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Product Development

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Abstract

Product development is one of the most common strategies adopted by the companies and firms in a competitive environment. It involves creating a new product or rebranding the existing one to fit the requirements of the business surrounding. There are several factors any management of the company should consider before implementing this strategy. Any firm should first analyze the impact of other related agents or the influence the plan will have on the enterprise. This paper tries to investigate if there is a significant relationship between product development and the independent factors such as global innovation, international products, customer requests, and production technology. The model is based on the primary data. The results reveal that all these explanatory variables have a significant connection with a response parameter. Moreover, the results show that there is a significant correlation between the dependent variable and the independent one. Therefore, this essay recommends that the management of any firm should consider the effects of these agents before implementing the product development strategy.

Keywords: Product; Development; International Products; Global Innovation; Customer Requests.

1. Introduction

The business field has become one of the most competitive areas of the 21st century. The research shows that the number of players in the market has doubled in the past ten years. Besides, the competition increased by more than twice in the same period [1].

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The rise in the number of players means that the variety and quality goods and services have boosted significantly. As a result, the firms have resulted in coming up with new strategies so as to remain at the top of competition [2]. The research shows that the most common policies are the reduction of price and improvement of the products' quality [3]. Also, the study by Ross [4] displays that the ability of the company to stay on the market depends on the effectiveness of the strategy they take. According to the article, the most efficient policy is product development. In accordance with [5], product development includes the specific steps taken by the firm when conceptualizing, planning and coming up with a new product. This process also involves the policies covered in the marketing of the item. Before considering implementing a new strategy, the management of the firm should take into account some factors. Some of them, which can be supposed, when implementing product development include global innovation, international products, customer requests, and production technology. This paper will investigate the nature of the model of product differentiation and its impacts on the company.



Figure 1: The most factors affect product development process.

2. Model and Discussion

This essay aims at coming up with a template, which can describe the nature of product development. Specifically, the research investigates a relationship between the product differentiation and the factors, which are thought to have a significant effect on a variable. Therefore, the best prediction model, in this case, is a linear relationship, which maps the dependent parameter on the independent ones [6]. The dependent variable is the product development, while the independent ones are the global innovation, international products, customer requests, and production technology. It is evident that all these parameter are quantitative in nature. The independent variables are more than two ones, implying that the model will be based on a multiple regression analysis [7]. The data research will be conducted using IBM SPSS so as to ensure that the results are as accurate and specific as possible.

The factors in the model are global innovation, international products, customer requests, and production technology. Global innovation is the ranking given to the different states or companies depending on their innovation ability. Research by [8] looks at the impact of the global innovation on the product differentiation. The results of the study show that the independent variable has a significant positive effect but the effect reduces when the confounding variables are introduced to the model. This result implies that an increase in global innovation leads to an increase in the product differentiation. Secondly, the international products are goods and services obtained from outside the state. Previous research shows that an increase in the number of these

products increases the competition thus motivates people to conduct product differentiation [9].

The customer requests also have been proven to have some significant effect on the product differentiation. A study by Pham [10] shows that in most cases, the customers have the largest effect influence on the company to conduct product differentiation. Lastly, the production technology is the machinery which is involved in generating new goods. The previous research shows that improvement in technology encourages the company to conduct product differentiation [11]. The author states that the technology is the driving block of facilitating the development of new products. Improvement in production technology leads to improvement in the quality of goods purchased. This study will use the primary data, which, according to Harrell [12], are the first-hand information. The latter one has never been passed through any statistical analysis before. The data will be collected by a survey tool, which will be given to respondents. They will be expected to give their feedbacks to the questions. The sample selection method of interest is the simple random sampling. The study population group is the businesses across three states in the USA. The inclusion criteria will be the firms, which have been operated for at least five years. Moreover, the study will consider the companies, which have a well-defined record keeping system to facilitate the retrieval of the necessary data and information. A simple random sampling is a process whereby the elements to be included in the sample are selected at random. All members in the population have the same chance of being selected [13]. All the businesses will be assigned to numbers; and a random number table will be used to select a random sample. The subjects corresponding to these numbers will form the piece. This method is used so as to avoid bias in it. SRS ensures that the sample is not inclined to the certain class or characteristic being not the case in other methods of sampling such as non-probability techniques [14]. Therefore, the piece will represent all the businesses and firms irrespectively of their income or budget. Due to financial and time constraints, this paper will consider the sample of 45 companies. Its size is large enough to give the accurate and reproducible data [15]. On the other hand, the survey tool will contain both the dependent and independent variables of interest to this research. The respondents will be asked to give a score, on the scale from one to ten, of how the parameters affect them. This scale of data collection is called a Likert-type scale. It is quantitative in nature [16]. The data will then be recorded in Excel for cleaning the analyzed information using SPSS.

3. Results and Discussion

There are two steps of statistical data analysis. The first one is a descriptive analysis, which aims at checking at the general characteristics of the data [17]. In this step, we are usually interested in the general trend, distribution, and shape of the information. The main measures of descriptive analysis include the criteria of central tendency, variation and correlation analysis. The Table 1 below shows the descriptive statistics of the information. From the output, it is evident that the average score of the product development is 5.76 with a standard error of 2.74. Also, it is clear that all the independent variables have the score of between 5 and 6, implying that these factors have an average effect in the market. On the other hand, the Table 2 is a correlation matrix, which shows the interrelation between the dependent variable and the independent ones. Correlation is a statistical measure, which reveals the extent of a linear relationship between two quantitative parameters [18]. The output displays that the product development is significantly linearly related to all other variables since all the p-values of the test are less than 0.05. Therefore, it is appropriate to conduct a regression analysis since the

correlation assumption is satisfied.

