CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

An asset can be tangible and intangible. Broadly, an asset can be defined as physical, organizational or human attributes which a company can leverage on in the development of strategies to improve its efficiency and effectiveness in marketplace. A relationship between a company and its external stakeholders such as the customers is one of the intangible market based assets (Rajendra, 1998).

Unlike other tangible assets, customer relationship is hard to measure. When the cash flow position is a company is not favourable, one of the measures taken is to cut cost, this includes marketing spending. More often, marketing expenditure for advertising and promotion is not easy to quantify in term of the effectiveness and return on investment. This is more evidence especially for those awareness campaign and customer relationship management activities where the result is not easily measured and delivered instantly. This is supported by the notion of Aaker and Jacobsen (1994) that assets which are hard to measure are more likely to be under-funded.

It is inappropriate for a company not to spend on marketing activities when it expects sales revenue to increase. In view of the above, the need arises for a better way of measuring this type of intangible asset. CLV is said to be an appropriate metric to assess the return on investment in marketing activities as well as developing strategies at customer and firm levels (Rush, Lemon & Zeithaml, 2004; Venkatesan & Kumar, 2004).

According to Kotler (1974, p.24), CLV is defined as "the present value of the future profit stream expected over a given time horizon of transacting with the customer". As the main goal of a company is to deliver value to the investor (Knight, 1994), it has become increasingly important for firms to assess their most crucial source of assets which is the customers (Hansotia, 2004). Reinartz and Kumar (2000, 2003) in their research have shown that by deciding on lifetime value of each customer and customer specific drivers of profitable customer lifetime duration, it will help the firms to determine the correct customers to retain.

It also highlighted that CLV is superior to RFM (Recency, Frequency, Monetary), PCV (Past Customer Value) and also CSS (Customer Spending Score) in a few perspectives. CLV is a forward looking profit modelling that takes into consideration the retention cost involved in projecting the contribution margin and purchase behaviour of the customers; whereas the subsequent 3 models fail to incorporate. This useful information will be adopted in managerial decision to select, maintain or forego certain customers, as well as for resource allocation decision. Based on the customer profitability, effective strategies would be proposed to market its product to high profitable target customers and to reward the customers based on profitability.

Chapter 2 will further explain the definition of CLV, importance of CLV, the application of CLV in various industries. Before that, it is worth to look at Malaysian oil industry in general, the company under study and fleet card business in specific to gain a better understanding of the business and its customers.

2.1 Malaysia Oil Industry Background

Malaysia is an emerging country that on the right tracks to become a developed nation with its GDP of RM16, 974 millions as at third quarter of 2010. With a total population of 28.25 million in 2010, it is considered as an upper medium income country by the World Bank with per Capita purchasing power of RM 26.734 during the third quarter of 2010 (Department of Statistic, 2010). Malaysia is a nation with rich natural resources, namely timber, gas and petroleum, as well as other commodities such as rubber, palm oil and paddy.

Malaysia's oil industry has an interesting history with its first discovery in the British Borneo in 1870's, but it was only in the beginning of twentieth century a more appreciable amount was found (Areif & Wells, 2007). Shell, the Anglo-Saxon Petroleum Company, was given the first concession to harvest petroleum in 1909 where in 1910, Miri, Sarawak oil was struck ("Satu Dekad Perkembangan", 1984). The Miri field contributed approximately 80 million barrels of oil in its early day, however in the pre-World War II period; the production was very much limited. It registered 15,000 barrels per day back in 1929 and was going through a declining pattern (Fred & Troner, 2007). This was worsened by the event of wars and other unforeseen circumstances. Up till then, there was no other petroleum harvesting elsewhere in neither Borneo nor Malaya until the 1950's.

However, when the role of petroleum in Malaysia economy is analysed further, it is noticed that there was a shift in focus in terms of reliance during the early days of our independence as compared to now. During the time of independence, Malaya registered a total of RM 762 million (Fred & Troner,

2007) on petroleum export, which it was not even in the list of main export items as the main emphasis was given to producing primary products such as rubber, tin, palm oil and others, as well as engineering and handicrafts. This trend was intertwined in early 1970s where it marked the development of the electronic industry which has stimulated the manufacturing sector where petroleum was given more attention (Fred & Troner, 2007). This situation continues to present day where petroleum industry plays a much more centre role in Malaysia's economic growth.

Malaysia currently is the third highest oil reserve holder in the Asia-Pacific region behind China and India with a proven oil reserve of 4 billion barrels as of January 2010, according to the *Oil & Gas Journal (OGJ)*. It is reported on Feb 15 2011 that the Malaysian national oil company, Petroliam Nasional Berhad struck two exploration blocks off the coast of Sarawak. This discovery is expected to provide an estimated of 100million barrels of oil and 2.8 trillion standard cubic feet (tscf) of natural gas, which represents 2 percent of oil National reserves and 3 percent of natural gas National reserves. As a result of this discovery, a research reported saying that the future of oil and gas industry is promising, the discovery prolong the lifespan of Malaysian reserves to twenty four years for crude oil and thirty eight years for natural gas (Sharidan, 2011).

