

THE INVESTIGATION OF THE EFFECTS OF THE OPERATIONAL RISK AND THE MARKET RISK ON THE WORKING CAPITAL VOLUME OF THE COMPANIES LISTED IN THE TEHRAN STOCK EXCHANGE

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Abstract: *The reason of failure for many bankrupt companies is the unfavorable condition and the inappropriate management of the working capital, while these companies enjoy a good financial situation in the long term, however they may lose their ability to compete and go out of the round because of insufficient working capital. Applying various policies in relation to the working capital management, the trading entities can impact the company's liquidity. These strategies can affect the risk and the returns of them. The objective of the present study is assessing the effect of operational risk and market risk on the volume of working capital of the companies listed in the Tehran Stock Exchange. Accordingly, the desired topic was studied in the period 2009-2013 with a sample involving 100 companies. The present paper is of the descriptive-field work type studies. The statistical population includes all the companies listed in the Tehran Stock Exchange, 100 companies have been selected through random sampling and them ultivariate regression method was used in data analysis; the results show that the operational risk is negatively influential on the amount of working capital, however the market risk has no effects on the amount of working capital.*

Keywords: *Operational risk, working capital, market risk, sales growth*

INTRODUCTION

Most financial texts would start the part of working capital with the discussion on the inherent balance between risk and return because the policies of the working capital are other forms of this problem. The strategy along with high risk and high return and more emphasis on the financing strategy implies a bold policy, the lower risk and lower return is called a moderate strategy and finally choosing a strategy with the lowest level of risk and return is called a conservative policy

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(Gitman, 1994: 646).

The objective of the working capital management is choosing a combination of the current assets and short term debts for the company in order to achieve a balance between the profitability and risk (Nabavi, 2012). The outlays in the working capital often form a high ratio of the total assets of a company and applying these outlays in an efficient and effective way is vital (Pourheidari, 2012: 45).

The working capital management is related to the finding of the sources of short-term financing and its investment in the short term assets. The working capital management interacts with the company's profitability and risk. Inappropriate management of the working capital may lead to surplus investment in the current assets and reduced profitability of the company. On the other hand, weak management of the working capital can cause an imbalance in the current assets and short term debts and consequently would create financial problems and finally may put the company in danger. The management of the working capital which is the management of the current resources and consumptions has a specific importance in maximizing the wealth of shareholders as a part of the financial management tasks. Presently, the focus of the financial management is on the subjects such as the relationship between the risk-return and the maximizing the return against the risk. Since the financial management has a significant effect in the improvement and efficiency of the organizations, the investing decisions and financing are of the most important financial decisions for a company that can be categorized as the subsets of the working capital management (Nokoumaram et al., 2006).

The increasing importance of the working capital in continuity of the activities of the profit units caused different strategies to be considered by the working capital management. Applying various strategies related to the working capital, the profit units can influence the company's liquidity. These strategies can affect the extent of risk and return.

The present paper is to study the effects of operational risk and market risk on the working capital of the companies listed in the stock exchange. Therefore this research is in search of finding a response to the following questions:

Is there a significant relationship between the operational risk and the policy of the working capital? How is that effect?

Is there a relationship between the market risk and the working capital management?

Naturally, it is expected that the companies that have adopted a bold policy to face higher risks, and conversely. This study intends to assess the operational

risk and the market risk to the working capital. Being aware of this problem, the company's managers can achieve a balance between the risk and return of their company and estimate the effects of the working capital on their own risks and manage it. It is hoped that with regard to the increasing development of the companies in the industry and the competitive market and the great efforts for controlling risk by the institutes and companies this important matter is realized too.

Literature Review of the Research

Operational risks mainly derive from a wide range of probabilities of errors and deficiencies in the certain operations of the business or financial corporations. This risk is mainly known in the financial and banking institutions as not directly relevant to the credit and market risks. These risks derive from the human errors, computer errors and computer programs, decision making errors and even the losses of embezzlement. The important point in the operational risks is the complexity of the concept so the operational risks are usually more difficult than the other typical cases of uncertainty and risks to the company.

The operational risk can be defined in this way: any risks, except the credit risk and market risk. In fact, this definition is a negative description of an operational risk which means the operational risk is any kind of activity other than the activities leading to the credit and market risks. This definition, in fact, involves other types of risks that are not usually regarded as the operational risks.

