

## The effect of market orientation, new product development process and new product development orientation on firm performance improvement (case study: Isfahan food manufacturing industry)

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**Abstract:** The present study aimed to investigate the effect of market orientation, new product development (NPD) process and new product development (NPD) orientation on the performance improvement of the food industry companies (Isfahan province). For this purpose, a model was used to study the effect of market orientation on NPD orientation, and NPD process stages. Moreover, the effect of NPD orientation on NPD process stages, then the effect of NPD process on NPD program success, and eventually the effect of NPD program success on performance were examined separately. This was an applicable research in terms of its purpose and a survey one with correlational approach in terms of its methodology. The instruments of the study for data collection were library resources and a self-designed questionnaire consisting of 43 questions. The validity and reliability of the questionnaire were confirmed through the ideas of supervisor and experts of management, and Cronbach's alpha coefficient (0.80), respectively. The statistical population of the study included 92 managers (including marketing, sales, and production, research and development managers) of food manufacturing industry in Isfahan. As this population of participants was limited to those 92 people, all of them were asked to participate in the study. The collected data were analyzed by SPSS software through statistical tests at two levels of descriptive statistics (frequency, mean value, standard deviation) and inferential statistics (regression and Friedman tests). The results of regression test supported all hypotheses, and the results of Friedman test indicated that among all variables, NPD process commercialization stage had the least mean rank and the most importance.

**Key words:** *Market orientation; NPD process; NPD process; NPD program success; Firm performance*

### 1. Introduction

Theoretically, it has been claimed several times that market orientation and new product development (NPD) process has relationship with the commercial performance of the companies and cause more attention of the members to the market and production of new products. The complexity of market condition, the presence of powerful opponents, the permanent change of customer desires and the increasing speed of their expectations have faced companies with deep challenges. The cognitive-analytic complexity of the market would bring the managers frustration of answering these changes through traditional ways.

In the other hand, the ability in the process and development of new products is considered one of the advantageous capabilities, as it will provide growth opportunities and competitive advantages for organization, by which the organization would be able to answer the environmental changes, needs and requirements of its customers. A firm and successful business performance is one of the important challenges in the most companies for the former and present managers. For years the competitive advantage of organizations in the

production process were hidden, but these days, the NPD ability is considered as one of the advantageous capabilities. It is so that most of the first grade producers in the world are leading the competitions through leaving construction and shifting on designing management, production and services development. In its general definition, NPD orientation is a group of defined duties, steps and actions which explains the natural purpose of the company for turning primary ideas into salable productions and services. (Ardekani et al, 2012).

These days, producers for making added profit among customers and convincing them for more purchases should focus on the distinction and concentration on their market and on the suitable flexibility of market development based on the product development strategies. Today the involvement of customers in NPD activities has been increasingly raised; studies have shown that the customers' interaction through speeding the production process up and reducing the costs and improving the quality of products influence the product development performance. Companies for their existence and success in the dynamic market use new product development as a competitive weapon. The new use useful product not only influences the markets but also causes the retention of relationship with customer and of profitability. So

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for deciding about NPD, the customer needs and satisfaction, the quality of product and the design of the intended product should be considered (Chan, 2011).

These days, new product development and market orientation are concepts attracted the attention of many researchers, consular and different industries. Specialization in the field of new product development and market orientation can lead many companies toward success. The astronomic changes in the technology, needs and requests of customers have highlighted the importance of new concepts of product development and the processes formed based on these concepts. Poolton and Barclary believed that if companies are able to use their effectiveness and efficiency to increase the entrance of new products into the market, they can empower their business root in the weak land of market and keep on their lives.

In fact, NPD has high importance because of answering the needs of customers, adjusting to market condition and environmental changes, increasing profit and customers' satisfaction, in addition to confronting with opponents policies. Most researchers believe that NPD is a vital factor in the economy wealth of a country but unfortunately, the importance level of NPD is not much comparable with its progress level, so the risk of failure is high (Seyed Hosseini and Iranian, 2005).

