



## CHAPTER I

### Introduction

#### 1.1 Importance of New Product Development

Introducing new right product to serve customer at the right time, right place and right price is important for a company to compete and sustain its position in the market place. There are many options of new product design strategy a company can pursue (Vellandi, 2007), cost advantage, design prominence, feature leadership, concentrated application, and desirable alternatives. Choosing any of the options, the company will need to be innovative as well as be as efficiently and effectively in managing the new product introduction process as possible.

Evidence of the importance of new product development is shown in the American Productivity and Quality Control benchmarking report stated by Robert G Cooper in the PDMA handbook (Kenneth, 2005). It publicized that on average, 27.5% of a company sales comes from new product launches, product life cycle gets shorter and there is an accelerated pace of product innovation. The report also shows that half of the business's new product development projects failed to achieve financial goal and only half are launched on time. The reasons (factor as issues' first cause) are technical problems (21.2%), lack of understanding customer needs (20%), lack of understanding of market environment (18.8%), launch timing too late (17.7%), defensive actions by competitors (16.4%) and price competition (5.9%)

In innovating a new product, a company will need to understand the driving forces (company's objective, product, order winning criteria, opportunity, financial and technology feasibility), product life cycle management (influenced by type of industry, type of competitor, quality, price, introduction time, customer requirements, technology advancement, etc.), technology life cycle and new product development category the company wants to follow.

After a new product has been decided, making the development process effective is crucial and not easy. According to Sobeck *et al.* in Morgan (2008), the shortened product development cycle time and increased product quality level adds competitive advantage and differentiate a company in automotive industry from others.

## 1.2 Importance of vehicle accessory business

Vehicle accessory business, despite the global economic turmoil, continues to grow. As vehicle pricing itself continues to be lowered down, the profit of selling those vehicles get slimmer. Dealers especially in North America find that vehicle accessory business can shore up these weak margins. There are more and more accessories put on display vehicles to attract customers and there is a Motor show set up specifically for accessories called SEMA show.

Large company's like Toyota, Honda, Ford as well as Mazda reports a growth in average accessory revenue year over year (Geist, 2007; Anonymous, 2008; Rehtin, 2006; Truett, 2007). It is interesting that most of the OEM (Original Equipment Manufacturer) established their own accessory brands which are recognized by customers such as TRD (Toyota), Mugen (Honda), RalliArt (Mitsubishi) and Mazda Speed (Mazda). In the market place, not only that there is genuine accessory business but there is also another type of accessory which captured a big portion of vehicle accessory business as well as good relationship with dealer network; those are after market accessory products or supplier branded accessories. Those accessories shops and stores can be found easily in every country with a lot of new technology and fashionable products.

Comparing accessory sales to vehicle sales, accessory business has its portion of about 5-10% of the total vehicle revenue but does help dealers in accelerating vehicle sales as well as reduce the gap between customer's need and wants and the company's technology and production capability and constraints. The reasons OEM tries to capture accessory business within the company's hand are.

- Accessory usually produces high profitability (compare to vehicle itself)
- Accessory helps to enhance the vehicle and support customer's personalization needs
- Accessory is less complex than base vehicle and requires shorter development time. The process is more flexible, thus accessories could response better to fashion and technology changes
- Accessory or SVP (Special Value Package/Limited series) programs are established to help accelerate vehicle sales
- Branded accessory quality level can be controlled

At the case company, accessories are designed, sourced and produced on marketing request basis then sold by company's factory distribution channel or customer service and dealer channels. Each product development time line varies from 9 months to 2.5 years depending on the urgency need, resource availability and product complexity. The best time to launch SVP is either as a series line up provided since new vehicle launched or when vehicle has been launched more than 4-5 months to create excitements to the product. Dealer accessories are also needed at the same time as base vehicle launch given that customers can see, touch and choose the accessories directly from dealers when buying vehicles. A number of sales persons chose to offer accessories instead of discount from their incentives to customers in order to help accelerate customer's desire for the vehicle and be able to close the deal.

### **1.3 Introduction to the case study: Vehicle Personalization (VP) organization**

The Asia Pacific & Africa (APA) Vehicle Personalization department (VP) was established in Thailand in 2001 as a regional engineering base for the company's group vehicle accessory design and development. VP used to produces 2 groups of accessories, OEM Special Value Package products, installed in vehicle production plant and OEM dealer accessory kits for both functional and decorative parts. In 2008, VP APA adopted VP Europe's practice and started to reduce its accessory price by offering

low cost as well as supplier branded accessories through company's dealer channel. Samples of accessories are shown below.



