ECONOMICS & Sociology

Nguyen, M. (2018). A New Decision Making Model based on the Made in Vietnam Lean Management Philosophy. *Economics and Sociology*, *11*(1), 44-60. doi:10.14254/2071-789X.2018/11-1/3

A NEW DECISION MAKING MODEL BASED ON THE MADE IN VIETNAM LEAN MANAGEMENT PHILOSOPHY

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Received: November, 2017
1st Revision: December, 2017
Accepted: January, 2018

DOI: 10.14254/2071-789X.2018/11-1/3

ABSTRACT. The main purposes of this research are to develop a new scientific decision making model based on the Made in Vietnam lean management philosophy, that has been developed and applied successfully at over 200 enterprises in Viet Nam in order to support these enterprises in their business decisions. The model was built from the practical point of view (observation, surveys, in-depth interviews, case studies) for finding out the methods of optimal thinking in order to analyze the current situation, construction, development, as well as verification of the optimal models. The model proposed in this research has been confirmed valid by both big businesses and SMEs in Vietnam. The model can be used not only for Vietnamese enterprises but also for other enterprises in both developing and developed countries.

JEL Classification: M1, L2

Keywords: decision making model, the Made in Vietnam lean management philosophy

Introduction

In the context of uncertainty and dynamism of business environment, optimizing decisions become a vital factor for any company (Gray & Meister, 2006; Golfarelli & Rizzi, 2008). Lots of company resources are involved in the decision making process and incorrect decisions may lead to the downfall of the organization as such (Verma, 2014). Speaking academically, decision making research has a considerable history with many notable contributions (Nutt, 2011). Decision making research has provided a large number of theories, models, techniques and practical tools to maximize the effectiveness of decision making in a company. Lean management has also been addressed in some current research, also as applied to making decisions. Božičković *et al.* (2012) have used some lean tools as well as statistical analysis, simulation and graphical tools to make decisions with higher efficiency and performance in production systems. Sacks, Esquenazi & Goldin (2007) also introduced a new production management model in the field of civil engineering. It is a lean management model with the goal of building luxury commercial buildings, that is integrated into the development of a simulation model LEAPCON to make decisions and control the situation overall. Sacks, Radosavljevic & Barak (2010) also proposed a simulation model of information for making construction decisions based on the views and principles of lean management. Mao & Zhang (2008) developed a framework for process re-engineering and information exchange methods

to integrate the principles of lean management into computer simulation techniques in the construction sector context. This integration will enable the processes of simulation and effectiveness evaluation of the construction work being adjusted. The results of the simulation showed that applying lean principles enhanced the performance of the construction process by reducing the overall project time and increasing the process efficiency.

However, the analysis of the authors mentioned above is only a combination of several tools (more specifically – simulation tools) with some specific lean approaches in practice without modelling and building optimal decision models based on the lean management approach to be applied in many different fields. Therefore, this is also the gap in professional and advanced studies related to lean management in decision making.

In Viet Nam, along with the opportunities that global competition brings, deeper integration into the world economy requires Vietnamese enterprises make decisions quickly, accurately and more effectively. However, management at most local enterprises and organizations is now mainly based on the qualitative analysis and management decisions are often made on the basis of managers' experiences, relying on the results of surveys, interviews or research based on rather old data. Vietnamese enterprises lack a good-quality support model for their management decisions.

In Vietnam, research on decision making has been rather limited, with no published official book/documents related to decision making models. Besides, due to differences in organizational cultures, human resource characteristics, finances, and the development of science and technologies, it is difficult for Vietnamese enterprises to apply effectively optimal decision making models which have been studied and applied successfully in the practice of enterprises around the world. It is necessary to carry out research in order to develop a suitable decision making model specifically for Vietnamese enterprises. Therefore, a new decision making model based on the Made in Vietnam lean management philosophy has been developed.

The Made in Vietnam lean management philosophy has been developed based on the lean management theories from a global context, along with some additional characteristics appropriate specifically for Vietnamese enterprises (Minh, 2015a). The Made in Vietnam lean management has been published and recognized as the new management philosophy for Vietnamese enterprises at the conference "13th Global Conference on Sustainable Manufacturing – decoupling growth from resource use" (materials of the event are indexed in Scopus) which was held in Ho Chi Minh City in September 2015.

To fulfil the aim of this research, the following objectives were formulated: (1) To review the conventional decision making model applied at Vietnamese enterprises, (2) To investigate the main problems with decision making these companies are facing, (3) To develop a new decision making model based on the Made in Vietnam lean management for Vietnamese enterprises.

The paper is organized as follows: After the introduction, Section 2 provides the description of the Made in Vietnam lean management philosophy. Research methodologies are presented in detail in Section 3. Section 4 describes the conventional decision making model applied at Vietnamese enterprise with all typical characteristics and identifies the main problems in decision making these companies are facing. The new decision making model based on the Made in Vietnam lean management philosophy with all its elements is explained in Section 5. Finally, conclusions are presented along with the limitations of the study and recommendations for further research.

1. Literature review

1.1. The Made in Vietnam lean management Philosophy

Lean management is one of the most advanced management styles and focuses on fulfilling customer satisfaction and creating value through waste reduction (Womack *et al.*, 2007; Liker, 1999). With the efforts of research and consulting groups, lean management was initially applied in Vietnam since the last ten years of 20th century. However, the number of Vietnamese enterprises successfully applying lean management is limited (Minh, 2015a). Most Vietnamese enterprises have been ambivalent regarding whether to apply or deny the lean management approach. Moreover, successful lessons from developed countries indicate that lean management cannot be applied mechanically, and there is need to develop an application philosophy suitable for Vietnamese enterprises. Based on that, the Made in Vietnam lean management philosophy has been developed along with added characteristics appropriate for Vietnamese enterprises. This philosophy has been applied successfully in over 200 enterprises in Vietnam.

