Research Journal of Management Reviews. Vol., 3 (1), 1-7, 2017
Available online at http://www.rjmrjournal.com
ISSN 2149-9168 ©2017

# The Relationship between Product Innovation and Performance and Competitiveness of the Company Regarding the Mediating Role of Environmental Concern

## Case Study: companies operating in the food industry in Golestan Province

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**Abstract:** Recently, many companies have been identified concepts related to product innovations or environmental implications. However, the relationship between product innovation, performance and competitiveness little attention was devoted to these cases. Therefore, the aim of this paper is to establish a link between these cases by providing empirical evidence to motivate companies in applying green products, promote their performance and increases their competitive capabilities. Thus, this study is conducted in order to investigate the relationship between product innovation and performance and competitiveness of the company regarding mediating role of environmental concern.

The study population consisted of all companies operating in the food industry in Golestan province, 241 people. Sample size is 250 based on Morgan table, and sampling method is simple random. To analyze the data, structural equation modeling using PLS software is used. There is a significant role between product innovation and the performance and competitiveness of the company regarding the mediating role of environmental concerns and in this regard hypotheses were confirmed. The companies are successful in today's competitive world where they can create more value for customers. Value creation will help achieve a competitive advantage. Companies must use different strategies to create value for customers and innovative services and products assist organizations in achieving this goal.

**Keywords**: Product Innovation, Company Performance, Competitiveness, Environmental Concern.

### Introduction

The frequent growth of the global economy, resources and environment related issues, which are key to acceptable economic progress, are raised common concerns. How to eliminate conflicts between economic growth and high energy consumption, such as deterioration of the environment, is a challenge for the whole world (Juan, 2011). So one of the challenges of this time is how to achieve standards in terms of ecology (Huber, 2004). Many

countries, in important environmental issues benefit from environmental protection laws to reduce the impact of industry on the environment (Yang & Chen, 2011). So, given industry's efforts to improve the environmental performance of its production cycle increases, and in many ways becomes the main goal (Barbiroli & Raggi, 2003). In the process of international environmental regulations, conventions and treaties related to environmental protection and biological knowledge and general awareness of consumers affect rules and patterns of global industrial competitiveness in industries and factories around the world (Chen et al., 2006) (Chen, 2008). Thus, a common environmental management plays an important role in today business world.

All the technologies and innovations that offer new product or service have positive contribution to the environment. This is reflected in the innovation of new products that offer environmental advantages and benefits. These can include saving energy, reducing carbon dioxide emissions, reducing water consumption, improving utilization, increasing diversity and reducing environmental pollution. There are other factors that innovation can lead to growth and competitive capability, and power production efficiency and enhance the economic wealth for companies. It also can reduce environmental damage and waste of plants, provide better goods and services with lower prices and create jobs for the people (Carrion-Flores & Innes, 2010). As a result, it can be said that innovation is a key sustainable factor in companies and countries

Porter (1991) found that by applying environmental initiatives, organizations can reduce more costs and increase economic efficiency. Increase in sales compared to the percentage of total sales, obtained with a focus on products which had a much lower environmental impact during life cycle. In this case, green innovation will become very important for companies to provide environmental awareness by producing products that do not contain toxic and hazardous substances (Chiou et al., 2011). With the growing environmental trends, innovation becomes an important factor for companies to achieve sustainable development (Lin & Chang, 2009) and be involved in the changes that are related to a sustainable society (Carrillo-Hermosilla et al., 2010).