Figure 1: Vehicle accessory products

VP organization is a part of Asia Pacific & Africa Marketing and Sales Department. VP consists of product planning, purchasing, finance, engineering and manufacturing functions. It acts as a stand alone department which has its own budget and decision making capability for all NPD projects. The organization is a matrix organization with about 70 people working on a project basis. Recently, company's direction is to dissolve VP and separate planning, engineering and manufacturing functions. The new organization became more complex and each function will report to their direct functional management team. The advantage of changing the organization structure is that the company can eliminate outsourcing engineering group and use the current resource available. The access to vehicle information is easier as the new engineering team also works on base vehicle. However, it also lessen marketing and product planning power over engineering and every decision making which needs concurrence from more parties becomes slower. Moreover, as accessory business requires flexibility and lower product specification than base vehicle, it is still in question whether or not alignment to base vehicle practice, process and specification will benefit the overall accessory business result.

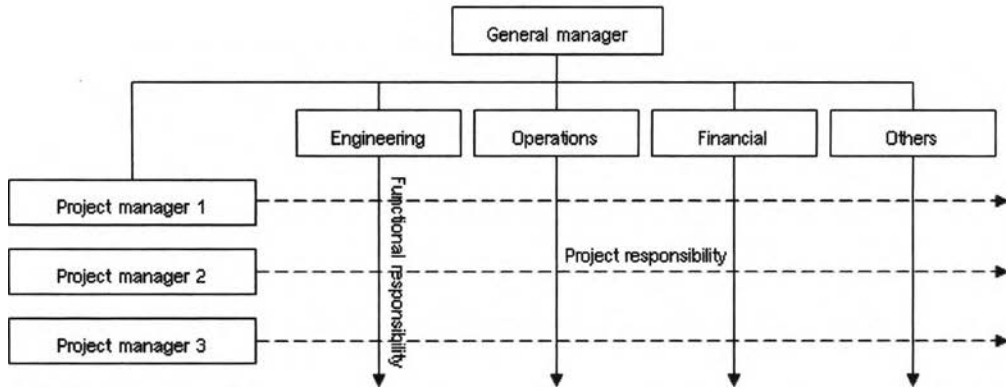


Figure 2: Typical matrix organization structure (Kerzner, 2006)