The Made in Vietnam lean management philosophy is the philosophy of gaining profit and creating added value for company/organization by utilizing employees' intellectual abilities to continuously improve the business process to minimize waste costs. The concept of the Made in Vietnam lean management is explained by the following equations:

Profit = Revenue – Cost **(1)**
Costs = Actual costs + Waste **(2)**
Waste = Tangible waste + Intangible waste **(3)**

Source: Minh, 2015a.

According to these equations, to earn more profit, an enterprise can increase revenue or reduce costs. Revenue is a subjective element that depends on customers as the source. In addition, business costs are highly constrained by labor wages and input materials that are necessary and cannot be reduced to such an extent that may hamper normal and effective operations instead. What would be eliminated, however, is the waste. The Made in Vietnam lean management also provides methods and tools to enable enterprises to identify existing waste in the business process and to gradually eliminate this waste, thereby improving business performance. There are two types of waste: tangible and intangible. Tangible waste is a popular focus as it is easy to identify in the business process, e.g., unnecessary inventory, overproduction, waiting time, unnecessary transportation and movement, and defects. In practice, most companies have made an effort to minimize their tangible waste and reduce costs. However, intangible wastes cannot be seen, therefore, are harder to identify. Intangible waste includes waste in thinking patterns (shortage of development thinking for business, afraid to think of change, conservative and traditional thinking), waste in working approach (methods and processes to operate the business), and waste in missing opportunities (growth chances and business opportunities). Indeed, intangible waste is generally regarded as being larger than tangible waste (Minh, 2015a).

1.2. "Tam the" – the foundation of the Made in Vietnam lean management

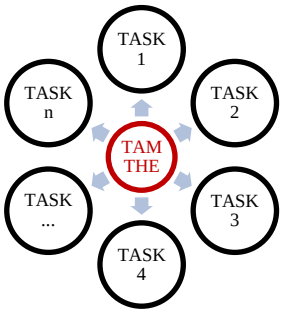

Figure 1. Tam the of things
Sources: Minh, 2015a.

Based on the development of the Made in Vietnam lean management philosophy, Minh (2015b) also proposed the management terminology Tam The. Tam The is illustrated as the heart of the Made in Vietnam lean management philosophy and is the central and key factor for the successful implementation of lean management. Tam The has been recognized as the management term written in Vietnamese and published in the *International Journal of Simulation and Modelling*, Vol. 14, pp. 289-298. Tam The, a management concept, is defined by the following management function:

Tâm Thế = Thấu 1 + Thấu 2 + Ý (4) (Vietnamese term)
Tam The = Deep Understanding 1 + Deep Understanding 2 + Consciousness

Source: Minh, 2015b.

Tam The includes two understandings and one consciousness. Deep Understanding 1 is to comprehend that a work (job/study) that a person implements benefits him/her. Deep Understanding 2 is to comprehend that by doing the work seriously (job/study) he/she can improve individual thinking capacity (when studying) and working possibilities (when implementing a job), thereby benefiting himself/herself. Consciousness is to comprehend that people should have good behavior, attitude, and morality toward work to reflect and implement the two understandings. If the Made in Vietnam lean management centers on human intelligence, then Tam The focuses on spiritual power, integrating people in the organization and guiding their thinking on a common axis to consolidate collective knowledge and strength of all the concerned people for creating added value for the organization. Therefore, Tam The plays an important role in establishing the thinking foundation for the successful operation of Vietnamese enterprises.

In short, in facilitating efficient utilization of human intelligence and favorable conditions for people to devote their knowledge to waste/cost reduction, lean management serves as a solution to more effective business and operational activities. This type of management thinking is the key to helping firms and organizations, particularly in developing countries (lacking capital and technology), to gradually improve their competitive advantage by means of better utilize their resources, to include their people.

Practically, the Made in Vietnam lean management began to be applied in Vietnam in 2014. During four years from 2014 to 2017, the Made in Vietnam lean management has been used in over 200 Vietnamese's private enterprises including not only small enterprises (with under 100 employees) but also many big enterprises (with over 15,000 employees).

Table 1. Number of enterprises applying the Made in Vietnam lean management in the period of 2014-2017

Size of enterprises	Quantity	Manufacturing	Services
Microenterprises	90	65	25
Small enterprises	60	40	20
Medium enterprises	45	35	10
Big enterprises	10	6	4

All of the above enterprises have started to realize the efficiencies after nearly 6 months of applying the Made in Vietnam lean management philosophy, which is reflected in the increase in employee productivity, the quality improvement of products or services through the optimization in quantity of products or services sold, and positive feedback from customers. At the same time, the cost of production has fallen as a result of eliminating the waste costs. In particular, it is easy to see the increase of the cohesion between employees and the enterprises by the proof of decline in employee turnover rate compared with the time before applying the Made in Vietnam lean management in manufacturing and production activities.

Table 2. Summary of the efficiencies of implementing the Made in Vietnam in enterprises

	1 year applying	2-3 years applying	4 years applying
Increase productivity	25-30%	70-100%	150-200%
Improve quality	5%	10-15%	20-30%
Reduce cost	5%	10-13%	15-20%
Enhance the cohesion between employees and enterprises	25%	50-60%	50-60%

Source: Summary from the annual report of efficiency after applying made in Vietnam lean management).

