

“IMPACT OF PRODUCT INNOVATION ON THE FINANCIAL PERFORMANCE OF THE SELECTED ORGANIZATIONS: A STUDY IN INDIAN CONTEXT”

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ABSTRACT:

The purpose of this research is to analyze the determinants of product innovation and its impact on the financial performance of the organizations. Specifically, the study examines the impact of intelligence generation, intelligence dissemination, product-process innovation, marketing support of the product, quality, Dependability/ Delivery, Technology selection, Flexibility on the financial performance of the automobile companies. The models of product innovation provided the theoretical framework for the research. The model of product-process innovation provides the basis for further research. The first concept explains the link between organizations surroundings and its innovation targets (Utterback JM 1974, 1975) (Miller & Friesen, 1982)(Milling, 1996) whereas the second concept explains the connection between firm's performance level i.e. innovative performance, financial performance, organizational performance and marketing performance and its innovation types i.e. product innovation, process innovation, organizational innovation and marketing innovation (Abernathy & Townseed, 1975) (Abernathy & Utterback, June/July 1978) (Gunday, et al., 2011). From these concepts evolved this study i.e. to evaluate the impact of product innovation on the financial performance of the organizations.

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INTRODUCTION

During modern decades increasing ecological concerns have become a well-built encouragement to creative thinking. Ecological system will exert huge weight on production industries, which will augment in the upcoming time, enabling a more surviving globe for coming generation. The automobile industry is one of several industries causing ecological pollution where cars have a important impact on all stages of the life cycle; manufacturing, use, reusing and dumping (Orsato and Wells, 2007). This business also continues to cultivate. The number of cars in worldwide use will amplify in close future, mainly due to growing command in budding countries. As an instance, the amount of cars sold in China has

enlarged by over 25% per annum in the past ten years, building China the world's biggest car marketplace. In 2012, the international car fleet conceded the one billion score. As a result of the increasing car market, the automotive industry records for 27% of CO₂ releases in the world (WWF, 2013). Automakers have also shown an escalating awareness of the ecological impact of their products as environmental rules and market demands for ecologically less disparaging cars have augmented. The centre on reducing CO₂ has become a well-built driver in the growth of not only less ecologically vicious cars, such as Electric Vehicles (EV) and Hybrid Electric Vehicles (HEV), but also of mass-reduction way-outs.

Product innovation makes the healthy environment inside the firm that enhances the growth, improves the financial returns and superior brand image (Liu *et al.* (2002) (Walker, June, 2004) . Studies have revealed that good experience within the firm is linked with growth of novel information and facts, which is significant element for organization results and uniqueness (Wheelwright & Clark, 1992)(Wong, 2014). Hence, there is need to address the issue of how to create product innovation in the organizations. The empirical research on the product innovation is limited both in volume and scope; especially in Indian Context. Thus, there is a need to understand the product innovation and its impact on the financial performance of the organizations. The automobile business involves two distinct businesses: (i) the automotive business; and (ii) the auto segment business. The automotive business further has three sub-parts: (a) two-wheelers; (b) three-wheelers; and (c) four-wheelers (passenger and commercial vehicles). While the history of India's growth in the economy is known in the last two decades, it is usually termed as a services-leading concept. Although, some production fields have played a major act in this industrial development and the automobile industry is important among them. The automobile industry's addition is not only in terms of sales revenues, incomes, taxes to be paid and jobs, but more particularly in production-process superiority, efficient enhancements and state of the art. This change has been vision through the sectors in the economic transportation, usability transportation, cars and automotive parts business. The automobile industry is the pillar of global economy, a main driver of macro economic growth, stability and technological advancement in developed and developing countries, covering many adjacent industries (Kearney, A.T, 2013). Firms adopted innovation approach since long-time, but very little published literature is available on the experiences of firms. Most

companies are using the basic innovation approach without categorizing the types of innovation. However, the implementation strategies and managerial commitment to innovation approach vary from company to company. This study deals with the determinants of product innovation and its impact on the financial performance of the organizations.

