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## Subject: "Studying the Role of Diversity on Company's Value in Tehran Stock Exchange Manufacturing Listed Companies"

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### ABSTRACT

With the enterprises and production companies' ever-increasing development of technology and progress, the competition to produce better products, as well as higher quality has been more. On this basis the companies, in order to keep themselves in a competitive arena, had tendency to the diversity of refined product. In various conducted researches in the field of diversity, scholars have not reached to clear and stable result about the relationship between the diversity with other organizational variables such as stock returns and risk, performance, and so on, and different results have been achieved focusing the community and various statistical samples. The aim of this study is to survey the relationship between a variety of valuable products in three related, unrelated and totally levels of the company. Therefore, a statistical sample of listed production companies on the Tehran stock exchange in the five-year span 2003 to 2008 was selected and after doing some statistical tests, this result was achieved that there is no significant relationship between companies valuable total, related, unrelated diversity

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## INTRODUCTION

In the latter half of the twentieth century, because of the specialized companies' vulnerability to rapid and unexpected changes of the environment, diversity was converted to an essential basis for the growth and survival of the companies. Increasing the importance of this matter in explaining conducted changes in the shape and structure of organizations and industries; led to develop a wide range of social science different grounds. Each of these researches, by examining the types of companies and diversification strategies, investigated the impact of it on various aspects of the organizations, although in many cases, researchers contradicted each other in the studied samples of the companies, however, the complex of these studies provides us the extensive knowledge in this field.

On the other hand, the diversification is one of the emphatic "endogenous growth theory" entering in the economic literature in the second half of the 1980s in various countries. In the endogenous growth theory, technology is seen as an endogenous issue improving by some variables such as government aid and human decisions. In this theory also progress meant and interpreted as improving in using innovation, practice, diversity of production, human capital, infrastructure, research and development. In this research we try to measure the diversification relation with changes in the company's value by studying the measurement different models of the diversification of the product, breaking it into two "related" and "unrelated" dimensions, we assess the relationship between its dimensions with the value of the company. According to "Ramanujam" and "Varadarajan" variety is the "extent to which the institutions simultaneously, are working in different business activities».

"The related variety comes a time when a company has a different business units, all of which are linked together through many ways. (e.g. similar businesses). In other words, they are shared issues or jointly, are used by the same related businesses in that company. By another look diversity is created when company

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manipulating within the industry itself, but in "unrelated diversification", the company has diversified in areas that have little in common. In other words, it is a kind of strategy in which the relationship between existing activities and new activities of company is not seen.

*Stating the of problem and how to choose a research topic:*

Many of today's organizations around the world are going to increase and to enlarge the size and scope of their business. Perhaps one of the reasons for this is to respond to the multiple needs of the customers. Managers are trying to make the customers loyal to their organization by meeting the needs of clients. For this reason and other technical reasons, such as fulfilling the raw materials and finished products distribution system within the organization, many of the organizations inclined to diversity, so that the large holding companies across the world are established in which may be engaged in quite different economic activities. Now the question is that what effect does the creation of a variety of products and businesses, on financial variables such as the value of the company?

*Research Objectives:*

The main objective of the study: To find the relationship between product diversification with the value of the companies in which it is the first objective of this study.

The following objectives: to evaluate the survival of the company in the market, to increase companies' profitability, customer oriented and customer maintaining.

*Research hypotheses:*

Hypothesis 1: There is a correlation between the related variation and value of companies. Hypothesis 2: There is a correlation between the unrelated variation and value of companies.

Hypothesis 3: There is a correlation between the total variation and the value of companies.

*Research Method:*

Research method, considering the essence, is in the form of solidarity and considering the target it is applied one. This research was conducted within the framework of inductive – inferential reasoning. Meaning that theoretic bases and research background in the format of inductive through library studies, scientific articles and collecting the statistical information to reject or approve the hypotheses are inferential.

