Factors Affecting the Business Efficiency of Enterprises Under the Vietnam General Department of Defence Industry

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Abstract:

Enterprises under the General Department of Defense Industry (GDDI) play an important role in the defenseindustry of Vietnam, yet so far their business operations has had low efficiency. Therefore, it is necessary toclarify the factors affecting the business efficiency of GDDI enterprises, thereby having timely solutions forthe new political and economic situation of the country. Previous studies have only focused on individualGDDI enterprises of different scale and resources and haven't been able to come up with a systemic solution.This article fills the gaps of previous studies by identifying factors affecting the business efficiency of GDDIenterprises between 2016 and 2021. By using quantitative research and linear regression model, the authoridentified factors affecting the business efficiency of GDDI enterprises and gave recommendations offinancial solutions to improve business efficiency for these enterprises.

Keywords: business efficiency, General Department of Defense Industry enterprises, operational capacity

I. Introduction:

Business efficiency is an economic category that reflects how effectively an enterprise makes use of its human and material resources through the comparison between the results achieved in terms of economic benefits and the cost of resources spent in a certain labor period.

Business administrators are those who directly operate, manage and make decisions to ensure the survival and development of an enterprise. Therefore, business administrators need to understand the business situation and profitability. By analyzing the business efficiency of an enterprise, business administrators grasp the current situation of the business efficiency as well as factors and causes that positively and negatively affect it, from which they make the most correct decisions to achieve the goal of business efficiency.

Business efficiency analysis is the use of a combination of analytical methods to evaluate the current business efficiency of an enterprise in order to provide information to managers inside and outside the enterprise, thus proposing management decisions in accordance with their objectives.

Analysis of an enterprise's business efficiency is carried out by collecting data inside and outside it, using methods to synthesize and process data, and developing a suitable system of analytical indicators to provide information on the business efficiency of the enterprise in an objective, complete, comprehensive and detailed manner. This is a very important source of information that helps business administrators and managers have a reliable basis for management decisions to achieve the best results.

Table 1 below shows business results of GDDI enterprises:

Table 1. Business results of GDDI enterprises

Unit: Million VND

Item	2016	2017	2018	2019	2020	2021
Net revenue	20,476,114	21,133,044	21,972,747	23,074,905	23,973,106	24,766,340
Profit before tax	632,741	632,445	657,001	686,722	718,168	740,786
Profit after tax	506,193	505,956	525,601	549,377	574,535	592,629

Revenue: The revenue of GDDI enterprises increases over the years. By 2021, total revenue reached VND 24,766,340 million with an average increase of 3.88% per year. The revenue of GDDI enterprises mainly comes from some large enterprises such as Ba Son Corporation, 31 Electro Mechanism and Explosive One Member Limited Liability Company, and 189 One Member Limited Liability Company.

Further analysis of the average revenue of GDDI enterprises according to their fields of operation shows that between 2016 and 2021, the average revenue of enterprises producing and repairing weapons is the highest among the GDDI enterprises, of about VND 1,000 – 1,200 billion per enterprise. This is followed by the average revenue of enterprises producing chemicals and ammunition with an average revenue of about VND 900 – 1,100 billion per enterprise. Military shipbuilding enterprises have the lowest average revenue in recent years. This results from the fact that shipbuilding enterprises are under increasingly competitive pressure in the regional and international markets. These enterprises face many difficulties in meeting modern technical requirements in the shipbuilding industry.

Profit: Similar to the fluctuation in revenue, the profit of GDDI enterprises in the research sample increases through the research period. Profit after tax in 2016 of GDDI enterprises is VND 506,193 million, increasing to VND 592,629 million in 2021, with an average increase of 0.91% per year. Enterprises that had high earnings in the period of 2016 - 2021 include Z113, Z131, Z121, and Z189.

Table 1 shows that the profit after tax of GDDI enterprises in 2016 - 2021 has differences between industry groups: Enterprises producing and repairing weapons maintained the highest profit (average profit after tax of over VND 20 billion/year/enterprise), followed by enterprises producing chemicals and ammunition, and finally military shipbuilding enterprises. However, it should be noted that all GDDI enterprises were profitable. No enterprises had business losses in the period of 2016 - 2021. This is commendable of GDDI enterprises.

