Explaining the Relationship between the Role of Green Innovation on the Brand and its Impact on Organizational Performance (Case Study: Iran Khodro)

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Abstract

Innovation means creating new and useful things and it is one of the most important concepts in the domain of entrepreneurship and strategic management that ensures companies’ survival in today’s changing world. Schumpeter, one of the outstanding economists of Austrian School and one of the oldest theoreticians in entrepreneurship domain says that innovation is the entrepreneurship process and the economic development engine. Hence, in the present research the relationship between the role of green innovation and its impact on organizational performance in Iran Khodro Company has been investigated and explained. The statistical population of this research is experts related to research domain in Iran Khodro Company, that 200 people from research statistical population were selected through simple random sampling and by using Cochran’s formula as statistical sample. This research is applied type in respect of research goal, and survey plan in this research is descriptive-analytical of correlation type. The standard questionnaires of (Zhou et al., 2009), (Huang et al., 2010), (Chiou et al., 2011), (Lin et al., 2013), (Li et al., 2010) have been aided for data collection. For data analysis the Kolmogorov-Smirnov test has been used for determining data distribution type, and the structural equation modeling approach and route analysis method, general fitness of model, and hypotheses test, software of AMOS 20 and SPSS 21 have been used as well. The research results show that green innovation has significant impact on organizational brand, organizational brand has significant impact on organizational performance, green product innovation has significant impact on green innovation, and green process innovation has significant impact on green innovation. The results also show that market demand has significant impact on green innovation and green innovation has significant impact on organizational performance. Finally, based on the obtained results some suggestions have been presented for the managers and experts of Iran Khodro Company.

Keywords: Innovation, Green Innovation, Brand, Organizational Performance.
Introduction

The greatest issue every organization is facing nowadays is the issue of change and transformation, and definitely admitting this change by the organizations is one of the greatest factors of organizational durability and survival (Morovati Sharifabadi et al., 2014, 26). Actually in this dynamic and full of competition market, innovation ensures the survival of any organization, because nowadays environmental performance of enterprises and following environmental rules are considered as a competitive advantage for enterprises (Tseng et al., 2013). Therefore, the compatibility of any kind of innovation with environmental considerations has high importance. For this reason, the necessity of new concept as green innovation was emerged. It means that any kind of innovation should have a share in promoting the environmental efficiency of organization, for instance, innovation in production processes that causes saving energy consumption and natural resources, recycling process improvement, or reducing environmental pollutions. Through environmental concerns increase by consumers, the governments and various communities all over the world, and the production companies intend to develop environment friendship programs such as development of green product, green brand, and green technology (Chiou et al., 2011). Actually, in this dynamic and full of competition market, innovation ensures the survival of any organization. Moreover, according to the performed researches in the past years, it has been stated that organizational identity and branding of company are potential sources of competitive advantage sustainability (Aaker, 2007). By global awareness increase in connection with environmental concerns such as global warming and social issues related to it (Zaylani et al., 2015).

Carrion-Flores and Innes (2010) have suggested that green innovation encourages the demand for environmental performance improvement. Kammerer (2009) has stated that green innovation is strongly related to company’s environmental management and acquiring environmental achievements. Hence, there is a belief of many people that indicates environmental performance is motivated by green innovation. According to Chiou et al. (2011), and Lin et al. (2013), green innovation is a reliable tool for obtaining company’s sustainable development through environmental performance improvement.

Mu et al. (2009) and Lau et al. (2010) state that green innovation helps the company to deal with environmental mistakes and protests, productivity increase, company’s credit increase, development of new markets, and acquiring competitive advantage. Zhu et al. (2012) have stated that environmental activities help the company to minimize wastes and promote brand that causes market share increase and company’s opportunities. Lopez-Gamero et al. (2009) have shown that the reduction of costs and making products different through environmental performance improvement has caused company’s social credibility and legitimacy. In a similar study in 2008 by Wahba, and in 2010 by Jacobs et al. it has been shown that environmental performance causes market share increase and company’s profitability. Wong et al. (2013) suggest that green innovation causes reduction of company’s environmental effects, accessing environmental goals, and environmental advantages.

