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The influences of cognition of institutional logics and triple helix relations on innovation performance: An empirical study of firms in industrial park in Taiwan

By Min-Lang YANG^a Rueywei GONG^b
Shih-Ying CHEN^c & Fu-Sheng TSAI^{d†}

Abstract. The present study set out to investigate into the influences of cognition of institutional logics and triple helix relationships (i.e., the industry-university-government linkages) on firm innovation performance in the context of Taiwan industrial parks. The data from 131 organizational-level questionnaires collected from firms located in different industrial parks were analyzed. The results showed that cognition of institutional logics is positively associated with firms' innovation performance. Furthermore, such positive relationship is strengthened by the number of triple helix relationships in the form of mediation but not moderation effect. Theoretical and practical implications were elaborated.

Keywords. Cognition of institutional logics, Triple helix, Innovation performance, Industrial park.

JEL. M10, M14.

1. Introduction

Over the past 20 years, Taiwan's industrial policy has focused mainly on the development of high-tech industries. The establishment of the Science Park and the promotion of the core industries have led to mass production and export of electronics, computer and communications industries to promote the overall industry and economic development. This development model with the manufacturing profit margins are also facing the industrial and export structure over-concentration, low value-added creative ability. With the gradual integration of East Asian regional economies, the deterioration of international competition, and the lack of investment in traditional industries R&D, weakening technology marketing and international competitiveness, great needs in transformation for organizing structure and business models are demanded. Fortunately, the decreasing profit has make the traditional technology firms located in industrial parks to regain attention from government and stakeholders.

After years of development, most of the existing 62 industrial parks managed by Ministry of Economic Affairs are forming clusters and gained settlement. However, most of the them are concentrated in the traditional industries and are small and medium enterprises. In the face of the increasingly competitive

^a Metal Industries Research & Development Centre, 1001 Kaonan Highway, Nanzi District, Kaohsiung city (833), Taiwan.

^b Department of Tourism & Recreation and Office of Institutional Research & Management, Cheng Shiu University, No. 840, Chengcing Rd., Niasong District, Kaohsiung city (833), Taiwan.

^c Department of Food and Beverage Management & Office of Institutional Research and Management, Cheng Shiu University, No. 840, Chengcing Rd., Niasong District, Kaohsiung city (833), Taiwan

^{d†} Department of Business Administration and Office of Institutional Research & Management, Cheng Shiu University, No. 840, Chengcing Rd., Niasong District, Kaohsiung city (833), Taiwan.

☎ +886 7 351 3121

✉ .tsaifs@gcloud.csu.edu.tw

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environment in the world, and when the relevant resources, talent, technology are inadequate circumstances, only through the effective link and use of strategic resources following the institutional guidance, the firms in the industrial parks can achieve the goal of upgrading and transformation.

In such vein, this study attempts to examine the degree of awareness of the institutional logic of the government system in the industrial park, and its impact on innovation performance. We further examine the role of firms' external relational capital with government and academia and its impact as a moderator in the above-mentioned relationship. The intended research sample are firms located in the industrial parks in Taiwan, adopting survey method.

2. Theory and Hypothesis

In the business environment featuring fast paces, complexity, and openness, firms can no more creating competitive advantage just by relying on internal resources and capability. On the contrary, it must work through the important external relations, including those with government, upstream and downstream, third-party organizations, and even competitors, to achieve mutual cooperation and coordination, then create a profit maximization. Such cross-cutting company partnerships are gaining their strategic importance (Ankrah & AL-Tabbaa, 2015).

Although the above-mentioned inter-organizational relationship link has become an irresistible trend, but in practice it still has a considerable challenge and difficulty. This is because that these cross-organizational units are embedded in differentiated (sub-)institutional environments, and so have differentiated cognition for institutional logics. For example, there are different organizational systems and thus institutional logics existing in politic, business, and academic worlds.

Firms, government, upstream and downstream, third-party organizations, and even its competitors, are all key actors (or agents) of an institution. With their efforts, institutions emerge along with a process of continuous correction, based on the communication and conflict resolution for differentiated institutional logics. (e.g., Sauermann & Stephan, 2013; Selznick, 1996).

However, existing research of institutional theory has relatively neglected the empirical situation of firms located in the industrial parks, especially the influences of these key actors' cognition of the institutions. These firms are special because they inherently accept administrative services from government founded unit in the industrial park, and institutional logics play an important part in their daily and strategic operations (Partha & David, 1994). The so-called government's institutional logic and change here are highly embedded in the park-related industrial or technological policy. In short, there is an important part of the performance of the firms in the park that may depend on whether they fully understand the important policy content and implications of the government's (i.e., institutional logics) and are able to respond accordingly.