*The conducted studies considering the variation abroad:*

In relation to institutional diversity and other variables relating to organization (such as performance, profitability, risk and return,) many studies have been conducted so far. But the results of these researches contradict each other in many situations and cases. For example, the relationship between diversity and organizational performance has been the subject of many studies in previous years. (Since 1971 onwards) specialists, considering the relationship between these two variables, have found three opposite results. Some considered this relationship as positive, some people have found a negative relationship between these two variables and other researchers did not find any relationship between them. So regardless of how to measure diversity, the literature of diversity has failed exploring the relationship between diversity and organizational performance. Surveying the diversity relation with other variables, such as ambiguity exists. Among the conducted studies, one can point to the following cases:

"Williamson" argues that variation could be made due to need to create and develop the company's domestic capital markets. "Weston" and "Mansynka" found that companies set (Conglomerate) had a better growth rate than companies without diversity. "Monte Gomry" In 1985, found that companies having a wide diversity, having low market share than companies with lesser diversity and attend in markets with lower levels of profitability and lower levels of focus. "Ramlet" found that companies making greater diversity have gained less profitability. "Betties" and "Hall" by applying the efficiency of assets and risks as the criteria of organization's performance, concluded that there is a direct relationship between return and risk with unrelated diversification strategy. "Monte Gamry" and "Singh" by using the return on equity as a measure of performance found that companies involving in single and related businesses, having the beta coefficient approximately equals to the beta portfolio of the market, but those companies creating unrelated diversity having greater beta than beta of market.

"Grant" and "Jammie" and "Thomas" during the studies among British companies came to the conclusion that diversity is positively related to the profitability of companies. "Amit" and "Leonat" found that those companies having less the return and risk, usually creating diversification unrelated. Some researchers, such as Kampa and Kdya by investigating all the companies in composting industry sector since 1985 to 1997, examined the effect of diversification on the company's pay policies. They found that more diverse companies pay more cash to their shareholders. Dennis found that the effects of industrial diversification on firm value are negative and there is a negative correlation between diversity and performance. Highland empirically analyzed

the company with regard to attitudes of deputation and found that diversified companies have more cash. In 82 studies investigating the relationship between diversity and performance during the past 3 decades, Palich concluded their 55 research in these terms that diversity is profitable to a specified point and more resulting performance problems.

#### Domestic conducted research:

A dissertation was done in by Mr. H. Ahmadian in 2004 entitled "Evaluation of the relationship between total diversity, related diversity and unrelated diversification in stock market manufacturing companies with their risk and returns of shares " at Tehran University.

Considering the statistical sample in 2010 he found out that there is no relationship between diversity of products and share and return risk . In 1379, another dissertation entitled "The relationship between an expanding variety of manufacturing companies listed in Tehran Stock Exchange, shares of the company reducing risk" by Mr. M. Hakim Javadi at Tehran University has been done.

About the company value one can point to the " To investigate effect of currency rates on company's value in iran" by Hassan Qalibaf and "investigating and explaining the relationship between the cash components and accrual of accounting earnings and the value of the company" by Hamid Rood neshin. Surveying the conclusions of these studies indicate that different results, at home and abroad, has been made in this area. Perhaps One of the reasons for this, is using different criteria to measure the diversity and value of the company and other organizational variables. But in general, these differences showing ambiguity in the background of related research on a variety of products.

#### Models used to calculate the variables:

##### A: Diversity:

To calculate the variation, the standard and measure of "entropy" is used. In 1979, "Jacquemin " and " Berry " defined the entropy measure of company's diversity as follow: the weighted average of company's diversity in different sectors. Palpo acknowledges this concept better: "entropy" is the weighted average of company operations share in different parts of the company rendering . in this average weight is the inverse logarithm of the operations' rate in every section. Therefore, the total variation can be calculated as follow:

$$TD = \sum_{j=1}^M \sum_{i=1}^N p_{ij} \ln \left( \frac{1}{p_{ij}} \right) \neq 0 \quad p_{ij}$$

$p_{ij}$ = the company selling rate in  $i^{\text{th}}$  business of  $j^{\text{th}}$  company to company total sale.

$N$ =: the number of involved businesses participating in that activity.

$M$ = the number of involved industries participating in that activity.

Selection the number of industries and businesses is conducted in the 2-digits and 4-digits ISIC codes. United Nations has considered specific classification system called ISIC in order to classify all economic activities, at all levels. In this classification, a special code is considered for each product indicating its profile and specification internationally. This criterion's unique characteristic to other criterion is that it can be changed in a way being applied to measure the related and unrelated diversity. reached this conclusion by accurate measuring this criteria that entropy equation) Hall, in some cases, is not considered a suitable criterion for measuring diversity. He then extended a measure as " entropy revised benchmark " which would greatly increase the accuracy of the measured variation of the companies.

