GOVERNANCE STRUCTURE ON INNOVATION ACTIVITIES. A CROSS-SECTION STUDY OF MEXICAN FIRMS

Área de investigación: 2. Administración de la tecnología

Andrea Celeste Tafolla Manzo
Universidad Michoacana de San Nicolás de Hidalgo
Instituto de Investigaciones Económicas y Empresariales (ININEE)
andrea_taf@gmail.com

Alexander Rivero Ticona
Universidad Michoacana de San Nicolás de Hidalgo
Instituto de Investigaciones Económicas y Empresariales (ININEE)
alex.rivero@hotmail.com

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Octubre 8, 9 y 10 de 2014 ◆ Ciudad Universitaria ◆ México, D.F.

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Abstract

This paper examines the relationship between three governance modes of organization of the firm – hierarchy, hybrid and market – to developinnovative activities and eight independent variables –export intensity, foreign ownership, manager's experience, skilled workers, technology access, innovationprograms, experience of the firm and public support–. To prove our assumptions, we tested seven hypotheses according to two paradigms: Transaction Cost Economics and Knowledge Based View. The empirical instruments were threelogistic models and the information was collected from the World Bank Enterprise Survey database. The sample consisted on 547 Mexican firmsthat carried out innovation activities during 2010.

Key words: Innovation activities, Governance structure, Transaction Cost Economics, Knowledge Based View, Mexican firms.

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1. Introduction

According to strategy literature, a crucial task for managers is to build up and keep important knowledge and capabilities (Nickerson and Zenger, 2004; Barney 1995, Wernerfelt 1984, Teece et al. 1997).

The knowledge-based theory of the firm considers knowledge as the most significant resource of the firm, since skill-based resources are exceptionally difficult to imitate and socially complex, heterogeneous knowledge and capabilities among firms are the major determinants of sustained competitive advantage and superior performance. This knowledge is inserted and transferred through different entities which can vary from routines, systems, policies, documents until organizational culture, identity and employees (Wernerfelt, 1984; Barney, 1991; Conner, 1991).

The most important feature of knowledge and capabilities is their potential to proficiently transform inputs into worthy outputs (Nelson and Winter 1982; Kogut, 2000). Therefore, managers develop the firm's competence to produce efficiently by renovating and creating knowledge. Through the internalization of valuable knowledge the firm is capable of exploit and guard knowledge (Nickerson and Zenger, 2004).

The major objective of the knowledge based view is to enlighten how the election of organization, specifically the choice of integration or outsourcing certain activities, impacts on the production and protection of valuable knowledge (Conner, 1991; Demsetz, 1988; Conner and Prahalad, 1996; Kogut and Zander, 1992, 1996; Grant, 1996; Madhok, 1996; Nahapiet and Ghoshal, 1998). However, this paradigm seeks to build up a theory that is independent of transaction cost economics and its key assumption of opportunism. To support this argument it's held that firms as organizational forms exist to economize on the exchange of knowledge rather than to attenuate opportunism (Conner, 1991).

Nevertheless, we sustain that firms need to avoid the uncertainty of the environment and the opportunistic behavior of their counterparts in order to protect the transference and creation of knowledge. It leads us to a key concept of strategy literature: the boundary choices of the firm. For starters, if we assume that competitive advantage comes out from rare, valuable, difficult-to-imitate resources (Barney, 1991; Wernerfelt, 1984), boundary choices would define the ownership and configuration of those resources. Transaction cost economics has theoretical and empirically explained that boundary choices are determined by the specificity of assets involved in any transaction (Shelanski and Klein, 1995), which according to Poppo and Zenger (1998), will result in vertical integration as the preferred governance solution.

Above all, one of the main functions of the manager is to settle on how to get significant knowledge either inside or outside the firm. Consequently, we explore the possibility of three alternative governance modes to assist the creation and transference of knowledge: markets, hierarchy and cooperative innovation.

Innovation agreements between firms and institutions have been analyzed at several theoretical and empirical works (Crosier, 1998; Winter, 1987; Foray and Mowery, 1990).In this research, we focus on settlements whose purpose is the construction and recombination of knowledge. This is why we try to explain how these covenants are constructed, for example, what are the options firms have to innovate and on which basis do they choose them?