The working capital management is one of the important areas in the financial management and organizational management because it directly influences the liquidity and profitability of companies. There is the possibility of bankruptcy for the companies that do not enjoy an appropriate management of the working capital even with regard to the positive profitability of them. The working capital management deals with the current assets and liabilities. Current assets of a company would form a considerable part of the total assets of that company. The excessive levels of current assets can lead to realization of less than usual investment returns; yet the companies with low current assets would have some deficiencies and problems in their typical operations (Mohammadi, 2009: 136).

The efficient working capital management involves scheduling and controlling the current assets and liabilities in a way that it can put down the disability in meeting short-term obligations on one hand, and avoiding excessive investment in these assets on the other hand (ibid, 136).

Many studies would certify the fact that the managers would spend a considerable time on everyday issues and one of the most important of them is related to the decisions on the working capital (Nikoumaram et al., 2006).

One reason for that is the current assets of the short term investments that are continually changing to other forms of asset (ibid, 137). In general, the decisions on different levels of working capital are frequent, repetitive and time-consuming.

One of the final goals of any company is reduction of risk in the long time, but maintaining the company's liquidity is also a key goal. The problem is that reduction of the operational and market risks at the expense of losing liquidity can lead to serious issues for the company. Therefore, there should be a balance between these two objectives and one should not be achieved at the expense of losing the other because both have their own importance. If a company does not pay any attention to the risks and profitability followed by that, it cannot last a long time, and on the other hand, if it does not worry about liquidity, it may face the problems as bankruptcy or lack of timely payment of debts. With regard to the above mentioned reasons, the working capital management should be specifically paid attention to and finally the operational and market risks may influence the companies.

The companies can have an optimum level of working capital that maximizes their value. Abundant inventory and a generous credit policy can lead to the increased sale. Abundant inventory would reduce the risk of lack of inventory and the business credit can increase the sale because it will provide the chance to evaluate the product quality before being paid to the customers (Dilofe, 2003). Another component of the working capital is the accounts payable; postponing payments would provide the opportunity for the corporations to evaluate the quality of the purchased products and it can be an inflexible and inexpensive source of financing for companies. On the other hand, if the provider offers a discount order to pay before the deadline, any delay in the bill payment can be expensive.

A common standard for evaluating the working capital management of the cash conversion cycle is the time interval between the payment for the purchase of the raw materials and the receipt of the amount of goods sold. The longer this time interval, the more investment in the working capital will be carried out. The long cash cycle may increase the profitability because it will lead to the increased sale. However, if higher costs of investment in the working capital exceed the benefits of holding more inventories or granting more business credits to the customers, then the profitability of the business corporation may decrease with increasing the cash cycle.

A concern of management in maintaining the high volume of activity and profitability in any company is indeed the working capital. According to the method of calculating the working capital, one can admit that the high or low level of the volume of working capital can always be risky and challengeable that

needs more attention. In economy and especially in investment the assumption is usually that the investors are logical. The logical investors would prefer certainty to uncertainty, so it is natural to say that the investors are not inclined to risk; in more exact words, the investors are risk averted. A risk averted investor is a person who expects a good return in return to that risk. It should be noticed that accepting the risk of a work in such a case is not illogical, although the risk is very high because a high risk is expected in such a case. In fact, the investors cannot logically expect a high return without accepting a high risk. On the other hand, the conducted research would indicate that the individuals in their decision making under risk never behave logically or rationally. Now, considering the importance of the risk and return in the investing decisions, it is necessary to investigate the effect of market risk and operational risk on the amount of working capital.

The importance of this research has been determined in three sections of the amount of working capital, the market risk and the operational risk. The working capital is a trading capital that is not left for over than a year in the company. The funds invested in these items will be changed during the business operations. In other words, how to maintain and use the working capital is a basic topic in the profit unit. As the circulation of blood in human's body is very important to protect the life, the amount of working capital is also required for the continuity of the business operations since its mismanagement can lead to the loss of items of working capital, and consequently to the loss of assets and finally the bankruptcy of the profit unit. On the other hand, market risk is created when the financing institute actively deals with the buy and sell of properties, liabilities and securities, not when the aforementioned items are kept for the purpose of long term investment, financing and hedging. So the market risk can be considered as important and basic as the profit and loss portfolios based on the changes of sudden price (Nikoumaram et al., 2006).