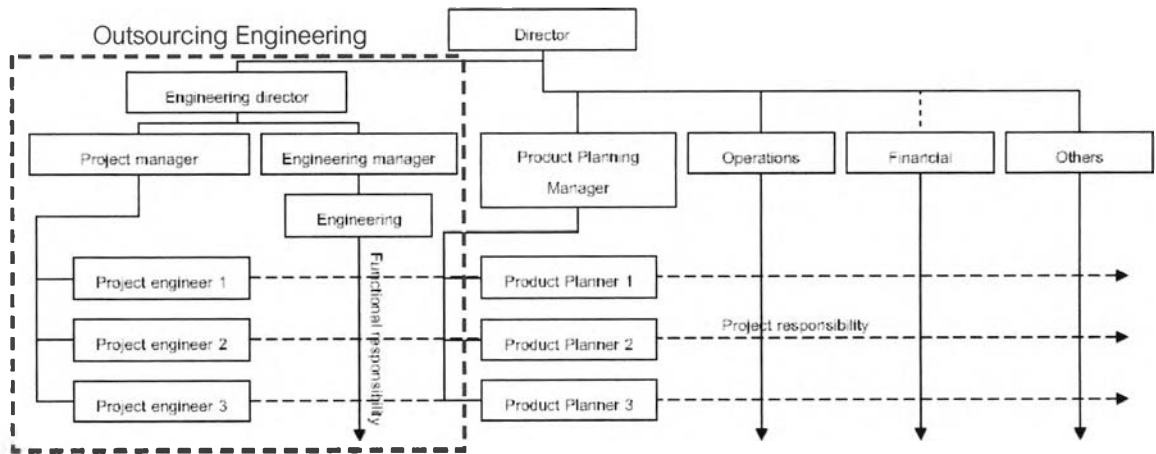


Figure 3: VP's previous matrix organization structure

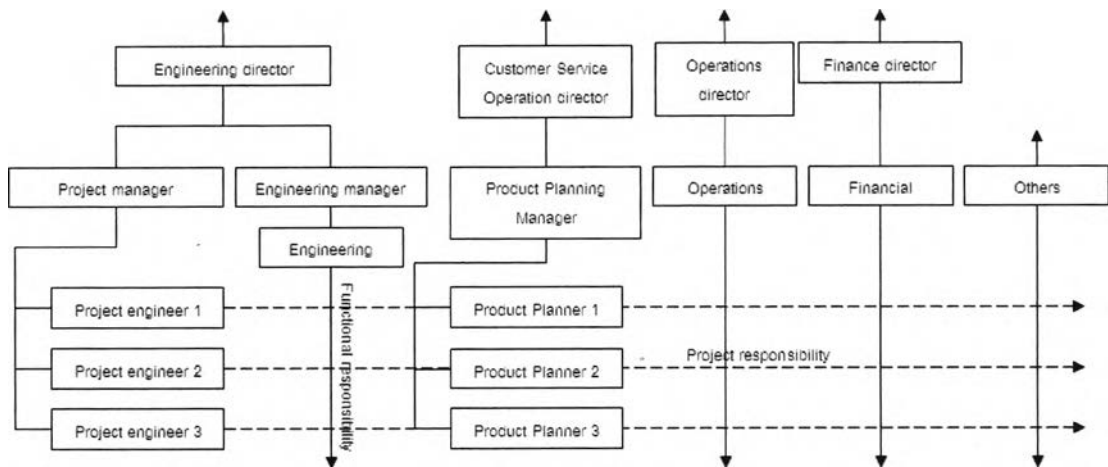


Figure 4: New accessory development organization structure

#### 1.4 Vehicle personalization department's new product introduction process

VP product development process is developed based on stage gate process. Products are categorized by the development timing need and complexity. Products are grouped into 3: long lead items (wheels, DVD, reverse camera system etc.), medium lead items (body kits, sports bars, tubular steps, etc.) and short lead items (carpet mat, Bluetooth, bedliners, etc.)

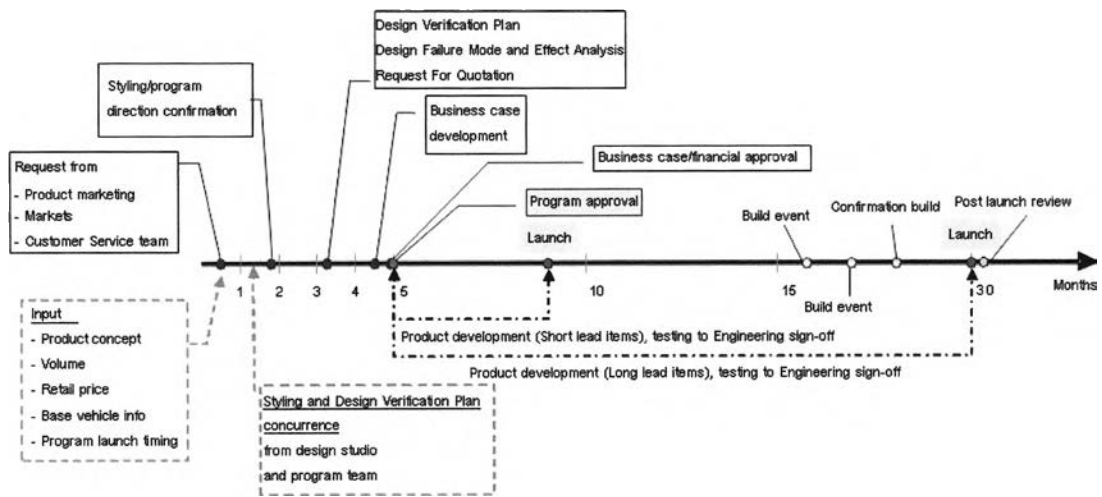


Figure 5: VP New Product Introduction timeline

Products developed by VP can also be categorized by the intent of the product introduction as a generic market pull product (requests from marketing team or summarized from customer research team) and platform products (basic products seen to be offering in all other platform or other competitors). There are few technology push projects.

Engineering and development budget for the projects is allocated from the central product development office per request per year. Since organization change, budget allocation to accessory development will be integrated into vehicle line development cost and will be approved by vehicle line finance controller. Production tooling could be owned by the company or supplier depending on agreement. VP will responsible for product engineering sign off as well as preparing part submit warranty report to be signed between supplier, VP and customer.

Note: VP customers are regional and local marketing team, regional and local customer service team and other brand umbrella team who sold the products throughout Asia Pacific and Africa region. End customer requirements in each individual market are studied by local marketing team (with the support from VP Product Planning team) with competitor benchmarking analysis for each project's input.