II. Theoretical basis of factors affecting the business efficiency of GDDI enterprises:

Considering independence, factors affecting the business efficiency of enterprises are divided into two groups of factors: objective factors and subjective factors. The study of factors according to the level of independence affecting the business efficiency of the enterprises will help the analyst evaluate which factors the administrator can affect and how much they affect the business efficiency of the enterprises, thereby making appropriate decisions.

* Subjective factors:

Subjective factors are factors that lie within each enterprise itself. Subjective factors fundamentally effect the business efficiency of enterprises. Subjective factors include:

- Human factor

The human factor in an enterprise includes the employee and the employer. These are the two labor forces that directly affect labor productivity, product quality and other resources such as machinery, equipment and raw materials, thereby affecting the business efficiency of the enterprise. The employer decides on the effective use of labor, sets a business development policy, and maximizes resources to achieve the best efficiency. Given the highly competitive market economy nowadays and the development of science and technology, the employee has to be more and more qualified. Meanwhile, this also requires the professional qualifications and organizational ability of the manager (employer) to be high. This proves the great importance of the human factor.

- Capital factor

Capital decides whether or not an enterprise can conduct business. An operating enterprise cannot be without capital. Capital is all the more important to an enterprise that wants to expand its production and business scale. Capital is an indispensable factor that determines the scale and business efficiency of an enterprise, and increases its competitiveness.

- Science and engineering factor

The increasing development of science and engineering has allowed enterprises to use science and engineering in production to create products with good quality and high productivity at a low cost, making prices lower and increasing business efficiency. Therefore, enterprises must focus on investment and transfer of advanced technology. In addition, it is necessary to train and foster employees to master modern technology and improve production capacity to increase business efficiency.

* Objective factors

- Economic environment

The economic environment includes inflation, exchange rate, interest rate, currency, price stability, etc. All of these factors affect production and business activities. Therefore, enterprises need to monitor their volatility to analyze, predict and plan for response.

- Legal and political environment

The political and legal environment includes the law, the State's policy mechanisms and international relations. Political stability is one of the important preconditions for business operations. Similarly, the stability and perfection of the legal system along with the seriousness of compliance with the law will have a great influence on the planning and organization of the implementation of business strategies. This is because the legal environment affects the type of goods and industries as well as business methods. State policies such as policies to attract investment, to expand domestic production, trade and service markets, to increase exports, and to expand international markets will affect business results.

- Natural environment

The natural environment including natural resources, geographical location, weather, and climate affects business activities: The geographical factor affects trade, transportation and storage; the weather and climate factor affects technological processes and business progress, especially businesses of seasonal goods.

- Supplier

The supplier of raw materials and inputs with sufficient quantity, type and quality at reasonable prices and in time will help enterprises achieve efficiency according to the set plan.

- Competitor

The stronger the competitor, the more difficult it is for a business to make profit, grow and maintain its position.

- State authorities

State authorities can encourage or pressure business activities.

In addition to the above factors, there are other factors affecting the business efficiency of enterprises such as purchasing power, consumption habits, customs, population and income levels.

III. Research methodology:

The article uses the econometric model to regress the factors affecting the business efficiency of GDDI enterprises. This method includes identifying independent variables and the dependent variable, collecting historical data on independent variables and the dependent variable, using regression analysis to determine the relationship between the dependent variable and independent variables, testing the model and assumptions about the relationship of the research variables, determining the change of the dependent variable in relation to independent variables, and predicting the scenarios that occur through the results of the research model.

The econometric model studies the factors affecting business efficiency as follows:

* Dependent variable: Net profitability of working capital (ROA).

* Independent variables:

Category	Variable	Calculation method	Content
Enterprise's financial characteristics	LogTS	Base 10 logarithm of total assets	Asset size and enterprise size
	TangtruongDT	(DT1-DT0)/DT0	Sales growth
	DautuTSCD_DT	Fixed assets in the period/Revenue difference	Fixed asset investment in relation to revenue
	ROS	Profit after tax/Net total turnover	Operational profitability
	TangtruongTS	(TS1-TS0)/TS0	Asset growth
	DautuTSCD	Fixed assets/Total assets difference	Fixed asset investment over total assets
	HesoNo	Total liabilities/Total assets	Debt ratio, the use of financial leverage

