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Research Article

DETERMINING INVESTMENT PRIORITIES IN PRODUCT DEVELOPMENT OF IRAN SAFFRON (CASE STUDY: NEGIN ZAFARAN COMPANY)

Hosseini Akram Sadat and Mokhtari Ali
[1]*Investigation advisor of Amir Kabir Research center*
[2]*Scientific Staff of University*
**Author for Correspondence*

ABSTRACT
Although new product development and its importance as a new approach for companies are accompanied by risks, identifying engineering factors for investment in development of new products can be helpful for managers in reducing decision making risks. The goal of the present study was to describe planning for investment in product packaging in saffron industry. In this investigation, the affecting factors were determined and rated to elucidate which factor has greater contribution in planning for new product development in saffron industry. The present study is an applied investigation with descriptive-survey methodology. Statistical population included twelve experts and top managers of saffron production selected by Delphi technique. Data were analyzed using main tool (questionnaire) and Excel software ($p \leq 0.15$). Delphi technique and Henderson and Johnson model were used for evaluation of the hypotheses. Results confirmed that competitive advantage factors including branding and packaging quality of saffron are among the major priorities of investment and engineering of new product development and feeling properties including odor and product variation have the lowest priority in saffron product development in Negin Zafaran Company.

Keywords: *Product Development, Competitive Advantage, Quality, Innovation*

INTRODUCTION
New product development is an issue highly acknowledged by investigators, advisors of various industries and business schools in current ear. Gaining proficiency in product development can help organizations achieve their goals and success. New product development is a major strength and also a difficult activity in every business. Business managers and market philosophers agree on the notion that a critical element for long term survival of organizations is success in development of new products (Henry *et al.,* 1989). In defining product development, it should be cited that new product development (NPD) includes a set of growth policies and activities that in different steps, cause slight or total changes and amendments in goods for existing market parts (Copper, 1990). Quick technological changes, increased risks of globalization and expectations of privatization are some of environmental properties met by current commercial organizations. Factors affecting competitive advantage achievement for new product development are increasingly regarded by organizations. It is documented that competitive advantage is obtained if the company is able to develop its products or offer services superior to those of competitors or offer the same products and services in lower prices or higher quality. This won't be achieved unless the company obtains some different production factors ignored by the competitors. The question is during recent decade which factors can help the companies to increase their benefits and get superior over their competitors? Some advantages are gained only when the company is their first user in the market. Some other advantages called unfair advantage are obtained when the company can access some factors that are inaccessible for the competitors by which the company makes competitive advantage to achieve product development. Indeed, new product development is necessary when organization meets a competitive environment. New product development is a major issue in pioneer food production industries. Movement of such industries toward competitiveness is caused by possessing marketing units, market investigation and professional research and development that will be intensified in close future. In this regard, innovation in saffron products and new product development plays the main role in competitiveness of