### **1.5 Statement of problem**

Current economic situation makes companies' decision in new product development more difficult. Even though, tighter business case will be needed, new products still need to be launched to keep accelerate customer's attention to the brand and maintain business position. The case company has been affected by the economic turmoil as well. According to the situation, "Globalization" policy has been implemented to encourage regionalization and globalization (where applicable) new product development. There will be centres of excellence set up throughout the region and all the employees in each location will need to change the way they think and work accordingly. VP as a part of regional product development organization will need to adapt itself to the plan. From past information, real regional new product development has never been done. One reason is that the vehicle platforms are slightly different across the region. However, this is changing and global platform products according to the "Globalization" policy already started their introduction to customers in 2009. A plan for regionalization product development will need to be established as soon as possible to support the policy and help the company to succeed better economic returns.

From VP product planning team's point of view, it is still in question to whether or not, marketing teams in all the countries in the region has fully utilized VP's resources efficiently and aligned their plans with the regional one. The case company's 2008 accessory sales summary shows that the total revenue the company gained from selling accessories in Asia Pacific and Africa region is USD 72.92 Million, among that only USD 9.36 Million or 13% is from VP's product. It is also interesting to see that, the penetration of VP's accessory to the total accessory sales is more in ASEAN region where VP

department is positioned while in growing markets such as India and China, the penetration rate is low.

Table 1: Penetration rate of VP accessory to countries' accessory sales

Country	% of VP accessory penetration to 2008 accessory revenue	Country	% of VP accessory penetration to 2008 accessory revenue
Indonesia	61%	Taiwan	7%
Thailand	61%	Japan	5%
Vietnam	53%	Australia*	4%
Philippines	32%	South Africa	2%
India	14%	New Zealand	1%
China	10%		

\* Australia provides the highest accessory sales revenue; however, only 4% is VP's accessory penetration

Moreover, there are evidences of duplicated engineering works in new product development made by local markets. Some of the development cost has been amortized into piece price by local supplier and some has not been included in the company's business analysis. It is obvious that the total product development cost is higher than it should be but the company might not aware of or not able to capture it in numbers, see evidence below on weather shield development.





Weather shield (common part which all vehicle series should have, low complexity and can be categorized as short development lead time item) for truck has been developed in 3 places

- 1) Supplier in Thailand (developed with VP) has a set of tool to produce the part to support Thailand production plant and modification centre as well as ASEAN markets
- 2) Supplier in South Africa (developed with South Africa marketing team) has a set of tool to produce the part to support South Africa production plant and support South African countries
- 3) Supplier in Australia (developed with Australia Customer Service Department) has a set of tool to produce the part to support Australia and New Zealand

Table 2: Summary of a weather shield for truck development cost

	1	2	3
Supplier/production	Thailand	South Africa	Australia
Sell in	ASEAN	South Africa	Australia/New Zealand
Developed by	VP	South Africa marketing team	Australia Customer Service Department
Piece cost (THB)	720	1,150	1,590
Tooling cost (THB)	45,000	100,000	90,000
Engineering cost (THB)	87,000	90,000	50,000
Volume	3,400	800	3,100
Total program cost (THB)	2,580,000	1,110,000	5,069,000

In this case, local market volume can justify local market business case but it is unsure other hidden costs are taken into account in the new product decision making or not. In order to make the business case viable, the costs are reflected to a higher retail price of each product or deducted from marketing variable budget which makes lower profitability and lower budget for promotions. Making the part in many places can refer to different engineering standards and thus yields to different part quality level and different brand communication. There are also evidences that base vehicle parts have to be replaced due to the low quality of accessory installed on. Timing wise, developing the part without base engineering team involvement will result in late product offering since market teams will need to wait to see the vehicle and understand the options provided prior to start developing additional accessories with suppliers. Optimization point between regionalization new product development, business performance and different product styling demand in each country needs to be identified.



Figure 6: Same vehicle but different style using accessory decoration in each country

In new product development process, design and product definition phase is important as it could define the quality, cost and time of new product launch as well as program management smoothness through the rest of the project. Issues found with new product development process is that product planner and product engineer can not clearly translate customer's requirement into product realization especially when marketing team keeps changing their input to reflect the changing of external environment while program budget remains.

A study of 188 VP's projects in from 2006 to 2008 shows that only 32% of the projects were completed on time within budget and quality constrain. 45% of the projects were dropped after initial study from either cost or engineering constrains. Issues found with the rest of the project causes an increased in cost of both product and development process (engineering hour, testing, additional tool, etc.) and delayed in launch timing while quality level of the genuine accessories remains mostly within control.