The majority of Malaysia's oil exploration occurs at offshore fields. Basically there are 3 producing basins: first is the Malay basin in the west and second, the Sarawak and finally the third, Sabah basins in the east. However most of Malaysia's oil reserves are located in the Malay basin and it is well recognized to be of high quality such as Malaysia's benchmark crude oil, the Tapis Blend.

This type of crude oil has a very distinguished characteristic of very light and sweet with an API gravity of 44° and sulfur content of 0.08 percent by weight.

In year 2009, Malaysia has clocked a total oil production of 693,000 barrels per day, of which 83 percent was crude oil. Tapis field contributes to more than half of total Malaysian oil production in the offshore Malay basin. However, Malaysian oil production has been going through a downward trend since achieving a peak of 862,000 barrels per day in 2004 due to exhausting offshore reservoirs. Malaysia has exported a total of 212,707 barrels per day in 2010, a reduction from 240,479 barrels per day in year 2009. Majority of the production is domestically consumed and it shows an upward trend as production continues to fall (U.S Energy Information Administration, 2010). Generally, crude oils in Malaysia are consumed in the form of petrol or diesel. For petrol, the government have introduced RON 95 in 2010 to replace the RON92 while another type of petrol RON97 remain unchanged. Diesel still retains its original type and being consumed mainly by manufacturing, transportation and other industries. However for diesel, there is a special subsidy given by the government under The Ministry of Domestic Trade, Co-operatives and Consumerism where companies from specific sectors registered with the Companies Commission of Malaysia can apply for the subsidy under certain guideline and regulations. As for the breakdown of diesel consumption in 2009, 37 percent is being consumed by the industry sector, followed by trade sector at 27 percent, 23 percent via fleet card, 10 percent by fishery industry and 3 percent by others (Ministry of Domestic Trade, Co-operative & Consumerism, 2010.) Fleet card business, being the

third largest segments of diesel consumption in Malaysia, is the focus of this case study.

Fuel card or fleet card will be used interchangeably throughout this whole write up.

2.2 Introduction to Fleet Card

Fuel card offers businesses with a more secure and efficient way of managing their vehicles/fleets. Before fuel card was introduced, companies were using cash or credit facility given by petrol kiosk operators for refuelling purposes. This was inconvenient and inflexible as sufficient cash must be kept and given to their driver's everyday or the vehicles must be refuelled at the same petrol kiosks which extended the credit line to the company. Time and resources were wasted on unnecessary administrative work where reconciliation and fuel consumption monitoring had to be done manually. With the introduction of fuel card, companies can take advantage of this secured cashless electronic payment facility to manage their fleets and fuel expenses effectively. The card, which is also known as fleet card, is accepted at all participating petrol kiosks as per Figure 1.

Figure 1: Types of Fuel Card in Malaysia

A fuel card is similar to a credit card in terms of transaction processing. It differs from credit card by offering monitoring and controlling features to

enable companies to manage large number of vehicles. The transaction is secured as valid PIN is required during every transaction. The detailed monthly statements include transaction date and time, merchant location, transaction amount, transaction quantity in liter, vehicle odometer and as well as fuel usage efficiency will be provided to the participating company. It provides better control, i.e. a company can choose to impose daily and monthly limits a vehicle can refuel, to restrict product allowable based on vehicle engine type and to restrict which petrol kiosks the card can be accepted.

Fuel card can be issued by banks or oil companies. Example of bank issued fuel card is The First Commercial Bank MasterCard Corporate Fleet Card in the United States. In Malaysia, all the five oil companies issue their own proprietary fuel cards. Fuel card issued by Shell is commonly called as Shell Card (http://www.shell.com.my) whereas Petronas issued fuel card is known as SmartPay (http://www.mymesra.com.my). Exxon Mobil Malaysia names their card as Fleet Card (http://www.exxonmobil.com/Malaysia-English/PA/MY_Cards.asp.), Caltex brands its fuel card as StarCard (http://www.caltex.com) and BHPetrol names its card as x-fleet (http://www.bhpetrol.com.my/fleetcard.htm).

Fuel card was introduced in Malaysia in the year 1998 to replace the government indents, the petrol chits used by the government agencies to purchase fuel at petrol kiosks. In the same year, the Government decided to introduce the self service concept at petrol kiosks. Self service at petrol kiosk means that drivers are encouraged to refuel petrol or diesel at the outdoor terminals themselves, instead of going inside the convenient stores to pay

and/or getting the assistance from the pump attendants. Hence, there is more pressing need for oil companies to introduce a payment card, besides the widely used credit cards. Payment using credit card is more applicable to individual driver as compared to the fleet cards which would be used by company drivers/employees.

Initially, fuel card is available to government agencies, business entities and sole proprietors which own three or more vehicles, for their day to day fuel needs. When the Malaysian Government introduced Diesel Subsidy Scheme in 2006 ("Diesel subsidi", 2010), fuel card is used as a means to implement this scheme. Under this scheme, specific transport sectors are given rebate for diesel purchased via fuel card, to the maximum of monthly quota given to the company. Effectively, the company can enjoy cheaper diesel as compared to retail price.