In order to test these arguments, we examine the relationship between the governance mode of creation and transference of innovation and a group of independent variables like export intensity, foreign ownership, experience of top managers, skilled workers, public support for innovation, firm age, etc. among 547 Mexican manufacturing firms in the year 2010.
The following section reviews the literatures on transaction cost economics and the knowledge based view to generate the research hypotheses. The subsequent sections describe the data, methods, and results. The final section discusses the findings and conclusions.

2. Theoretical framework

As a result of emerging markets along with rapid changes of business conditions and the development of new technologies, competition has gradually transformed into a battle to win positions in the market with new or improved products (Noteboom, 2004). In order to win such battles, firms need to get rid of activities that are not part of their core competencies, which finally create competitive advantages (Prahalad and Hamel, 1990). At the same time, firms should seek for complementary competencies from outside partners.

The boundary decision (what to make and what to buy) entails vertical collaboration in the supply chain, which can involve marketing and distribution, and also interactions may also be horizontal, with competitors, or lateral, with firms in other industries (Anderson and Coughlan, 1987). Subsequent to the question of what to do inside or outside and why, we can find the questions with whom and how to cooperate: the form of organization, the networks, the instruments for governance and the kind of process.

Furthermore, the higher the transaction costs the greater the possibility of integrate the transaction within the firm due to the benefits of its synchronization capability, so this way disputes can be resolved via hierarchy. Then, simpler and less frequent transactions that implicate ordinary assets will be carried out through market organization (Shelanski and Klein, 1995). Amongthe approaches of the make or buy decision, there are hybrid forms that combine the intensity of the market and the adaptation ability of the hierarchy (Williamson, 1996).

Williamson (1991) has developed a categorization of transactions to predict that a transaction with a certain array of qualities will be structured through the market or inside the firm; for example the higher the uncertainty of the transaction, its frequency and the specificity of the assets entailed, the more complicated it will be to script a complete contract, mostly because of bounded rationality.

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On the other hand, knowledge based theories also involve the specificity of assets, especially those related with the performance of the firm (Barney, 1986, 1991). That is the case of human resources developing specific routines, language, information transference and skills. This means firm specific investments constitute an important source of valuable knowledge and capabilities. Knowledge based explanations for the boundaries of firms, expand knowledge analysis yonder the tautological prediction that firms internally source the activities they perform well and outsource those that others perform better (Poppo and Zenger, 1998). As an alternative, this theoretical frame studies how boundary choices influence the configuration and relocation of capabilities and knowledge. Similar to transaction cost theorists, these exponents identify specificity of assets as the main driver of boundary choice (Conner, 1991).

In response to the critics of the dichotomic character of TCE, Williamson (1991, p. 281), distinguishes the differences between market, hierarchy and hybrid organizational modes through a variety of characteristics:
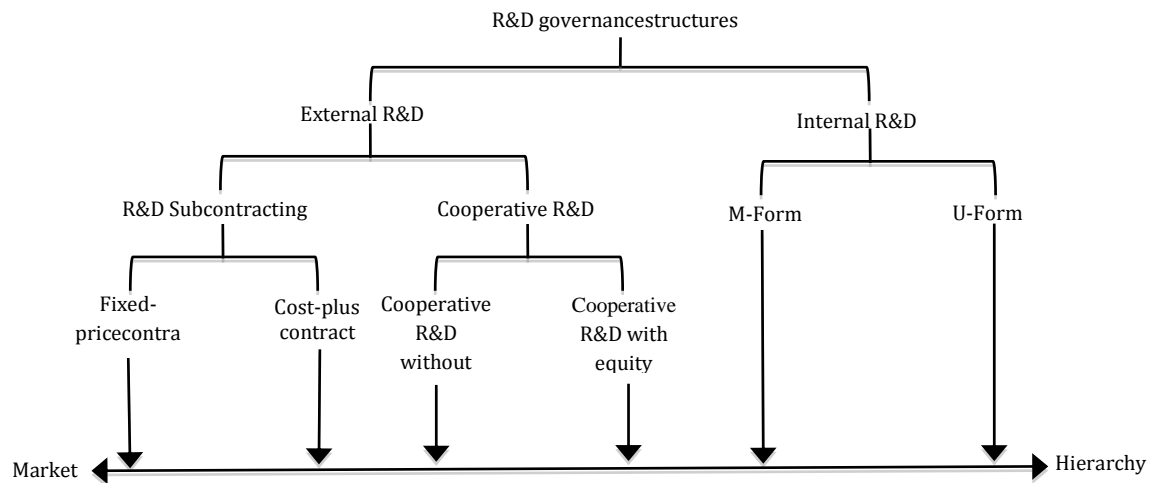
1. Contract law: formal, written and anonymous for the market, adapted and flexible for the hybrid modes, replaced by the power of hierarchy within the firm.
2. Adaptive capacity: it is easier and faster to adapt a market contract than hierarchy when independent adaptation is required, but the opposite happens when the disruption demands coordinated adaptation.
3. Incentive intensity: assumed to be elevated in markets (because of opportunistic behavior), low inside the firm due to the fact that action and sanction can be mitigated by the mechanism of salary.
4. Administrative controls: inexistent in a market relation, but indispensible to counterweigh weaker incentive intensity of hierarchy.

