

BUILDING A STRATEGIC CONTROL MODEL FOR THE SPACE TECHNOLOGY PROGRAM IN INDONESIA

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Abstract: *Indonesia does not have the required special characteristics to be one of the best space activity organizer in the global. Lack of the strategic control is the main cause to be not competitive. Building a strategic control can be a strategic solution to make sure that every space technology programs in Indonesia still on the right track to achieve the aims. And every strategic process can be controlled with the building of strategic control model. Schreyögg & Steinmann's model, Simons' model, and Ittner and Larcker's model are good exemplary to be reviewed and analyzed. This study attempts to building a strategic control model for the space technology program in Indonesia. With the building of strategic control model, Space technology program in Indonesia will have good guidance to identify the strategic environment and reliable measurements of how space technology programs are running well.*

Key words: *Space Technology Programs, Strategic Controls, Strategic Environment, and Reliable measurements.*

INTRODUCTION

Control is very important step in strategic process to make sure that the execution of the strategy still on the right track. Controlling action involves the setting the target based on the environmental scanning and assesing, evaluating the every result in strategic process, till the end of the strategic process, which is post action. Post action control can be defined by using benchmarking the current performance results with the other organizations. Control is the system, whole system, and it can be time consuming. But, if the organization do not do controlling, it can be worse, when there will be gap between the target and the results. Managers can also use, if necessary, Scan and Asses the strategic environment (pre-action), fast forward control (during action), and feedback control and post action control (post-action).

Scan and Asses the strategic environment, is a part of strategic control to identify strategic environment before formulating the strategy. It can be the

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guidance to make a decision what kind of strategic emphasis will be taken by the organization. Scan and assess the external strategic environment will make the organization know their position in the market. In the other hand, scan and assess the internal strategic environment will help the organization know their capacity. **Feedforward control**, is a control system before action or strategy is being formulated. After we know the position and capacity of our organisation, then we must make sure that we have minimum requirement of resources to achieve next strategic target. Feedforward is designed for anticipating the potential problem and taking preventive action to avoid that problem (Schermerhorn, 1998). Feedforward control can be early warning system before doing strategic formulation.

Fastforward control, is a control system during action or strategy is being implemented. Sudden change from external and internal organization can be anticipated by using fastforward control. Strategy will be re formulated as adaptive action of environmental changing, in the same process, the implementation of strategy also being adapted.

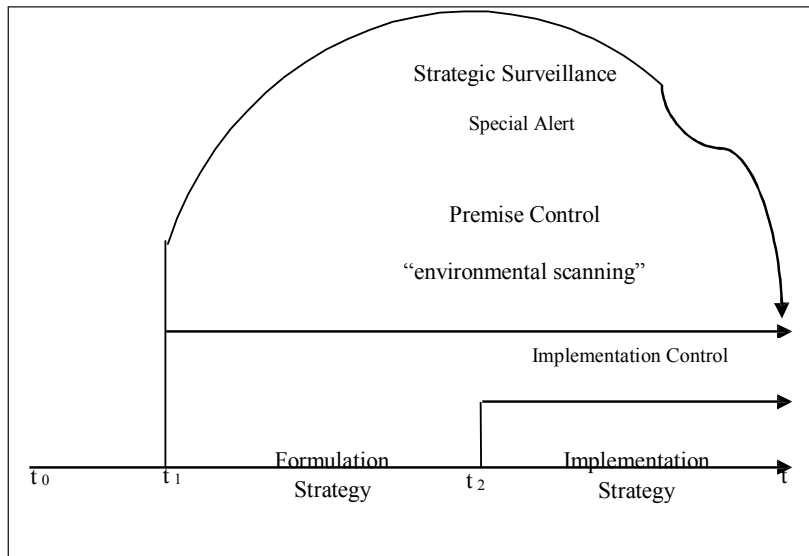
Feedback control, is any control where results are compared to the standard after the operation or project is complete (Nazaripour and Parvizi, 2011).

Espionage Control, is a control system to identify the current of performance results from the organization to be benchmarked by the organization in same industry. It can help the organization to make measurement whether the organization run effectively and efficiently to achieve the target or not.