1. The components that represents the number of sectors.

2. Components indicating how the amount is distributed between the various operations..

$$TDsco = \left[ \sum_{j=1}^M \sum_{i=1}^N p_{ij} \ln \left( \frac{1}{p_{ij}} \right) / \left( \ln M + \sum_{j=1}^M p_j \ln N_j \right) \right] (\bar{N} \cdot M)$$

$$RDsco = \left[ \left( \sum_{j=1}^M p_j \sum_{i=1}^N \left( \frac{p_{ij}}{p_j} \right) \ln \left( \frac{p_i}{p_{ij}} \right) \right) / \left( \sum_{j=1}^M (p_i \ln N_j) \right) \right] \bar{N}$$

$$UDsco = \left( \sum_{j=1}^M (p_j \ln \left( \frac{1}{p_j} \right)) / \ln M \right) M$$

In this relations:

RD sco: related diversity score

UD sco: The unrelated diversification

TD sco: total score of diversity

$p_{ij}$ : the portion of operations (sales) of company in the  $i^{\text{th}}$  business of  $j^{\text{th}}$  industry.

$p_j$ : the portion of operations (sales) of the  $j^{\text{th}}$  industry.

$M$ : number of industries (separate ISIC two-digit code)

N: number of existing businesses (four-digit ISIC codes separately)  
 N<sub>j</sub>: total number of businesses in the j<sup>th</sup> industry.

#### B. The company value:

Tobin's as the index of value of the firm is equal to the ratio of market value to book value of the company's business. The company's market value equals to the sum of the ordinary market share value and book value of the firm debts.

$$Q = \frac{M.V.S + B.V.D}{B.V.A}$$

MVS represents the market value of the common stock; BVD represents book value of debits and BVA represents the book value of assets.

#### Population:

All companies being listed in the Stock Exchange at the end of fiscal year of 2003 to 2008, with the exception of "investment", "financial intermediary" and "textile" were selected as sample population. The reason for removing the financial intermediary and investment companies is that these companies don't produce the final product. The textile industry has been removed due to deficiencies in existing companies in this industry; most of the information wasn't available. The purpose of this study was to determine the relationship between diversity and value of companies, so those companies not having product diversity or are of the zero variation should also be removed. Thus, the population of the companies was limited to 54 companies. In fact, the statistical method of calculation is as follows:

The number of companies listed in Tehran Stock Exchange in 2003	380 companies
Number of removed companies during the time span of 2003 to 2007 from stock exchange	27 companies
Number of just entered companies during the time span of 2003 to 2007 to the stock exchange	111 companies
Number of those companies that their fiscal year doesn't end in Esfand	48 companies
The number of textile industry companies going bankrupt and due to lack of information	17 companies
Investment and intermediary companies due to lack of products	24 companies
The number of companies with zero diversity or and companies with incomplete information	99 companies
The number of surveyed companies	54 companies

#### Determining the sample size:

Based on the above image, since the number of participating companies in the study were 54, so it is not necessary to determine the sample size and all of them were examined.

#### A definition of research variables:

##### A: To calculate the product diversity:

The following steps were taken to calculate the range of companies products diversity in the three levels of related and unrelated and total one. First, using data obtained from the Tehran Stock Exchange organization about surveyed companies, all information relating to the companies selling these products were collected in the year 2003 to the end of 2007. By Using the ISIC classification system, for individual products, ISIC two-digit and four-digit codes from the manual of "The international standard classification of economic activities major (ISIC, Rev.3,1) 2002 Statistical Center of Iran" were collected and extracted. It was clear that each company is participant in a number of "industry" and "various business".

- Finally, by applying the above relationships, the variation score in the level of "total variation", "related diversity" and "unrelated diversification" for companies of statistical samples were calculated.

##### (B) Calculating the value of the company:

Tobin's Q index is used to measure the value of the company. Assets and debits book value is achieved from companies' balance sheets. Market value (price of the shares on the stock exchange) was determined from the companies display screen and through the Tehran Stock Exchange software Forum and its specialized website.

#### Testing criteria functions:

These tests include Kolmogorov-Smirnov, regression analysis, diagram of scattering and Pearson correlation coefficient.

Unrelated diversity :U.DIV

total diversity :T.DIV

Related diversity :R.DIV

value of company :VALUE

The 1<sup>st</sup> hypothesis: between related diversity and value of manufacturing companies, there is a significant relationship. First, the Kolmogorov-Smirnov test investigates the "value of company" variables distributed normally.

