

NGUYEN DUY DAT  
 NGUYEN THI NGOC LAN  
 DINH TRAN NGOC HUY  
 LY LAN YEN  
 NGUYEN TIEN DUNG  
 PHAM MINH DAT

**Plans for better business  
 performance of Sony in  
 Japan - and suggestions for  
 management and financial  
 accounting transparency**

## 1. Introduction

Nguyen Duy Dat, Ph.D.,  
 Thuongmai University Hanoi,  
 Vietnam  
 ORCID: 0000-0002-6459-7980.

Nguyen Thi Ngoc Lan, Ph.D.,  
 Vietnam General Confederation  
 of Labour,  
 Vietnam,  
 ORCID: 0000-0002-8790-4939.

Dinh Tran Ngoc Huy, MBA,  
 Banking University HCMC,  
 Ho Chi Minh city Vietnam-International  
 University of Japan,  
 Japan,  
 ORCID: 0000-0002-2358-0699.

Ly Lan Yen, Ph.D.,  
 Academy of Finance, Hanoi,  
 Vietnam,  
 ORCID: 0000-0003-4156-5967.

Nguyen Tien Dung, Ph.D.,  
 School of Economics and Management,  
 Hanoi University of Science  
 and Technology,  
 Vietnam,  
 ORCID: 0000-0001-7624-0201

Pham Minh Dat, Ph.D.,  
 Thuongmai University Hanoi,  
 Vietnam,  
 ID ORCID: 0000-0002-7262-4299.

The 4.0 technology wave appears many new business models, new products and services as well as new ways to approach new customers, new media and sales channels, significantly changing the behavior of consumers, all businesses are more or less clearly affected.

Sony in Japan has accepted innovation to grow and gain better profits. It will need to enhance financial accounting information transparency to have better management. In addition to products such as hifi and video systems, Sony also thrives in the field of television, video, informatics, semiconductors, radio cassettes, and electronics for the masses and professionals".

In the context that GDP growth in Japan has been stable during 2014-2019 , it is necessary to evaluate impacts of seven (7) internal and external macro-economic factors on Sony performance, esp. Firm net profit. From these analytical results, we could suggest bank and government policies to encourage and stabilize the growth of technology system and stock market.

This study will calculate and figure out the impacts of seven (7) macro-economic factors such as inflation, GDP growth, market interest rate, net sale, cost, S&P500 on Sony net profit.

The paper is organized as follows: after the introduction it is the research issues, literature review and methodology. Next, section 3 will cover methodology and data and section 4 presents main research findings/results. Section 5 gives us some discussion and conclusion and policy suggestion will be in the section 6.

## **2. Body of manuscript**

### **2.1. Research issues**

The scope of this study will cover:

Issue 1: What are the correlation and relationship among many economic factors: Sony net profit, stock price, interest rate, cost, inflation, S&P 500 and GDP growth?

Issue 2: What are the impacts of above 7 macro-economic factors on Sony net profit?

Issue 3: Based on above discussion, we recommend some solutions regarding to technology management in incoming period.

This paper also tests two (2) below hypotheses:

Hypothesis 1: An increase in lending rate will make Sony net profit declines.

Hypothesis 2: An increase in inflation can increase pressure in Sony net profit.

### **2.2. Literature review**

Lina (2012) indicated that both the change of inflation rate and the growth rate of money supply (M2) are positive but insignificant to the banking industry stock return, the exchange rate is positive and significant to banking industry stock return and interest rate is negative and significant to banking industry stock return. Next, Sadia and Noreen (2012) found out exchange rate, and Short term Interest Rate have significant impact on Banking index. Macroeconomic variables like Money Supply, Exchange Rate, Industrial Production, and Short Term Interest Rate affects the banking index negatively whereas Oil prices has a positive impact on Banking index.

Manisha and Shikha (2014) stated that Exchange rate, Inflation, GDP growth rate affect banking index positively whereas Gold prices have negative impact on BSE Bankex but none of them have significant impact on Bankex. Then,

Winhua and Meiling (2014) confirmed that macroeconomic do have a substantial influence to the earning power of commercial banks.