Automobile manufacturing industry with its supply chain is one of the greatest production industries in Iran. By global awareness increase in connection with environmental concerns such
as global warming and issues related to it (Zaylani et al., 2015), automobile manufacturing industry in Iran was also under pressure of environmental protection groups and institutes and consequently environmental rules of government (Tseng et al. 2013). Therefore, the compatibility of any kind of innovation with environmental considerations has high importance. For this reason, the necessity of new concept as green innovation was emerged. It means that any kind of innovation should have a share in promoting the environmental efficiency of organization; for instance, innovation in production processes that causes saving energy consumption and natural resources, recycling process improvement, or reducing environmental pollutions (Murat, 2012). For the reason of the automobile manufacturing companies on the one hand, and the role of this industry in environmental pollution and indiscriminate exploitation of natural resources on the other hand, it is necessary to consider and emphasize concurrently on innovation and innovative measures in this industry, involve environmental considerations in these innovations as well, and actually instead of innovation, the green innovation is utilized; moreover, the automobile manufacturing companies put all sections of their life cycle such as exploitation of natural resources, production, consumption, and after consumption in direct and indirect interaction with the environment.

In this regard Safari et al. (2014) in an article entitled as “The Impact of Green Marketing Mix Elements on Customers’ Loyalty to Company’s Brand (Case Study: Naqsh Jahan Sugar Company)” investigated the impact of green marketing mix elements as one of the important marketing variables on customers’ loyalty to the brand. The results obtained from their investigation show that green marketing mix elements impact on customers’ loyalty to the brand of company under investigation. Hassani (2013) in a study entitled as “Investigating the Impact of Brand Management System on Company’s Performance” stated that in today’s throughout competitive business world that the whole endeavor of companies is to surpass competitors, the importance of brand and brand management system is manifested more. He has also investigated the factors impacting on brand management system such as innovation, market orientation, and also factors on which brand management system impacts such as brand orientation, internal branding, brand strategic management, and customer’s performance. Abdolazimi (2012) in a research entitled as “Innovation and its Impact on Selection and Loyalty to Brand” stated that nowadays the competition among companies to attract customers permanently is very severe and obtaining permanent or several years purchase of a customer for a company requires gradual high sale costs, in a way that nowadays, the companies are obliged to offer high discounts to make the customers dependent when purchasing directly, and to make customers aware of their products in today’s full of advertisements atmosphere are obliged to spend high costs such as advertising in TV, journals, web spaces, display boards in overcrowded centers, and etc., and undertake high costs of interviewing with media. In order to motivate the sellers of their products, they are obliged to give kinds of discounts (on cash, by number, etc.), and to increase customers’ purchase, they are obliged to spend costs for entertainments and more services for their customers. Amores-Salvadó et al. (2014) in their study have shown that the green image of company not only impact on company’s performance, but it also impacts on the relationship between company’s environmental performance and the company’s financial performance. Lin,
Tan, and Geng (2013) in an article entitled as “Demand in Market, Green Product Innovation, and Company’s Performance” investigated four top motorcycle manufacturers in Vietnam with the aim of responding to this question that how green product innovation can impact on company’s performance. The results of their research indicated that company’s performance in the domain of green product innovation has direct and positive impact on the company’s general performance including market share, sale ratio, profit, credit, and reputation of company. The positive impact of the environmental performance of company on the company’s general performance was also confirmed. Murat Ar (2012) in a study entitled as “The Impact of Green Product Innovation on Company’s Performance and Competition Ability: The Role of Adjusting Managerial Environmental Concerns” investigated the impact of green product innovation on the performance and competitive advantage of organization in 140 companies activating in various industries of Turkey. The results of this research showed that green product innovation has positive and significant impact on the performance and competitive advantage of organization. This impact is more on the competitive advantage of organization than performance. Costantini and Mazzanti (2012) in the research entitled as “The Impact of Environmental and Innovation Policies on the Exports of European Union” investigated the impact of environmental innovations on the export performance of European organizations. The results of this research also showed that the capability and performance of organizations under survey in the field of environmental or green innovation has positive impact on their competitive advantage in global markets. Tseng et al. (2012) performed a research entitled as “Green Innovation Performance beneath Incompleteness Information” with the aim of evaluating green innovation stimuli in electronic companies of Taiwan. In this study, they assessed green innovation in the format of four dimensions of green product innovation, green managerial innovation, green process innovation, and green technological innovation. The results of their research showed that green managerial innovation is one of the most critical stimuli of implementing green innovation in the organization. With regard to the points offered, this research is going to respond to this question:

**Does green innovation have positive and significant impact with interfering role of brand on organizational performance?**

**Research Method**

This research is applied type in respect of research goal, and it is regarded as descriptive in respect of research classification in terms of data collection method (research plan), and considering that the relationship between research variables is investigated, it is therefore correlation type. The statistical population of this research is experts related to research domain in Iran Khodro Company. In this research the simple random sampling method has been used to determine the sample, and the sample size has been calculated 200 people by using Cochran formula. Regarding research goal and method, descriptive and inferential statistics have been used in this research. The descriptive statistics has been performed to describe respondents and their demographic information and also to state existing condition through describing the answer to research questions and by using SPSS software. Moreover, in order to test research hypotheses and also to respond research questions, inferential statistics has been used. To test research
hypotheses, the structural equation modeling and route analysis (by using Amos software) were used.

**Research Hypotheses:**

**Major Hypothesis:**
Green innovation has positive and significant impact with interfering role of brand on organizational performance.

**Minor Hypotheses:**
1. Market demand has significant impact on green innovation.
2. Green innovation has significant impact on brand.
3. Brand has significant impact on organizational performance.
4. Green innovation has significant impact on organizational performance.
5. Product innovation has significant impact on green innovation.
6. Process innovation has significant impact on green innovation.

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Research Conceptual Model (source: Lin et al. 2014; Amores-Salvadó 2014)

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**Findings**
In the first section, data collection was performed by using research hypotheses test and to respond the research questions, the inferential statistics was also used. For research hypotheses test, the structural equation modeling and route analysis (by using Amos software) were used. Among the respondents, 132 people have been male, and 68 people have been female.

**Kolmogorov-Smirnov Test for Data Distribution Normality**
H 0: Sample data distribution function is a normal distribution function.
H 1: Sample data distribution function is not a normal distribution function.
Table 1: Obtained Results of Kolmogorov-Smirnov Test for Research Variables

<table>
<thead>
<tr>
<th>Components</th>
<th>Kolmogorov-Smirnov</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Product Innovation</td>
<td>0.521</td>
<td>0.949</td>
</tr>
<tr>
<td>Green Process Innovation</td>
<td>0.480</td>
<td>0.975</td>
</tr>
<tr>
<td>Market Demand</td>
<td>0.632</td>
<td>0.820</td>
</tr>
<tr>
<td>Organizational Performance</td>
<td>0.403</td>
<td>0.997</td>
</tr>
<tr>
<td>Brand</td>
<td>0.879</td>
<td>0.423</td>
</tr>
</tbody>
</table>

Provided that Kolmogorov-Smirnov significance level is less than 0.5, it can be concluded that data distribution related to the Central Limit Theorem variable has significant difference with normal distribution. As it has been reported in the above table, the significance level of each one of the research indicators has been obtained more than 0.05. Hence, it can be said that the data distribution related to variables does not have significant difference with normal distribution and follows normal distribution.