The above evidence suggests the effectiveness and benefits of applying the Made in Vietnam lean management philosophy and thinking in business practice. The Made in Vietnam lean management has been recognized by Vietnamese enterprises as a new and advanced management philosophy that is suitable for all types of businesses in Vietnam.

2. Methodological approach

2.1. Research framework and research methods

The research used qualitative methods to match with research objectives. The research framework is presented as below:

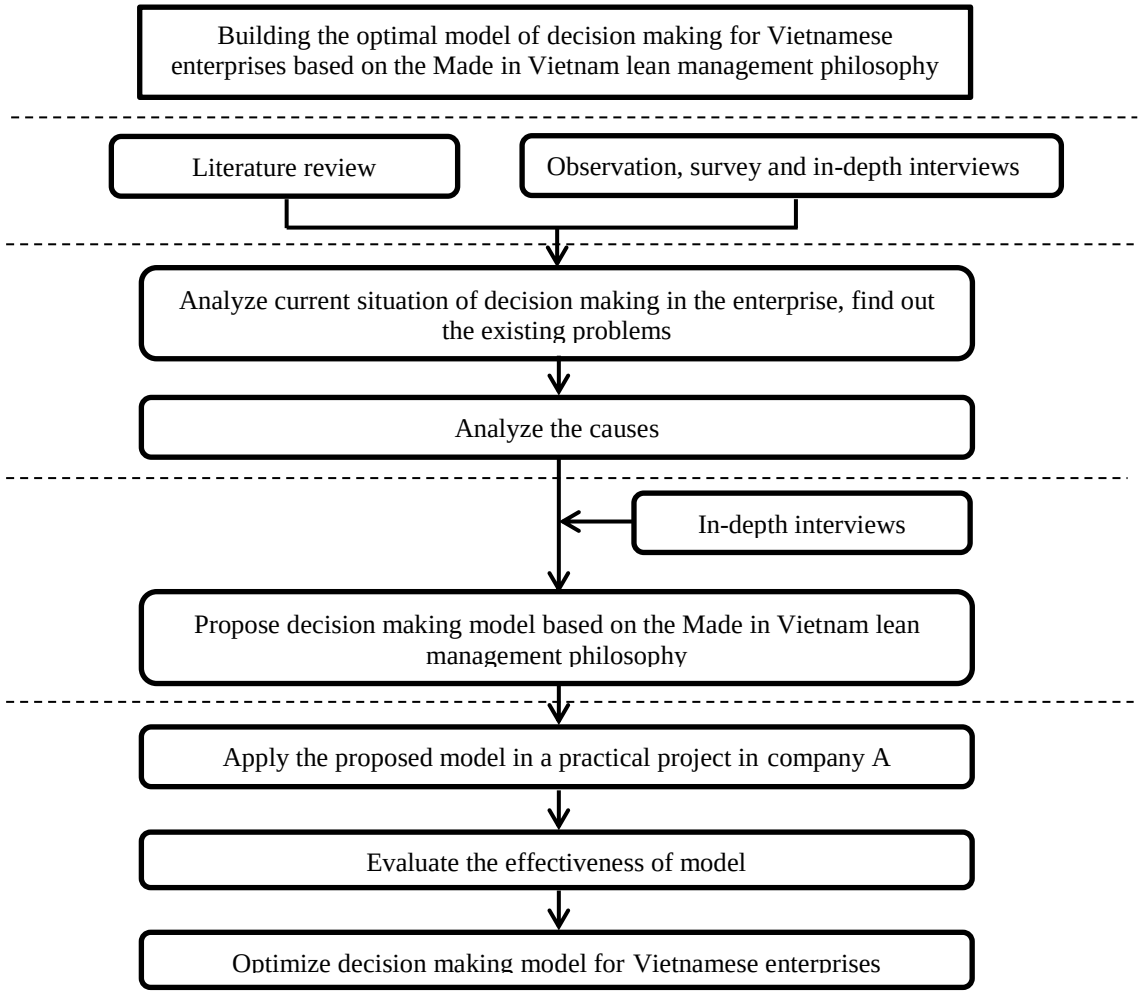

Figure 2. Research framework

2.2. Data collection method

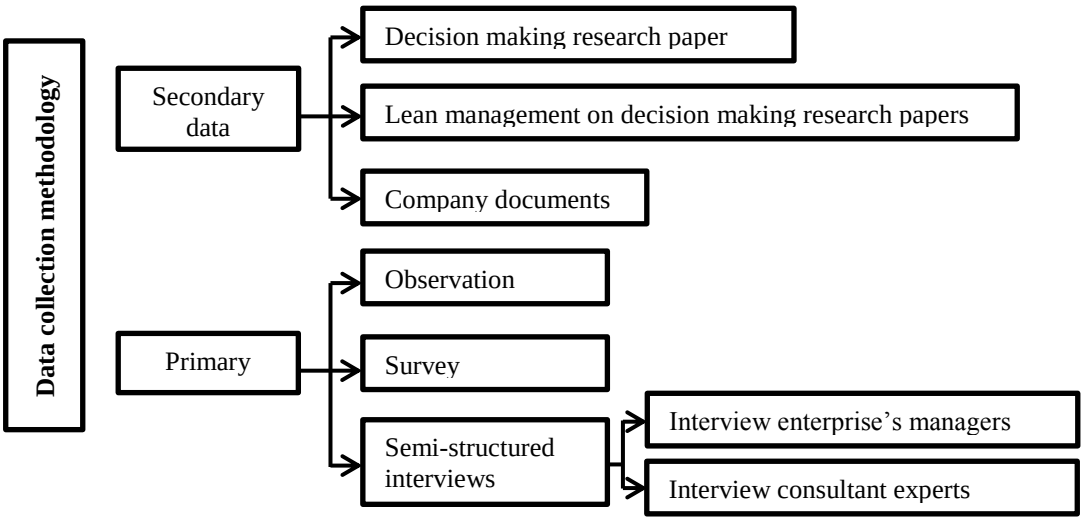

Figure 3. Data collection methods

Secondary data collection methods

The collected secondary documents and information included two types:

Type 1: Including international and domestic research about many topics such as model studies, decision making method, research of lean thinking management in decision making. The classification and analysis of these documents will help to find out the current trend of research and decision making theories, as well as collect the existing research of theoretical lean management thinking. Based on that, the author started to build a theoretical framework and research model appropriate for Vietnam context.

Type 2: Including historical data of actual business result when enterprises made decisions in reality. These data will support the assessment of the effectiveness of conventional model and decision making methods which are applied by Vietnamese enterprises.

Primary data collection methods

Primary data in the study was collected through 3 methods:

Observation method

Observation methods were implemented within 10 typical enterprises in the following areas: mechanical manufacturing, retailing and logistic services in the scope of the research. The main contents focused on the way they make decision and governance. Then, observe and figure out the existing irrationalities in the decision making process.

Survey method

By conducting investigation and survey on 100 enterprises in various fields through a consistent questionnaire closely aligned with the research objectives. The content of the survey covers two main parts:

Part 1: Information about enterprises and participants involved in the survey

This section is used to group the survey's enterprises and survey's respondents. Section 1 needs to capture the following information: the size and the field of each enterprise, basic information of survey participants (occupation, position in the enterprise, contact information).

Part 2: Current situation of decision making in the enterprises:

This section is designed including 15 semi-closed questions to explore the conventional decision making model in Vietnamese enterprises through 3 factors:

- Decision making method
- Decision making process in Vietnamese enterprises
- Effectiveness of decision making

Table 3. Number of participants responded to the survey

Participants responded to the survey	Number of Enterprises	Number of responses
Top management	100	150
Middle management		200

In-depth interviews method

The in-depth interviews were conducted twice during the study.

First time: In-depth interviews were conducted at stage 1 of collecting primary data for the study. Enterprise leaders and managers were interviewed by representative sampling method. On average, each interview was conducted within 40 minutes to reaffirm the results obtained through the survey, explore the key issue that exists in corporate decision making; simultaneously, find out the most important causes of these problems.

The second time: In-depth interviews were conducted at stage 3 of building the solution model. In this period, 15 senior managers in 10 enterprises were interviewed using representative sampling method. The selected enterprises have applied the Made in Vietnam lean management thinking into production and business activities for 1-3 years. On average,

each interview was conducted within 50 minutes to get practical feedback from participated enterprises for the decision making model based on the Made in Vietnam lean management philosophy.

Table 4. The number of participants responded to the in-depth interview

Participants responded to the in-depth interview	Quantity
Round 1	
Top management (not include CEO)	90
Middle management	90
Round 2	
CEO	50

The results of survey and in-depth interviews are the inputs that help the author to build an optimal model of management decision making based on the Made in Vietnam lean management philosophy.

3. Results

3.1. The conventional decision making model in Vietnamese enterprises

Figure 4. The conventional decision making model applied in Vietnamese enterprise

After analyzing the results of observations, surveys and in-depth interviews, the conventional decision making model applied in Vietnamese is illustrated in *Figure 4*. The model has three main features:

- Basing on experience is general methods for making decision in Vietnamese enterprises.
- Conventional decision making process including three main steps: Collecting information (based on experience, investigation, surveys), making decision and implement in reality.
- No method to predict the efficiency of decision before implementing in reality.

3.1.1. Decision making method:

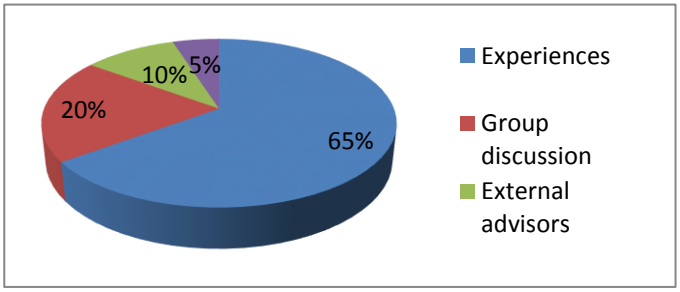

Figure 5. Decision making methods of Vietnamese enterprises

According to the results of the survey, on average, 65% of decisions were made in enterprises based on their own experiences, 20% decisions were based on group discussion, 10% decisions were made by external consultants, and the remaining 5% were made by other methods such as following the opinion of the majority.

The results of in-depth interviews have re-affirmed that using experience is the most common method which is used by company managers for evaluating, analyzing and selecting the best option to make decisions. Making decision based on this method would have high success rates for repetitive decisions, but would be difficult to apply to new decisions. At that time, if managers make decision based on this method, they will take high risk. At the same time, the results of in-depth interviews also show that success rate for the decisions significantly depends on the number of experiences gained by the decision makers. Therefore, to ensure an accurate decision, decision makers usually focus on a small group of employees who are experienced, which cause autocracies in company.