Krishna (2015) investigated the nature of the causal relationships between stock prices and the key macro-economic variables in BRIC countries. The empirical evidence shows that long-run and short-run relationship exists between macro-economic variables and stock prices, but this relationship was not consistent for all of the BRIC countries. And Kulathunga (2015) suggested that all macroeconomic factors influence the stock market development. More precisely, volatile inflation rate and exchange rate together with higher deposit rate have curtailed the stock market development in Sri Lanka. Moreover, positive optimism created by the economic growth and the stock market performance during the previous periods tend to enhance stock market performance.

Last but not least, Quy and Loi (2016); Huy, Loan and Anh (2020) found that 3 economic factors (inflation rate, GDP growth rate, and exchange rate) impact significantly on real estate stock prices; but the relationship between 10-year Government bond yield and trading volume, and real estate stock prices was not found. Ahmad and Ramzan (2016) stated the macroeconomic factors have important concerns with stocks traded in the stock market and these factors make investors to choose the stock because investors are interested to know about the factors affecting the working of stock to manage their portfolios. Abrupt variations and unusual movements of macroeconomic variables cause the stock returns to fluctuate due to uncertainty of future gains.

Until now, many researches have been done in this field, however, they just stop at analyzing internal macroeconomic factors on stock price. There are a few recent investigations of impact of external factors of stock markets (e.g. Masood, Tvaronavičienė, and Javaria, 2019; Masood, Javaria, and Petrenko, 2020).

Within the scope of this paper, we measure impacts of both internal and external macro factors on Sony net profit and suggest policies for bank system, government, Ministry of Finance, State Bank and relevant government bodies. We also analyze data throughout time series from 2014-2019.

### 3. Methodology and data

This research paper establishes correlation among macro-economic factors by using an econometric model to analyze impacts of seven (7) macro-economic factors in Japan such as: GDP growth, inflation, interest rate, cost... on Sony net profit.

In this research, analytical method is used with data from the economy such as inflation in Japan and market interest rate, GDP growth rate, SP500. Data are

included from 2014 -2019 with semi-annual data (10 observations in total). Data is estimated based on exchange rate and lending interest rates of commercial banks. S&P 500 index data is from USA Stock exchange, data source (inflation, GDP) is from Bureau of Statistics. Beside, econometric method is used with the software Eview. It will give us results to suggest policies for businesses and authorities.

We build a regression model with Eview software to measure impacts of factors. Sony net profit is a function with 7 variables as follows:

$$Y \text{ (Sony net profit)} = f(x_1, x_2, x_3, x_4, x_5, x_6, x_7) = ax_1 + bx_2 + cx_3 + dx_4 + ex_5 + fx_6 + gx_7 + k$$

With:  $x_1$  : GDP growth rate (g),  $x_2$  : inflation,  $x_3$ : net sale,  $x_4$ : lending rate,  $x_5$ : risk free rate ( $R_f$ ),  $x_6$ : cost;  $x_7$ : S&P500

Beside, this paper also uses analytical and general data analysis method to measure and generate comments on the results, then suggest policies based on these analyses.

## 4. Main results

### 4.1. General data analysis

First of all, the below figure 1 shows us that Y has a negative correlation with cost:

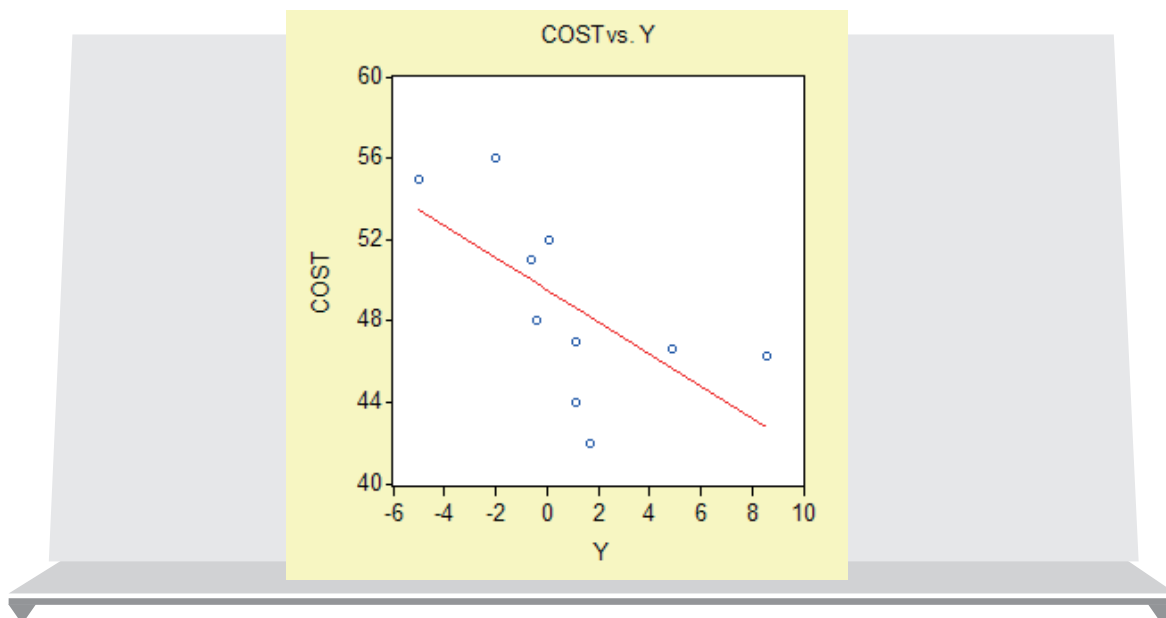
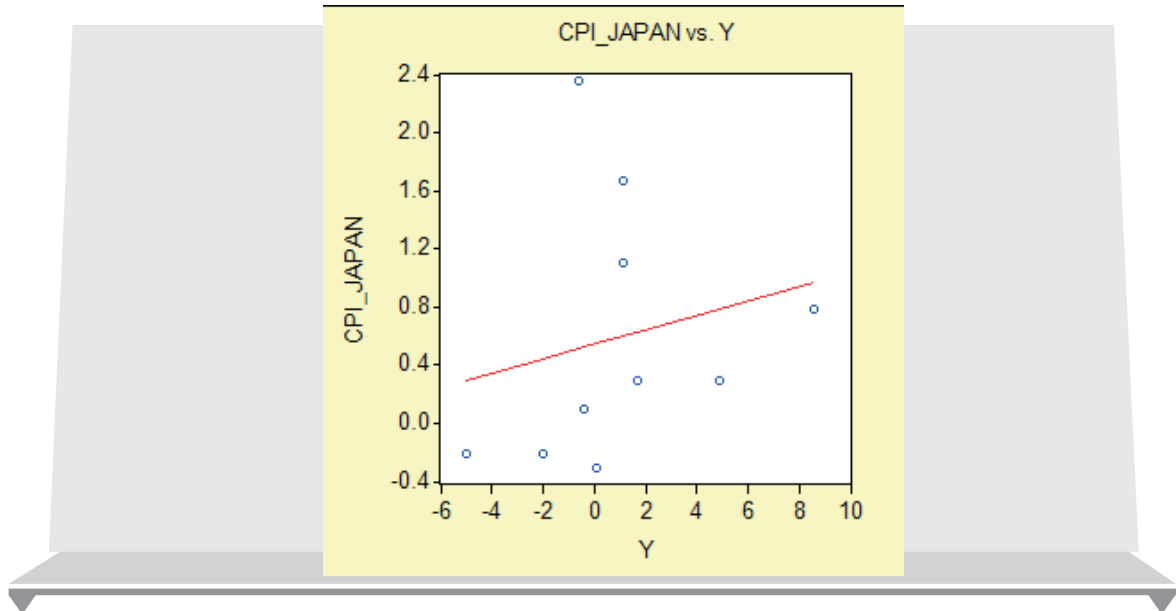


Figure 1. Net Profit (Y) vs. Cost (C)