Structural Equation Modeling (Confirmatory Factor Analysis)
As it was mentioned in this stage the relationship between factors impacting on the role of green innovation on brand and its impact on organizational performance is investigated by structural equation modeling and by the aid of Amos software, the confirmatory factor analysis of these factors is tested. In this section, it is required to ensure the accuracy of models measuring factors of green product innovation, green process innovation, market demand, brand, and factors of organization. Therefore, the structural model of the impact of discovered components on organizational performance in Iran Khodro industry was investigated. Considering the P-value equal to 0.000 in Amos output, and the high number of sample size, it can be said that it is an appropriate model in the impact ratio of independent variables on dependent variable. The value of GFI=0.929 and AGFI=0.987 and are higher than 0.9; hence the model is acceptable and it indicates model fitness.

Table 12: Determining Normality of Research Model Variables in Amos
Assessment of Normality (Group number 1)

<table>
<thead>
<tr>
<th>Variable</th>
<th>min</th>
<th>Max</th>
<th>skew</th>
<th>c.r.</th>
<th>kurtosis</th>
<th>c.r.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Demand</td>
<td>1.000</td>
<td>5.000</td>
<td>-.358</td>
<td>-2.068</td>
<td>-.770</td>
<td>-2.224</td>
</tr>
<tr>
<td>Green Process Innovation</td>
<td>2.000</td>
<td>5.000</td>
<td>-.565</td>
<td>-3.262</td>
<td>.908</td>
<td>2.620</td>
</tr>
<tr>
<td>Green Product Innovation</td>
<td>1.000</td>
<td>5.037</td>
<td>-.915</td>
<td>-5.281</td>
<td>.632</td>
<td>1.826</td>
</tr>
<tr>
<td>Green Innovation</td>
<td>1.875</td>
<td>4.750</td>
<td>-.128</td>
<td>-.740</td>
<td>-.431</td>
<td>-1.245</td>
</tr>
</tbody>
</table>
The skewness value observed for the variables of market demand, green process innovation, green product innovation, brand, and organizational performance are in the range of 2 to -2. It means that in respect of skewness, these variables are normal and the distribution is symmetric. The kurtosis value in the variables is less than 3, indicating that variable distribution has normal kurtosis.

<table>
<thead>
<tr>
<th>Variable</th>
<th>min</th>
<th>Max</th>
<th>skew</th>
<th>c.r.</th>
<th>kurtosis</th>
<th>c.r.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand</td>
<td>.861</td>
<td>5.000</td>
<td>-.337</td>
<td>-1.947</td>
<td>-.931</td>
<td>-2.687</td>
</tr>
<tr>
<td>Organizational Performance</td>
<td>1.000</td>
<td>5.000</td>
<td>-1.068</td>
<td>-6.165</td>
<td>2.415</td>
<td>6.972</td>
</tr>
<tr>
<td>Multivariate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6.922</td>
<td>4.996</td>
</tr>
</tbody>
</table>

Flowchart 11: In Standard Mode

Flowchart 12: In Non-Standard Mode
The Results of Route Analysis and Structural Equation Modeling
In this stage, the connection and predicting power of three variables of green product innovation, green process innovation, and market demand on green innovation variable were evaluated by using route analysis. In the fitted model which is the most complete saturated model, the factor of green process innovation with the route coefficient $\beta=0.17$ had the highest impacting power and importance in green innovation. The factor of green product innovation with the route coefficient $\beta=0.12$ was the second impacting factor and importance in green innovation. The next factor, market demand with the route coefficient $\beta=0.08$ was the third factor impacting on green innovation variable. Green innovation with regard to the above flowchart has the highest impact on brand variable with the route coefficient $\beta=0.25$, and then green innovation with the route coefficient $\beta=0.10$ impacts on organizational performance variable. Finally, brand variable generally impacts on organizational performance variable with the value of $\beta=0.10$.