saffron industry. The necessity of the present investigation can be revealed by regarding importance of new product development and its role in achieving competitive advantage in current competitive world.
New product development is a set of activities and policies resulting in slight or full changes of the product in current market through various steps of production (Cooper, 2000).
In a general definition, new product development is a process to develop a new product that is different from current and previous products and so new product development can be considered as a type of product innovations in which, new and distinct products are described and the word "product innovation" refers to emerging and freshness.
In another definition, new product development is defined as a collection of activities delivering customers' orders, market demands and technological progresses through product design and production (Dougherty 1992). The concept of process in new product development refers to a logical movement originating from a certain point and ending at another one. It should be mentioned that management of new product development is process-oriented not duty-oriented meaning that in management of new product, optimization of the whole process is regarded via product development planning by participation of all functional sectors and not slight optimization of each section involved in the project. In fact, new product development is process for suitable execution of which whole the firm should be motivated (Weelwright and Clark, 1992).
According to Mormen and Minner (1997), new product development includes slight (gradual) and fundamental development of product.
Gradual (slight) product development: Savoitti and Metcalfe (1984) introduced gradual product development as an improvement in the product by which some new features are added to existing ones and some features are omitted. Ireland and Sirmon (2003) defined new product development as learning better exploitation of current product properties for achieving competitive advantage. The following classification was proposed by Booz, Allen and Hamilton advisory center for new product development:
1- New-to-the world: novelty compared to existing products; such as invented products such as polaride camera, and the first laser printer
2- New product line: products that are produced for the first time in the company, however these products are not new for the market.
3- Additions to existing product lines: products that are produced by extension of production line for current market of company's products
4- Improvements and revisions of existing products: the improved products can be introduced as new products. In fact all current products are improved version of previous ones.
5- Repositioning: products for which new applications are found can be classified as new products that have recently entered the market.
Target costing concept originates from production firms' demands to improve product cost and development. Traditional management methods of costs, accumulated cost and cost allocation which have been practiced for a long time can't be proposed as efficient tools for new product development, planning and cost management. Lukami and Smith (2000) maintained that this is because of the fact that these methods are concentrated on product cost, preferentially by customers' expectations, and product designing. Traditional methods are not future-oriented and ignore cost demand, cost stimuli or necessity for function and product.
In traditional approaches, customers' demands other than product cost are neglected (Yazdifar, 2011). Butcher (2009) maintained that over engineering of products frequently occurs which is not in alignment with customers' demands and priced inappropriately (Hematifar, 2009). Supply chain dimensions are not regarded in planning and product costing as they deserve. Need for improvement of productivity and production quality mas made many firms adopt new cost management approaches such as activity oriented cost management, Kaizen costing, on time production management, total quality management and target costing. Compared to traditional management and cost management approaches, target costing is the best tool for improving product development, pricing, sale costs and production management (Masoudi, 2013).

Research Article

Characteristics of Target Costing and Product Development

According to international consortium of improved production firms, target costing is a collection of managerial tools and methods whose goals are: a) directing planning and designing activities for new products, b) providing a base for controlling next performance phases, c) ensuring that products gain the defined profitability goals through their lifetime (Yazdifar, 2011). Target costing is more concentrated on costs and less concerned with customers' demands. Considering its key factors, target costing resembles a planning tool dealing with production and cost aspects via product total lifetime perspective; it is also a multifunction process which is indeed a strategic planning (Swenson and Everart, 2011).

As a necessity for competing in global competition, new product development has gained much attention. Before making decision about introducing the products in to market, the products should be profitable through their lifetime. Target costing can be an indispensible part of new product development because it makes the cost an input in product development process rather than a consequence of product development process (Cooper *et al.,* 1999). Since target costing is future-oriented and a purposeful and integrated activity, it is more effective when applied early in product development process.

Target Costing Process

Target costing process is composed of s number of individual activities and decisions which begins with calculation of product and its properties and qualities and the best sale price which is probably the most important step in costing process. The product itself finally determines its own production and sale cost based on customers' demands and concerns. What does customer want? Which designing properties does customer like or dislike? Does he have demand or not? Understanding the customers regarding quality, price and value is also important. Marketing search is applied to determine customer wanted price regarding function, quality and products of the competitor company. Anyway the product should be future-oriented and possess critical and characteristic properties for ensuring distinction of the product (Hematifar, 2009). The second step in target costing process is determination of favorable profit. And it should cover planning costs, necessary extra investment, working costs and sale costs throughout product lifetime. Profit margin should enough to support sustain of investigation and development about the product (Hematifar, 2009). Calculating product allowable cost is the third step in target costing. Allowable cost refers to the difference between sale price and profit margin. The fourth step in target costing process is to determine identity and quantity of production and marketing costs. In target costing process, integration of various affairs including accounting, purchasing, marketing, production, support, preparations and engineering is necessary in planning activities to reduce costs and unnecessary works. Since target costing approach is a method of reserves multitask group in production and supply chain activities, although reduction of costs is usually positive, the goal of target costing is cost optimization rather than cost minimizing. This issue is compatible with techniques such as value engineering performed for product redesigning, production processes and distribution systems and its services (Hematifar, 2009). Although a production firm is committed ethically and legally to retain its employees' and customers' health and legal and monitoring rules are increasingly intensified, the firms should minimize their costs as much as possible. However, cost saving is not possible in some circumstances and product properties should be investigated for segregation of cost saving. Supply chain should be carefully investigated in cost reduction opportunities and be benefited from it; this is much more important than target costs. Supply management and purchase activity in early stages of target costing in the time of developing surface-part costs and realizing activities and amendments to achieve the costs is very critical. Moreover, supply management can play an important role in managing, monitoring and improving the costs in supply chain (Woodcock, 2000). Furthermore, firm and supplier should be in coordination and collaboration for developing and improving the products and enhancing customers' satisfaction and value (Bently, 2000).