In this test the  $H_0$  and  $H_1$  hypotheses are as follow:

$H_0$ : The observations distribution is normal

$H_1$ : The observations distribution isn't normal

#### One-Sample Kolmogorov-Smirnov Test

		VALUE
N		54
Normal Parameters a,b	Mean	1.4123
	Std. Deviation	1.06820
Most Extreme Differences	Absolute	.241
	Positive	.241
	Negative	-.189
Kolmogorov-Smirnov Z		1.773
Asymp. Sig. (2-tailed)		.004

a. Test distribution is Normal.

b. Calculated from data.

Because Sig value for the value of company in this test is 0.004 and is less than  $\alpha$  value equaling 0.05, then we reject the  $H_0$  hypothesis by 5% error. Transformation Ln (ln), being used to achieve one variable normalization. we apply Ln on value is one of the normalization variable. Results are as follow:

#### One-Sample Kolmogorov-Smirnov Test

		LNV
N		54
Normal Parameters a,b	Mean	.1617
	Std. Deviation	.56560
Most Extreme Differences	Absolute	.146
	Positive	.146
	Negative	-.085
Kolmogorov-Smirnov Z		1.069
Asymp. Sig. (2-tailed)		.203

a. Test distribution is Normal.

b. Calculated from data.

Kolmogorov-Smirnov test results for related diversity variables are as follows:

#### One-Sample Kolmogorov-Smirnov Test

		RD
N		54
Normal Parameters a,b	Mean	.6677
	Std. Deviation	.59483
Most Extreme Differences	Absolute	.131
	Positive	.128
	Negative	-.131
Kolmogorov-Smirnov Z		.961
Asymp. Sig. (2-tailed)		.314

a. Test distribution is Normal.

b. Calculated from data.

It is seen that the Sig's value for the related diversity (RD) is 0.314, which is larger than  $\alpha$  value, that is, 0.05. Then we accept the  $H_0$  hypothesis by 5% of error, namely, the observations distribution is normal.

1<sup>st</sup> hypothesis regression analysis:

The variance analysis table for this model is as follow:

#### ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.030	1	.030	.094	.761 <sup>a</sup>
	Residual	16.924	52	.325		
	Total	16.955	53			

a. Predictors: (Constant), RD

b. Dependent Variable: LNV

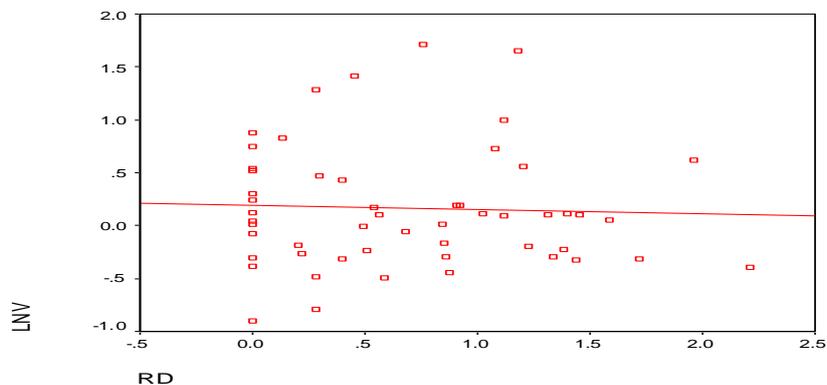
Using image analysis of variance, the test could be done. Based on number results of above table, since the value of Sig is 0.761 and is larger than  $\alpha = 0.05$ . Then we accept the  $H_0$  hypothesis considering "lack of relationship between value (Ln) and related diversity.

$H_0: \beta_1 = 0$  LnY isn't a function of related diversity

$H_1: \beta_1 \neq 0$  LnY is a function of related diversity

1<sup>ST</sup> hypothesis scattering diagram:

THE related diversity and value scattering diagram (R.DIV) is as follow:



1<sup>ST</sup> hypothesis of Pearson's correlation coefficient:

#### Correlations

		LNV	RD
LNV	Pearson Correlation	1	-.042
	Sig. (2-tailed)	.	.761
	N	54	54
RD	Pearson Correlation	-.042	1
	Sig. (2-tailed)	.761	.
	N	54	54

By using this table one can test the hypothesis. If the Sig's value is less than  $\alpha = 0.05$ ,  $H_0$  hypothesis is rejected at the 95% confidence level and we accept that two variables are significantly related. But if the value of Sig is more than  $\alpha$ , we accept the  $H_0$  hypothesis.