For each of these features, the hybrid modes are intermediate, that's why we use this conceptualization to develop the managerial options of governance in the innovation activities. We made the first distinction between internal and external innovation: internal actions are those managed inside the firm without any outside intervention (for instance, product or process innovation conducted by the firm, improvement of the quality of workforce, technology development, among others) and external activities indicate that the firm has relation with outside partners through a contract (market regulation via interactions with suppliers or consumers, actions to benefit from government programs of innovation).

According to Bernard Croisier (1998) the argument about which of these options are useful to decide rather make than buy, are exposed in Figure 1. Since the object of this study is the governance mode of a set of activities related with the innovation process, we focus on the third level proposed in the Figure 1, that is, we only consider the two broad external modes and the general one referring to internal control. Corresponding to the TCE framework, the central assumption of our analysis is that the features of the transaction affect the selection between those options, and regarding the knowledge based view, we undertake the idea that the more valuable knowledge created by the firm, the greater the possibility of internalize the innovative activities.

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Figure 1
R&D Governance structures. (Croisier, 1998).

Therefore, we test a series of hypothesis related as much with TCE as with the knowledge based view. To verify which organizational mode is more likely to occur in the presence of a variety of innovation variables, we contrast hierarchy decisions against hybrid (cooperation) and market modes. In the case of the knowledge based analysis we build four hypothesis:

H1: The higher the participation of qualified employees within the firm, the higher the probability that the governance mode be through hierarchy.
H2: The higher the participation of the firm in governmental innovation programs, the higher the probability that the governance mode be through hierarchy.
H3: The longer the experience of the manager, the higher the probability that the governance mode be through hierarchy.
H4: The longer the residence time of the firm in the market, the higher the probability that the type of governance structure is hierarchy.
Pertaining to the TCE, we drew up another three hypothesis:
H5: The greater the propensity of entering the foreign markets, the less likely the probability that the type of governance structure is hierarchy.
H6: The greater the participation of foreign investors in the firm, the greater the probability that the type of governance structure is hierarchy.
H7: The higher the easiness of the firm to access technologies of information and communication, the greater the probability that the mode of governance be trough hierarchy.

We expect that the vaster the participation of foreign owners into the firm, the higher the likelihood that the firm organization be through an external mode, whether cooperative mode or market innovation. In words of Kogut (2000, p. 405) "[…] part of the value of the firm comes from its participation in a network that emerges from the operation of generative rules that instruct the decision to cooperate. Whereas the value of firm-level capabilities is coincidental with the firm as the unit of accumulation, ownership claims to the value of coordination in a network pit firms potentially in opposition with one another".

On the other hand, empirical evidence suggests that export intensity is related with the capacity of firms of investing abroad to acquire knowledge (Cantwell, 1989, 1995; Kogut and Chang, 1991). Additionally, is assumed that firms can increase their innovative productivity as a result (Almeida, 1996; Penner-Hahn and Shaver, 2005). According with Salomon and Jin (2010), exporting is associated with the ex post increase in innovative productivity of firms.As stated by Bozeman (2000), government actors and universities have a very important role for innovation, in the form of technology development and transfer. For instance, government can perform as a research actor, providing applied research to industry, or it can work as a broker, by the creation of industrial policies that affect innovation. In the innovation literature there is an extensive recognition of the ability of government to organize resources and to impact events to nurture technology development and innovation (Chiang, 1991).