While the processes related to innovation toward sustainable progress in the last two decades have attracted much attention, particularly practical methods which are used to analyze these processes are less developed. While the emphasis is on innovation and market potential of a new product, its environmental impact is often overlooked (Yang & Chen, 2011). In addition, recent scientific communities have not shared much attention to topics related to environmental concerns about the competitive capabilities. Defining the concept of innovation is a challenging endeavor because of analytical and empirical shortcomings. In other words, in developing countries and emerging economies, such as Turkey, there is a lack of information about the application of innovation. Although the Turkish economy has grown dramatically in the past few decades and has had a negative impact on the natural environment, there is no experimental research on Turkish companies except (Büyükkeklik et al., 2010). Thus, the relationship between product innovation, and product development capabilities, performance and competitive capability for Turkish firms is evaluated in this study. In theory, the contribution of this study is to consider the interactions and relationships between all factors that previously were considered for Turkish companies. This study answers exclusively important questions that are on the issue of whether there is a direct and significant relationship between product innovation, performance and competitive capabilities. In addition, the goal is to determine the role of management sustainable environmental concerns.

## Materials and Methods

The research method was descriptive and correlational. The study population consisted of companies that are active in the food industry in Golestan Province and their number is 250. Given the choice of two senior people in the company (including the Chairman and CEO) statistical population size is 500. Using Morgan table, minimum sample size is 217 which regarding the possibility of returning questionnaires, the sample size was determined as 250.

In this research, product innovation is independent latent variable, latent dependent variables are firm performance (NFP) and the competitiveness and latent moderator variable is environmental concerns. In conducting stage of the study, the methods to answer the tests were explained to the participants in details. In terms of ethical considerations, after taking written consent and giving information, participants we assured that their personal information will just be used in this study and they are protected against any abuse. This questionnaire contained questions that could measure variables of the study. Answering scale is five-point Likert's domain. To confirm the validity a copy of which was provided to instructors. Then some questions that were unintelligible, ambiguous or unrelated to the topic, location and population of the study were removed and some more clear questions were added. Cronbach's alpha was used to determine its reliability. The results showed that questionnaire has a good reliability (Table 1).

**Table 1.** Cronbach's alpha value.

| Variable | No of questions | References | Cronbach's alpha |
|---|---|---|---|
| Product innovation | 4 | Chiou et al., 2011 | 0.773626 |
| Company performance | 6 | Hiu Sun Young, 2013 | 0.865643 |
| Competitiveness | 3 | Tang, 2006 | 0.768855 |
| Environmental concern | 4 | Eidat et al, 2011 | 0.865643 |

The conceptual model of the relationship between variables was as follows (Figure 1). Structural equation modeling was used to analyze the data. $P \leq 0.05$ was considered in all analyzes.