Maximum Likelihood Estimates
Regression Weights: (Group number 1 - Default model)

<table>
<thead>
<tr>
<th></th>
<th>non-) (standard Estimate</th>
<th>S.E.</th>
<th>C.R.</th>
<th>P</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green innovation --- Green product innovation</td>
<td>.116</td>
<td>.04</td>
<td>2.393</td>
<td>.017</td>
<td></td>
</tr>
<tr>
<td>Green innovation --- Green process innovation</td>
<td>.170</td>
<td>.06</td>
<td>-2.620</td>
<td>.009</td>
<td></td>
</tr>
<tr>
<td>Green innovation --- Market demand</td>
<td>.075</td>
<td>.04</td>
<td>1.770</td>
<td>.077</td>
<td></td>
</tr>
<tr>
<td>brand --- Green innovation</td>
<td>.254</td>
<td>.13</td>
<td>1.988</td>
<td>.045</td>
<td></td>
</tr>
<tr>
<td>Organizational performance --- Green innovation</td>
<td>.101</td>
<td>.08</td>
<td>1.224</td>
<td>.221</td>
<td></td>
</tr>
<tr>
<td>Organizational performance --- brand</td>
<td>.104</td>
<td>.04</td>
<td>2.456</td>
<td>.014</td>
<td></td>
</tr>
</tbody>
</table>

Standardized Regression Weights: (Group number 1 - Default model)

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green innovation --- Green product innovation</td>
<td>.176</td>
</tr>
<tr>
<td>Green innovation --- Green process innovation</td>
<td>.181</td>
</tr>
</tbody>
</table>
Estimate Green innovation <--- Market demand .130
brand <--- Green innovation .230
Organizational performance <--- Green innovation .086
Organizational performance <--- brand .172

Table: 13

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>C.R</th>
<th>(Standardized coefficients)</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifying the impact of market demand on green innovation</td>
<td>1.770</td>
<td>0.130</td>
<td>Rejected</td>
</tr>
<tr>
<td>Identifying the impact of green innovation on organizational brand</td>
<td>1.988</td>
<td>0.230</td>
<td>confirmed</td>
</tr>
<tr>
<td>Identifying the impact of organizational brand on organizational performance</td>
<td>2.456</td>
<td>0.172</td>
<td>confirmed</td>
</tr>
<tr>
<td>Identifying the impact of green innovation on organizational performance</td>
<td>1.224</td>
<td>0.086</td>
<td>Rejected</td>
</tr>
<tr>
<td>Identifying the impact of green product innovation on green innovation</td>
<td>2.393</td>
<td>0.176</td>
<td>confirmed</td>
</tr>
<tr>
<td>Identifying the impact of green process innovation on green innovation</td>
<td>-2.620</td>
<td>0.181</td>
<td>confirmed</td>
</tr>
</tbody>
</table>

In the above table for each estimate of non-standardized regression coefficient (in the output table of Regression Weights) a critical ratio (C.R) exists. The critical ratio outside range ±1.96 shows a significant route (that is P<0.05). According to this criterion, it is observed that the variables of green innovation and green product innovation are very significant predictors for green innovation. The green innovation variable is also a very significant predictor for organizational brand. Standardized estimate coefficients indicate this point that the relationship compares the dependency between each independent variable and dependent variable.