The proficient use of information technologies is critical for exporting firms. In this case, TCE provide a basis for exploring entry strategies into foreign markets because it suggests a cost effective structure for conducting international operations; and provides a way to understand why partners make contracts. Since they count with limited resources, small firms encounter bigger risks in entering international markets than larger firms. In general, small and medium sized firms suffer from information asymmetries referring to the target market, so to prosper they must associate with local partners with the knowledge to leverage the firm's resources (Zacharakis, 1997).

As stated before, the structure for transactions has two poles: market governance and hierarchy with an intermediate or hybrid mode; this is the reason why many relationships are hybrid forms of partnership, mostly because can protect small business against risks. In the same way, for such alliances to be beneficial, there must be information asymmetries, subsequently we expect that firms with superior capabilities of handling information and communication tend to overcome opportunism and moral hazard trough internalization.

Another significant variable is firm age, because the number of years operating in a market indicates the path a firm has stridden to accumulate experience. Additionally, it denotes profitability, technical superiority, stability (Yli-Renko, et al., 2002); also financial factors, such as leverage and initial financial size, impact growth rates. According to Huynh and Petrunia, (2010) the inclusion of leverage has little impact on the economic significance of age and size relationship with firm growth; that's the reason why we consider that the more experience a firm has, the higher the possibilities it innovates via hierarchy.

3. Empirical analysis

This section describes the database, the sample, and the measures we used for each of the variables and finally it presents the methods we used to test the hypotheses.

The data

In order to test our hypotheses, we use the World Bank Enterprise Survey database. The Enterprise Surveys use standard appraisal instruments to collect firm data on the business environment from business owners to analyze firm performance at different levels, for example, the inside actions a firm carries out during a year; the licenses and permissions it gets, or the degree of uncertainty of its economic, social and administrative background.

According to the World Bank (2011), the unit selection methodology was a stratified random technique, implying every possible unit was grouped into a homogeneous group and then the samples were assembled within each group. The advantage of this method is the estimation for all the strata and the complete population with an elevated level of precision through the accurate weighting of particular observations.

The survey's sections are industry sector, firm size and geographic location. The fist strata classification is basically manufacturing, retail, and other services. Some specific manufacturing subsectors were selected as supplementary divisions since they gather a significant amount of employment, value added, and a substantial number of firms. While firm size categories were small (5-19 employees), medium (20-99), and large-sized (more than 100). Geographic location was designated according to the regions with the higher concentration of economic activity.

Since the object of study were innovative Mexican firms, we collected a considerable amount of information from more of 1,480 units, nevertheless our sample decreased to only 547 companies because only those achieved at least one innovation activity during the period 2010 to 2011. Similar circumstances occurred while selecting appropriate indicators. Even though there were more than 20 questions measuring innovation activities – related to the dependent variable – only 10 enclosed the complete sample.

The whole sample was composed of manufacturing firms from which 32 percent corresponds to high and medium-high technology intensity subsectors consistent with Hatzichronoglou (1997) technology classification. Table 1 extends evidence around the sample enterprises' activities and their innovation development.

Table 1
Subsectors and technology classification

	Subsector	Number of firms	(%)	Classification
1	Chemicals	96	17.55	Medium-high
2	Rubber and plasticproducts	86	15.72	Medium-low
3	Computers and office machinery	80	14.63	High
4	Fabricated metal products	71	12.98	Medium-low
5	Food, beverages and tabacco	65	11.88	Low
6	Othermanufacturing	62	11.33	Medium-low
7	Textilee and clothing	54	9.87	Low
8	Electricalmachinery	14	2.56	Medium-high
8	Non-metallic mineral products	14	2.56	Medium-low
9	Electronics-communications	3	0.55	High
10	Ferrousmetals	2	0.37	Medium-low

Source: World Bank, 2011 and Hatzichronoglou, 1997.