Yang (2012) with representing experimental evidences, for the first time, which were expected to obtain considerable profits through the different strategies in NPD when they were performed showed that the improvement of the results of new product development studies might cause performance promotion and improvement in the organization of the market and help the increase of market share and selling purposes. Lin et al. (2013) have also studied the intercessional role of internal relationships of the organization on the effect of customers' interaction on the performance of NPD. They reported that the customers interaction through the speed increase, cost reduction and product quality improvement have positive effect on the developmental performance of the product. On the other hand Lee and Wong (2011) showed that the results of new product development process depend on the external environment power can be considered as a limitation or an opportunity for penetrating into the process of the company and improving the organization performance. Kachuiee and Talebi (2012) have introduced the key management factors in the success of NPD processes of small and average businesses as commitment of top manager to new product development, entrepreneur strategies, international tendency, assets management and tendency toward considering future. Also, Abzari et al. (2010) showed that in hotel industry internal marketing has meaningful effect on market orientation and organizational performance which means the more market orientation results more organizational performance.

It should be declared while about studying the effective factors on new product development a vast and comprehensive academic studies have been done but these studies have considered the food manufacturing industries less than the others. This is while the issue of product development and market orientation of organizations is very important for the existence and promotion of food manufacturing industries with attention of their managers. So this study tries to help the organizations of food manufacturing by considering and studying the factor of new product development and market orientation approach in order to use their facilities more efficiently and increase the rate of their production and profit.

## **2. Theoretical framework and hypotheses development**

### **2.1. Theoretical framework**

This study examines the effect of market orientation, NPD process and NPD orientation on the performance improvement of companies. New product development orientation includes a set of defined and arranged tasks, steps and activities that justify the natural objective of firm to converse primary theories to commercial products and services (Griffin, 1997). On the other hand, according to new products development and management association, NPD process includes all of process that are related to strategy, organization, concept production, product creation and evaluation, production and planning evaluation and commercialization (Chen, 2007). New product development program success (NPDS) is a planning that must be reflected in firm capability in achieving competitive advantages and superior financial returns (Reid and Brady, 2012). Another effective factor in firm performance is market orientation. According to (Narver and Slater, 1990), market orientation is an institutional culture that creates efficient and effective behaviors that are essential in order to superior value creation for customers (Bahreinizadeh et al, 2012). According to Narver and Slater, market orientation includes three factors including customer orientation, competitor's orientation, and interfunctional coordination; customer orientation is the focus of market orientation and more values creation for customers need continuous understanding buyer value chain, customer orientation includes members that their purpose is targeted customers understanding and more values creation; competitors orientation is the identification of strength and weak points and competitors capabilities and strengths so that it can provide capability of on-time reaction (Dawes, 2000), and interfunctional coordination, indeed, refers to competitors and customers data sharing among all of members and organization sections and is essential for suitable views creation about customer's needs and suitable planning and

overcome in competition (Bahreinizadeh et al., 2012).

Another subset of business activities of NPD process in commercialization activities include mix marketing activities. Most of marketing activities to produce commercialization depends on marketing, quality and promotion (Kandmir, 2006). Finally, our purpose is firm performance improvement. Conclude from previous studies and literatures, we can divide the activities to two groups; in the first view, performance equals productivity, but in the second view, we evaluate the performance in employees level according to their performance results. Blanchard as one of the researchers in this field divided the performance into two sections of conceptual and behavioral conclusions (Afjeh and Miri, 2010).

According to the mentioned context, the following conceptual model (Fig 1) can be used. In this model, the effect of market orientation, new product development orientation, new product development process, and new product development program success on the firm performance improvement were considered. Furthermore, the effect of market orientation on NPD orientation and NPD process (pre-development, development and commercialization stages) were investigated. The model also illustrated the effect of NPD orientation on NPD process and NPD process (development and commercialization stages) program on performance. The effect of NPD process on NPD program success, and eventually the effect of NPD program success on performance were examined separately.