Marketing and New Product Development

Marketing plans and strategies are effective when they are in accordance with internal weaknesses and strengths and external opportunities and threats. Marketing planning should be performed by assuming that current markets has changed their traditional mode and firms regard innovation and added value as a

benefit and competition factor and by extension of information systems in production and marketing, necessity for creating changes in the products is better felt. These revolutions have challenged marketing in selection of product and target markets. In product development, those plans that help the firms achieve ideal position, concentration and cost leadership should be applied (Jefreh and Mamaeghani, 2007). One of these strategies is cost leadership strategy. The goal of this planning is to gain superiority in competition via production with the lowest possible cost compared to competitors. Another model of product development is step by step model proposed by Cooper. The number of steps in this model varies from one firm to another one and is distinctive based on organization and production type. This model begins with idea finding and ends at production. Each step is evaluated by product development team and directed to the nest step after eliminating inappropriate cases.

Product Development Strategy Toward High Level Customers' Values

Development strategy or simultaneous engineering is a managerial strategy which can significantly reduce the duration of product development cycle; moreover this strategy can enhance firm ability to achieve organizational values up to world class. This strategy is formed based on team synergy property using comments of various parts with multiple functions.

Table 1: Cooper's 6-step model for new product development (Cooper, 1990)

Project evaluation	**Final confirmation and tentative production**	**Final appraisal before production**	**idea evaluation (from market and economical perspective)**	**Idea sorting**	**Idea finding**
Processes and plans for each process					
Commercialization	Market test	Idea development	Selection of the best idea	Conceptualization of Idea	Conclusion on ideas
Performing regular marketing plan in target markets and adjusting previous plans and implementing necessary plans during product lifetime by the team	Exact marketing plan with proper mixes, conclusion and financial analysis and prediction of product for market	Setting plan details including marketing, details of production and financial plan and readiness for production	Proposing suitable plan, plan test and presenting management, financial and production plans and reporting by product development team	Technical, financial and primary evaluation and analysis in market	Idea collection and storage

Other factors for success of simultaneous engineering include target oriented time and plan, top management commitment, effective relationship between all sets and progressive planning levels and strong leadership of plans (Rezayi, 2001). The first critical step in new product development is accurate evaluation of customers' real demands. Typically customer's value can be classified in functional, costs, trust and properties fields. In new product development strategy or value engineering, product definition phase is performed to ensure that customer's values in real designing of product are integrated and firm goals are achieved. Then, in product development phase, products are designed for production. In fact, product development strategy enables the firm to deliver the product to market on time by special methods. Since whole the process is shortened and has the highest efficiency and development cost is reduced, this reduction of cost can be observed in lower initial price and higher customer's value (Roff, 2005).

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Evaluating Saffron Product Development Conditions

Iran possesses good advantage regarding availability of primary production factors of saffron product development such as good weather, skillful labor and proper land. However, competitive advantage resulting from primary factors is delicate and unstable in international markets. Since a large portion of saffron added value resides in its foreign business circle and the value is based on improved factors such as updated and scientific marketing system, it is necessary for improvement of such added value to consider factors such as educated and skillful labor who are professional in production and marketing, equipment, processing and packaging localized based on Iran properties and accumulated knowledge resources in universities and research centers.

Regarding demand conditions, it can be said that if domestic market size is large, investors can be benefited from scale-based saving.

In countries in which internal buyers are the most aware and fastidious ones, domestic producers have to follow higher standards and response to more difficult needs. Predictability makes it possible to invest under more reliable conditions.