Discussion, Conclusion, and Suggestions
Hypothesis 1 claims that market demand has significant impact on green innovation. Regarding the result of structural equations modeling presented in table 13, the standard coefficient between two variables of market demand and green innovation is equal to 0.130, that this equation with the critical value Z= 1.770 (which is smaller than 1.96) is the reason of rejecting H1. It means
that market demand does not have positive, direct, and significant impact on green innovation, and market demand increase does not cause green innovation increase. This finding is unlike the findings of researchers such as Zailani et al. (2015), Lin, Tan and Geng (2013) and Amores-Salvado (2014), etc. Hypothesis 2 claims that green innovation has significant impact on brand. Regarding structural equations modeling presented in table 13, the standard coefficient between two variables of green innovation and brand is equal to 0.230, that this equation with the critical value Z= 1.988 (which is greater than 1.96) is the reason of confirming H2. It means that green innovation has positive, direct, and significant impact on brand, and green innovation increase causes brand improvement. This finding is in line with the findings of researchers such as Azizi et al. (2011), Abdolazimi (2012), etc. Hypothesis 3 claims that brand has significant impact on organizational performance. Considering the result of structural equations modeling presented in table 13, the standard coefficient between two variables of brand and organizational performance is equal to 0.172, that this equation with the Z= 2.456 (which is greater than 1.96) is the reason of confirming hypothesis 3. It means that brand has positive, direct, and significant impact on organizational performance, and brand improvement causes organizational performance improvement. This finding is in line with the findings of researchers such as Safarzadeh and Moradi (2012), Hassani (2013), Ghasemi and Azizi (2013), etc. Hypothesis 4 claims that green innovation has significant impact on organizational performance. Regarding structural equations modeling presented in table 13, the standard coefficient between two variables of green innovation and organizational performance is equal to 0.086, that this equation with the Z= 1.224 (which is smaller than 1.96) is the reason of rejecting hypothesis 4. It means that there is not a positive, direct, and significant impact between green innovation and organizational performance, and green innovation increase does not cause organizational performance improvement. This finding is unlike the findings of researchers such as Amores-Salvado et al. (2014), Tseng et al. (2013), Chiou et al. (2016), Lin, Tan, and Geng (2013), Murat Ar (2012), Safarzadeh and Moradi (2012), Marvi et al. (2014), etc. Hypothesis 5 claims that product innovation has significant impact on green innovation. Regarding structural equations modeling presented in table 13, the standard coefficient between two variables of product innovation and green innovation is equal to 0.176, that this equation with the Z= 2.393 (which is greater than 1.96) is the reason of confirming hypothesis 5. It means that product innovation has a positive, direct, and significant impact on green innovation and product innovation increase causes green innovation increase. This finding is in line with the findings of researchers such as Tseng et al. (2012), Morovati et al. (2014), Jandaghi and Nazemi (2014), etc. Hypothesis 6 claims that green process innovation has significant impact on green innovation. Regarding structural equations modeling presented in table 13, the standard coefficient between two variables of green process innovation and green innovation is equal to 0.181, that this equation with the Z= -2.620 (which is smaller than -1.96) is the reason of confirming hypothesis 6. It means that green process innovation has a negative, reverse, and significant impact on green innovation and green process innovation increase causes green innovation reduction. This finding is in line with the findings of researchers such as Tseng et al. (2012), Morovati et al. (2014), etc.
Given the devastating consequences and adverse effects that various products had on environment and various aspects, and especially the performance of organizations in the past, the managers of automobile manufacturer companies and affiliated industries are required to investigate the factors that impact on the performance improvement of affiliated organizations. Therefore, regarding the obtained results, it is suggested that the managers of automobile manufacturer companies and affiliated industries, particularly Iran Khodro Company perform more research and investigation in order to improve organizational performance with regard to the role of green innovation on brand, by receiving expected environmental standard quality, considering new products compatible with environment, and regarding green customers’ participation and interests in respect of market demand and relationship with their customers, and be completely aware of market demand process. They should also concentrate on company’s brand improvement by producing advanced automobiles in technical and environmental respects, increasing green product manufacturing capacity and productivity of production line, increasing innovation in reliable performance in technical and environmental respects, reflecting environmental quality in design, reflecting quality in accordance with environmental standards, implementation of just in time production system, increasing the quality of manufactured automobiles in technical and environmental respects, reducing cost and general time required for manufacturing automobile, increasing more accurate quality control of manufactured automobiles in technical and environmental respects, reducing waste of time and lesions, reducing the cost of changing from an operation to another operation. Then by improving customer’s mental image of the quality of manufactured automobile, they should provide appropriate mechanisms for returning the customer to buy other products of organization, offer services according to the promises given to the customer, and perform services at the first appropriate time to have a better organizational performance.
References