LITERATURE REVIEW

Product innovation means dissimilar equipment to diverse group. It can be opening of a new product into a market place for the first time (Kanter, 1982)(Kanter, 2006 Nov). Few people regarded innovation as the upgradings in the old products (Andreasen & Hein, 1985). Although, changes in the products for betterment is taken as product innovation in many corporate houses. Product Innovation may be distinct as the expansion of novel goods, alterations in features of recognized goods, or make use of novel resources or mechanism in the production of recognized goods.

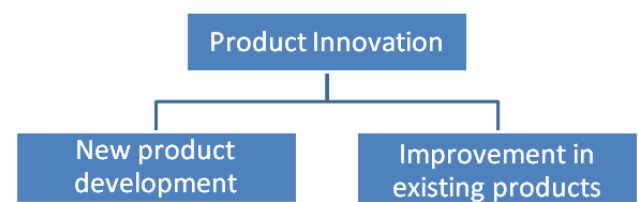


Figure 2.1 represents the product innovation in two categories of innovation:

For the business to exist in the aggressive market, it is relevant to pioneer new-fangled goods and services (Cahill, 1996). On the other hand, it is established that over 80 percent of novel goods be unsuccessful. Further, even thriving opening do not constantly results in top-level development.

Showing Constructs, Measurement of Variables and Authors

Constructs	Measurement Variables for Investigation in the Study	Author(s)
Intelligence Generation	a) Process of intelligence generation	Nonaka and Toyama, 2002; Wiig, 1997 ; Ramachandran and Ray, 2006
	b) Design of new products, services or systems.	
	c) Capability to generate intelligence and utilize it	
	d) Capability to engage employees in innovative activities.	
Intelligence Dissemination	a) Interaction among employees	Ruggles, 1996; Frances and Sandberg, 2000; Nonaka and Takeuchi, 1995; Sheshadri et al., 2003
	b) Availability of appropriate infrastructure and processes	
	c) Familiarity with colleagues	
	d) Identifying and designing intelligence dissemination processes.	
Technology selection	a) Selection of leading strategy	Shengbin Hao, Bo Yu, 2011; M. Torkkeli and M. Tuominen, 2002; S. B. Hao and B. Y, 2009 ; G. M. Bao and J. Yang, 2004; J. Morone, 1989; D. Cetindamar, R. Phaal and D. Probert , 2009; D. Cetindamar, R. Phaal and D. Probert , 2009
	b) High emphasis on R&D activities	
	c) Selection of advanced technology in industry.	
	d) Develops new products totally	

Constructs	Measurement Variables for Investigation in the Study	Author(s)
Marketing support of the product	a) Renews the design of the current and new products	Hauser, et al., 2006; Henderson, 1994; Pelham, 1997; Wang and Wei, 2005; Lhuillery, 2014; Li, 2000; Buzzel and Gale, 1987; Venkatraman and Prescott, 1990, Wang and Wei, 2005
	b) Renews the distribution channels without changing the logistics processes.	
Product-Process Innovation	a) Determines and eliminates non-value adding activities in production processes.	Ettile, 1995; Fruin, 1998; Galbraith, 1982; Meeus & Edquist, 2006; Damanpour, Gopalakrishnan 1999; Pisano, 1997
	b) Decrease manufacturing cost in components and materials of current products.	
Financial performance	a) Increase in the ratio of return on sales	Aktan & Bulut, 2008; Andriessen, 2007; Venkatraman and Ramanujam 1986; Fis & Cetindamar, 2009; Floyd & Woolridge, 1990; Gatignon & Xuereb, 1997; Gopalakrishnan, 2000; Gunday, et al., 2011; Heshmati & Loof, 2006; Lumpkin & Dess, 2001; Malerba & Marengo, 1995; Mankin, 2007
	b) Increase in the ratio of return on assets	
	c) Increase in the general profitability of the firm	
	d) Increase in the cash flow of the firm.	