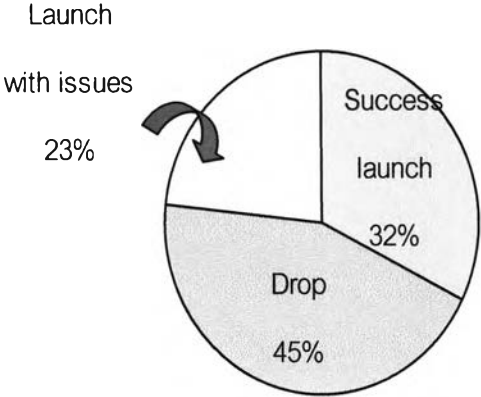


Figure 7: Results from 188 projects from 2006-2008

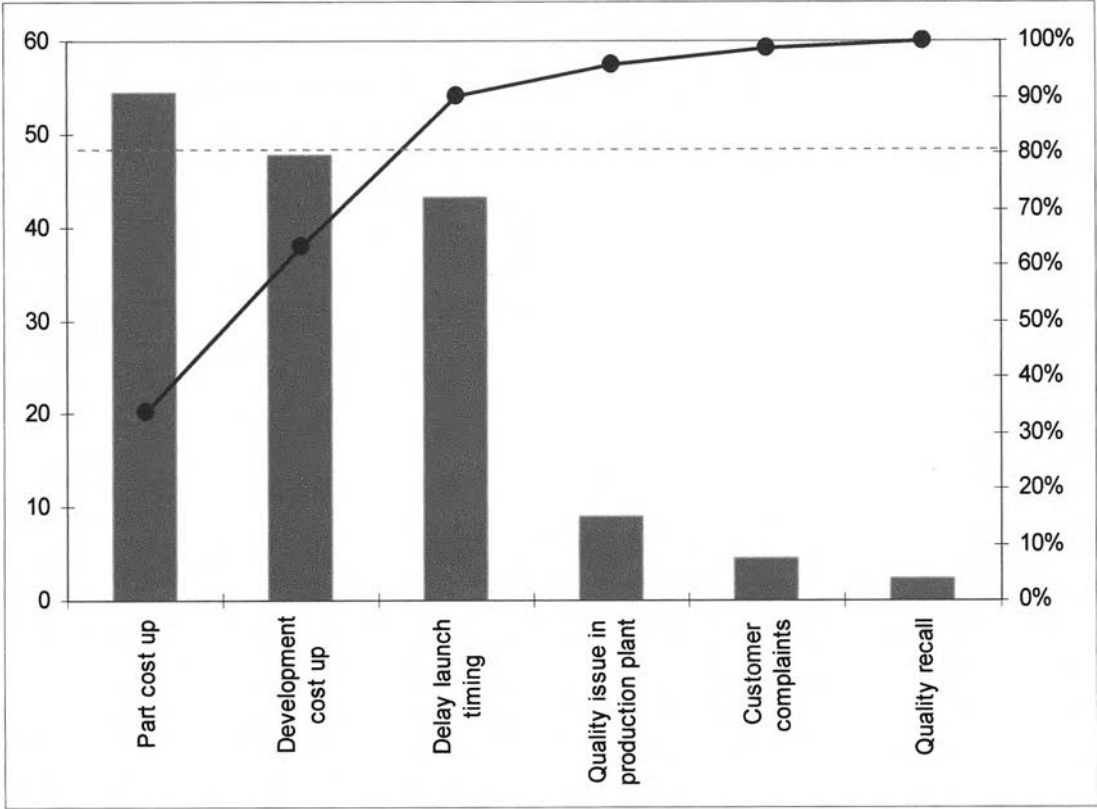


Figure 8: Effects from the "Launch with issues" projects

Study deeper into the reasons of the issues, it was found that 29% of the problems were reported from the unclear and frequent change in input direction and 17% were from miscommunication. Input to engineering design and development from the product planning process is not effective. Although there is a traditional stage gate process in place, gates are over ruled by higher management decision, gates to determine 'go' or 'no go' is not effective and some of the gates were skipped. Time and resource are wasted in looping the process and gates. A new and more effective gate in a good product planning process is required.