Corporate governance	BOM_kichthuoc	Number of Board of Managers members	The size of the Board of Managers and the scale of corporate governance activities
	BOM_nu	Number of female Board of Managers members/Total number of Board of Managers members	Percentage of female members of the Board of Directors
	BOM_trinhdo	Number of members with a master's degree or higher	Qualifications and knowledge of the Board of Managers
	BOM_logthulao	Base 10 logarithm of total remuneration to the Board of Managers	Remuneration of the Board of Managers, benefits and the ability to encourage members to participate in corporate governance
	BOM_logtuoi	Base 10 logarithm of the total age of the members of the Board of Managers	Age of Board of Directors members
	BOM_logkinhnghiem	Base 10 logarithm of the total years of experience at a research enterprise	Working experience of Board of Managers members
	CBQL_NV	Number of managing employees/Total number of employees	Ratio of the number of managing employees over the total number of employees
	NV_logthulao	Base 10 logarithm of average income of employees	Income of employees
	NV_trinhdo	Number of employees with a bachelor's degree or higher	Qualifications and knowledge of employees

The model used to analyze the influence of factors on business efficiency is the fixed effects model on the panel data of enterprises. The use of the fixed effects model helps control and separate the influence of the individual characteristic factors of each enterprise from explanatory variables, thereby helping to estimate the actual impact of explanatory variables on the dependent variable. To select explanatory variables for the model, the author started with estimating the influence of all factors of the enterprise's financial characteristics on the dependent variable. Then the author used the VIF to detect multicolinearity between explanatory variables and discard explanatory variables with high linear dependence or great similarity in economic significance.

Analytical models:

Model 1 (m1): ROAit = α+ f(Variable for financial characteristics of the enterprise) + δi + δt + εit

Model 1 (m1) is built on the basis of ROA-dependent regression to the group of financial characteristics of the enterprise.

δi and δt are the control variables of space (each enterprise) and time (year by year), respectively.

εit is the remaining factor that affects the unexplained dependent variable with the variables in the model.

Model 2 (m2) : ROAit =α+ f(Variable related to financial characteristics of the enterprise) + f(Variable related to corporate governance) + δi + δt + εit

Model 2 (m2) is built on the basis of ROA-dependent regression to the group of financial characteristics of the enterprise and the group of corporate governance factors.

Model 3: ROAit =α+ f(Variable related to financial characteristics of the enterprise) + pc1 +pc2 + δi + δt + εit

Model 3 (m3) is built on principal component analysis (PCA) to combine factors related to corporate governance in model 2 into new factors pc1 and pc2, thus eliminating the influence of multicolinearity in the model.

IV. Results and discussion:

The results of analyzing the impact of enterprise characteristics on the enterprise's business efficiency come from estimating the model of fixed effects on the panel data of GDDI enterprises. This data with a sample size of 132 observations is composed of spatial data (22 enterprises) and time series data in year for 6 years (2016 to 2021). The use of the fixed effects model helps control and separate the influence of the individual characteristic factors of each enterprise from explanatory variables, thereby helping to estimate the actual impact of explanatory variables on the dependent variable. To select explanatory variables for the model, the author started with estimating the influence of all factors of the enterprise's financial characteristics on the dependent variable. Then the author used the VIF to detect multicolinearity between explanatory variables and discard explanatory variables with high linear dependence or great similarity in economic significance.

Model 1 (presented in a column) is based on the regression of ROA-dependent variables to the group of financial characteristics of the enterprise in the order of: Asset size (LogTS), asset growth in relation to revenue (DautuTSCD_DT), fixed asset investment over total assets (DautuTSCD), debt ratio (HesoNo).

In terms of statistical significance, each independent variable (factor affecting ROA) will have 2 lines showing the results. The first line is the level of influence of the factor on the ROA-dependent variable, the second line is t-statistic statistics to determine the level of statistical significance of the factor's influence value. * * *, * * and * denote the results of the significance level of 1%, 5% and 10% (For example, the 5% significance level means the probability that the actual level of influence of the factor is different from the calculated influence level in the model is 5%). Usually, the smaller the t-statistic, the greater the above probability, i.e. the less statistically significant the calculation results of the model. The general acceptance level in many studies is α<=10%, even <=5% in some studies.