For the second method, group discussions among the related members, this method is often used by companies for difficult and complicated decisions. The advantage of this method is that it provides more accurate decision making alternatives which reduce risk when put into practice due to the diversity of experience and multi-dimensional perspectives of all the involved members. However, due to the unique cultural characteristics in Vietnam working environment, management decision making by group discussion takes a lot of time, because they will need more time for more discussions before unification of ideas among members. Sometimes these discussions are not very effective.

3.1.2. Management decision making process:

According to the survey and in-depth interviews, the basic decision making process of Vietnamese enterprises consists of 5 steps. However, on average, only 20% of decisions were carried out under all five-step process. These decisions are mainly difficult and complicated decisions, make a big impact on the business activities of the enterprises such as deciding to invest in new projects or expand business...

Figure 6. 5 Conventional steps of decision making process

The remaining 80% of decisions of businesses were based on a three steps process. The enterprises think these decisions were mainly simpler and close to daily business.

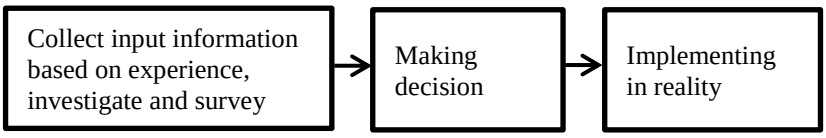

Figure 7. 3 Conventional steps of decision making process

Making decisions in a 3-step process has the advantage that decisions are made quickly, solves issues in time, but decision making in this 3-step process also creates a high risk, that only offers a single decision making alternative and ignore the assessment process among alternatives before choosing the best alternative. Therefore, the alternative picked might not be the most optimal, which would not bring the best result to the enterprises.

3.1.3. Decision making efficiency

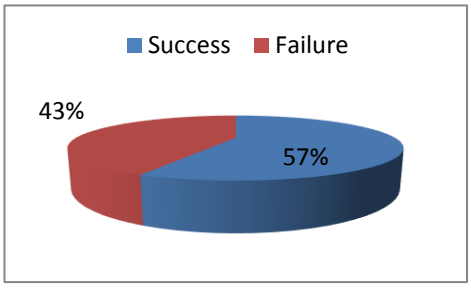

Figure 8. The success rate of applying decision in practice

The results of the survey show that the success rate of making decision in enterprises is 57%, which means that 57% of decisions applied in practice effectively met the original goal, while the remaining 43% of decisions were reversed. In the in-depth interviews, leaders also said that Vietnamese enterprises are facing a great difficulty, which is a high failure rate when making decisions in reality. It has created a big waste for the enterprises. The tangible wastes are easy to identify such as waste of money, time and human resources; meanwhile, the intangible wastes are the biggest waste of business, but it cannot be seen, therefore, are harder to identify such as waste of opportunity for development, reducing the competitiveness of enterprises in the market.

3.1.4. Other features: The level of decentralization and empowerment in decision making

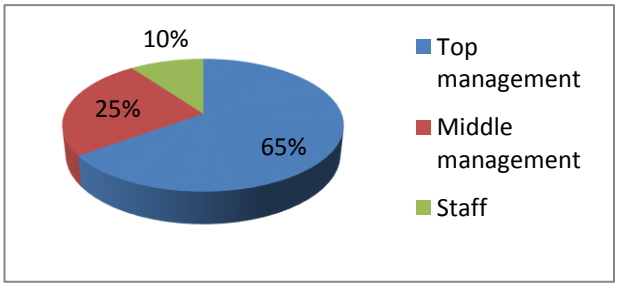

Figure 9. The level of decentralization and empowerment in decision making

65% of decisions by businesses are made by top and senior managers, 25% of decisions by middle managers and only 10% of decisions made by staff. The results of in-depth interviews have shown a common reality in businesses, which is that subordinates try to evade decision making and try to push higher up. 65% of decisions were made by senior executives in the business, up to 35% of decisions were taken from the scope of the lower level. Therefore, at the Vietnamese enterprises, senior leaders are usually faced with an overload situation in decision making.

3.2. The problem that existing decision making in the enterprise and causes

According to the results of in-depth interviews, business leaders agreed that Vietnamese enterprises are facing the same problem that is ineffective decision making. The results show the failure rate when putting decisions into practice in Vietnam market is higher than the average. In the time of making in-depth interviews, the author also took advantage to interview business leaders about the root of this problem in their own businesses.

Based on the collected data from the survey and in-depth interviews, the author used the 5-whys tool to analyze the causes and find out the root causes of the problem. The 5-Whys method was introduced by Sakichi Toyoda in the 1930s, which is widely used in the Toyota Group until now. When a problem occurs, asking the "why" question will enable the solver to query the underlying cause of the problem. Steps to ask why will stop when the main cause occurs, so the number of questions may stop at level 3, level 5 or more than 5 times. However, the researchers said asking why 5 times is the most common number which helps us to estimate the main cause.

After analyzing the causes of the problem such as ineffective business decision making by the 5-whys method and re-affirming the accuracy of the cause with business leaders in the second in-depth interview, the author has found the following main causes:

- Decision makers with lack of "Tam the".
- People who are responsible for decision making within the business do not have the same decision making thinking.
- Lack of optimal decision making model that applies uniformly throughout the enterprise.
- Lack of supportive methods to evaluate the effectiveness of the decision before putting it into practice.