Regarding saffron related and supporting industries it should be expressed that without considering investment in support equipment and packaging, probability f or success at international level is weak. Therefore, to assist with value added to foreign commerce of saffron, supporting industries should be fortified.

It is obvious that creating and improving added value is possible by identifying and eliminating non value adding activities and promoting value adding and generating activities. Thus, priority identification in investment in saffron product development is highly important. Some factors able to generate added value to saffron product development include (Ehtesham, 2010):

- Reduction of product cost in production and processing section
- More facilitation concerning availability of product for customer
- providing additional information for customers regarding usage way, application and so on
- Providing more quick services to customer
- Product adaptation based on customer's special demands
- Following standard principles and quality to provide customer's health safety
- Managing the market and destructive competitions

To achieve saffron product export and sustainable development, it is necessary to make variation in saffron product and to prepare growth policy. The following methods should be considered for identifying growth opportunities and achieving sustainable development (Ehtesham, 2010): Market penetration, concentration on new markets, extension for development of new products and development in variability of saffron products.

Finally it should be mentioned that identifying customers' tastes and demands for providing saffron products that are proportional to target customers' demands has the highest importance for saffron product development.

Awareness about these demands and tastes is the most important determinant in decision making and buyer selection. Therefore, after preparing a comprehensive list of all customers' possible demands they should be screened so that after classification of issues and adopting the most important items and working on them, saffron product development can be completed. This issue should be considered by experts and professionals. In the present study, we tried to identify investment priorities for saffron product development based on market information and experts' and customers' comments.

Background

There have been many investigations on saffron new product development and factors influencing this issue which show different results. In the table below, some investigations conducted on new product development in various parts of market that have high similarity with the present study are cited. It should be mentioned that there has not been any study specially conducted on saffron product development, and most of them are concerned with saffron export marketing analysis and investigation of capacities, importance and necessity for saffron export.

Investigation Goals

In the present study, Henderson-Johnson for identifying investment priorities is presented and it is tried to evaluate investment priorities for development of saffron products in Negin Zafaran Company among the competitors based the mentioned model.

- Simultaneous engineering of investment on new product development in Negin Zafaran Company

Table 2: Methods of market develoment for saffron products (Asenov competitive strategy matrix (1957))

	Current products	**New products**
Current markets	2- market penetration	1- generation of new product
New markets	3- cncentration on new markets	4- variation of saffron products

Table 3: Literature review on new product development

Author(s)	**Year**	**Factors affecting success of new product development**
Gupta and Wilemon	1990	Concentration on customers' real demands
Cooper	1993	Quick and on time definition of product development
Shepherd and Ahamd- Cooper and Adget	2000 and 2002	On time delivery of product in to market
Ziger and Midik	1990	Exploiting regular and official process for product development
Brown and Wisenhardet and Pingliue *et al.*,	1995	
Lin *et al.*,	1996	Using previous projects experiences for product development
Bimats	1992	Integration of activities of marekting and research and development sections
Sarmad and Mamaghani	2008	Executive model of product development
G.H. roff	2004	Simultaneous engineering
Hosseini and Iratban	2003	product development strategy
Ameli and Karbasian	2012	

Hypotheses

It seems that branding and distribution network have the highest priority for investment on new product development in Negin Zafaran Company. Moreover, price and saffron packaging have the lowest priority for investment on new product development in Negin Zafaran Company.

An applied survey methodology was used in this investigation. The model was evaluated by submitting the questionnaire to saffron buyers and experts of Negin Zafaran Company and by using Delphi technique. A method for achieving group knowledge is Delphi technique which is a method for predicting and assisting in decision making throughout rounds of surveying, data collection and finally, group consensus (Sarmad, 2007).

Statistical population was composed of two groups of saffron customers and experts of Negin Zafaran Company. Customers group included 200 people and experts group was composed of 8 experts of Negin Zafaran Company. According to Henderson-Johnson model (2003) and based on Morgan table, 103 people persons were selected for column a, and 103 persons for column b. Morgan table is used when neither population variance nor success/failure probability is known and statistical formulas can't be used to estimate sample size (Habibi, 2011). Regarding presence of these conditions in the present study, sample size was extracted least statistical population.