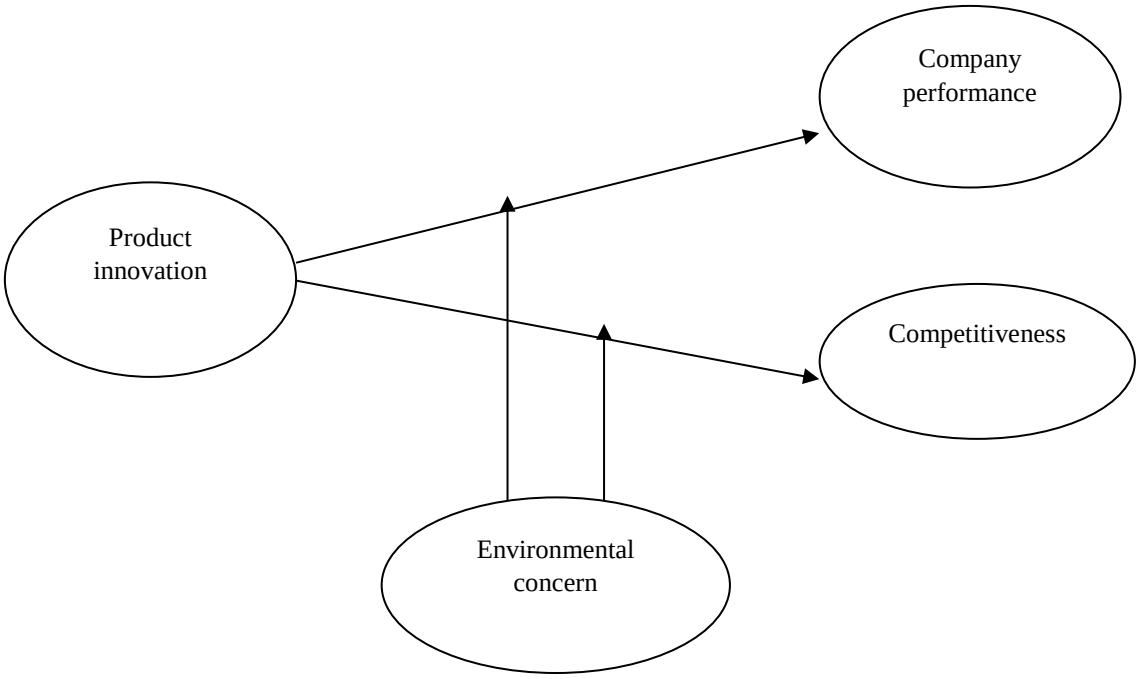


**Figure 1.** Conceptual model of the study.

## Results

Table 2 shows the mean and standard deviation of variables.

**Table 2.** Descriptive statistics of variables.

| Variable | Mean | SD | Variance | Min | Max |
|---|---|---|---|---|---|
| Performance | 3.44 | 1.09 | 1.18 | 1.00 | 5.00 |
| Environmental concern | 3.45 | 1.08 | 1.16 | 1.00 | 5.00 |
| Innovation | 3.20 | 1.01 | 1.03 | 1.00 | 5.00 |
| Competitiveness | 3.06 | 1.16 | 1.35 | 1.00 | 5.00 |

So to analyze the general model of conceptual model there is a need to review the fitness of the existing measurement model. In accordance with analysis algorithm of models in PLS method, to assess measurement models fitness, three criteria: reliability, convergent and divergent validity are used. Table 3 shows the results of reliability, convergent and divergent validity and assessment tool.

**Table 3.** Indices of measurement model fitness.

| Variable | Cronbach's Alpha coefficient Alpha >0.7 | Mixed coefficient of reliability Alpha>0.7 | Mixed variance mean AVE>0.5 | Result |
|---|---|---|---|---|
| Performance | 0.86 | 0.89 | 0.59 | Good and confirmed |
| Environmental concern | 0.83 | 0.88 | 0.66 | Good and confirmed |
| Innovation | 0.77 | 0.85 | 0.59 | Good and confirmed |
| Competitiveness | 0.76 | 0.86 | 0.68 | Good and confirmed |

Given that the right amount to Cronbach's alpha is 0.7, Cronbach (1951), for mixed reliability is 0.7 Nonaly (1978) and for AVE is 0.5, Fornell and Larkr (1981) and in accordance with the results of the SMART-PLS software outputs in Table 4, all the criteria about research variables have adopted good values and can confirm the reliability and convergent validity of the study. As a result, the survey instrument has good validity (content, convergent) and reliability (factor loadings, mixed reliability coefficient, Cronbach's alpha coefficient). The results of divergent validity of the measurement tool are shown in Table 4:

**Table 4.** The results of divergent validity of the measurement tool.

| | Performance | Environmental concern | Innovation | Competitiveness |
|---|---|---|---|---|
| Performance | 0.76 | | | |
| Environmental concern | 0.38 | 0.81 | | |
| Competitiveness | 0.48 | 0.27 | 0.58 | 0.82 |

In table 5, results from goodness of fit for final model are presented.

