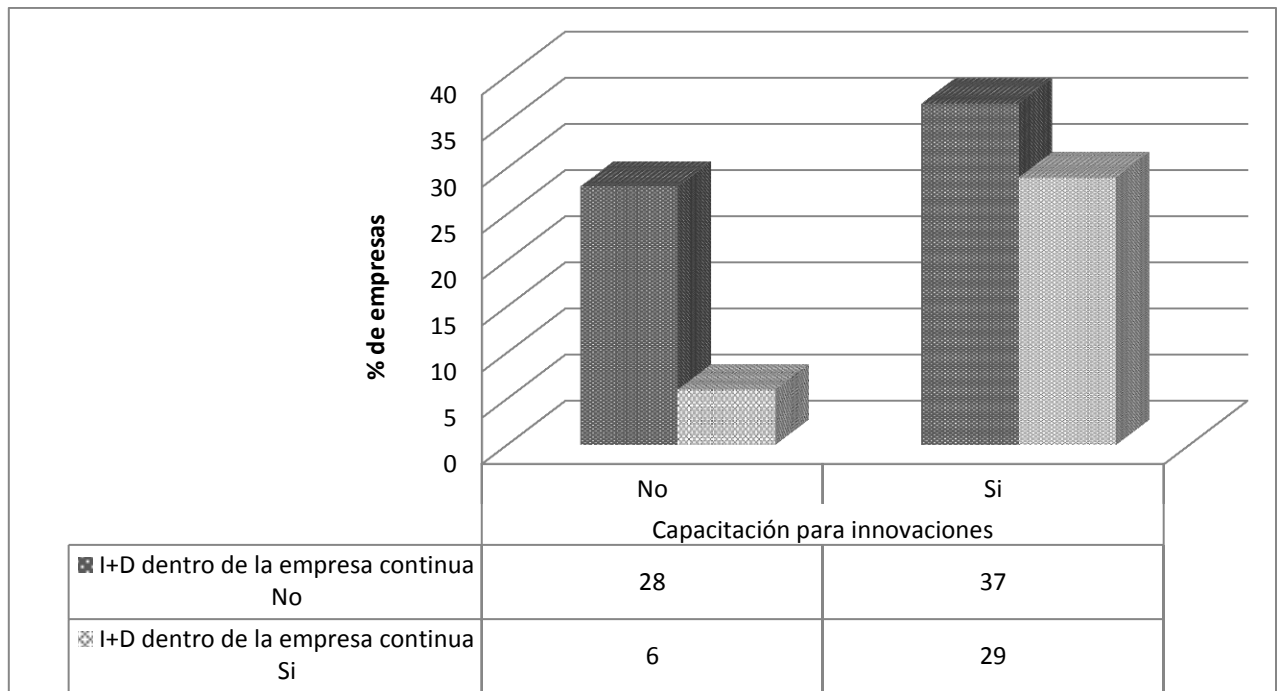


Figure 1. Conducting R & D and providing training in innovation in the two groups in relative terms

In this Figure 1 shows the significant difference is observed in R & D in the business between group 1 and 2 in which the sample was divided, suggesting the influence of training on innovation activity.

Conclusions

By way of conclusion, first it presents the way it was covered the overall goal of research in the companies in the sample that was to provide evidence to identify the relationship between staff training and the process of innovation in companies. These evidences are presented in

- 1) The comparative tables Tables 3 and 4 show higher figures in group 1 associated with the continuous delivery of training focused on innovation, on the characteristics related to innovation, such as R & D, the new products and the registration of intellectual property.

2) Table 5 shows the results of tests Pearson chi square variables related to the performance of the company, also favorable to group 1, associated with the continued delivery of training focused on innovation.

3) contingency table of Table 6 showing through the test of Chi square dependence between the practices of research and development (R & D) and continuous delivery of training to innovation-oriented staff, which allowed the test of the hypothesis: H1. Dependence exists between innovation and continuous delivery of training to staff in companies.

Overall conclusions

This study clarifies the close relationship between the development of process innovation and continuous delivery of training to staff aimed at this important function within the company, which highlights the importance of learning and human capital development organizations.

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