First Model of Strategic Controls

Strategic Control, originally introduced by Tannenbaum in 1968. In that year, the control was focused on the operational level in an organization. However, in substance approximation theory was firstly introduced by Schreyogg and Steinmann (1987) which introduced a three-step model of formally. Then the model was developed more by Preble (1992). The core components of the model developed Schreyogg and Steinmann (1987) is the premise control (environmental monitoring), implementation control, and strategic surveillance (environmental scanning). Then, Preble (1992) adds the components on special alert to help facilitate the practical application. Preble emphasized that control activities must be done in a way that is structured and focused on the systematic monitoring of the external environment as a means to achieve the strategy. Later, additional components that do Preble (1992) has the support of Pearce and Robinson (2012). Model control strategy can be illustrated in Figure 1 as follows.

Figure 1: Strategic Control in Strategic Process (Picture was adapted from Schreyogg and Steinmann (1987) and Preble (1992))



The model above indicates that the strategy formulation stage begins at the time t_0 . Premise control is built at the time t_1 . Control of the special alert and strategic surveillance was also made at the same time. At the time of entering the stage of the implementation process of the strategy or t_2 , implementation control is done. The whole control components operate at this stage t_2 (Schreyogg and Steinmann (1987)).

Premise Control

Premise Control is the management process of investigation systematically and continuously to determine whether the reasoning on which the strategy is still valid or not (Preble, 1992; Pearce and Robinson, 2012). Premise control requires an ongoing process on environmental monitoring related to the external business environment, social and industrial environment with reference to the expected inflation, legislation, and changes in the competitive (Jauch and Glueck, 1988; Lorange, Morton and Ghoshal, 1986; Preble, 1992). While Pearce and Robinson (2012) adds the technology, or social demographic change as a factor in part of environmental monitoring should be done to measure the premise. The performance of companies or public sector agencies are also affected by industry factors. Competitors, suppliers, substitute products, and barriers to entry are factors that serve the industry as a strategic assumptions.

The premise being considered related to the conditions predicted or expected to enter into the initial process of strategic planning (Schreyogg and Steinmann, 1987). It can be concluded that the control of the premise in the form of monitoring of the environment is only focusing on the variables that are very relevant to affect the organization as a whole.

Strategic Surveillance

By its characteristic, premise control is the focused control, but a strategic surveillance is not focused control (Pearce and Robinson, 2012). Strategic surveillance was designed to monitor the wide variety of events inside and outside the company are likely to affect the strategy. A strategic surveillance is supervisory control of the process of implementing the strategy, which is a means of systematically scanning the business environment (Honcharenko, 2015). The need for the implementation of a more extensive strategic surveillance will improve the ability to recognize the challenges of asymmetric (Bennett, et al, 1999). Some other things that become the focus in strategic surveillance, in a research report on Space Technology and The Soviet / US Strategic Competition: A Perspective and Twelve-Year Forecast Using Cycles, 1988, Colonel George W. Criss mentions, among others, the widespread acceptance of lower levels of management on the chosen strategy, lack of clarity on the direction of the higher management level, Interservice rivalry between different branches of a company in one country, and the lack of funding.

Special Alert Control

Another type of strategic control is special alert control. Special alert control is rethinking rigorous, and most rapid of the strategy of the company or public sector agencies as an event that is sudden and unexpected (Pearce and Robinson, 2012). For example, the great tsunami hit Aceh in 2004, difficulties in obtaining raw materials due to policy restrictions on materials that can be used to construct sensitive technologies in Indonesia, are examples of events that can drastically change the strategy of the company or public sector agencies. Such an event should cause a reevaluation of the company's strategy and the current strategic situation quickly and seriously. At many companies or public sector institutions, a crisis team to handle the initial response the company or public sector agencies against unexpected events that might cause immediate effect on strategy.

Implementation Control

Implementation of strategies occurs as a series of steps, the program, investment and movement along an extended time. Special programs carried out. Functional areas initiate activities related to the strategy. Key personnel plus or reassigned, including the mobilization of other resources. In other words, leaders implement

comprehensive strategies to translate the plan into action, results and additional measures of special units and individuals. Implementation control was designed to assess whether the overall strategy should be changed taking into account the results relating to additional measures in the overall strategy (Pearce and Robinson, 2012).