The Pearson's correlation coefficient between related diversity and value logarithm is -0.042 showing the inverse and weak correlation.

$H_0: \rho = 0$  two variables aren't correlated

$H_1: \rho \neq 0$  two variables are correlated

2<sup>nd</sup> hypothesis: there is significant relation between unrelated diversity and value of productive companies:

Normality of the unrelated diversity variables is studied with Kolmogorov-Smirnov test

#### One-Sample Kolmogorov-Smirnov Test

		UD
N		54
Normal Parameters a,b	Mean	.9275
	Std. Deviation	.76456
Most Extreme Differences	Absolute	.115
	Positive	.115
	Negative	-.113
Kolmogorov-Smirnov Z		.849
Asymp. Sig. (2-tailed)		.467

a. Test distribution is Normal.

b. Calculated from data.

Because Sig's value for unrelated diversity (R. .D) is 0.467, and then the observations distribution is normal.

*Second hypothesis regression analysis:*

Based on the above table, since the Sig's value is 0.103 and the amount is larger than  $\alpha=0.05$ , then  $H_0$  hypothesis regarding the "lack of relationship between (value) Ln and unrelated diversification" is accepted.

**ANOVA<sup>b</sup>**

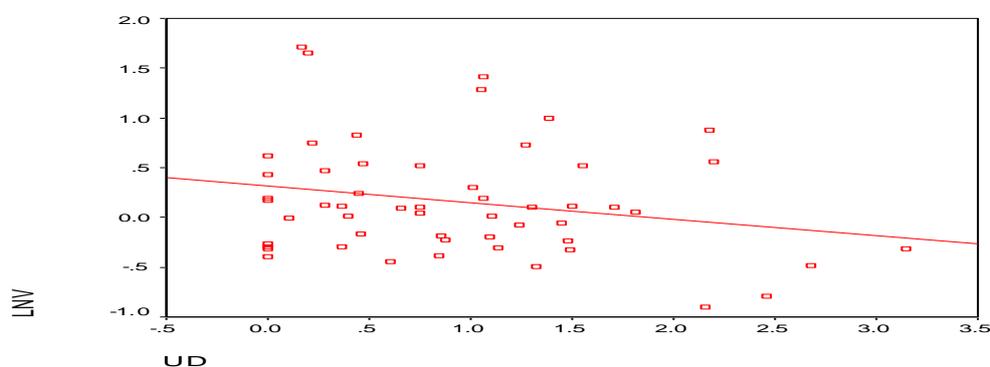
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.854	1	.854	2.757	.103 <sup>a</sup>
	Residual	16.101	52	.310		
	Total	16.955	53			

a. Predictors: (Constant), UD

b. Dependent Variable: LNV

*Second hypothesis scattering diagram:*

Scattering diagram of value and unrelated diversification (U.DIV) is as follows:

*2<sup>nd</sup> hypothesis of Pearson's correlation coefficient:***Correlations**

		LNV	UD
LNV	Pearson Correlation	1	-.224
	Sig. (2-tailed)	.	.103
	N	54	54
UD	Pearson Correlation	-.224	1
	Sig. (2-tailed)	.103	.
	N	54	54

Pearson correlation coefficient between values of logarithm of the unrelated diversity equals 0.224.-

*The third hypothesis: There is a significant relationship between total diversity and value of productive companies:*

In this section, the total diversity variable normality is studied.

**One-Sample Kolmogorov-Smirnov Test**

			td
Normal Parameters <sup>a,b</sup>	N		54
	Mean		1.5952
Most Extreme Differences	Std. Deviation		.90737
	Absolute		.084
	Positive		.084
	Negative		-.064
	Kolmogorov-Smirnov Z		.621
	Asymp. Sig. (2-tailed)		.836

a. Test distribution is Normal.

b. Calculated from data.

It is seen that the value of sig for the unrelated diversity is .0836 which is larger than  $\alpha$  being larger than .05. Then we accept the  $H_0$  hypothesis in the error level of .05, namely, the observations distribution is normal.