In addition, the inter-organizational relationship has an important but differentiated impact on the operation of industrial park manufacturers (Bakouros, Mardas, & Varsakelis, 2002). Meanwhile, inter-organizational relations may also affect the specific manufacturers' external environment of knowledge and interpretation (Tsai & Ghoshal, 1998), and further affect the manufacturers of innovative performance. Thus, we further consider the triple helix relationships (connections of a firm to academia, government, and other knowledge creating organizations) for playing a moderator role in the relationship between institutional logics and innovation performance.

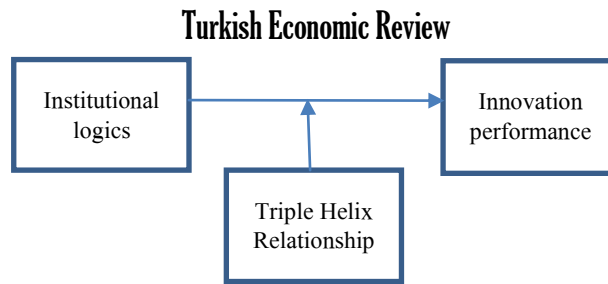


Figure 1. *Conceptual Framework*

3. Methodology

The samples for this study were collected from 131 park manufacturers, with the survey questionnaire listed in the appendix A. Since the independent variable and the dependent variable are measured with Likert scales, the analysis method used is Linear Regression (Hair *et al.*, 1998).

Measure

Institutional logics perception: was measured as the firms' perceptions to government policies specific to industrial park development. A total of four items were measured with 7-point Likert scale.

Innovation performance: was measured as the patent number a firm developed.

Triple Helix Relationship: was measured by directly asking firms to count the total number of their built connections or partnerships with academic or governmental organizations.

3. Results & Discussions

Of the 131 samples recovered, the manufacturers were evenly distributed across the National Industrial Park. The future studies may consider the proportion made by the number of manufacturers and the population of the relationship between the sample structure in order to complete. To the operators of the operating sector, the metal machinery 38.2%, plastic chemical 13%, 10.7% of the livelihood of the people, 6.1% of communications, the rest for the other (38.2%). As for the manufacturer's establishment time in the park, the information provided shows that the distribution of the options is fairly average. In terms of revenue of 103 years, most of the manufacturers were [between \$ 1 and \$ 300 million], followed by [10 million to 50 million] and [50 million to 100 million] (All 16%).(52.7%), followed by [101 people] (28.2%), and finally [52-100 people] (19.1%), the number of companies in the number of companies. Even more interesting is that in the 131 rewind, only 64 companies have their R&D departments, of which 44 have to ask for R & D expenditure accounted for the proportion of total output to fill. In the above 64 rewind, the average R & D number of 16.93 people (standard deviation of 46.38, the maximum value of 353, the minimum value of 0 (that has set up R&D department, but the number of R&D personnel is zero, a situation that is worth of further research.

Next we report more descriptive statistics based on the park and firm characteristics. As can be seen from the data, in addition to the official field, San-Huang, Nantun, the new North Industrial Park, the other manufacturers on the average system for the different logic of the system showed a consistent understanding. In other words, such as young, large, Chang Bin, etc., for the system logic is very understanding, for all the very understanding. Relative to such as Linkou, Taoyuan fourth, bamboo and other industrial areas, for the logic of the system do not understand, is presented in all the upward do not understand. The results reminded that the institutional logic of the lower understanding of the industrial area, the need for a comprehensive strengthening of counseling.

Then we look at the distribution of the main variables of this study in different industrial areas. The data show that in most industrial areas, firms in the four main variables (from left to right: institutional logic cognition, innovation performance, industry and government relations, the relationship between business and

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government diversity). The score has a very different trend, but also initially support us to different variables in the theory of positioning for the model of different functional types of variables reasons. With a high degree of institutional logic cognition, not necessarily have a high degree of innovation performance, the relationship between industry and government, the relationship between business and government diversity. At the same time, with a high degree of official relations between the number of firms, not necessarily the relationship between the production and management of diverse, showing the relationship between industry and trade, industrial area manufacturers in this area (quantity) and quality (structure) is not necessarily consistent status. Subsequent research can further explore the reasons for the study.

An Analysis of the Types of Business - related Relationships in Sample. It can be clearly seen that the upper half of the industrial area, manufacturers of the academic link is significantly more than the other two types of business relations with a lot less; relatively, it is in the research institutions and legal links are relatively lacking.

The following analysis examines the impact of the vendor characteristics of all sample vendors on the differences in the relationship between the three different types of firms. First is for difference between the impact of manufacturers' establishment time in the industrial park. We found that the establishment of the shortest and the longest, compared with the establishment of a medium, it is easier to have more research institutions and legal persons, as well as government relations. But this difference is not so obvious in the three sub-groups. In contrast, the most notable difference is that for those having the shortest and longest establishment time, as compared with the establishment of the middle of time, obviously have more links to the academia. We found that manufacturers within the R & D department, for its more biased to establish those types of business research and research relations, do not have significant differences. Finally, for those the main products market in the United States and Canada, Europe, and Southeast Asia, significantly compared to those the main product market in other regions (including Taiwan's domestic market), have a high degree of cooperation in tertiary institutions.