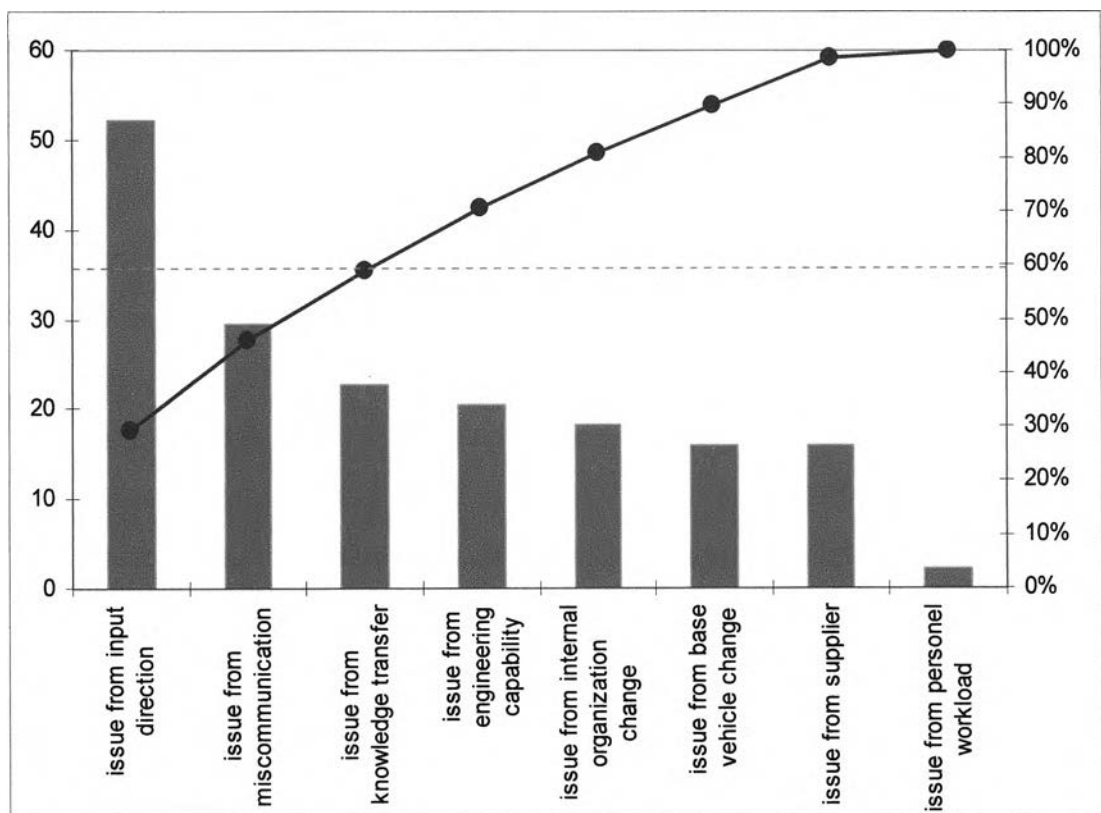


Figure 9: Summary of causes of the issues in the "Launch with issues" projects

As mentioned earlier, there has never been a true regionalized project for accessory development. In order to introduce new product planning process and decision model, not only the current business plan, product planning process and resource constraints need to be taken into account, but also the flexibility for the different local market requirements as well.

Problems summary is as follow

1. Input to new product development or front end of the product development process is not effective and miscommunication still troubled the process
2. Gates are not effective and are overruled
3. Local development products make the overall product development cost higher than budget
4. As volumes are split into sections, some countries would not be able to get a business case approved for the development
5. Branding and product quality standard could not be controlled
6. There is no standard process to justify the best economic way to develop accessory on a regional basis
7. Markets are still afraid that regional development would not be able to compliment all customers preferences as well as regulation differences.
8. There is a trend of organization change and number of head count will be further reduced
9. New regional accessory development process needs to be defined according to the "Globalization/Regionalization" policy
10. Currently there's no settled plan for accessory development
11. Current process did not support high level view of accessory development for a vehicle platform, no standard practice in place and the development did not follow base vehicle time line

The issue chosen to be resolved is the establishment of a regional product planning process and product/project selection criteria that provides excellent, clear and fits to customers requirement while maintain the development and product cost within company's budget and resource constrain and to be able to launch the product on time at the end of the project.

### **1.6 Objectives**

To develop a decision making model for regional vehicle accessory development that fits to new product planning process.

### **1.7 Expected result**

A standard decision making model for regional new accessory product development.

### **1.8 Benefits**

1. Better overall business case performance for accessory development in case company's Asia Pacific and Africa region
2. Improve productivity and economy of scale of the organizations new product planning process
3. Effectively and timely choose products to be developed
4. Support case company's "Globalization/Regionalization" policy
5. Increase controllability and consistency of accessory development
6. A regional approach theory contribution for accessory development

### **1.9 Thesis boundary**

The research will cover new product development process for case company's accessory business from project initiation to project selection and business approval (product planning process). It will not cover engineering development detail and launch process. Other brand's products, aftermarket products and supplier branded accessory will be included only when relevant.