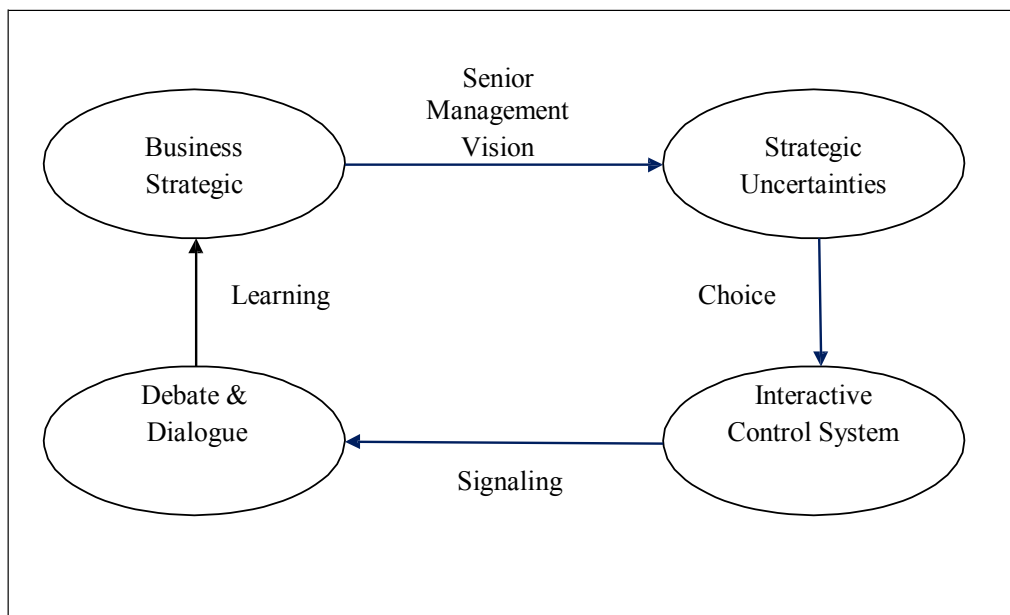
Previously Developed Strategic Control Model

Previous studies that can be used as a reference in developing a pattern or model for the management of the implementation strategy of space technology program in Indonesia has been inventoried by the author. Here is the explanation of the overall model of control strategies that have been developed in previous studies:

1. Strategic Control Model by Simons (1995; 2000).

Model developed by Simons wider than the three-step models. Simons focus on the implementation and control of strategies and also develop and articulate a comprehensive strategic management process and can be used in the organization. For more details, the model developed by Simon can be seen in Figure 2 as follows.

Figure 2: Strategic Control Model from Simon (Picture adapted from Simons, Robert, *Performance Measurement and Control Systems for Implementing Strategy*, Published by Prentice Hall Inc, 2000)

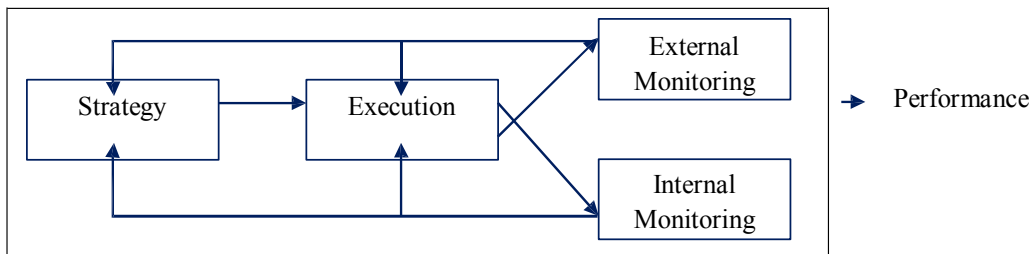


In the image above, interactive control system to anticipate uncertainty strategic emerging threats and opportunities that could invalidate the assumptions that are based on business strategy today: changes in competitive dynamics, changes in the internal competency, the appearance of things unforeseen in the future.

2. Strategic Control Model by Ittner dan Larker's (1997).

The other theory expressed by Ittner and Larker's (1997) where they built a conceptual model which is more theoretical and general than the model belongs Schreyogg and Steinmann also Simons. The model they developed mention that feedforward controls (external monitoring) is as important as feedback controls (internal monitoring). Model Ittner and Larker's is opposite to (Schreyogg and Steinmann (1987), Preble (1992) and Simons (1995; 2000) who found feedforward controls (or interactive control, a term used Simons) are more relevant to the process control strategy compared to feedback control (control diagnostics). Model Ittner and

Figure 3: Strategic Control Model from Ittner, C.D. dan Larcker, D.F. (Picture adapted from Ittner, C.D. dan Larcker, D.F., *Quality Strategy, Strategic Control Systems, and Organizational Performance*, Published by *Journal of Accounting, Organizations, and Society*, 1997)



According to Ittner and Larcker, there are three elements of control system strategy, the strategy then its execution, external monitoring (benchmarking, market research and strategic audits of products and processes), and internal monitoring (quality feedback, rivi management, and rivi Board of Directors). The model developed Ittner and Larcker impact on the results in the company's performance (return on assets, return on sales, and perceived performance).