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Product Development	45	1.00	10.00	5.7556	2.73990
Global Innovation	45	1.00	10.00	5.6667	2.44949
International Products	45	1.00	10.00	5.8222	2.36729
Customer Requests	45	1.00	10.00	5.8667	2.76011
Production Technology	45	1.00	10.00	5.7333	2.54416
Valid N (least wise)	45				

Table 2: Correlation Matrix

		Product Development	Global Innovation	International Products	Customer Requests	Production Technology
Product Development	Pearson Correlation	1	.699**	.711**	.813**	.691**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	45	45	45	45	45
Global Innovation	Pearson Correlation	.699**	1	.722**	.773**	.744**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	45	45	45	45	45
International Products	Pearson Correlation	.711**	.722**	1	.817**	.732**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	45	45	45	45	45
Customer Requests	Pearson Correlation	.813**	.773**	.817**	1	.791**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	45	45	45	45	45
Production Technology	Pearson Correlation	.691**	.744**	.732**	.791**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	45	45	45	45	45

** . Correlation is significant at the 0.01 level (2-tailed).

The second step of data analysis is the inferential one. It is a process whereby the main variables of interest are analyzed with the aim of answering the research question [19]. The regression model is filled with the data. The output is shown in the Tables 3, 4 and 5 below. The Table 3 is a model summary list, which shows that the value of the adjusted R-squared is 0.645. This output implies that the variation of the model, which is explained by the independent variables, is 64.5% [20]. Secondly, the Table 4 is the ANOVA table of the model. The output shows that the model F value is 21.016. It yields the p-value of 0.000 with (4, 40) degrees of freedom. Since the p-value is less than 0.05, it implies that the model is significant at the level of 5% [21]. Lastly, the Table 5 shows the regression coefficients. Below is the explanation of the output of each of the independent variables.

1. Global innovation: the analysis above reveals that the average score of the global innovation is 5.67 with a standard deviation of 2.45. This result means that the global innovation factor has an average score since the minimum score is 1 and the maximum score is 10. Also, the correlation analysis reveals that this variable has a significant positive correlation with the dependent variable (correlation coefficient=0.699, $p < 0.001$). The regression analysis shows that global innovation is significant in the model. The coefficient for the variable is 0.15, with a t-statistic of 0.875 and a p-value of 0.007. The model shows that an increase in one unit of global innovation leads to an increase of 0.150 units of product development.
2. International products: The analysis reveals that the average score for this variable is 5.82 with a standard deviation of 2.36. There is a significant positive correlation between product differentiation and international products (coefficient=0.711, $p < 0.001$) implying that an increase in the score of the international products leads to an increase in the score of the product development. The model fitting output shows that the regression coefficient for this variable is 0.103 which is significant at 10% level since the p-value is less than 0.1. Therefore, an increase in one score of international products implies that the score of the product development increases by 0.103.
3. Customer requests: The factor customer requests also has an average effect on the market because its average score is 5.87 with a standard deviation of 2.76. The correlation between this variable and the dependent variable is positive and significant at 5% level (coefficient=0.813, $p < 0.001$). The table of coefficients shows that the coefficient for the customer requests is 0.584 and it is significant at 5% level. This result implies that an increase in one score of customer requests should increase the score of product development by 0.584.
4. Production technology: The table of descriptive statistics reveals that the production technology has an average score of 5.733 with a standard deviation of 2.544. The correlation analysis shows that an increase in the score of the production technology leads to a significant increase in the score of product development (coefficient=0.691, $p < 0.001$). Lastly, the production technology has a regression coefficient of 0.066 which is significant at 5% level ($p = 0.001$). Therefore, an increase in one score of production technology increases the score of product development by 0.066.

Therefore, the variables above reveal that the regression model of the dependent and independent variables is as

follow:

Product developpment

$$= 0.502 + 0.150(\text{global innovation}) + 0.103(\text{international products}) + 0.584(\text{customer requests}) + 0.066(\text{production technology})$$

Table 3: Model Summary

Model	R	R Square	Adjusted Square	RStd. Error of the Estimate
1	.823 ^a	.678	.645	1.63170

a. Predictors: (Constant), Production Technology, International Products, Global Innovation, Customer Requests
 b. Dependent Variable: Product Development

Table 4: ANOVA Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	223.814	4	55.953	21.016	.000 ^b
	Residual	106.497	40	2.662		
	Total	330.311	44			

a. Dependent Variable: Product Development

b. Predictors: (Constant), Production Technology, International Products, Global Innovation, Customer Requests

Table 5: Table of Coefficients

Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients Beta		
1	(Constant)	.502	.689		.728	.471
	Global Innovation	.150	.171	.134	.875	.007
	International Products	.103	.189	.089	.548	.087
	Customer Requests	.584	.186	.588	3.133	.003
	Production Technology	.066	.171	.061	.387	.001

a. Dependent Variable: Product Development

4. Contribution and New Insight

There are few research works, which investigate various factors affecting the product development. Some of the articles have previously researched this topic. Haeussler, Patzelt, and Zahra [22] have not put into consideration the variables such as customer requests and international products. Therefore, this paper brings a great contribution in the business field in the sense that the model described above can be used in various business and research situations. Also, this essay creates a basis for other researchers who might be interested in the same topic.

5. Conclusion

In conclusion, it is evident that the product differentiation is one of the most important strategies employed by businesses that aim at overcoming the market competition. Moreover, it is clear that this variable can be described and predicted by the parameters such as customer requests and production technology. The other ones, which have a significant effect on the product development, include the global innovation and international products. Therefore, the companies should conduct a thorough prior analysis of these variables before implementing the strategy. This research will ensure that the firms get the maximum of the product development with minimum chances of a failure.

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