The empirical analysis focuses on the following indicators available from the World Bank Enterprise Survey, whose main descriptive statistics are reported in Table 2.

Dependent variable

It splits into three sub variables; one to distinguish internal innovation trough hierarchy from the other two external types of governance structures, namely cooperation with other firms and institutions and innovation conducted via market contracts. Formerly, the dependent variables are:

Contractual Innovation (Market governance structures): dummy variable indicating whether the organizational mode of innovation activity of the firm is coordinated via a contract (coded as 1 if contracts were present and 0 otherwise).
Cooperative Innovation (Hybrid governance structures): dummy variable reporting whether the firm has collaborated with a partner in innovative activity, which corresponds to cooperative innovation (coded as 1 if there was any kind of collaboration and 0 otherwise).
Internal Innovation (Hierarchy governance structures): dummy variable indicating whether the organizational mode of innovation activity of the firm is coordinated via hierarchy (coded as 1 when the firm internalized actions and 0 otherwise).

Independent variables

Export Intensity: reports the rate ofexportsanddomestic sales.
Foreign Ownership: proportion of foreign investors' ownership.
Top Manager Experience: number of years of experience of the top manager.
Skilled Workers: percentage of workers who have at least a bachelor's degree.
Technology Access: dummy variable indicating whether the firm used the Internet and other communication technologies for the development of new products and services.

Innovation Programs: dummy variable indicating whether the firm used services or programs to support innovation.

Public Support: dummy variable indicating whether the firm received financial or other types of assistance for innovation activities.

Firm Age: years since the company started operations until the year of the survey.

The table 2 shows the descriptive statistics of our variables. A higher percentage (77%) of innovation activities are developed through the hierarchical mode in relation to other types of governance structures (market and hybrid). In addition, on average13% ofthe sales of thecompanies aretargeting foreignmarkets and another 13% of the company ownership is foreign.

Table 2
Descriptive statistics

Variable	Mean	Std. Dev.	Min.	Max.
Contractual Innovation	0.3291	0.4703	0	1
Cooperative Innovation	0.2834	0.4510	0	1
Internal Innovation	0.7788	0.4154	0	1
Export intensity	0.1327	0.2365	0	1
Foreign ownership	0.1305	0.3260	0	1
Top Manager Experience	24.7349	11.8139	1	60
Skilled Workers	0.1886	0.2211	0	1
Technology Access	0.7861	0.4104	0	1
Innovation Programs	0.5338	0.4993	0	1
Public Support	0.1590	0.3661	0	1
Firm Age	26.7239	18.8316	1	104

The results for the *Top Manager Experience* variable denotes that on average the top manager has 24 years of experience in our sample. The variable *Skilled Workers* showed that on average 18% of the employees achieved at least a bachelor's degree. Instead *Technology Access* indicated that 78% of the firms used the Internet and other technologies to develop new products and services during the analysis period.

The variable *Innovation Programs* implies an average of 53% of the sample exploiting services or programs to support innovation (private or public). Finally, the *Firm Age* measure reports an important fact: the standard firm age in our sample is 16 years, which means we're dealing with a group of highly experienced firms, so we can expect a significant tendency to innovate via hierarchy.

4. The model

The empirical method used in this study is a logistic model or logit (Liao, 1994), because the dependent variable measure the election about the organizational mode of innovation activity (Internal innovation, contractual innovation or contractual innovation), and it is used to predict a binary response based on one or more predictor variables. Explicitly, the characteristic of this method is model the probability of an event, using a logistic function:

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$$Y_i = \ln\left(\frac{P_i}{1-P_i}\right) = \beta_1 + \beta_2 X_i + u_i \qquad (1)$$