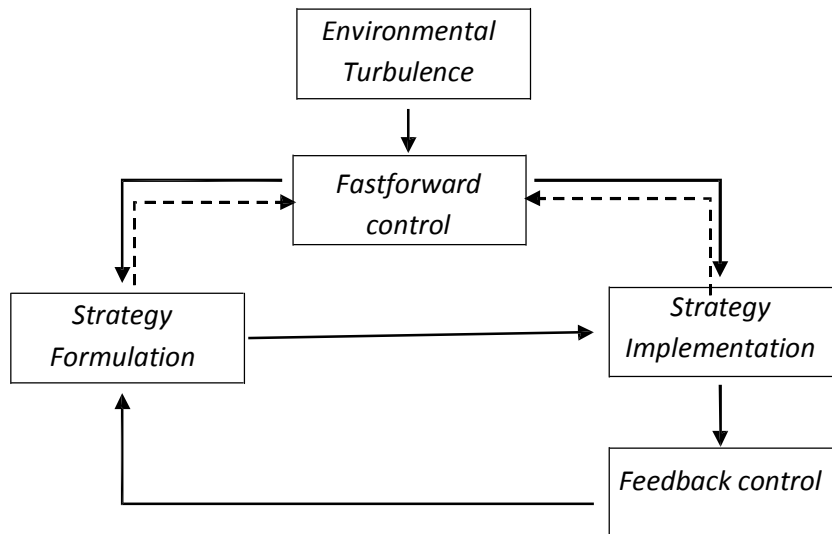
Feedback control is a standard condition in which there is assumed to be true performance and deviation that arises is testament to the failure of the strategy (Schreyogg and Steinmann, 1987). In the three-step model, the feedback control

is part of implementation control, and focus on the monitoring of the impact of the action taken against the strategy (Schreyogg and Steinmann, 1987). Diagnostic controls that are part of a feedback component will generate corrective actions when deviations appear in the desired outcome (Simons, 1995). Interactive control process is part of a strategy to focus feedforward. Simons (1996; 2000) explains that the level of interactive control strategy that helps to focus on the uncertainty of the strategy is received.

3. Strategic Control Model by Durden (2001)

Another component that can also form a pattern or model of control is fastforward control strategy proposed by Durden (2001). According to him, fastforward controls is the design and description of the more relevant than the feedforward control to anticipate the rapidly changing environment and require greater focus to the suitability of the strategic direction and goals. fastforward related to the control can be clarified with the Figure 4 as follows.

Figure 4: Framework of Strategic Control (Durden, 2001)

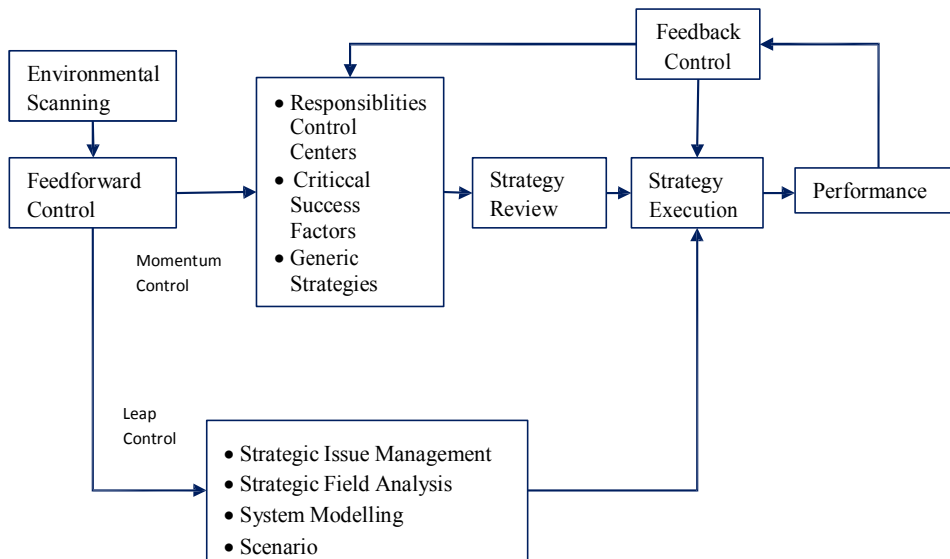


In the scheme developed by Durden (2001), FastForward controls designed to follow up quickly to changes from turbulent environment and has become a reference in parallel to the improvement of strategy formulation and implementation.