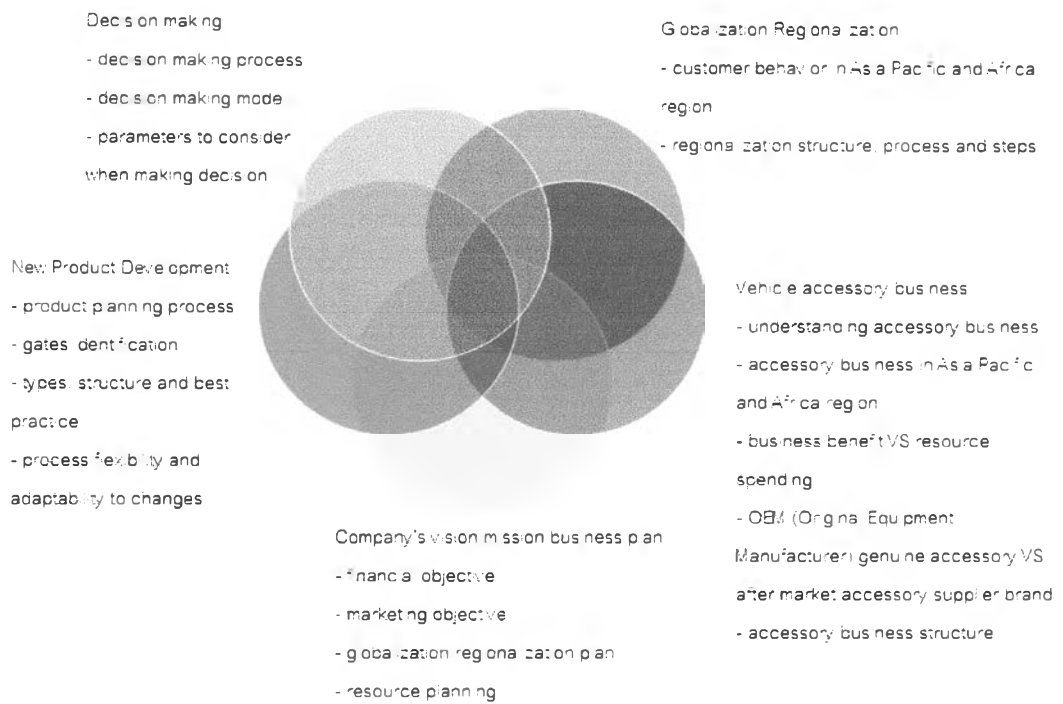


Figure 10: Thesis pillars

Five pillars will be studied to support the decision making model; New Product Development process (focused on product planning process), decision making process, regionalization process, vehicle accessory business in Asia Pacific and Africa and the case company's business and product development plan.

Picture below (modified from <http://www.stage-gate.com>) scopes the decision making process which will be discussed in the thesis. The focus will be on the three first gates.