Where Y a vector of zeros and ones (1 if an event occurs and 0 otherwise), β is a vector of parameters to be estimated and X is a matrix of independent variables (Gujarati and Porter, 2008).The regression equations estimated in this study make use of a binary dependent variable for each governance structure. Therefore, we propose three regression models described below:

$$\text{Innov\_contract}_i = \beta_0 + \beta_1 \text{Export\_intensity}_i + \beta_2 \text{Foreign\_ownership}_i$$
$$+ \beta_3 \text{Exper\_manager}_i + \beta_4 \text{Skilled\_workers}_i + \beta_5 \text{Technology Access}$$
$$+ \beta_6 \text{Prog\_innov}_i + \beta_7 \text{Public\_support} + \beta_8 \text{Firm\_age}_i$$
$$\text{Innov\_coop}_i = \beta_0 + \beta_1 \text{Export\_intensity}_i + \beta_2 \text{Foreign\_ownership}_i$$
$$+ \beta_3 \text{Exper\_manager}_i + \beta_4 \text{Skilled\_workers}_i + \beta_5 \text{Technology Access}$$
$$+ \beta_6 \text{Prog\_innov}_i + \beta_7 \text{Public\_support} + \beta_8 \text{Firm\_age}_i$$
$$\text{Innov\_internal}_i = \beta_0 + \beta_1 \text{Export\_intensity}_i + \beta_2 \text{Foreign\_ownership}_i$$
$$+ \beta_3 \text{Exper\_manager}_i + \beta_4 \text{Skilled\_workers}_i + \beta_5 \text{Technology Access}$$
$$+ \beta_6 \text{Prog\_innov}_i + \beta_7 \text{Public\_support} + \beta_8 \text{Firm\_age}_i$$

Were: i is total number of firms (i=1, …, 547) and β is coefficient of the variables.

5. Results

The results wereobtained fromthecompanies that madeat leastone activityof innovation withinat least agovernancestructure.

Eachregression modelisanalyzedindependently. However, companieswithinnovation activities indifferentgovernancestructureare consideredineach one of them. Thus,the number of companiesinvolved incontractualinnovationis 180, in cooperativeinnovation 155 and internal innovation426.Thisimplies that for78% of companies involvedin innovation activitiesbyhierarchicalgovernancestructurethecontractualinnovation and cooperative represent only analternative. The econometricsoftware usedfor this exercise isEViews7.The Table 3 reports the results from the estimation of the three logit models applied to measure the association between the dependent variable and the independent ones.

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Table 3
Results of the three logistical models

Variable	Contractual Innovation		Cooperative Innovation		Internal Innovation	
Export Intensity	0.2364		-0.9609	***	-0.1183	
Foreign Ownership	1.8496	*	-0.0476		-1.2633	*
Top Manager Experience	-0.0042		-0.0033		0.0078	
Skilled Workers	-0.2287		0.6106		0.1847	
Technology Access	-0.6493	*	0.3118		0.9203	*
Innovation Programs	-0.5815	*	0.6365	*	1.3510	*
Public Support	-0.1852		1.3554	*	0.0475	
Firm Age	0.0084		0.0039		-0.0104	***
Cons	-0.2735	**	-1.8321	*	-0.2667	**
Adjusted R^2	0.1000		0.0900		0.1316	

Note: Logit estimation.
* Mean significant at 1 % level.
** Mean significant at 5 % level.
*** Mean significant at 10 % level.

The first model estimates*Contractual Innovation* as the dependent variable. We observe that the effect of the *Foreign Ownership* is positive and significant, which undermines H6. Moreover, we found that *Technology Access* and*Innovation Programs* are negative and significant, which leads us to accept H7 and H2.In model 2 the dependent variable is *Cooperative Innovation*. As we can see there is a positive and significant relationship with*Innovation Programs*and *Public Support.* On one hand, the implication of these divergent results referring to the first model, is that the firms in the sample are capable of use as much the hierarchy as the coordinated mode to develop innovation activities.

On the other hand, the boundary in conjunction with*Export Intensity* is negative and significant, what confirms our assumptions about H5, that meansthe more firm exports, theare less likelythey are to use the hierarchygovernance structure to innovate, preferring cooperative modes. In other words, there is some evidence of the tendency of association with other partners to leverage the firm's resources in the international entries determinations.

Finally, looking at the relationship between the main predictors and*Internal Innovation* (Model 3) we are able to see *Foreign Ownership* and *Firm Age* are negative and non significant.While the positive signs and significant values of*Technology Access*and *Innovation Programs*, confirms our expectations of a more persistent incidence of hierarchy modes when innovation activities arise (H7 y H2 are supported).Our results suggest that firms with more participation of foreign investors in the composition of their ownership structure will be organized through market mode instead of hierarchical mode, that's the reason why we don't accept H6.