4. Strategic Control Model by Forghani and Arabi (2007)

The model developed by Forghani and Arabi (2007) conducted on companies engaged in the military industry. The main components in the model they have developed focuses on feedback control and feedforward control as the core of the process of achieving strategic goals and competitive advantage. For more details, can be seen in Figure 5 as follows.

Figure 5: Strategic Control Model by Forghani and Arabi (2007)



The built of strategic control model above aimed to ensuring that built assumptions as the basis for the determination of the formulation of the strategy is still valid. In addition, the built model is also used to find out what needs to be done to maintain or control the momentum. There are three techniques used are: responsibility control centers, critical success factors, and generic strategies. Business Environment in Iran are relatively unstable requiring leap control strategy to ensure the changes are significant. Leap control strategies can help them determine a new strategic needs and to cope with the dynamics of the environment. Techniques used are: strategic issues management, strategic field analysis, system modeling and scenarios.

Basically the strategy is progressive, designed so that the plan can be achieved in the coming years. In the formulation stage, the strategy is also based

on several assumptions of management regarding many events yet to come. Thus, the required control strategy as a form of adjustment to the strategy and the possibility of changes need to be made operational. So it will be important to monitor the “health of strategy” throughout the period of the strategic plan prepared (Freedman, 2003) and the control strategy is more than just control over finance (Bert and Henk, 1993).

On a large number of companies, the success of the strategy determined by some basic financial data, such as the return on investment, return on sales, and so on. However, in the context of public sector organizations, in this case the government agency, can analogize the return on investment to how much benefit that can be provided by the government agencies for the welfare of society. The society give the investment, of course, is their contribution in annual tax which give to the state for the funding of government agencies’ activity.

This is in line by the theory from Pearce and Robinson (2012) which states that the control strategy is the management’s efforts to track down a strategy when implemented, detect problems or changes in basic assumptions, and make adjustments as needed. When compared with the post-action control, strategic control with regard to the direction of action steps. At the time of the measures carried out and the end result will look the next few years.

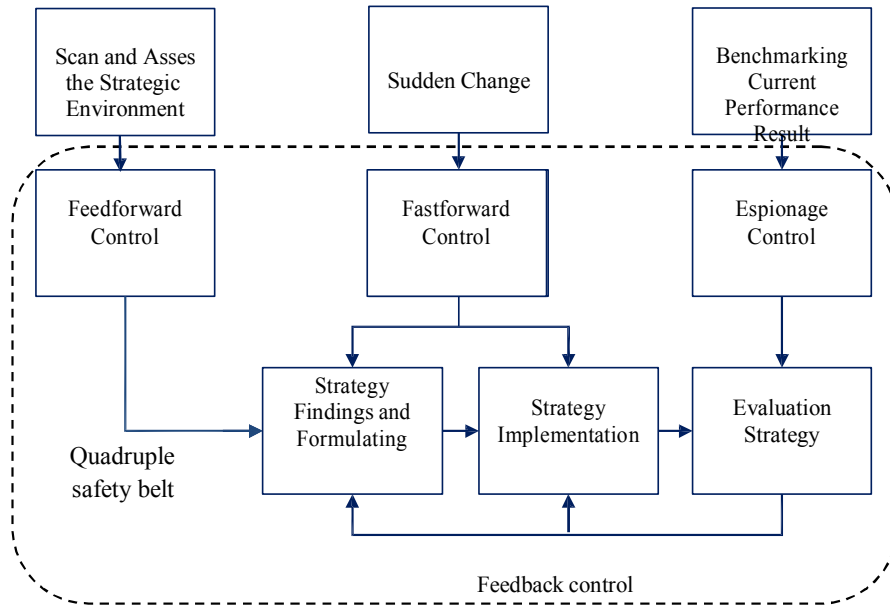
Ryszard Barnat, on Strategic Management: Formulation and Implementation. Strategic control, the process of evaluating strategy, is practiced both after the strategy is formulated and after it is implemented. Strategic control requires data from more sources, more data from external sources, oriented to the future, more concerned with measuring the accuracy of the decision premise, based on external factors, and relies on variable reporting interval.

Rapid environmental change and continuously increasing has made the importance of strategic control to help a company or public sector institutions can survive and succeed. Control should provide the basis for adjusting the strategic actions and direction of a company or public sector agencies in response to various developments and changes.