4. Optimal decision making model based on the Made in Vietnam lean management

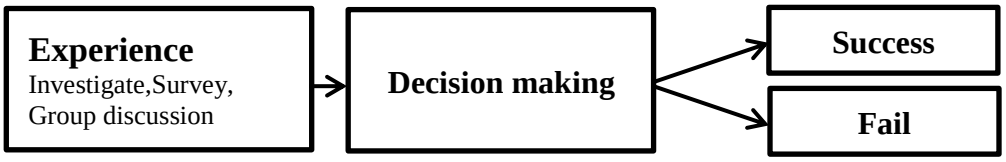

Figure 10. Conventional decision making model applied in Vietnamese enterprise

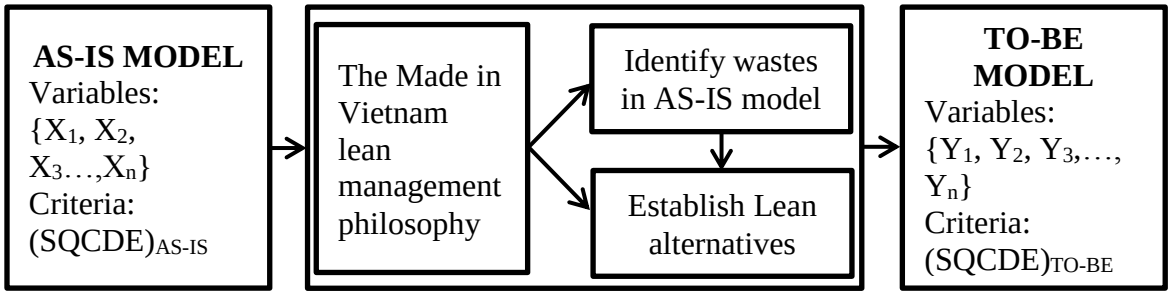

Figure 11. New decision making model based on the Made in Vietnam lean management

The proposed decision making model includes three main parts:

- AS-IS model: Imitation decision context, input in decision making process.

- The Made in Vietnam lean management philosophy: foundation thinking in building the management decision making alternatives.
- TO-BE model: Evaluation alternative, output in decision making process.

AS-IS model

Building AS-IS model is the compulsory task of decision maker in decision making process. AS-IS model describes an imitation of current decision context, considered as input in decision making process. It is the most important part in the new decision making model, because it helps decision maker deeply understand the decision context (current operation management, project situation…)

AS- IS model includes: {X_1, X_2, X_3…,X_n}
Where: X represents project essential variables
n: number of variables

AS-IS model is established by a set of essential variables corresponding to significant entities in the decision context. Each project has differential essential variables, it depends on decision's objectives and selected by decision makers. All variables are divided into 5 groups namely:

- ***Group 1: Tam the***: Including all variables describes Tam the of all people who related to decision (worker, supplier, competitor…).
- ***Group 2: Man:*** Including all variables describes people related to decision (worker, supplier, competitor…).
- ***Group 3: Method:*** Including all variables describes method used in decision context.
- ***Group 4: Machine:*** Including all variables describes machine used in decision context.
- ***Group 5: Material:*** Including all variables describes material used in decision context.

In the next steps, in order to make the decision evaluated fully and directly, the comprehensive criteria for the alternative selection needs to be established. According to in-depth interview results, the criteria are divided into six groups:

- ***Safety***: Including all criteria measuring Safety. Each project has differential safety criteria, they are identified from characteristics (objectives) of decision.
- ***Quality***: Including all criteria measuring Quality. Each project has differential quality criteria, they are identified from characteristics (objectives) of decision.
- ***Cost***: Including all criteria measuring Cost. Each project has differential cost criteria, they are identified from characteristics (objectives) of decision.
- ***Delivery***: Including all criteria measuring Delivery (timing). Each project has differential delivery criteria, they are identified from characteristics (objectives) of decision.
- ***Environment:*** Including all criteria measuring Environment. Each project has differential environment criteria, they are identified from characteristics (objectives) of decision.

For each project, we have:

$S = \{S_1, S_2, S_3 \ldots S_n\}$be the set of all criteria measuring Safety
$Q = \{Q_1, Q_2, Q_3 \ldots Q_n\}$be the set of all criteria measuring Quality
$C = \{C_1, C_2, C_3 \ldots C_n\}$be the set of all criteria measuring Cost
$D = \{D_1, D_2, D_3 \ldots D_n\}$be the set of all criteria measuring Delivery
$E = \{E_1, E_2, E_3 \ldots E_n\}$be the set of all criteria measuring Environment

For different projects, the decision making criteria will be different. Decision makers and managers will be the ones who directly select the criteria for decision making based on the actual situation and condition of each project. For example, the criteria for project X in

Company A consists of two elements: Cost and Delivery, but the decision criteria of Project Y in Company A will include three elements: Quality, Safety and Costs.

In addition, the priority of each criteria in each project also depends on the agreement among the team members regarding that decision. For example, in Project X of Company A, Safety criteria will be prioritized first, but may be the third priority in Project Y.

The Made in Vietnam lean management – foundation philosophy/thinking in building the management decision making alternatives

The Made in Vietnam lean management is the thinking of gaining profit and creating added value for enterprises/organizations by utilizing employees' intellectual abilities to continuously improve the business process to minimize waste costs. When applying it to decision making process in Vietnamese enterprises, it is interpreted as follows: the Made in Vietnam lean management thinking is the thinking of creating optimal management decisions for enterprise/organization by utilizing employees' intellectual abilities to build alternatives which minimize existing waste (intangible and tangible cost) in decision context, and at the same time prevent potential wastes that can happen in the future when decisions are deployed in practice.