*3<sup>rd</sup> hypothesis regression analysis:*

ANOVA(b)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.797	1	.797	2.566	.115(a)
	Residual	16.157	52	.311		
	Total	16.955	53			

A: Predictors: (Constant), TD  
 B: Dependent Variable: LNV

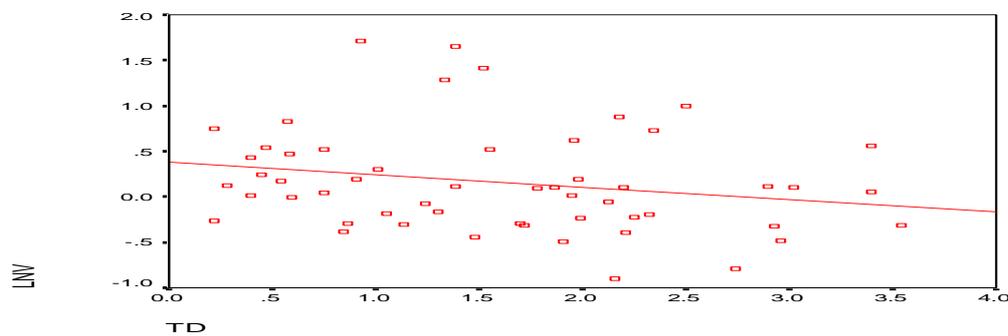
By using the variance analysis we can do the test. Since the amount of sig is .115 and larger than  $\alpha = 0.05$ . Then we accept the  $H_0$  hypothesis regarding the lack of relation between value and total diversity.

$H_0: \beta_3 = 0$   $LnY$  is not a function of total diversity

$H_1: \beta_3 \neq 0$   $LnY$  is a function of total diversity

3<sup>rd</sup> hypothesis scattering diagram:

Scattering diagram of value and total diversity is as follow:



3<sup>rd</sup> hypothesis Pearson's correlation coefficient:

**Correlations**

		LNV	TD
LNV	Pearson Correlation	1	-.217
	Sig. (2-tailed)	.	.115
	N	54	54
TD	Pearson Correlation	-.217	1
	Sig. (2-tailed)	.115	.
	N	54	54

Correlation coefficient between value of the logarithm of the total variation equals to - 0.217.

Summary of existing relationships between dependent and independent variables:

Pearson's Correlation coefficient amount between variables (value) Ln and independent variables

Total diversity	Related diversity	unrelated diversity	independent variable dependent variable (Value) Ln
-0.217	-0.224	-0.042	

The relation between variable (value) Ln and independent variables

Total diversity	Related diversity	unrelated diversity	independent variable dependent variable (Value) Ln
No relation	No relation	No relation	

Research limitations:

- Since many of companies are centralizes and there is no diversity in their business, they are obliged to remove them from the population sample restricting the selection of statistical sample to great extent.
- Restricting access to some information such as companies sale items list
- Due to time constraints and the sheer volume of data and variables measured in this study, it isn't possible to control all the variables.
- Lack of generalization to other non- stock companies.

*Practical recommendations based on the research results:*

1. It is recommended that Senior management, if wanting to employ strategies variety, act logically, first survey their current situation, strengths - weaknesses and opportunity- threat and then with a clear vision, whereas diversity is suitable to achieve the purpose, they attempt to expand the scope of their business.
2. The organizational agents and mechanisms should be analyzed and choose the diversity tailored to their internal mechanisms (culture, number of employees, capital, management style).
3. Probably the results of each options of diversification and centralization mayn't soon be visible. Managers are recommended to consider the time gap for decision on the efficiency and effectiveness of the chosen strategy, and avoid premature judgments.
4. Since most of studies have come to this conclusion that achieving the higher value takes place when companies expand their dominant area of focus not being diversified in business peripheral issues, managers are recommended to do the dominant business field of company if they don't have enough incentive to diversification. In other words, the organization focuses on its main and central advantages and do not login to unrelated situation with the probability of failure.

*Recommendations for the future research:*

- A- Researcher can assess the relationship between the "diversity" and other organizational variables such as "organizational performance", "profitability", "Capital Structure", "risk and return" to, or can investigate the value relationship with other dependent variables to it.
- B -Researcher can use other models to calculate the variety of companies
- C- Researcher can consider the relation of each of these variables to different timeframe. For example, in a period of after 2007, each research could be done.

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