Proposed Model of Strategic Control for Space Technology Program in Indonesia

In this section of the study, it is attempted to design a strategic control models which probably meet the specific requirements of implementing space technology program in Indonesia. This model can be a good guidance in order to achieve strategic aims.

Figure 6: Strategic Control Model for Space Technology Program in Indonesia



Every step of the proposed model will be explained as follows:

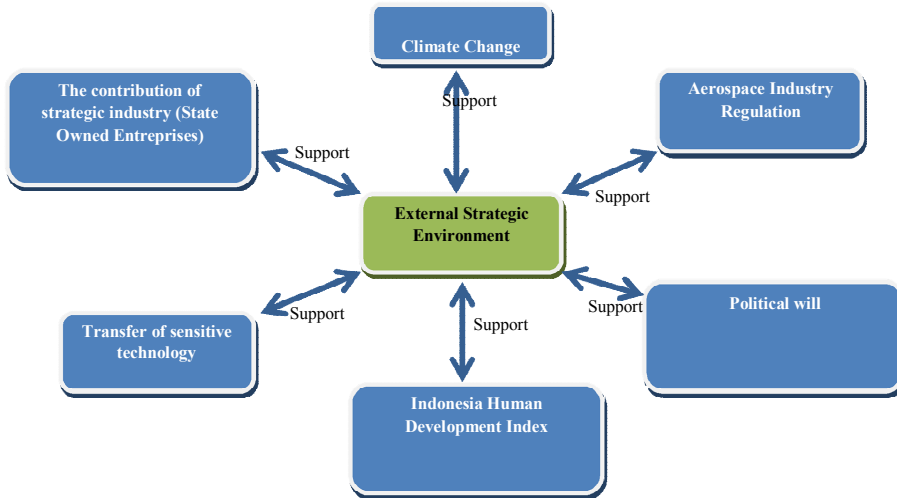
Scan and Assess the Strategic Environment

Strategic Environment is very important ingredient to formulating the strategy. The changing on the strategic environment must be scanned and assessed. Environmental scanning is the acquisition and use of information about events, trends, and relationships in an organization’s external environment, the knowledge of which would assist management in planning the organization’s future course of action (Choo, 2001). The figure 7. Below explain about the external strategic environment of space technology program in Indonesia.

External strategic environment of implementing the space program in Indonesia consisting of climate change, aerospace industry regulation, political will, Indonesia Human Index Development, transfer of technology sensitive, and the contribution of strategic industry.

Climate change, nowadays, be hot issue in every country in this world. Climate change brings the implication of human beings. Empowering the space technology can be strategic solution to anticipate the impact of climate change. In Indonesia, climate change also can be a booster for pushing the public opinion to support the development of space program.

Figure 7: Strategic Environment for Space Technology Program in Indonesia



Aerospace industry regulation, make a challenge for supporting the space program. Political will, is a public domain and the successful of implementing the space program can push the political will. As I Know, space program in Indonesia is not fully supported by political will. It can be explained by the trend of budgeting policy to implement space program. Table 1. belows can explain the fact.

Table 1
Budgetary Policy for LAPAN 2010-2019

YEAR	BUDGETTING POLICY(USD)
2010	16.952.672,53
2011	32.434.699,33
2012	36.496.277,57
2013	36.975.538,26
2014	54.371.891,85
2015	49.820.635,15
2016 (approximately)	82.139.156,18
2017 (approximately)	91.961.509,99
2018 (approximately)	98.053.293,85
2019 (approximately)	84.448.556,62