**Fig 1.** The conceptual framework (Reid and Brady, 2012).

## 2.2. Hypotheses development

Market orientation organizations differ from production orientation organization (in terms of: product delivery, product class, pricing, research, packaging, credit and advance (Walker et al., 2011). Market orientation behavior had been divided to traditional behavior (focused on the needs that expressed by customers) and modern behaviors (focused on the declared and undeclared needs of customers) (Slater and Narvar, 2000). Market orientation is capabilities and skills that allow the firm to achieve superior situational advantage. In other word, market orientation perceived as a philosophy and behavior that directed to determining and understanding target customers' needs and consistence response by sale organization. In this way, they can meet customers' needs better than competitors and therefore creates a competitive advantage (Jimenez et al., 2007). Market orientation is the source of competitive advantage and helps organization to create superior advantages for their customers. So it is not surprising that promotion of market orientation equals firm

performance promotion. In fact, many researchers have found a positive relationship between market orientation and performance (Slater and Narvar, 2000). Therefore the following hypotheses are proposed:

*H1: Market orientation has a significant effect on NPD orientation.*

*H2: Market orientation has a significant effect on NPD process (pre-development stage).*

*H3: Market orientation has a significant effect on NPD process (development stage).*

*H4: Market orientation has a significant effect on NPD process (commercialization stage).*

Firms cannot relied on their unique products because of rapid changes in competitors situation, technology and customers preferences, while customers search for new products, therefore, firms should produce and deliver new products that that meets customers' needs, preferences and expectations thus each firm need new product development program. New product development program steps are as follow: creation of ideas, refining these ideas, development and testing, developing marketing strategies, business surveys, limited product development, market testing and commercialization (Rusta et al., 2010). New product development is one of the most powerful and yet one of the most difficult in any business activities. New products developments activists are eager to show the technique of products development because recognition of methods that have more capability and efficiency in new product delivery, can show difference between failure and success (Barczak and Kahn, 2012). Thus the following hypotheses are proposed:

*H5: NPD orientation has a significant effect on NPD process.*

*H6: NPD orientation has a significant effect on NPD process (development stage).*

*H7: NPD orientation has a significant effect on NPD process (commercialization stage).*

Some key factors that affect the success of new products development process are: proper orientation of market, focus on market, product focused, customer orientation, focus on the development international products, possession of international orientation in planning process, development and marketing, attention to pre-development activities, final project definition, on-time delivery of new products, focus on suitable institutional structure, and organization top management support (Akhbari and Taghavifard, 2008). Thus the following hypothesis is proposed:

*H8: NPD process has a significant effect on NPD program success.*

Researchers used different components in various institutional performances studies. In this research we induced three components in the review of literature including: 1. financial performance components consists of earnings, liquidity, and capital return rate, 2. market dominance that consists of sales rate components, sale growth and market share, 3. the effectiveness of firms in market

that includes components of new product success, customers retention, attraction of new customers, and product quality (Doaiee and Bakhtiari, 2006). On the other hand, studies demonstrated that market orientation influenced the firm performance. Market orientation is considered as an intangible factor in marketing that influence the organization performance. Therefore the following hypothesis is proposed:

*H9: NPD program success has a significant effect on firm performance.*

### 3. Research methodology

#### 3.1. Instrument development and data collection

An empirical investigation of the effect of market orientation, NPD orientation and NPD process on the improvement of firm performance (case study: food manufacturing industry) was conducted in Isfahan city. The questionnaire consisting of two parts was used. The first part solicited demographic information such as age, gender, level of education and work experience. The second presented questions pertaining to the proposed model including 43 questions which were measured on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). To address questionnaire validity, supervisor professor's and management experts' opinions were used. The pre-test examination was conducted by distributing 30 questionnaires, which provided us reasonable assurance of the validity of the scale items and helped us to refine the questionnaire. The target population was all marketing, sales, production, research and development managers of Isfahan food manufacturing industry, equaled to 92 people, which was a limited population, therefore, sampling was not required and questionnaires were distributed among all population through census method. Cronbach's alpha coefficient was calculated using SPSS software, so that questionnaire reliability was 0.80 which indicated questionnaire good reliability.