According to our results, it is likely that firms with a higher access to communication and information technologies develop their innovation activities through the hierarchical mode.

Furthermore, the firms that use innovation programs or receive public support are on average more likely to choose a hierarchical mode for their innovation activities. However, the *Public Support* predictor is significant only in the *Cooperative Innovation* model. Also, we found out that the hypothesis H7 is not supported because variable *Firm Age* is negative and significant in the model 3 (*Internal Innovation*) which differ from our suppositions of a correspondence among greater experience and the endurance of innovation activities inside the firm. One explanation we suggest in this case, is that young firms in Mexico have low level of trust in institutions and this does not reduce the perception of opportunistic behavior. For instance, the statistics of CEPAL (2013) show that an average of 24% of Mexicans, don't trust in their institutions. Therefore increases the need of hierarchical control.

The results of models 1 and 3 confirm the assumptions of TCE researchers Shelanski and Klein (1995) and Williamson (1991) and knowledge based theorists (Conner, 1991; Demsetz, 1988), that the higher the complexity of the assets, the greater the probability to internalize, due to the fact that the parameter of the variable *Technology Access* was critical and significant. In the first one was negative and in the third positive. Denoting that firms with superior technology control tend to organize themselves turning less to the market or to cooperation modes. Additionally the elevated uncertainty implied in technology transactions and its distinguishing specificity, decrease the probability of sharing any knowledge related to it owing to the competitors' threat.

In accordance with the knowledge-based theories the protection of technology derives from its potential to transform inputs into value-added outputs in combination with proficient human resources (Nelson and Winter 1982; Kogut, 2000). Nevertheless, none of the models obtained a significant probability that experienced managers influenced any governance mode. One possible explanation is that the majority of the sample were small sized firms which do not require (or can pay) skilled labor to prevail. Besides, all the independent variables in Model 3 were positive except for *Export Intensity*, *Foreign Ownership* and *Firm Age.* The first two suggest that firms set up outside its limits only when it's indispensable and the third one that greater experience compeers higher levels of confidence in the environment.

One important variable to explain selection mode of organization, was *Innovation Programs*, because on one hand, it was significant in the three models and on the other, it reinforces the idea of knowledge synergies that entail diverse ways to transform knowledge individually and through collaboration, whether created by the firm or obtained in the market.

6. Conclusions

In this paper, we studied the types of governance structures of innovation activities of over 547 Mexican firms. We defined three governance structures *Contractual Innovation*, *Cooperative Innovation* and *Internal Innovation* and eight independent variables.

The logistic model used to test our hypothesis, showed that firms with more participation of foreign investors in the composition of their ownership structure will be organized through market mode and the firms with larger access to technologies of information and communication; to innovation programsand to public provision, tend to develop their innovation activities through the hierarchical mode. Moreover, the firm age and foreign ownership participation on the company only become significant in the third model based on the hierarchical structure.

One relevant result is related to the variable *Innovation Programs*. On one hand, more than half of the sample makes use of private or public programs to reinforce innovation. On the other, it was significant at 1% level in the three models. The first and the third confirmedthe greater odds that hierarchy was the governance mode,as the involvement of the firm in innovation programs increased. While the second modelunveiledthe proficiencyof certain firms to exploit both modes, hierarchy and coordinationwhen developing innovation.

Another important outcome, is the connection between the boundary statement and the exporting dynamism that ratified that the more firm exports, the more they select cooperative modes, which means the firms tend to associate with others to leverage their international entries purposes.

Finally, the results suggestthat access toinformation technologycan lead toencourage the developmentof new strategies forinnovation withincompanies. Therefore,effortsin the dissemination andprovisionofnew technological advanceswill have a positiveresultfor businessesrelated toinnovation activitiesthrough itsabsorption capacity.

On the other hand, the role of government through development programs in innovation activities have met the aim to inform, update and link to private institutions that require support for the development of new products or processes that are themselves limited to undertake. Therefore, maintaining and expanding the scope of these initiatives will be relevant for companies that require the cooperation of other institutions in the development of research activities.

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