Source: own study

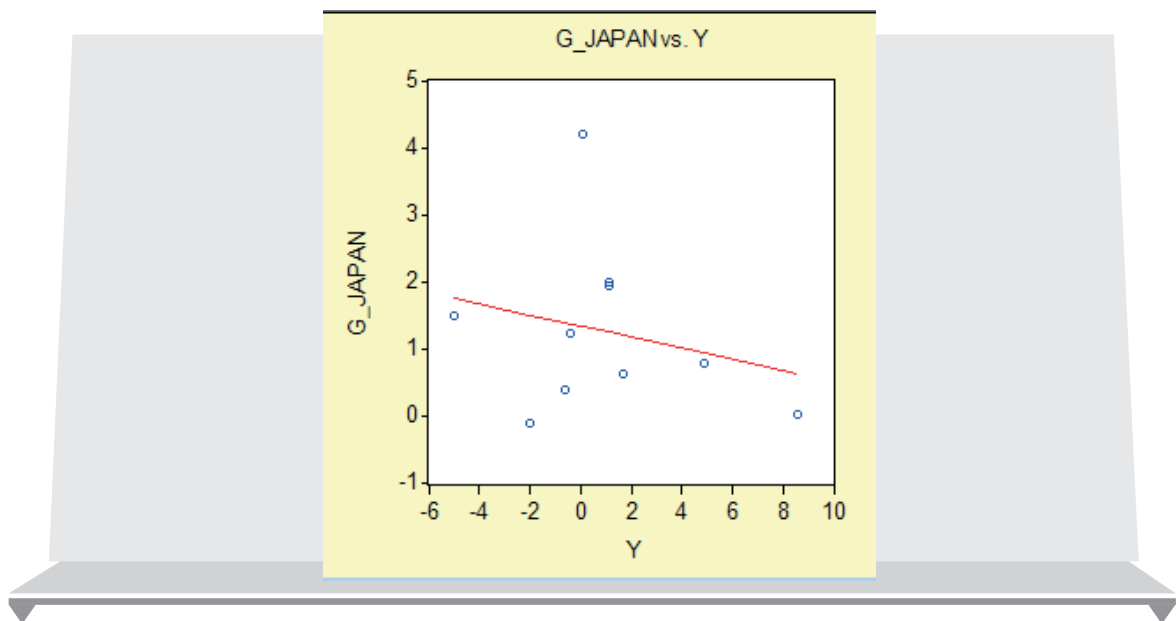
Next we find out that, based on the below scatter chart, Y (net profit) has slightly positive correlation with inflation (CPI).



**Figure 2. Sony net profit (Y) vs. Inflation (CPI)**

Source: own study

Looking at the below figure 3, we also recognize that Sony net profit (Y) and GDP growth have negative correlationship.