**Table 5.** Results from goodness of fit for final model.

| index / variable | R2 | 1-SSe/SSO (1-SSe/SSO>0.3) | Communality | Result |
|---|---|---|---|---|
| Performance | 0.380 | 0.43 | 0.59 | Very good |
| Environmental concern | - | - | 0.66 | Very good |
| Innovation | - | - | 0.59 | Very good |
| Competitiveness | 0.383 | 0.66 | 0.68 | |

**Table 6.** General results of the study.

| Hypothesis | Sig. | Factor loadings | Relationship in the model | Result |
|---|---|---|---|---|
| 1 | 3.271 | 0.335 | Product innovation and company performance | Confirmed |
| 2 | 2.838 | 0.308 | Product innovation and competitiveness | Confirmed |
| 3 | 6.713 | 0.567 | Product innovation with company performance and environmental concern | Confirmed |
| 4 | 4.551 | 0.419 | Product innovation with competitiveness and environmental concern | |

Coefficients are significant when their significance test is larger than 1.96 and less than -1.96. As can be seen, significance coefficient between product innovation and performance is 3.271. So structural model shows that there is a significant relationship between product innovation and performance of active companies in food industry in Golestan province. Significance coefficient between product innovation and competitiveness is 2.838. So structural

model shows that there is a significant relationship between product innovation and competitiveness of active companies in food industry in Golestan province. Significance coefficient between product innovation and performance regarding mediating role of environmental concern is 6.713. Thus structural model shows that there is a significant relationship between product innovation and performance of active companies in food industry in Golestan province regarding mediating role of environmental concern. There is also a significant relationship between product innovation and competitiveness of active companies in food industry in Golestan province regarding mediating role of environmental concern. Numbers on the paths show that affects competitiveness regarding mediating role of environmental concern which is equal to 0.419.