In the second step, Delphi technique was used to screen and identify product emotional criteria. According to Klinton (1997), 5 to 10 persons is sufficient if a combination of experts with various proficiencies are used (Samerwil, 2008). Regarding reliability and validity, it should be mentioned that since all the criteria have been considered in this evaluation and the author is not able to take special

orientation in designing the questions, so questionnaires based on pairwise comparisons are innately valid (Mehregan, 2008).

RESULTS AND DISCUSSION

Two hypotheses were proposed in the present study. After conducting analyses resulting from Henderson-Johnson model, answers of the hypotheses are presented in table 4. Moreover, engineering priorities of investment on saffron product are presented in a graph.

Table 4: Results obtained by engineering of investment priorities for saffron product development

Product brand	Moisture content	Product diversity	Product origin	Network distribution	Advertisement	Price	Color quality	Packaging	Odor and smell		
1	3	8	4	7	7	6	5	2	9	Investment priorities	
2100000	416667	54857.1	157500	57600	57600	102857	112500	617143	50625	Conclusion (Q) (I.M.P)	
50	100	100	50	100	100	50	50	100	50	Sensitivity product (P=N.O)	
5	10	10	10	10	10	10	5	10	5	Gender sensitivity (O)	
10	10	10	5	10	10	5	10	10	10	Age sensitivity (N)	
150	50	4	20	4	4	20	40	20	30	Competitive-financial product (M=j.k.l)	
5	5	1	1	1	1	1	1	1	1	Technologic competitor (i)	
3	1	4	4	4	4	4	4	4	3	Financial attraction (k) price tension	
10	10	1	5	1	1	5	10	5	10	Product development (j)	
280	83	137	158	144	144	103	56	309	34	Technical product(I=f.g.h)	
2	1	1	1	1	1	1	1	2	3	Degree of difficulty (h)	
15	15	15	15	15	15	10	5	15	1	Technical difficulty (g)	
9.3	5.6	9.1	11	9.6	9.6	10	11	10	11	Customer orientation (f=a.e)	
1.2	1.1	1.1	1.2	1.2	1.2	1.1	1.1	1.1	1.1	Improvement (e)	
7	10	8	7	6	6	8	9	8	9	Goal (d)	
8	8	8	8	8	8	8	8	8	8	Competitor's power (c_2)	Market Research
7	8	8	9	7	7	7	8	8	8	Competitor's power (c_1)	
6	9	7	6	5	5	7	8	7	8	Our power (d)	
8	5	8	9	8	8	9	10	9	10	Market demand (a)	
18	16	12	12	12	14	14	14	18	15	Total (T.H)	
4	2	2	2	1	1	2	2	3	1	Good code	
4	3	3	4	3	4	4	4	3	4	Product type	
3	4	2	2	2	3	3	4	4	4	Packaging date	
4	3	2	1	2	3	2	2	4	4	Exploiting license	
3	4	3	3	4	3	3	2	4	2	Weight	

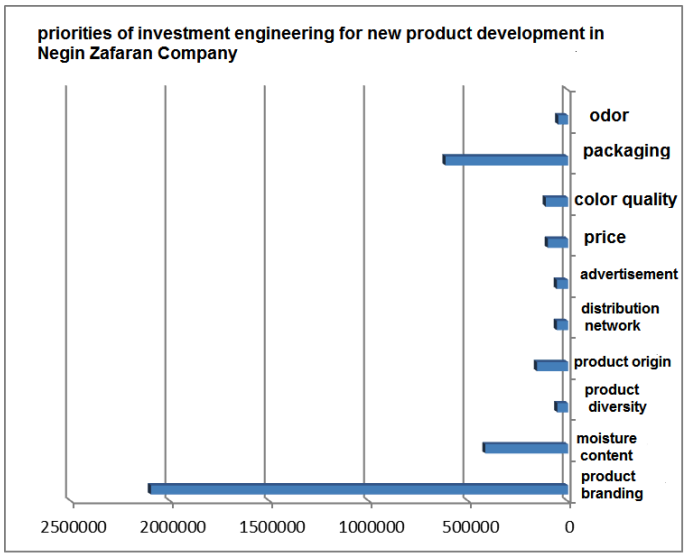
Results of product development engineering were extracted through five phases according to Henderson-Johnson model. In the first step, relation level between saffron technical and emotional properties was determined based on saffron experts' comments and their average values were recorded as pairwise comparison and the results of each emotional property were recorded in T.H column. In the second phase, we dealt with market research and via saffron market demand survey and then by our own and competitors' capabilities and capacities including "Adaman and Abbaszadegan" Saffron company and also based on short term goals of Negin Zafaran Company, the goals were quantitatively defined according to the model.