The phenomenon of risk is one of the key features in the fields of investment, financial markets and economic activities. In many of the books on economics, three factors of work, land and capital have been named as the major organs of production. Presumably one can recognize that these three factors are the required conditions for production, but the adequate condition is nothing but the risk. In other words, if there are three factors, but the producer does not accept the probable losses of this process, there will be no production at all. Hence, in some studies the factor of risk has been introduced as the fourth factor in the process of production (Mesbahi Moghadam and Safari, 2009).

Proper management of risk would give the manager power to balance the operational and economic expenses, it would help him in making the best decisions, and it would allow him to create the required security in recognizing the

organization's mission through implementation of the proper risk management, also it can guarantee the survival of the organization and protect it against any small or big risks. Regarding what was mentioned above, one can explain a model to show the effects of market risk on the amount of working capital to suggest some of its items and provide a help for the financial managers of the companies and the investors in order to make appropriate and timely decisions. Therefore the objective of this research is to study the effect of the operational risk and the market risk on the volume of working capital.

Many studies have been conducted so far on the relationship between risk and the policy of working capital and the scope of studying this subject is limited. Following is an overview of a few investigations on this subject:

Westhead and Howorth (2003) showed that in small and growing enterprises, the effective management of the working capital can be the key component of success, continuation of activity, profitability and liquidity. They claimed that the smaller enterprises should adopt a series of official programs relating to the working capital management in order to reduce the risk of business failure and increase the business performance.

Teruel and Solano (2004) dealt with assessing the working capital management and its role in the profitability of companies. Their studies lasted for seven years (1996-2002). They found out that the reduction of cash conversion cycle would cause an improvement in the company's profitability. They stated that the working capital management is important in that it is influential on the company's profitability and risk and consequently it would result in the value creation to the company.

Medho (2013) in his study, "the effect of operational risk and market risk on the working capital" extracted the information on the all listed companies in Australia for the period 2003-2008 and came to the conclusion that in big companies holding high inventory and in small companies holding cash is very important; the companies with low leverage should prioritize the use of internal resources to the foreign investment.

In Iran, so far there has been little research on the working capital. The conducted studies mainly focus on the effect of working capital on the performance and return of the companies and no research has been ever conducted on the effect of the working capital on the risk. The conveyed studies on the working capital involve the following cases:

Setayesh et al. (2008) in a research, "the effect of the working capital management on the profitability of companies listed in the Tehran Stock Exchange", studied 224 companies during a period from 2003 to 2007 and concluded that there is a

negative and significant relationship between the variables of collection period of demands, inventory conversion period and the cash conversion cycle with the profitability of the companies listed in the Tehran Stock Exchange.

Izadinia and Taaki (2010) in a research, "the effect of the working capital management on profitability of the companies listed in the Tehran Stock Exchange", extracted the companies' information for the period from 2003 to 2008, and concluded that a negative and significant relationship exists between the profitability and the cash conversion cycle.

Safari (2010) studied "the relationship between the profitability of the business unit and the working capital management"; he evaluated 99 sample companies in the Tehran Stock Exchange from 2003 to 2009, the results of that study suggests a negative and significant relationship between the profitability and the cash conversion cycle.

Bahdor Moghadam et al. (2012) in a study dealt with "the effect of specific characteristics of the companies on the working capital management" and extracted the financial information of the companies for the period 2005 to 2010, and concluded that there is a positive and significant relationship between the chance of growth and the capital structure with the working capital and also a negative and significant relationship between the operational cash flow and the company's profitability with the company's working capital.

Hormozi and Ahmadi (2012) in a research entitled "a study of the relationship between the working capital management with the corporation governance and the theory of financing hierarchy in the companies listed in the Tehran Stock Exchange", analyzed the companies' information for the years 2001 to 2009 and came to the conclusion that there is a significant relationship between the management tenure period, company's size, and company's growth and the free cash flow with the working capital, there is no relationship between the variables of debt, percentage of government ownership, and percentage of institutional ownership and the working capital. The results also show that the companies listed in the Tehran Stock Exchange would observe the financing hierarchy theory.