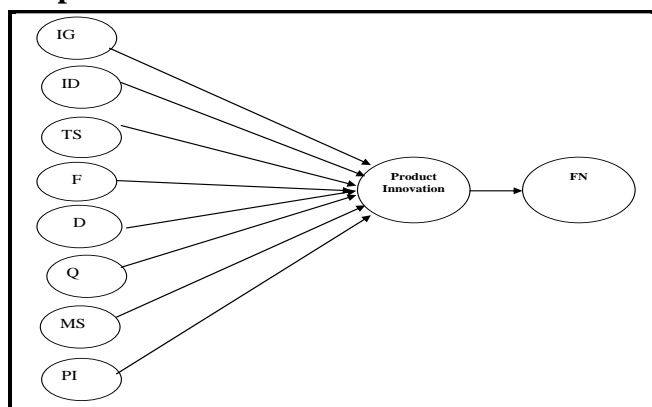
RESEARCH METHODOLOGY

The researcher used **quota sampling dividing into the Delhi/ NCR** amongst four automobile companies i.e. the four of them are market leaders as per their market share and in each of these areas **purposive sampling** is used for the purpose of survey. It is a sampling techniques in which the

sample is obtained by selecting convenient population units. For the purpose of the study, primary data was collected with the help of a well-drafted Questionnaire given to Top and middle executives in the automobile organizations (N=423). Measurements for the model's constructs were adopted from the literature and in

some cases adapted for the study. Cronbach Alpha was used to evaluate the internal consistency of the scale items and Structural Equation Modelling was used to test the proposed hypotheses. Results suggest that determinants of product innovation influence the financial performance of the organizations. Implications for automobile organizations i.e. main leaders of the sector are presented along with future directions for research academics and industry practitioners.

Proposed Model



Codes	Factor Name
IG	Intelligence generation
ID	Intelligence dissemination
TS	Technology selection
F	Flexibility
D	Dependability/ Delivery
Q	Quality
MS	Marketing Support of the Product
PI	Product- Process Innovation
FN	Financial Performance

DATA ANALYSIS AND RESULTS

Reliability is the degree to which a group of measurable variables would give similar outcomes if information gathering were duplicated (Malhotra, 2007) and is tested by considering the ratio of organized change in a scale. Measuring the Cronbach Alpha coefficient of a scale is the main generally accepted barometer of internal consistency (Pallant, 2007), with the fair Cronbach Alpha coefficient being over 0.7 (Hair et al. 2010). A figure of less than 0.7 is taken to state uncontented internal consistency reliability (Malhotra, 2007). Cronbach’s Alpha is taken in this study to test internal consistency reliability of the 32 measurable variables of the questionnaire.

Summary of Overall and Individual Constructs Reliability analysis for the Main Study

Constructs	Items	Cronbach Alpha Coefficient	Reliability Results
Intelligence generation	4	0.811	Good
Intelligence Dissemination	4	0.751	Good
Technology Selection	5	0.784	Good
Flexibility	4	0.811	Good
Dependability/ Delivery	5	0.781	Good
Quality	2	0.736	Good
Marketing support of the product	2	0.708	Good
Product-Process Innovation	2	0.715	Good
Financial Performance	4	0.819	Good
Overall	32	0.893	Good

The Cronbach Alpha coefficient of the ‘Impact of product innovation on the financial performance of the organizations’ measurement scale of the research, as shown in Table above is 0.893. Because this value is above the required 0.7 Cronbach Alpha fair, the measurable variables used have a contented internal consistency and can be termed as reliable statistically.

FACTOR ANALYSIS

Factor Analysis is a data condensing statistical method that permits simplifying the interrelation linkages between numbers of repeated items. Factor analysis permits analysts to reduce a big group of items or measurement variables down into a small, more organized- number of constructs or factors. After the information has been gathered from 100 respondents, Factor Analysis was taken to obtain the general constructs from among the variables based on the linkages between them (DeCoster, 1998). The total variable Explained box was recommending that it obtains one construct detailed for 65.73% of the variance of the link between items. There are just nine constructs, each having Eigen value greater than 1. The Eigen values for nine constructs were 8.557, 2.259, 1.964, 1.692, 1.489, 1.426, 1.334, 1.205 and 1.109, correspondingly.