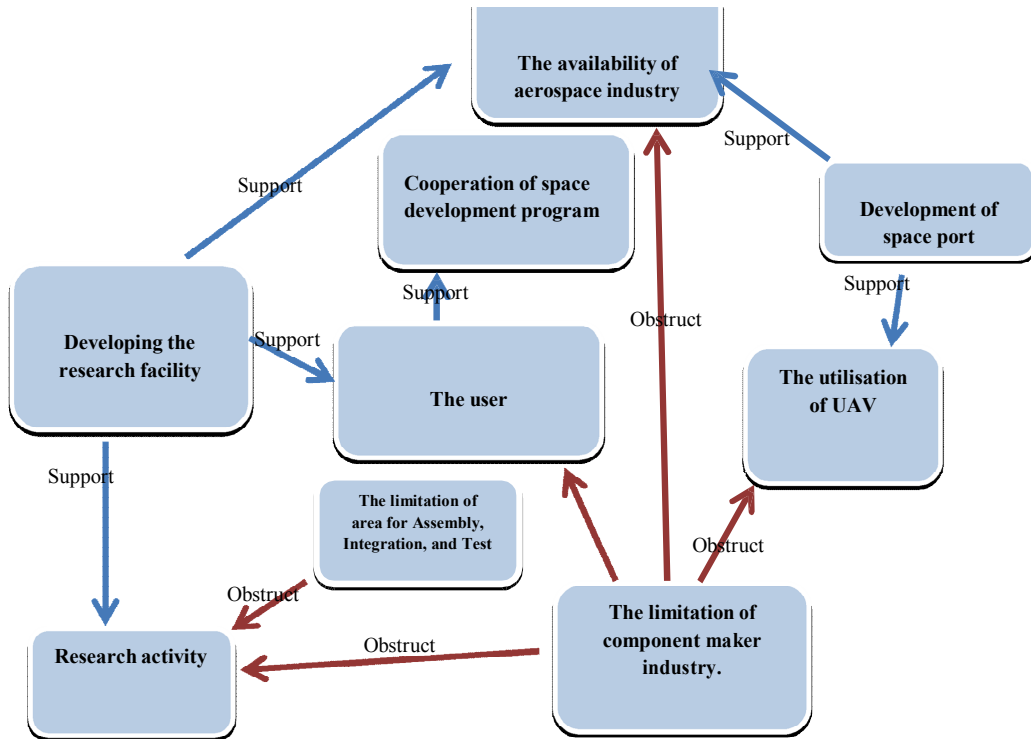
Source: LAPAN, 2015

Indonesia Human Index Development can be pushed by developing of space program. The scheme funding for the scholarship to master space and technology science is being progressed.

Transfer of technology sensitive, is one of disturbance in doing research for space technology. Missile Technology Control Regime (MTCR) is an informal association of non-governmental treaty or regime that was originally established by the G-7 in 1987. The MTCR aims to restrict and oversee the transfer of technology (including space technology) that may play a role in missile technology, weapons of destruction mass, and dual use technologies (civilian and military).

Contribution of strategic industry being slow in recent condition. The situation of global economic give big impact about the quantity of their contribution in space program in Indonesia. The figure 8. below explain about the internal strategic environment of space technology

Figure 8: Internal Strategic Environment (Adapted from LAPAN Midterm Development Document and Developed by Author for this study)



The figure above can identify the position of space program in Indonesia. The identification based on strength and weaknesses of internal condition.

Feedforward Control

Feedforward control as explained above can be early warning system before finding and formulating the strategy. After knowing the position and capacity of our organisation, we can do measurement of what kind of resources we have now to get next strategic target. For developing of space technology program in Indonesia, we must develop our resources.

Strategy Findings and Formulating

The scanning and assessing process of the strategic environment create the result for knowing the position and capacity of the organization. Then, based on feedforward control, we can do finding and formulating the strategy. The process of strategy finding and formulating, we can create realistic target based on resources of the organisation's.

Strategy Implementation

After the process of finding and formulating the strategy, the next process is strategy implementation. This means that there will be a translation the strategy into action. There are two representative points of view in present researches. One is created by Yunkui Xue, Huaning Wei Daqing Qi (2005), through identify various steps in the process of the implementation of strategy, three major element: consensus, coordination and control will be made as a basis for describe the implementation of strategy. The other viewpoint is made by Larry Bossidy and Ram Charan (2007). Organisation based on the actual situation, select key processes of strategic management—strategic processes, personnel procedures and management process as constituent elements of the implementation of strategy. It means that strategy implementation is one of strategic process step who use comprehensive resources to achieve strategic aims of the organisation. Ability to control strategic implementation consist of capacity of performance management, capacity of information control, capacity of financial control, and capacity of cultural integration (Kailiang Chen, Wei Guo, Huirui Li, 2008).

Sudden Change

Strategic environment can give the impact the turbulence in strategy implementation and strategy formulation. Nowadays, external condition of space program implementation in Indonesia be influenced by global economy. The funding scheme for space program is reduced for fulfilling another development

sector. Every sudden change is absolutely change strategy formulation and also can influence the strategy implementation.

Fastforward Control

The sudden change can be anticipated by using fastforward control. With this control scheme, the organization can do parallelly change the direction or adaptive scheme in every changes happen to the strategy formulation and strategy implementation. Fastforward control can reduce lag time to execute the strategy because of strategy formulation has not changed yet. It is also can break the opinion that control scheme always identic with the time consuming.