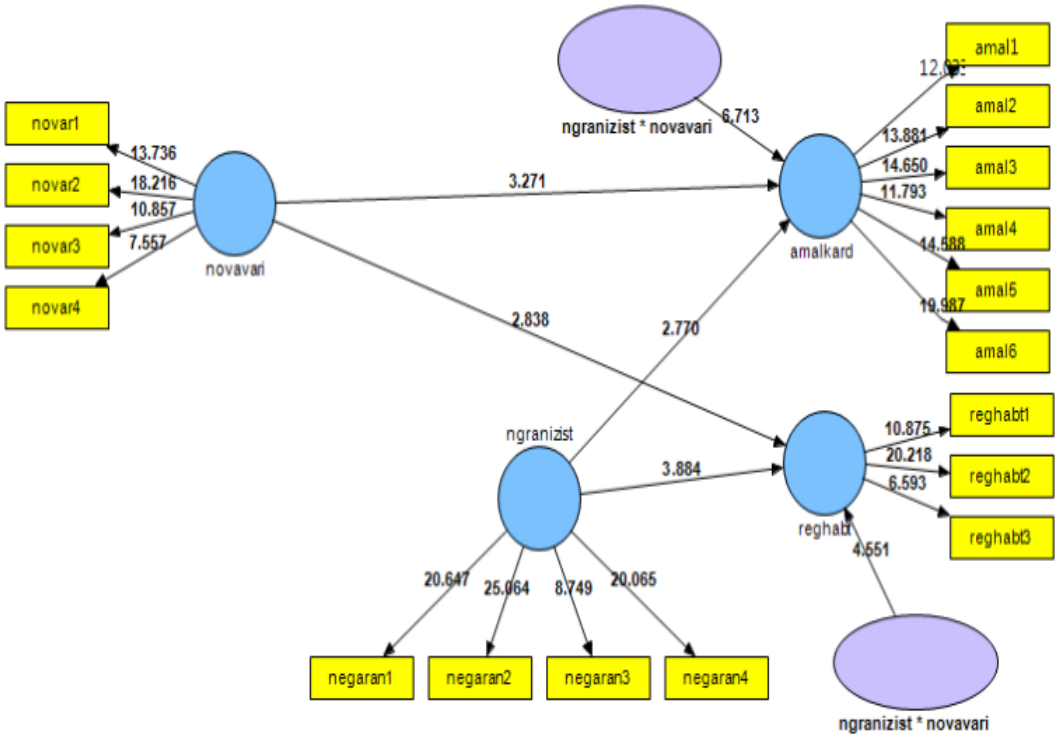


**Figure 2.** Conceptual model test in the state of significance coefficients.

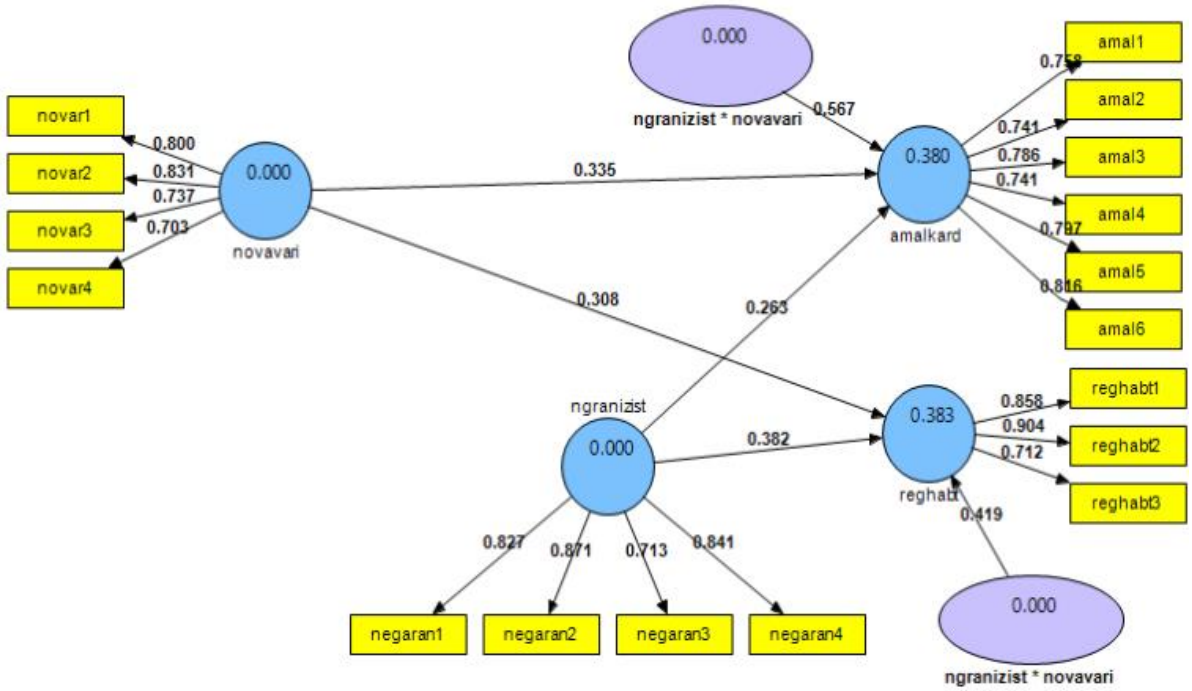


**Figure 3.** Conceptual model test in the state of factor loadings.

## Conclusions

In this paper we tried to investigate direct and important relationships between innovation, company performance and competitiveness in active companies of food industry in Golestan province. Results showed that there is a significant relationship between product innovation and performance of active companies in food industry in Golestan province. This hypothesis is in agreement with research conducted by Morowati et al (2014), Hosseini and Salar (۲۰۱۲), Zugarya and Nurazman (2015), Ilker Murat Ar (2012), Chiou et al (2011).

There is also a significant relationship between product innovation and competitiveness of active companies in food industry in Golestan province. This hypothesis is in agreement with research conducted by Fakhry Pour (2013), Ilker Murat Ar (2012) and Chiou et al (2011).

There is a significant relationship between product innovation and performance of active companies in food industry in Golestan province regarding mediating role of environmental concern. This hypothesis is in agreement with research conducted by Ilker Murat Ar (2012) and Chiou et al (2011). There is also a significant relationship between product innovation and competitiveness of active companies in food industry in Golestan province regarding mediating role of environmental concern. This hypothesis is in agreement with research conducted by Ilker Murat Ar (2012) and Chiou et al (2011).

**Conflict of Interest**

The authors declare no conflict of interest.

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