After AS-IS model in each project have been building, based on lean thinking, decision-makers will identify existing tangible and intangible wastes in AS-IS model, potential wastes which cause the failure of achieving the initial target if applying that decision in practice. Then, the parties involved in the decision will build alternatives to minimize these wastes to ensure that they will achieve the initial target when decision is made.

Alternatives are established based on the Made in Vietnam lean management which must meet two requirements:

(i) Solve maximize existing wastes (tangible waste and intangible waste).
(ii) Prevent maximize potential problem.

Lean alternative includes: { A_1, A_2, A_3…A_n}
Where: A: represent solutions to reduce waste
n: number of solutions

All solutions also are divided into 5 groups corresponding to 5 variables groups, namely: (i) Tam the; (ii) Man; (iii) Method; (iv) Material; (v) Machine

TO-BE model

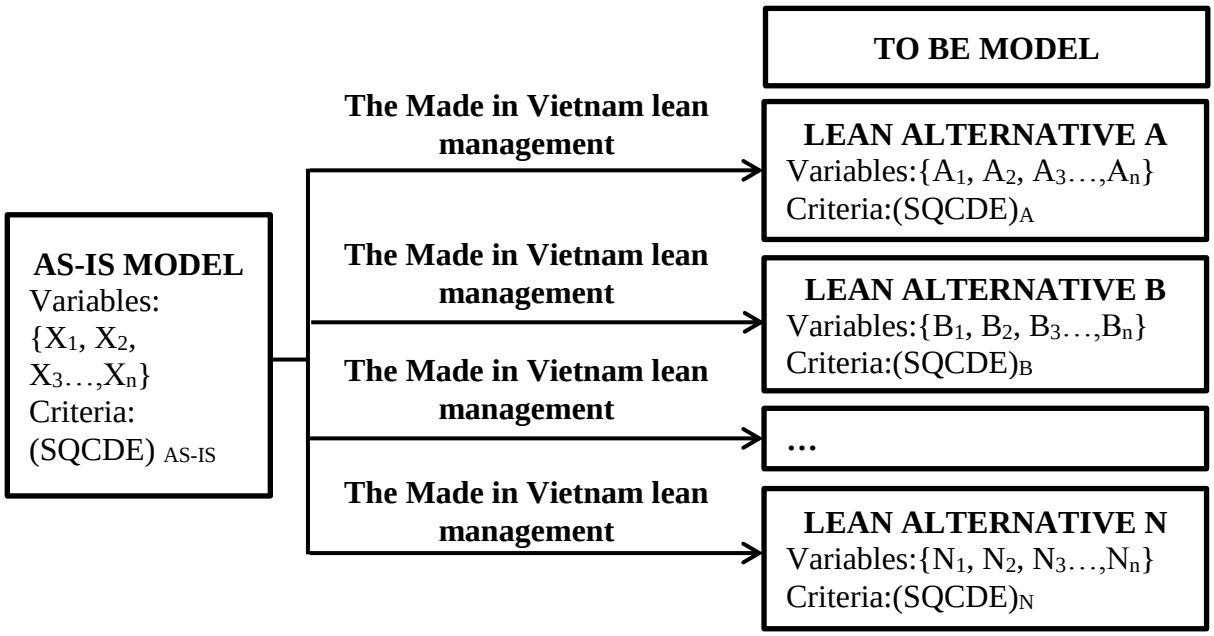

Figure 12. TO-BE model

TO BE model used to describe future desired situation when to implement specific alternative in reality. According to characteristics of decision, a specific method used to evaluate alternative efficiency is different. Based on the result of evaluation criteria set from the beginning, the before-after comparison was conducted within managers who involved the in process. Then, managers will discuss to choose the best alternative.

The above-mentioned model can be applied in many cases to include both service and manufacturing industries.

Case study (for further understanding of the model):

The production line of company A is designed as shown in *Figure 13*. After 6 months of operation, the level of line balance has not reached its original design. Company A's managers need to make the decision to overcome the existing problem in order to put the production line back into balance.