#### 3.2. Demographic data

Among all respondents, the majority of them (83.7%) were male and 16.3% were female. The age range of 26.1% of respondents was 18-29 years old, 27.2% were 30-39, 42.4% were 40-49, and 4.3% were above 50 years old. The level of education of the majority of respondents (51.1%) was bachelors, 14.1% had diploma, and 26.1% had associate degree, while merely 8.7% of them had masters. The work experience of most of the respondents (46.7%) was 6-10 years, work experience of 30.4% was 1-5 years, 16.3% was 10-20 years, and 6.5% was more than 20 years old. Table 1 provided research variables descriptive indexes such as mean value, standard deviation, and variance.

### 4. Regression and hypotheses test

#### 4.1. Regression

In this study, linear regression was used to test the research hypotheses. The beta coefficient of each independent variable indicates its effectiveness on the dependent variable. In the regression analysis, we seek to estimate and analyze the mathematical relationship, so as the quantity of an unknown variable is estimated using the definite variable or variables (Momeni and Faal Qayum, 2011).

**Table 1:** Descriptive statistics of research variables

variable	Mean value	Standard deviation	variance
Market orientation	3.274	0.762	0.580
NPD orientation	3.424	0.859	0.739
NPD process (pre-development stage)	3.265	0.744	0.554
NPD process (development stage)	3.256	0.733	0.537
NPD process (commercialization stage)	3.256	0.702	0.493
NPD program success	3.274	0.762	0.580
Firm performance	3.196	1.0263	1.053

The coefficient of determination ( $R^2$ ) is squared coefficient ( $R$ ) and considers the proportion of variance in the dependent variable selected by the set of independent variables for the model explanation. The coefficient of determination is used to understand how independent variables can well predict the dependent variable. Before using linear regression, the following conditions must be fulfilled:

1. There is no correlation between the model errors; it means that the errors must be independent of each other.
2. Errors should be normally distributed.
3. The predictors should be linearly independent

#### 4.2. Hypotheses test

After reviewing the requirements for regression, hypotheses were tested using this method. Table 2 provided results of hypotheses regression testing with standardized coefficients, non-standardized coefficients, modified coefficient of determination, significance level, etc. In all hypotheses testing, the significance level was less than 0.05.

In analyzing the first hypothesis, the results of regression test indicated the significant effect of independent variable (market orientation) on dependent variable (NPD orientation) with coefficient equaled to 0.79, which meant that per unit increase in the independent variable (market orientation), 0.79 units were added to the dependent variable (NPD orientation). Moreover, the modified coefficient of determination (0.49) indicated that the independent variable affected the dependent variable rather well (supporting H1). Similarly, in analyzing the second, third and fourth hypotheses, the results of regression test indicated the significant

effect of independent variable (market orientation) on dependent variables (NPD process (pre-development, development, and commercialization stages)) with coefficients equaled to 0.72, 0.75, and 0.58, respectively, which meant that per unit increase in the independent variable (market orientation), 0.72 units, 0.75 units and 0.58 units were added to the dependent variables (NPD

process (pre-development, development, and commercialization stages)), respectively. Moreover, the modified coefficients of determination (0.54, 0.60, and 0.39) indicated that the independent variable affected the dependent variables rather well (supporting H2, H3 and H4).