Shamakhi and Goudarzi (2003) in a research studied the "relationship between the working capital management and the smoothing profit in the companies listed in the Tehran Stock Exchange"; they extracted the information related to 100 companies for the period 2007 to 2011 and came to the conclusion that there is a positive and significant relationship between the working capital management and the smoothing profit and there is an inverse and significant relationship between the collection period of claims and smoothing.

Samadi Lorgani and Imeni (2013) dealt with "the relationship between the

working capital and the level of cash holdings in the companies listed in the Tehran Stock Exchange" and extracted the information of 45 companies for the period from 2005 to 2010. Their findings indicated that there is no significant relationship between the inventory conversion period and the collection period of accounts receivable with the level of cash holdings; however there is a significant relationship between the suspension period of accounts payable and the cash holding level.

Mojtahedzadeh et al. (2011) studied "the relationship between the working capital management and the performance of the companies listed in the Tehran Stock Exchange" and concluded that there is a negative relationship between the average claims collection period and the average period for payment of accounts payable with the company's performance, and no relationships between the inventory period and the performance were traced.

Taghizadeh et al. (2012) studied the relationship between the working capital management and the performance of the companies in the Tehran Stock Exchange". The findings show a negative relationship between the variables of claims collection period, inventory turnover, accounts payable period and the company's performance, while no relationships were realized between the cash cycle and the performance of the companies.

Statistical Population

The companies listed in different industries would form the statistical population of the present study enjoying the following conditions. The end of their financial year is March. They must have been listed at least from the beginning of the financial year of 2009 in the Tehran Stock Exchange; their shares have been traded on the stock exchange and their trading has not been interrupted for more than 3 months; they have no financial year changes; they are not involved in the investment companies, leasing and financial and credit institutions. Having applied the above mentioned conditions, 65 companies were selected and studied from 2009 to 2013 using the random sampling method and as the samples of the research.

The Research Models

With regard to the objectives of the research, the models 1 and 2 will be used for testing the first and second hypotheses:

Model 1:

$$WC_{i,t} = \beta_0 + \beta_1 OR_{i,t} + \beta_2 Growth_{i,t} + \beta_3 Size_{i,t} + \varepsilon_{i,t}$$

Model 2:

$$WC_{i,t} = \beta_0 + \beta_1 MR_{i,t} + \beta_2 Growth_{i,t} + \beta_3 Size_{i,t} + \varepsilon_{i,t}$$

Market Risk

Market risk or the value at risk can be defined as the possibility of danger related to the uncertainty of the income from the trading portfolio of a financing institute due to the changes in the market conditions involving the asset price, interest rate, market fluctuations and market liquidity. The market risk comes to existence when the financial institute actively deals with the buy and sell of finance, liabilities and the derivatives, but not when the aforementioned items are held for the purposes of long term investment, financing and hedging.

Operational Risk

Operational risk has been defined as the risk of loss derived from the internal processes, inaccurate (not sufficient) or imperfect individuals or systems or the risk of loss resulting from the external processes (Basel II, 2004).

The operational risks may lead to the credit and market risks. For example, one operational mistake in the bargain, such as no settlement, can simultaneously create credit and market risks, because it can influence the market prices just like the credit default.

Company's Size

The total value of the all issued shares of a company in Rial in the stock market is called the company's size. The company's size is calculated from multiplying the number of shares of a company by the day price of per share. In the investing population, this standard is used for comparing the companies with each other.

Sales Growth

Is the difference between the current year sales and the sales of the previous year divided by the sales of the previous year.

Methodology of the Research

This research is a practical study with regard to its objectives, considering the methodology it is a descriptive research of the correlation type. It is also a post-event research regarding the data collection method and the required data in relation to the variables were extracted through the field work method, that is using CDs and the available softwares such as Rahavar-e-Novin, in order to study and test the hypotheses, and for analyzing the information the descriptive statistics like average, standard deviation, inferential, multivariate regression method with the panel data techniques were used. The research hypothesis was tested based on the tested panel data and also the effect of the operational risk and market risk

on the working capital volume. In order to calculate and process the variables, the softwares 7Eviews, and Excel 2007 were used too.