**Figure 3. Y vs. GDP Growth**

Source: own study

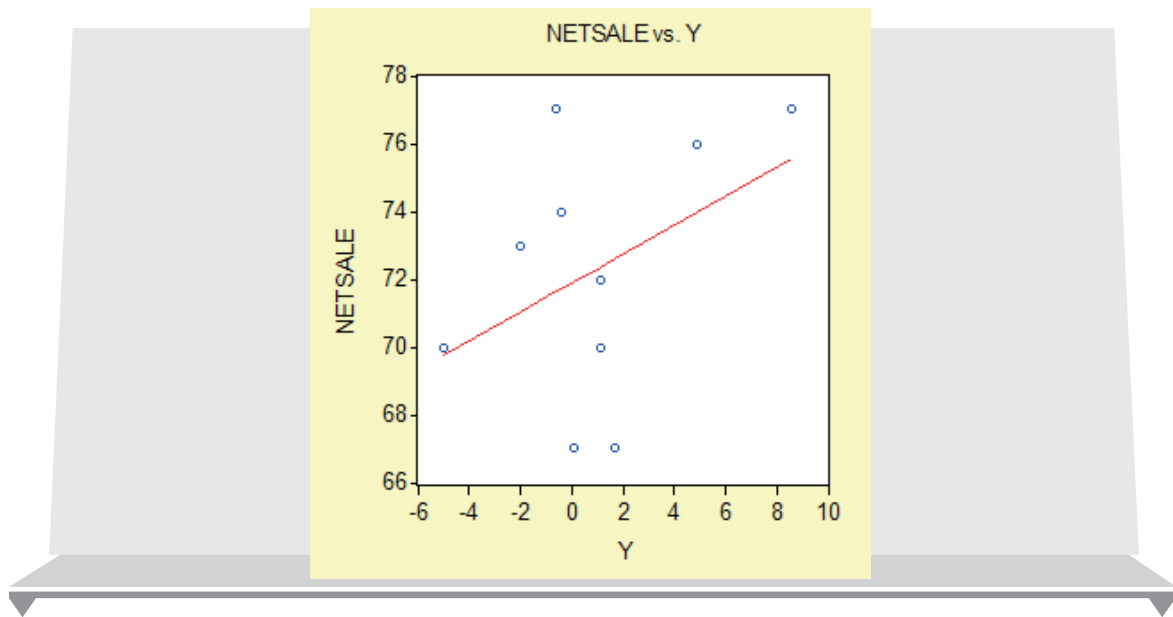


Figure 4. Y vs. sale

Source: own study

We see that, Sony net profit (Y) and sale have positive correlation:  
On the other hand, we could see statistical results with Eview in the below table with 8 variables:

Table 1. Statistics for macro and micro economic factors. Unit: [%]

	Net profit	Net sales	Cost	SONY stock price	Inflation Japan	Lending rate Japan	GDP growth - US	Inflation US (CPI)	S&P500
Mean	0.95	72.30	48.79	31.66	0.59	1.18	2.24	1.76	2354.99
Median	0.6	72.5	47.5	26.32	0.3	1.165	2.23	1.825	2331.12
Maximum	8.6	77	56	68	2.36	1.55	2.92	2.96	2752.06
Minimum	-5	67	42	11.2	-0.31	0.96	1.55	0.73	2043.94
Standard dev.	3.709	3.773	4.590	17.602	0.888	0.217	0.485	0.680	294.931

Source: own study (date access: 1/10/2020)

Looking at the above table, we recognize that standard deviation of stock price and SP500 are the highest values. Whereas standard deviation of GDP growth and lending rate are the lowest values.

If we want to see correlation matrix of these 8 macro variables, Eview generate the below result in table 2:

**Table 2. Correlation matrix for 8 macro-economic variables  
(GDP growth, inflation, market interest rate, net sale, cost and Sony net profit )**

	Y	Net sale	Stock-price	SP500	R_Japan	G_Japan	CPI_Japan	CPI	Cost	G
Y	1	0.41	0.89	0.83	-0.6	-0.23	0.2	0.2	-0.6	0.14
Netsale		1	0.29	0.45	-0.27	-0.63	0.44	-0.15	0.06	0.36
Stockprice			1	0.81	-0.5	-0.08	0.01	0.28	-0.51	0.27
SP500				1	-0.8	-0.4	0.36	0.09	-0.7	0.17
R_Japan					1	0.4	-0.36	0.01	0.83	-0.11
G_Japan						1	-0.2	-0.3	0.05	0.27
CPI_Japan							1	-0.38	-0.31	-0.03
CPI								1	0.04	-0.6
Cost									1	0.007
G										1

**Source:** own study (date access: 1/10/2020)

The above table 2 shows us that correlation among 8 macro variables. An increase in exchange rate and decrease in lending rate might lead to an increase in Sony net profit . It also indicates that correlation between Sony net profit (Y) in Japan and stock price and S&P 500 in the US (0.89 and 0.83) is higher than that between Y and lending rate (-0.6) or between Y and CPI (0.2).

The below table 3 shows us that covariance matrix among 8 macro-economic variables. Sony net profit (Y) has a negative correlation with GDP growth and lending rate but has a positive correlation with CPI, and stock price.

Hence, an increase in inflation may have slight positive impact on Sony net profit.