**Table 2:** Hypotheses regression test results.

	Dependent variable	Model	Non-standardized coefficient		Standardized coefficient $\beta$	T statistic	Significance level	coefficient of determination	Modified coefficient of determination
			B	Standard error					
H1	NPD orientation	constant	0.734	0.285		2.575	0.012	0.492	0.486
		Market orientation	0.791	0.085	0.701	9.332	0.000		
H2	NPD process (pre-development stage)	constant	0.904	0.234		3.869	0.000	0.545	0.540
		Market orientation	0.721	0.069	0.738	10.379	0.000		
H3	NPD process (development stage)	constant	0.807	0.214		3.764	0.000	0.604	0.600
		Market orientation	0.748	0.064	0.777	11.718	0.000		
H4	NPD process (commercialization stage)	constant	1.365	0.255		5.362	0.000	0.392	0.385
		Market orientation	0.577	0.076	0.626	7.621	0.000		
H5	NPD process	constant	1.968	0.280		7.035	0.000	0.203	0.194
		NPD orientation	0.390	0.081	0.451	4.789	0.000		
H6	NPD process (development stage)	constant	1.317	0.225		5.850	0.000	0.468	0.462
		NPD orientation	0.583	0.066	0.684	8.897	0.000		
H7	NPD process (commercialization stage)	constant	1.762	0.247		7.135	0.000	0.303	0.295
		NPD orientation	0.450	0.072	0.550	6.249	0.009		
H8	NPD program success	constant	0.644	0.230		2.801	0.006	0.604	0.600
		NPD process	0.808	0.069	0.777	11.718	0.000		
H9	Firm performance	constant	0.413	0.370		1.115	0.268	0.398	0.391
		NPD program success	0.850	0.110	0.631	7.714	0.000		

Furthermore, the results of table 2 indicated the significant effect of independent variable (NPD orientation) on dependent variables (NPD process, and NPD process (development, and commercialization stages)) with coefficients equaled to 0.39, 0.58, and 0.45, respectively (supporting H5, H6, and H7). Similarly, the results of regression test indicated the significant effect of independent variable (NPD process) on dependent variable (NPD program success) with coefficient equaled to 0.81, which meant that per unit increase in the independent variable, 0.81 units were added to the dependent variable (supporting H8). Eventually, the results of table 2 indicated the significant effect of independent variable (NPD program success) on dependent variable (firm performance) with coefficient equaled to 0.85, which meant that per unit increase in the independent variable, 0.85 units were added to the dependent variable. Moreover, the modified coefficient of determination (0.40) indicated that the independent variable affected the dependent variable rather well (supporting H9).

**4.3. Friedman test**

In this section, the mean values of variables were compared using Friedman test. According to table 3, research variables did not have the same importance, with regard to respondents' opinions. The less mean rank of variable, the more important variable. Therefore, NPD process (commercialization stage) had the least mean rank and the most importance. Table 4 provided  $\chi^2$  statistic, degrees of freedom and significance level. Since significance level is less than 0.05, it was concluded that there was a significant difference between variables.

**5. Conclusion and discussion**

All studies that have been conducted in the context of market orientation, NPD process and NPD orientation support the strong relationship between market orientation, NPD process, NPD orientation, profitability, customer's retention, an increase in

sales and NPD success through products marketing, which affect firm performance significantly.

**Table 3:** Variables mean rank

Variable	Mean rank
NPD orientation	4.35
Market orientation	4.03
NPD program success	4.03
NPD process (development stage)	3.97
NPD process (pre-development stage)	3.96
Firm performance	3.96
NPD process (commercialization stage)	3.90

**Table 4:** Friedman test results

Sample size	92
$\chi^2$	12.9
Degrees of Freedom	6
Significance level	0.006

The results of regression test indicated the significant effect of market orientation on NPD orientation, which was consistent with Baker and Sinkula (2007), Langerak et al. (2007) and Lee et al (2006). The results also supported the significant effect of market orientation on NPD process (pre-development, development, and commercialization stages), which was suggested by Barczak (2012), Mavondo et al. (2005), Morgan et al. (2009) and Langerak et al. (2007). Furthermore, NPD orientation affected NPD process significantly, which was proved previously by Kleinschmidt et al (2007). The significant effect of NPD orientation on NPD process (development, and commercialization stages) was also confirmed before by Madhavaram and Hunt (2008) and Ernst (2002). Eventually, the significant effect of NPD process on NPD program success and the significant effect of NPD program success on firm performance were supported, which were consistent with Langerak et al. (2007), Reid and Brady (2004), Cooper et al. (2003), Menon et al. (2002) and Ruckert et al (2002). Considering the above results, it could be said that market orientation, NPD process and NPD orientation affected firm performance improvement significantly.

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