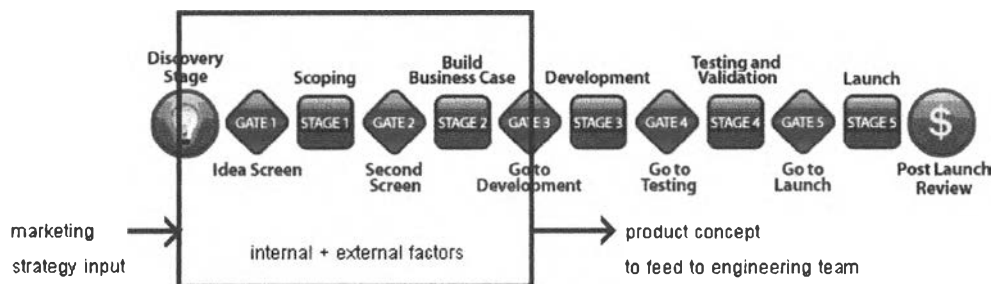


Figure 11: Product planning stage

## 1.10 Research design

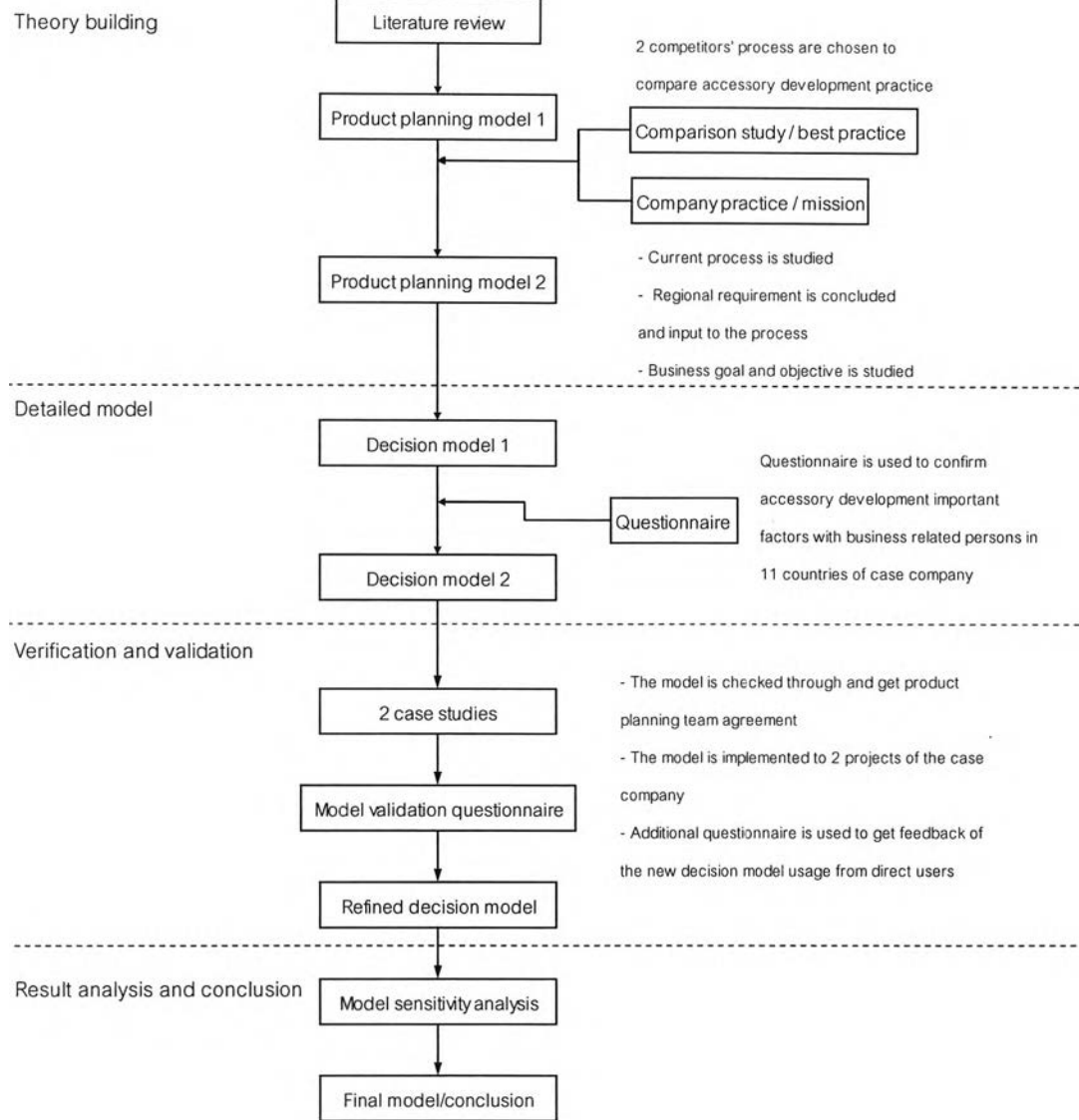


Figure 12: Research design

The research is separated into four phases:

1. Theory building – in this phase, literature review was done on marketing, product planning in new product development process, decision making process and regionalization and globalization topics. Competitor analysis as well as case company's current practice and business objective is also studied.
2. Detailed model – from case company's current practice, a new decision making model is proposed. The model is designed to reflect case company's best suitable practice combining information from a questionnaire answered by case company's personnel working related to accessory business.



3. Verification and validation – after the model is refined, model verification and validation is done. Two projects are assigned as validation case study and the utilizable of the model and its effect to the current product planning process is confirmed by feedbacks from direct users and the project outputs.
4. Result analysis and conclusion – sensitivity analysis to the final model weights is studied and final model is proposed.

The success of the decision model is measured by

- Reduction of product planning decision making process steps
- Reduction of resource and time spending for new accessory development decision
- Increase in new product development decision transparency and consistency using a structural approach

### 1.11 Research schedule

The research duration is 10 months and the schedule is as follow

	1	2	3	4	5	6	7	8	9	10
<u>Research schedule</u>	Jun'09	Jul'09	Aug'09	Sep'09	Oct'09	Nov'09	Dec'09	Jan'10	Feb'10	Mar'10
Theory building	—————	—————								
Detailed model			—————	—————	—————	—————				
Verification and validation							—————	—————	—————	
Result analysis and conclusion									—————	—————

Figure 13: Research schedule