**Table 3. Covariance matrix for 8 macro-economic variables**

	Y	Net sale	Stock-price	SP500	R_Japan	G_Japan	CPI_Japan	CPI	Cost	G
Y	12.3	5.2	52.6	1756	-0.43	-1.01	0.62	0.46	-9.7	0.23
Netsale		12.8	17.6	988	-0.2	-2.7	1.3	-0.3	1.05	0.59
Stockprice			278	8160	-1.8	-1.6	0.2	3	-37	2.12
SP500				361545	-110	-297	187	36	-1935	47.9
R_Japan					0.04	0.1	-0.06	0.002	0.75	-0.01
G_Japan						1.4	-0.2	-0.23	0.3	0.15
CPI_Japan							0.7	-0.21	-1.1	-0.01
CPI								0.41	0.13	-0.18
Cost									18.9	0.01
G										0.21

Source: own study (date access: 1/10/2020)

## 4.2. Regression model and main findings

In this section, we will find out the relationship between eight macro-economic factors and net profit.

### 4.2.1. Regression model with single variable: analyzing impact of cost (c.o) on Sony Net profit (Y) (Scenario 1)

Note: C: constant

Using Eview gives us the below results:

Coefficient (Cost): -0.5

Constant C: 25.9

Hence,  $Y = -0.5 * \text{cost} + 25.9$ ,  $R^2 = 0.4$  SER = 3.04

Within the range of 10 observations (2014-2019) as described in the above scatter chart 1, coefficient -0.5, when cost increases, Sony net profit will decrease.



#### 4.2.2. Regression model with 2 variables: analyzing impact of Inflation (CPI) on Net profit (Y) (Scenario 2)

Running Eview gives us below results:

Method Least square		Constant C
	Cost	CPI Japan
Coefficient	-0.5	0.04

Therefore,  $Y = -0.5 * \text{cost} + 0.04 * \text{CPI} + 25.7$ ,  $R^2 = 0.4$ ,  $\text{SER} = 3.25$

Hence, this equation shows us Sony net profit has a positive correlation with CPI and negative relationship with cost. Esp., it is more negatively affected by cost.

#### 4.2.3. Regression model with 3-7 variables: adding factors into the above model (Scenario 3)

**Table 4. Regression results**

	Co efficient			
	3 variables	5 variables	6 variables	7 variables
cost	-0.5	-0.2	-0.5	-0.6
GDP growth	-0.6	-0.05	-0.7	-0.7
Net sale		0.2	0.3	0.3
Stock price		0.1	0.2	0.2
Lending rate				5.3
SP500			-0.006	-0.003
CPI	-0.13	-0.02	0.5	0.2

**Source:** own study

#### 4.2.4. Regression model with 8 macro variables: adding GDP growth US onto the above model (Scenario 4)

Running Eviews gives us results (table 5).

**Table 5 - Regression results**

Method Least square								
	Cost	CPI Japan	G_Japan	Net sale	Stock price	SP500	R_Japan	G
Coefficient	-0.54	-0.44	0.7	0.86	0.23	-0.006	-5.4	-3

$$Y = -0.5*cost - 0.4*CPI - 5.4*R - 0.4*G_{Japan} - 3*G_{US} - 0.006*SP500 + 0.2*STOCKPRICE + 0.8*NETSALE - 16,$$

$$R^2 = 0.97, SER = 1.9$$

**Source:** own study

Therefore, we see impacts of 8 micro and macro factors, with the new variable: GDP growth US, the above equation shows that Sony net profit (Y) has negative correlation with cost, CPI, GDP growth, G\_US, SP500, whereas it has positive correlation with stock price, net sale. We also recognize that GDP growth and lending rate, then CPI have the highest impact on net profit, while SP500 just has a slightly impact on net profit.

#### 5. Discussion and further researches

Through the regression equation with above 8 macroeconomic variables, this research paper used updated data from 2014-2019 to analyze the regression equation via Eview in order to show that an increase in lending rate and GDP growth has a significant impact on reducing Sony net profit (Y) with the highest coefficient of impact, followed by an increase in CPI and increase in cost, then an increase in S&P500, as well as a decrease in stock price.

Data is from observations in the past 10 years, it is partly based on the market economic rules, and the research results are also affected by socio-economic characteristics in Japan such as: efficiency of public investment, waste of public investment, enterprise bankruptcy, and investment in areas that increase GDP such as production, electricity, etc. or investing in healthcare, environment and education sectors. We have not yet considered the impact of these factors.