The following analysis into the relationship between variables. The analysis model was linear regression analysis. In the first stage, we add the dependent variable (i.e., institutional logic) to verify its impact on the firm's innovative performance. The second stage is to add the number of official relations, and its after the alignment (centering) after the value of the system and the logic of the logic of the intersection of items to verify the relationship between the official and the relationship between the direct effect of the adjustment effect.

Direct effect: After the direct variable (institutional logic cognition) enters the pattern, the overall pattern is valid ($R^2 = .35$, $p < .1$). The following table shows the positive impact of the variable on the coefficient of influence of the firm's innovation performance (the normalized regression coefficient $\beta = .19$, $p < .01$). The results show that with the manufacturer's logical awareness of the system to enhance the performance of the manufacturers have a positive impact. In other words, manufacturers with the right institutional logic are more likely to have good innovation performance.

Moderating effect. And then explore the regulation of the relationship between the results of the official relationship. In the Hierarchical linear regression analysis, the adjustment of the variance into the second order mode, the overall model of the R^2 change value is not significant, showing the hypothesis of adjustment variables are not supported. On the whole, the results of such research show that the relationship between business and industry is not a moderating role in the relationship between institutional logic cognition and innovation performance.

Mediation effect. However, the above results and the cumulative knowledge of the literature and the literature for the literature review, derived results, there are expected differences. Looking at the literature, the relationship between business

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and industry should be in the vendor awareness until the actual action between the output relationship, play a promotional function. So, we carry out additional analysis of the study, try to set the triple helix relationship as a mediation variable. To determine whether the mediating effect was established, I used one of the following four steps to confirm with Baron & Kenny (1986). First, the independent variable (i.e., institutional logic cognition) should have a significant effect on the dependent variable (innovation performance). This is the direct effect that has been confirmed above. Second, the independent variable should have significant direct effect on the mediator variable. As shown in the table below, institutional logic cognition presents a positive and significant direct effect ($\beta = .33, p < .01$) (R-square = .10, $p < .01$) for the triple helix relationship. Thirdly, the mediator variable should have a significant effect on the dependent variable. According to the results shown in the table below, the relationship between triple helix relationship has a positive and significant direct effect on innovation performance ($\beta = .67, p < .01$) (pattern R-square = .45, $p < .01$). This shows that the triple helix relationship between business and industry has a very significant positive impact on the manufacturers of innovative performance.

Fourth, when the dependent variable and the intermediate variable are typed into the pattern at the same time, the direct effect of the dependent variable on the dependent variable will disappear or decrease significantly. When the relationship between institutional logic cognition and business relations exists in the model, the obvious effect of institutional logic cognition disappears, and the fourth step is established. Integrated four steps, the intermediary effect is established. Showing the impact of institutional logic on the innovation performance of manufacturers, and then through the role of the relationship between the official and the role, can only be effective.

Thus, the conceptual framework should be revised as the following figure 2.

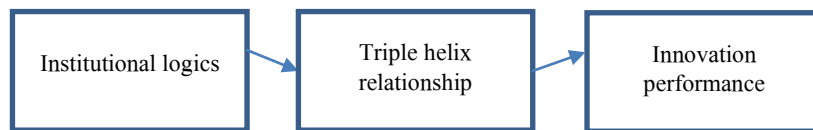


Figure 2. Revised conceptual framework

4. Conclusion and Implications

Overall, this study finds that the relationship between business and industry in industrial park will play a mediating role in the relationship between institutional logic perception and innovation performance, rather than play a moderator role. In other words, the development of the relationship between business and industry has become an indispensable focus for making good use or transformation of firms' good institutional logic perception. Furthermore, even if the manufacturer has the correct institutional logic perception, it demands triple helix relationship lead to such perception to be embodied into real innovation performance.

According to the above, we proposed the park management recommendations are as follows: Park management units need to help manufacturers to build the correct system of logical understanding, at the same time, we must also try to create a good company to develop good relations between the official and government field. Through the sharing of activities (such as: technical or new concept seminar) held, innovation breeding, cooperation media and other mechanisms to help manufacturers play these two variables can be innovative performance benefits.

For the firms, it is also necessary to actively develop the strength of the institutional logic perception and triple helix relationship, to improve innovation capacity. In addition to continuous efforts to enrich their core competence in management and technology, they also need to strengthen the monitoring of information from the institutional environment for responding to the development of policies, systems and other related actions well. In sum, beyond developing

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cognitive capability for innovation, relational capability especially that built toward government and academia, are two inseparable twins for the innovation performance of firms located in industrial parks.

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