Findings of the Research

In order to test the normality of data *Jarco-Bra* test (JB) and for testing the common root(reliability) Phillips and Perron test (PP) were applied. The results of normality test and data reliability are presented in table (1):

Table 1
The normality test and reliability of data

Variable	Working capital volume	Market risk	Operational risk	Sales growth	Company's size
JB statistics (significance level)	5.160 (0.162)	28.561 (0.000)	398.018 (0.001)	175.875 (0.001)	16.326 (0.008)
PP statistics (significance level)	288.971 (0.002)	339.639 (0.000)	227.110 (0.001)	453.913 (0.004)	86.153 (0.001)

As you can see in table (1), the data related to all the variables, except the variable of working capital volume, are abnormal; it means that the null hypothesis, the normality of data, is rejected and the alternative hypothesis stating the abnormality of data, is supported.

Testing and Analyzing the First Hypothesis

The first hypothesis: market risk is influential on the working capital management.

The regression model of the first hypothesis:

Model 3:

$$WC_{i,t} = \beta_0 + \beta_1 MR_{i,t} + \beta_2 Growth_{i,t} + \beta_3 Size_{i,t} + \varepsilon_{i,t}$$

With regard to the presented hypothesis, the statistical assumption is expressed as follows:

H0: market risk has no effects on the working capital volume.

H1: market risk affects the working capital volume.

Table 2 the result of the model estimation and the hypothesis testing has been presented in table (2):

Table 2
Results of testing the regression model of the first hypothesis

$WC_{i,t} = \beta_0 + \beta_1 MR_{i,t} + \beta_2 Growth_{i,t} + \beta_3 Size_{i,t} + \varepsilon_{i,t}$						
Variable	Symbol of variable	coefficients	t-statistics	Prob.	VIF	Result
y-intercept	β_0	-0.156	-1.462	0.566	–	–
Market risk	BETA	0.00362	0.652	0.874	1.036523	Rejected
Sales growth	GROWTH	0.0632	6.527	0.0002	1.170	Supported
Company's size	SIZE	0.0674	3.749	0.0228	1.168	Supported
Coefficient of determination (R2)		0.9126	Durbin-Watson (DW)		1.763	
Adjusted coefficient of determination (Adj. R2)		0.8947	F-statistics (Prob.F)		42.896 (0.001)	

As you can see in table (2), the value of determination coefficient equals 0.9126 and the adjusted coefficient of determination equals 0.8947, and it means that the explanatory power and the model fitting are at an optimum level. The adjusted coefficient of determination means that 89 per cent of the changes in the working capital volume (dependent variable) will be explained by the independent (market risk) and controlling variables (company's size, sales growth) of the research. Durbin-Watson statistics equals 1.763, and regarding the fact that the range of 1.5 to 2.5 shows the absence of autocorrelation of the first order, the autocorrelation of the first order does not exist in the error component of the model. The statistics of the variance inflation factor (VIF) suggests the extent of alignment between the research variables and the allowed value of VIF is less than 10, and since the value in table (2) is less than 10, there is no alignment between the variables. Finally, the value of F-statistics equals 41.896 and the value of its probability equals 0.001, and since the value of its probability is less than the significance level (5 percent), the model's significance is supported.

With regard to table (2), the coefficient value, t-student statistics and the significance level for the first hypothesis equal 0.00362, 0.652, and 0.874 respectively. Since the value of the significant level is more than 0.05, the null hypothesis implying the lack of effect of the market risk on the working capital volume is supported.

Test and Analysis

The second hypothesis: the operational risk affects the working capital volume.

Model 4:

$$WC_{i,t} = \beta_0 + \beta_1 OR_{i,t} + \beta_2 Growth_{i,t} + \beta_3 Size_{i,t} + \varepsilon_{i,t}$$

With regard to the presented hypothesis, the statistical population is stated as follows:

H0: the operational risk does not affect the working capital volume.

H1: the operational risk affects the working capital volume.