Total Variance Explained

Total Variance Explained									
Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.557	26.742	26.742	8.557	26.742	26.742	3.156	9.862	9.862
2	2.259	7.058	33.800	2.259	7.058	33.800	3.127	9.772	19.635
3	1.964	6.139	39.939	1.964	6.139	39.939	2.952	9.224	28.858
4	1.692	5.286	45.225	1.692	5.286	45.225	2.593	8.104	36.963
5	1.489	4.652	49.877	1.489	4.652	49.877	2.515	7.858	44.821
6	1.426	4.457	54.333	1.426	4.457	54.333	2.381	7.440	52.261
7	1.334	4.167	58.501	1.334	4.167	58.501	1.604	5.012	57.273
8	1.205	3.765	62.265	1.205	3.765	62.265	1.411	4.410	61.683
9	1.109	3.465	65.730	1.109	3.465	65.730	1.295	4.047	65.730
10	.981	3.065	68.795						

Extraction Method: Principal Axis Factoring.

Construct Validity

‘Construct validity leads to the extent to which assumption can accurately be made from the functionalities in your research to the theoretical factors on which those functions were dependent (Trochim, 2006). In other words, it means whether the scale measures what it claims to measure. Construct validity consists of convergent validity, discriminant validity and nomological validity (Malhotra, 2010). For the present research, convergent validity and discriminant validity will be considered. Both these validities should be considered jointly in order to get the proof for construct validity (Trochim, 2006).

Convergent Validity

Convergent validity shows the degree to which the measures of a construct are positively related to each other (Malhotra, 2010). Convergent validity is determined by comparing Cronbach alpha of the construct with Average Variance Explained by the measures (Hair et.al, 2010). The Convergent validity is achieved if: 1) Cronbach Alpha coefficient > Average Variance Explained 2) Cronbach Alpha co-efficient is greater than 0.7 3)

Average Variance Explained > 0.5. The below table shows the validity and reliability of all the dimensions. As the value of Cronbach alpha is above .07 for all dimensions this shows all dimensions have good reliability and internal consistency. AVE is also above 0.4 which is threshold value. Therefore, the nine constructs met the norms of convergent validity.

Discriminant Validity

Discriminant validity shows the extent to which the constructs differ from each other. It is assessed by comparing the squared correlation (R²) of the paired constructs with the AVEs of each construct (Fornell & Larcker, 1981). For this, Maximum of the two correlation coefficients is taken and squared. This is called Maximum Shared Variance (MSV). Discriminant validity can be said to be satisfactory if MSV of a pair of constructs is less than the AVE for each corresponding construct (Hair et.al, 2010). As the MSE is below AVE and ASV is below AVE it shows that the constructs differ from each other. Therefore, the nine constructs met the norms of discriminant validity.

Factors	Cronbach Alpha coefficient	Average Variance Explained	Average Variance Explained	Maximum Shared Variance
Dependability/ Delivery	0.781	0.574	0.574	0.36
Intelligence Generation	0.811	0.497	0.497	0.31
Flexibility	0.811	0.577	0.577	0.38
Technology Selection	0.784	0.550	0.550	0.37
Intelligence Dissemination	0.751	0.584	0.584	0.25
Quality	0.736	0.504	0.504	0.44
Product-Process Innovation	0.715	0.512	0.512	0.40
Marketing support of the product	0.708	0.541	0.541	0.28
Financial Performance	0.819	0.595	0.595	0.43

Confirmatory Factor Analysis

CFA is first conducted at the individual construct’s level to explore its dimensionality, reliability, convergent, and discriminant validity.

Then, CFA is further conducted at the overall proposed conceptual model level to analyze the fit of the sample model with the population model.