Evaluation Strategy

Evaluation strategy, is the end process of strategic process. The function of evaluation strategy is to identify the gaps between target and performance result. The result of this strategic process, can be implemented as an input for the future strategy formulation. Evaluation strategy must be followed by recommendations for improving the quality of strategy findings and formulating.

Benchmarking Current Performance Result

To identify that your organization run well and do effective and efficient system, you need to compare your organization performance with the same organization in same industry. It can be a guidance for the organization for the next target setting process.

Espionage Control

Espionage control, is the control scheme to play significant role to give another input for future program. Evaluation results can be implemented in comprehensive way if we do a benchmarking with the other performance results from another organisations from same industry. It is can be called a strategic scheme control from external of the organisation after implementing strategy process. Competitor can create something better than us, we can copy their strategy or their way to achieve their best performance. Espionage control can be used to filtering external sources to be example in our organisation. We can not copy all of their strategic ways, because we just can adopt wisely.

Feedback Control

According to Forghani (2007), feedback is an essential means for companies to evaluate the effectiveness of their strategic decisions. When there is a gap, there is feedback. The output of feedback like a alert system for formulating and

implementing process of the strategy. It can be an improvement system in strategic process to reducing the loss.

The proposed strategic control in this study offer control scheme for organisation during pre-action, action stage 1 (formulation), action stage 2 (implementation), and post action (espionage control). It can be called by quadruple safety belt for the organisation in achieving their strategic aims.

Conclusion:

Strategic control is very effective tools. With the proposed model of strategic control, Indonesia space technology program can effectively identify every change. Because every change brings its consequences for corporate strategic. It can also bring to the strategic failure. The stagnancy of the implementation of space technology program can be reduced by the best strategic control model.

Strategic control also allow the top management to evaluate from pre action to the post action. Post action control will give the best view in strategy evaluation with benchmarking of current performance result from the other space activity organizer.

References

- Barnat, Ryszard, *Strategic management: formulation and implementation*. Accessed on May 11, 2015.
- Bennet, et all. (1999). *What Are Asymmetric Strategies*. Rand: Washington DC.
- Choo, C.W. (2001). Environmental Scanning As Information Seeking and Organizational Learning. *Information Research* Vol 7. No. 1.
- Criss, G.W. (1988). Space Technology and The Sovoet/US Strategic Competition: A Perspective and Forecast Using Twelve –Year Cycles. Air War College Research Report.
- Forghani, Ali, Arabi, Mohammad, “Applying the strategic control in the military industrial companies”, 2nd International Conference on Strategic Management, (December 2007), Tehran.
- Freedman, M., & Tregoe, B. (2003). *The Art and Discipline of Strategic Leadership*, McGraw-Hill, New York.
- Honcharenko, I. (2015). The Implementation Features of The Strategic Management Process in Organizations of Small and Medium Business. Київ Миколаївський національний університет імені В.О. Сухомлинського: National University of Technology and Design.
- Ittner, C.D., dan Larcker, D.F. (1997). Quality strategy, strategic control systems, and organizational performance. *Accounting Organizations and society*, 22(3/4), 293-314.

- Jauch, L.R. dan Glueck, W.F. (1988). *Business Policy and Strategic Management*. McGraw-Hill: New York.
- Kailiang Chen et all. (September 2008). The Implementation of Strategy Evaluation Model and Index System Construction. *International Journal of Business and Management*.
- Larry Bossidy and Ram Charan. (2007). *Administer-the discipline of getting things done*, Beijing: China Machine Press.
- Pearce, J. dan R. Robinson, Jr. *Formulation, Implementation, and Control of Competitive Strategy* (10th edition). Irwin, Homewood, IL. 2012.
- Preble, J.F. (1992). Towards a comprehensive framework of strategic control. *Journal of Management Studies*. pp. 391-409.
- Schreyogg, G. dan H. Steinmann. Strategic Control: A new Perspective. *Academy of Management Review*. Vol. 12, pp. 91-103, 1987.
- Simons, R. (1995). *Levers of Control*. Harvard Business School Press, Cambridge, MA.
- Simons, R. (2000). *Performance Measurement and Control Systems for Implementing Strategy*. Prentice Hall: New Jersey.
- Tannenbaum, A., *Control in Organizations*, McGraw Hill, New York, 1968.
- Xue, Yunkui, Qi, Daqing and Wei, Huaning. (Sep, 2005). *Organizational strategic implementation status and analysis for determinant of implementation in China*. Management World.