In the third phase improvement rate of Negin Zafaran Company for each property of product development was determined based on the results of market research and as can be seen from the table, most improvements are in advertisement and saffron distribution network that should be considered by Negin Zafaran Company. Moreover, by determining customer orientation, technical difficulty and difficulty degree of Negin Zafaran Company, technical product was calculated.

In the fourth phase, product financial development was determined based on product properties so that each emotional property of saffron product was reviewed by regarding if it needs low, moderate or high capital, and then financial attraction of each property was recorded by expert panel according to its price tension. Moreover, competitors' presence and effects regarding each emotional property was revealed and finally, product financial-competition product for each emotional property was obtained; results indicated that regarding competition, product branding has the highest score.

In the fifth phase, sensitivity of each emotional feature was evaluated based on gender and age sensitivity showing that females are more concerned with product odor, color and brand and as a conclusion, sensitivity multiplying product regarding packaging, advertisement, product variation and moisture content of saffron are considered by the customers.

In the sixth phase, product investment priorities were obtained by calculating final product resulting from technical, financial-competition and sensitivity multiplication. These results are depicted in the following graph separately for each emotional property of saffron product for engineering of investment priorities in Negin Zafaran Company.



Graph 1

As can be seen, results of Henderson-Johnson model regarding the hypothesis 1 indicated that product branding was determined as the most important priority in investment engineering of saffron product development in Negin Zafaran Company, followed by packaging. Regarding the second hypothesis, odor and variation had the lowest priority in investment priority engineering of saffron product development in

market. This conclusion is highly important because investment is one of the most effective components in production development.

Saffron product development plan based on Henderson-Johnson is a product development plan based on financial components that relies on product reliability and stability based on evaluation of new product development process. Application of this model in evaluation of saffron product development results in designing, improvement and processing development of the products in Negin Zafaran Company. This consistent model determines investment priority for saffron product development using a combination of market research and product technical and emotional properties; therefore it occupies a special place regarding the methodology because new product development based on customers' demand is defined as "a systematic method and process for identifying and establishing customers' qualitative demands in every step of product generation" (Ehtesham, 2010). In the present study, instead of developing and packaging at first, we tried to identify product development priorities based on customers' demands and competitors' market status and then improve product development in Negin Zafaran Company.

Moreover, by reviewing literature it is revealed that most investigations have been carried out about product development based on marketing and technological factors with the exception being the study conducted by Sarmad and Mamaghani (2008), simultaneous engineering (2004) and new product development strategy (2012). Regarding market orientation and planning, these investigations are to some extent similar to each other, but there has not been any investigation on saffron similar to the present study. Finally, based on the results obtained in the present investigation, it is recommended to increase demand and extend saffron export to global markets via exploiting appropriate pattern of packaging and branding; because despite the fact that Iran has the highest contribution in global saffron production, Iran saffron has not been suitably introduced in domestic and international markets. Based on the results of the present study, saffron product development should be aligned with proper branding and packaging to achieve success in saffron product development in primitive and modern markets. Moreover, it is recommended to Negin Zafaran company to improve its branding via three short term, mid-term and long term strategies for achieving saffron new product development, so that the company become able to compete with its competitors and gain a larger contribution in the market by relying on its own strengths.

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