The result of the model estimation and the hypothesis testing has been presented in table (3):

Table 3
Results of testing the regression model of the second hypothesis

$WC_{i,t} = \beta_0 + \beta_1 OR_{i,t} + \beta_2 Growth_{i,t} + \beta_3 Size_{i,t} + \varepsilon_{i,t}$						
Variable	Symbol of variable	Coefficients	t-statistics	Prob.	VIF	Result
y-intercept	β_0	-0.367	-4.067	0.008	–	–
Operational risk	OR	0.00057	5.0532	0.001	1.128	Supported
Sales growth	GROWTH	0.0489	6.680	0.000	1.745	Supported
Company's size	SIZE	0.0458	5.201	0.002	1.096	Supported
Coefficient of determination (R2)		0.754	Durbin-Watson (DW)		1.703	
Adjusted coefficient of determination (Adj. R2)		0.721	F-statistics (Prob.F)		39.38 (0.001)	

In order to study the model fitting, the criteria of determination coefficient (R2), the adjusted coefficient of determination (Adj. R2), and Durbin-Watson (D-W) and for evaluating the significance of the model the F-statistics are also used. As you can see in table (3), the value of the determination coefficient equals 0.754 and the

adjusted determination coefficient equals 0.721, which means that the explanatory power and the model fitting are at an optimum level. The adjusted coefficient of determination means that 72 per cent of the changes in operational risk (dependent variable) can be explained by the independent (the working capital volume) and the controlling (company's size, sales growth) variables of the research. Durbin-Watson statistics equals 1.703, and regarding the fact that the range of 1.5 to 2.5 shows the absence of autocorrelation of the first order, the autocorrelation of the first order does not exist in the error component of the model. The statistics of the variance inflation factor (VIF) suggests that the extent of alignment between the research variables and the allowed value of VIF is less than 10, and since the value in table (4) is less than 10, there is no alignment between the variables of the research. Finally, the value of F-statistics equals 39.38 and the value of its probability equals 0.001, and since the value of its probability is less than the significance level (5 percent), the model's significance is supported.

With regard to table (3), the coefficient value, t-student statistics and the significance level for the second sub-hypothesis equal 0.0057, 5.0532, and 0.001 respectively. Since the value of the significant level is less than 0.05, the null hypothesis is rejected and the alternative hypothesis stating the effect of operational risk on the working capital volume is supported. In other words, the operational risk affects the working capital volume and regarding the coefficient sign and t-student statistics (t), the type of effect is negative and inverse.

CONCLUSION

Result of the First Hypothesis

The first hypothesis states that the market risk impacts the working capital volume of the companies listed in the Tehran Stock Exchange, the research results would give an opposite conclusion (not supporting the first hypothesis).

Result of the Second Hypothesis

The second hypothesis states that the operational risk affects the working capital of the companies listed in the Tehran Stock Exchange; the research results support this hypothesis (supporting the second hypothesis) and with regard to the negative coefficient (-0.320728), we can say that this effect is negative (inverse); in other words, the increase (decrease) of the operational risk may lead to the reduction (increase) of the working capital volume.

In table (1-5) a summary of results have been presented.

Table 4
Summary of results

Row	Independent variable	Dependent variable	
		Working capital volume	
		Result	Type of effect
1.	Market risk	Rejected	–
2.	Operational risk	Supported	Negative and reverse

The present research studied the effects of market risk and the operational risk on the working capital volume of the companies listed in the Tehran Stock Exchange. In this study, for assessing that subject the working capital volume was used as the dependent variable and the variables of market risk and the operational risk were used as the independent variables. The results of the present study suggest that the operational risk has a negative effect on the working capital volume; however the market risk is not influential on the working capital volume.

Suggestions of the Research

In order to make the investors familiar with the financial statements and their analysis methods, it is suggested that:

1. Before investors purchase the shares, a complete guide would be provided by these curities and the stock exchange organization and/or the makers of exchange to be granted to them to allow them to become more careful while buying or selling shares, or the measures be taken into consideration so that the elites and experts (financial analysts) can play an active role of guide for the novice investors. Textbooks, public media, etc. can be used as the sources of teaching how to select stocks, acquaintance with the financial statements and their analysis methods to the investors and others to let them invest with sufficient acquaintance in the aforementioned fields.
2. A small number of investors who enjoy a good knowledge and experience in the field of investment cannot achieve the required information to the financial analyses due to the lack of an integrated information system in the Tehran Stock Exchange. It is recommended that the appropriate information systems be created in the Tehran Stock Exchange to easily provide the required information to the investors.
3. It is suggested that more research be conducted on the relationship between the operational risk and the beta of the stock market or the relationship between a set of financial ratios and beta.

4. Studying the relationship between the market risk and different components of the working capital.
5. Studying the relationship between the operational risk and different components of the working capital.

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