Model Fit Indices of each Construct

Constructs	MODEL FIT INDICES				
	CFI	GFI	RMSEA	P-CLOSE	CMIN/df
Dependability/ Delivery	0.998	0.997	0.033	0.517	1.536
Technology selection	0.992	0.968	0.056	0.062	4.200
Financial performance	0.998	0.989	0.038	0.851	1.966
Intelligence Generation	0.989	0.975	0.052	0.382	2.810
Flexibility	0.999	0.997	0.059	0.305	3.336
Intelligence dissemination	0.997	0.987	0.052	0.079	4.509
Quality	0.998	0.989	0.038	0.851	1.966
Linking Product-process Innovation	0.989	0.975	0.052	0.382	2.810
Marketing Support of the product	0.992	0.97	0.059	0.078	3.305

Notes:

1. CFI & GFI value of 0.95 and above signifies good model fit (Byrne, 2013)
2. RMSEA value less than 0.05 is considered good, P-CLOSE value greater than 0.05 is

acceptable and CMIN/df value between less than 3 is considered good but sometimes less than 5 is permissible (Hu and Bentler,1999)

The table above shows the model fit indices of all constructs namely, IntelligenceDissemination,

fits the data. Although, due to the responsiveness of χ^2 in large samples, other fit indices were assessed (Kline, 1998). Inspection of these indices represents acceptable model fit with TLI = .811, CFI = .842, RMSEA = .079, NFI= 0.797.

Second Order- Structural Model

Financial performance (FN) is defined as the second order factor which is elaborating all variance and co-variance linked to the first order factor arrangement. It is significant to take specific note of the fact that financial performance

(FN) does not have its own group of measured barometers; instead, it is related impliedly indirectly to those measuring the lower order constructs. Initially, observe the availability of single-headed arrows coming from the second-order construct (FN) to each of the first order constructs (Dependability (D) to Marketing support of the product (M)). These regression paths show second-order factor loadings and all are independently predicted.

showing Standardized Regression Weight Summary

			Estimate	S.R.	C.R.	P	Label
Financial performance	<---	Dependability/Delivery	0.150	0.105	1.432	***	par_64
Financial performance	<---	Intelligence Generation	0.133	0.059	2.244	***	par_65
Financial performance	<---	Flexibility	0.256	0.041	6.196	***	par_66
Financial performance	<---	Technology Selection	0.087	0.068	1.293	***	par_67
Financial performance	<---	Intelligence Dissemination	0.181	0.088	2.047	***	par_68
Financial performance	<---	Quality	0.628	0.315	1.991	***	par_69
Financial performance	<---	Product-Process Innovation	0.496	0.573	0.866	***	par_70
Financial performance	<---	Marketing support of the product	0.639	0.461	1.385	***	par_71

Co variances between factors were measured and taken as input for confirmatory factor analysis. Co variances, means and standard deviations of the averaged measures are shown in Table below. All the predicted co variances were statistically significant ($p < 0.05$). The path coefficients found in table of the path estimates are significant ($p \leq 0.05$). According to results, dependability, flexibility, marketing support of the product, quality, product-process innovation, technology selection, intelligence generation and intelligence dissemination has a considerable positive effect on financial performance

CONCLUSION

The major aim of this research was to investigate the important internal organizational determinants that prompt product innovation and made an instrument that measures these determinants. To achieve this objective, the research collected data from 423 managers in 4 organizations. Outcomes from the investigation can therefore assist to define internal organizational determinants phase of impacts and finalize the base for better environment to enhance entrepreneurial activities. The role of organizational factors for stimulating product innovation has been discussed. After identifying different organizational

factors from literature, a discussion has been followed by an empirical study conducted to identify the impact of product innovation on financial performance. The outcomes of the research and their affects for further study and executives action have been stated in detail.

This study has established that in the context of the fast changing needs of the customers, the adoption of product innovation is very important. The presence of internal organizational drivers/factors is critical for financial outcomes. A product innovation model has been evolved, which may be used by organizations to assess the presence of necessary and critical internal factors for stimulating product innovation activities within the organization. This framework can further be enriched by subsequent studies. There are several factors reinforcing relationships once they have been established. In this study financial performance has been related to the components of product innovation and it has been found the product innovation has a positive impact on the financial performance. So the automobile sector cannot neglect the product innovation as it is very essential for the overall success of the organization. All the business earnestly works for improvement of the financial performance so; product innovation is one of the key element to improve the financial performance.

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