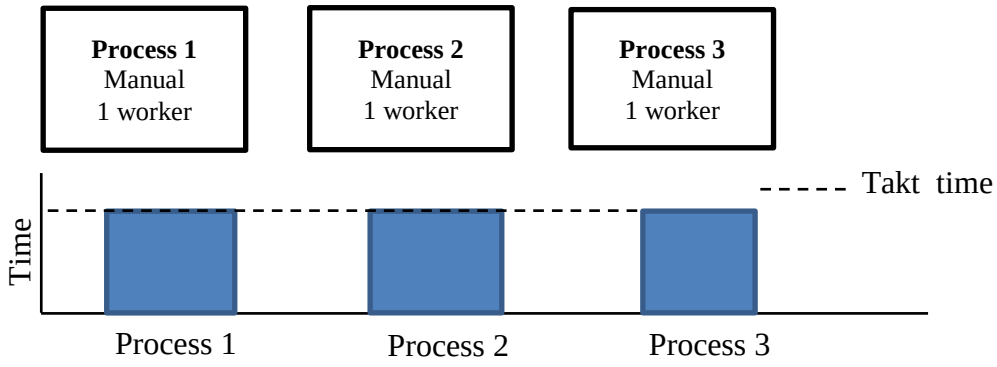

Figure 13. Original designed production line of company A

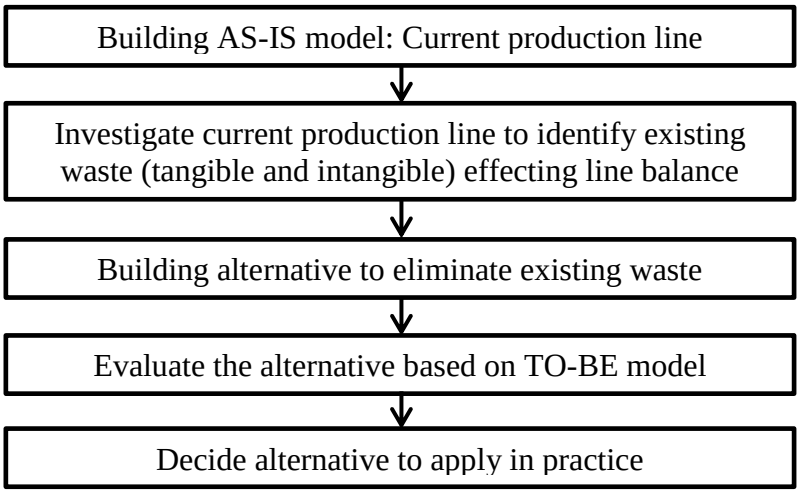

Figure 14. Decision making process base on new decision making model for Company A

Company A's decision making process applied new decision making model is as follow

Step 1: *AS-IS model: Current production line of Company A*

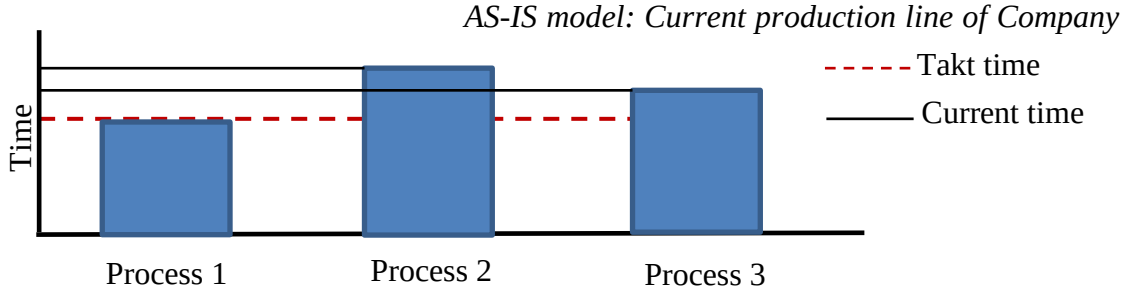

Figure 15. Current production line situation of company A

After the time of operation, the takt time of each workstation was unbalanced, process 2 had a total time 30% higher than the initial workstation and workstation 3 had total time 20% higher than the design workstation.

Step 2: Identify waste in current line base on the Made in Vietnam lean thinking

Table 5. Existing waste in current production line of company A

Tangible wastes	Intangible wastes
Employee lack of Tam The	Does not optimize the productivity something is missing here something is missing here> workers
Employee does not comply with the work process	No continuous improvement of working methods
The level of worker skills is not the same	
Using traditional method to produce	

Step 3: Building alternative based on the Made in Vietnam lean thinking

Table 6. Two alternatives for Company A

	Alternative 1	Alternative 2
Tam the	Training Tam the for employees	Training Tam the for employees
Man		Increasing the number of workers in process 2 to 2 workers
Method	Moving overload work of Process 3 to Process 2 then using extra machine to support	Moving overload work of Process 3 to Process 2 then using extra machine to support
Machine	Using extra automated equipment to support worker in process 2	

TO-BE model for each alternative

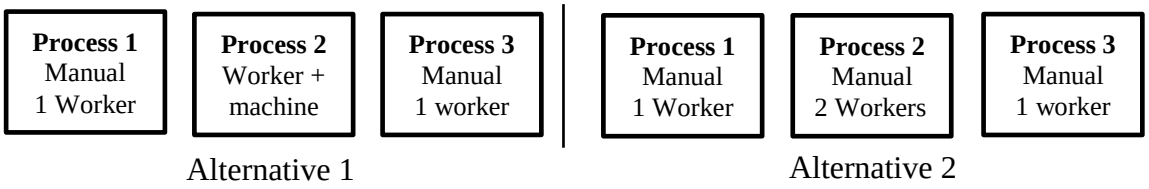

Figure 16. Production line of two alternatives

Both alternatives have been established based on the Made in Vietnam lean management. Each alternative has difference advantage, alternative 1 will reduce labor cost, alternative 2 will save investment costs.

Step 4: Evaluate the alternative base on TO-BE model

Table 7. Summary Cost of each alternative

	Alternative 1	Alternative 2
Investment cost	$7/units	$2/units
Labor cost	$1/units	$3/units
Defect cost	$0.05/units	$0.1/units
Time	10 days (for setup equipment, rebalance worker load and training)	5 days (for rebalance the worker load and training)

Step 5: Decide alternative to apply in practices

Based on the result in steps 4, and company situation, company A decided to choose alternative 2.

After applying the model, the before-after comparison was conducted within managers involved the in process. Most interviewed managers in company A confirmed that the proposed model supported the making decision process easier and saving time from long discussion in comparison with their conventional way.

Conclusion

The proposed model based on the Made in Viet Nam lean management philosophy has been recognized as practical tool for Vietnamese enterprises in decision making. The model has

recently been applied in both the manufacturing and service sectors. In future research, this model can be extended to government sector. The model not only can be used for Vietnamese enterprises but can be extended for enterprises in both developing and developed countries.

Acknowledgments

This research is funded by Vietnam National Foundation for Science and Technology Development (NAFOSTED) under grant number 502.02-2015.11

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