In model 1 (m1), the ROS factor is the factor with the greatest influence on ROA. This result means that if the ROS increases by 1%, the ROA will increase by 0.7282%. This result is statistically significant as the significance level is 1%, i.e. the probability of the ROS' influence level being different from 0.7282 is less than 1%. This shows that the improvement of cost management is of great significance to improving the business efficiency of GDDI enterprises. In addition, two factors related to the ratio of fixed asset investment to total assets (DautuTSCD) and the debt ratio (HesoNo) have positive impact on ROA. The impact of the DautuTSCD factor shows that the enhancement of fixed assets, improvement of scientific and engineering qualifications, and improvement of production capacity also have a positive impact on the business efficiency of GDDI enterprises. In addition, maintaining the debt ratio and using appropriate financial leverage also enhance the profitability of these enterprises. On the other hand, two factors related to asset size (LogTS) and asset growth in relation to revenue (DautuTSCD_DT) have negative impact on the profitability of the enterprises. The negative impact of these two factors may be due to the State management mechanism, and especially in the field of operation, the expansion of the scale of enterprises is too large, leading to difficulties in control, thus hindering the business efficiency of enterprises growing to their potential.

Model 2 is constituted by adding to the basic model factors related to corporate governance. The results from the m2 model show that the number of members of the Board of Managers (BOM_kichthuoc), the number of female members of the Board of Managers (BOM_nu), and the income of employees (NV_Logthulao) have positive impact on business efficiency. The large number of members of the Board of Managers helps them share work, track work progress and improve management capacity. The income of employees is also a driving force to help them improve labor productivity, use materials and supplies economically, and improve the business efficiency of GDDI enterprises. Meanwhile, factors related to the remuneration of the Board of Managers (BOM_logthulao) and the age of the members of the Board of

Managers (BOM_logtuoi) have a negative impact on business efficiency. The experience of the Board of Managers is not a factor that has a positive contribution to the business efficiency of GDDI enterprises. In a field that requires timely updating of scientific and technological advances, along with fierce competition in the economy, older members of the Board of Managers may be unable to keep up with new trends and slow to change, thereby negatively affecting the business efficiency of enterprises.

Table 2. Results of model regression of factors affecting ROA

ROA	m1	m2	m3
	Coef./t	Coef./t	Coef./t
LogTS	-0.0090***	-0.0322***	-0.0343***
	-3.07	-10.54	-10.20
DautuTSCD_DT	-0.0024**	-0.0000	-.0001
	-2.16	-0.06	-0.11
ROS	0.7282***	0.6573***	0.7808***
	11.90	11.78	15.18
DautuTSCD	0.0175***	0.0052	0.0017
	2.72	1.28	0.34
HesoNo	0.0280***	0.0306***	0.0094***
	6.69	7.43	2.67
BOM_kichthuoc		0.0026**	
		2.41	
BOM_nu		0.0090***	
		6.97	
BOM_Logthulao		-0.0235**	
		-2.40	
BOM_logtuoi		-0.0460**	
		-2.36	
BOM_Logkinhnghiem		0.0050	
		0.61	
BOM_trinhdo		0.0007	
		1.40	
CBQL_NV		0.0103	
		1.40	
NV_Logthulao		0.0398***	
		5.67	
NV_trinhdo		-0.0050	
		-0.72	
pc1			0.0036***
			9.49
pc2			0.0031***
			5.73
Constant	0.0947**	0.2857***	0.4098***
	2.6	4.26	9.83
R_squared	0.6363	0.8804	0.8110
N	132	132	132

Model 3 is built on principal component analysis (PCA) to combine factors related to corporate governance in model 2 into new factors pc1 and pc2, thus eliminating the influence of multicolinearity. The results of evaluating the attributes of corporate governance characteristics are processed according to the principal component analysis method. The analysis results are given in Table 2.7. This process is carried out to analyze the principal component for the purpose of determining the number of principal components needed to represent the data (including 9 attributes of corporate governance characteristics). Scree plot represents the descending order of magnitude of Eigenvalues and cumulative percentage value of variance. In terms of factor analysis or principal component analysis, scree plot helps the analyst visualize the relative importance of the components. In this case, components 1 and 2 have an eigenvalue greater than 1 and account for 75.08 cumulative % of the variance.

Factors related to corporate governance are combined together into new factors pc1 and pc2 to eliminate the influence of multicolinearity. The model results show that both pc1 and pc2 have positive impact on ROA. This shows that improving the qualifications of employees, creating a competitive environment, and improving income will motivate employees to improve labor productivity and business efficiency of enterprises.

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