Beside, we can analyze impact of another macro factor, for example, deposit rate when we add this variable into our regression model of profit. Furthermore, we can add unemployment rate or public debt increase into our econometric model to measure the impact of these extra factors on net profit.

## 6. Conclusion and policy suggestion

Based on the above data analysis from our regression model, we would suggest the government, Ministry of Finance and State Bank consider to control inflation more rationally, i.e. not increasing much and suitable with each economic development stage. Governmental bodies and bank system also need to apply macro policies to stimulate economic growth, however not increasing lending rate too much, together with credit, operational and market risk management, corporate governance and controlling bad debt.

Next, it is necessary to coordinate synchronously between the management and administration of commercial bank policies with fiscal policies, monetary policies (used as effective tools to stimulate bank stock price) and other economic development policies to limit the negative effects of lending rate.

Generally speaking, managing Sony net profit depends on many factors, so the government need to use fiscal policy combined with monetary policies and socio-economic policies to reduce unemployment and stimulate economic growth, toward a good stock price management.

## 7. Business risk management solutions

In order to reduce business risks, we propose Recommendations for improving risk management against fluctuations in economic factors at macro level as follows:

For better risk management, we suggest:

Identification of possible risks - including identifying and measuring risks resulting from accidental loss through inspecting, reviewing contracts, synthesizing claims and reviewing internal risks. to find the holes.

Risk reduction - includes reducing the frequency and severity of risks. Provides a reasonable rationale for making risk-solving decisions.

Risk management planning involves estimating the effects of different risks and outlining possible responses if a hazard occurs.

In addition, risk management will ensure that high-risk risks are prioritized and that addressing risks will cost you a low cost but the highest efficiency.

In a nutshell, risk assessment and management are the best weapons against disasters for your project, plan, or business. Moreover, the firm need to develop a long-term strategy to prevent them, this will bring more efficiency.

The risk analysis process includes the following phases:

Determine the risks. This step requires reviewing the list of hazards that can occur with the knowledge and experience of the risk management team. Then use the tool rating, classifying and rating the level of risk. Risk rating helps manage risks with high impact and high probability of occurrence. Risk assessment. Before any attempt can be made to control risks well, it is necessary to identify the root causes of the identified risks.

Coping with risks. Now risk managers are starting to come up with measures that can either reduce or better prevent risks from happening. The question now is: What can we do to reduce the likelihood of this risk happening? What can be done to deal with the consequences when a risk occurs?

Develop a contingency plan or measures to prevent future risks. From the above stages, administrators will summarize and solve the cause and analyze the solution to make future plans for better resolution.

**We also suggest to enhance financial accounting transparency:**

Transparency policy will affect positively on investment management policy of the company in local and global markets. Inclusive finance is the provision of appropriate and convenient financial services, especially for low-income and vulnerable people, to enhance access to finance, contribute to livelihood opportunities, circulating investment capital flows and saving in society, thereby promoting economic growth.

Accounting information will ensure the complete and timely recording and monitoring, thereby serving the process of checking, analyzing and evaluating the use of financial products and services in terms of effectiveness and efficiency. savings, as well as the ability to recover. This is the function and duties of the accountant, the recording is done at the supplier; users and factors in the environment of comprehensive finance. Hence, it will help to manage firms better.

**Abstract**

**Plans For Better Business Performance Of Sony In Japan - And Suggestions For Management**

Through years Sony In Japan has shown success in bringing to the market high quality products, and via technical inventions. Today

risk management is one of vital issues in Sony to maintain its reputation in global markets. The purpose of this study is to find out impacts of economic factors at macro level on net profit of a big technological giant like Sony.

We found that movement of net profit in big firms such as Sony will reflect the business health of technology system and the whole economy. The results of quantitative research, in a seven factor model, show that the increase in inflation, GDP (increasing too much) and lending rate and reducing risk free rate has a significant effect on reducing Sony net profit with the highest impact coefficient, the second is decreasing the exchange rate.

Last but not least, this study proposes risk management solutions and business management plans to lower business risks, cost and enhance its net profit.

**Keywords:** *Sony net profit; stock price; lending rate; market interest rate.*

**JEL:** M21, N1

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