2.2.1 Fleet Card Customer

Any corporation or government agencies with two vehicles and above can apply for fleet card. When a company submits an application, it is recommended either a prepaid or post-paid plan based on monthly sales volume. A post-paid application with a credit limit equivalent to two times of its monthly fuel usage will be submitted to Credit Control Department for credit worthiness evaluation. Security collateral in the form of Bank Guarantee or cash deposit will be imposed according to its credit rating. Meanwhile for a pre-paid application, it does not have to go through credit assessment as payment is made in advance before using the card.

Upon successful application, a fleet card account would be created, together with the cards. Each account number is a unique identifier, it would be used

for future new card request or when making payment. Meanwhile, each fleet card is given a unique serial number for identification purposes.

2.2.2 Fleet Card Type

There are three types of card available, i.e. single card, dual card and fleet manager card. For a single card, one card is assigned to a dedicated cardholder and vehicle in which the cardholder and vehicle registration number are embossed on the card. For fleet manager card on the other hand, is also a single card with no specific cardholder and vehicle registration number embossed on the card. It serves as a master card or a back up card in case other cards cannot be used. Dual card consists of a driver card and a vehicle card in which both cards must present and be swiped during transaction. In this context, either card can be swiped first as the order of swiping is not important. Driver name and vehicle registration number are embossed on driver and vehicle cards respectively. Dual card is suitable in the environment where there is a pool of drivers and vehicles, where any driver card can be paired with any vehicle card in many-to-many relationship.

2.2.3 Fleet Card Security

All fleet cards issued in Malaysia are still in the form of magnetic stripes. It is protected by 4-digits Personal Identification Number (PIN) which is mandatory during transaction. The system will decline a transaction if a wrong PIN was entered during the transaction. PIN number is tagged to single card, fleet manager and driver card.

Online real time transaction validation and authorization further improves the card security. Each and every transaction request is sent to a central host system to verify the credit balances and product allowable to ensure limits are

not exceeded and only authorized product is dispensed. In the event of system unavailability, the card cannot be used for purchases as the system is unable to validate the parameters.

Besides that, the customer is also allowed to specify the maximum transaction, daily and monthly limit (all in RM) in which a card can be transacted. Transaction limit means the maximum allowable amount permitted per transaction; daily limit is the maximum allowable amount permitted for a card in a day and the same applies to monthly limit. Each transaction request will be verified against these control measures before it is approved. All these limits are applicable to every single card, fleet manager card and vehicle cards.

In addition, the customers are also allowed to specify type of products allowable for a card. For an instance, a diesel-only card which is allowed to purchase diesel only. Attempt to purchase product other than diesel will be declined. This feature is meant to prevent card abuse by irresponsible drivers, as well as preventing incidents where driver mistakenly pouring diesel into a petrol car.

Another distinguished security feature against its close competitor is the ability of the system to restrict card acceptance at a particular service station only. For example, a customer whose vehicles are only plying in Georgetown, Penang, can request to configure the card to be accepted at service stations in Georgetown area only. This is particularly attractive to big companies which many vehicles as it help minimizing card abuse and monitoring work.

The major challenge faced by the domestic fleet card industry is fuel card fraud. According to Peter Bridgen, the Managing Director of Keyfuels, a firm supplies fuel card, in year 2009 alone, fraud on fuel card was estimated to some £40m in UK alone (David, 2010). No official statistics is known available for domestic fleet card industry.

To minimize fraud, Caltex South Africa has issued fleet cards with smart chip tag. A security device called ACCESSRing is attached to the fuel inlet of a vehicle. It contains a smart chip which is programmed with the vehicle registration number and correct fuel grade information. This ensures the correct fuel is dispensed into the designated vehicle. Should the security device is removed by force, the smart chip will be deactivated automatically which make future dispense impossible. Besides, it's another security device by the name of ACCESSPro has added security ability. A transceiving coil is installed around the fuel tank inlet, in which a Vehicle Informational Unit (VIU) is also connected to, will record the odometer or engine hours, in addition to other fuel transaction details. Engine hour is the cumulative amount of time the engine ignition is active in between two consecutive refuelling. Literally, this means that the distance travelled and the amount of fuel purchase are recorded automatically without human intervention. (www.caltex.com/sa/en/starcard.asp*)* This reduces card abuses effectively.

2.2.4 Fleet Card vs. Credit Card

The above card security features provided by Caltex South Africa are not known to be available in a credit card.

Unlike credit card which can be used at all service stations, fleet card issued by an oil company in Malaysia can be accepted at the participating merchants which are the oil company's service stations only.

A card holder is required to enter its vehicle odometer reading during transaction. This distinguishes the fleet card monthly statement from credit card's where the detailed reporting such as type of product purchased, quantity (normally in liter) and fuel efficiency in term of RM/liter. Apart from that, customized transaction reports in MS Excel format are available upon request. Customers may choose to upload this report to their own in-house system for further analysis and to detect card abuse and potential fraud.

The table below summarizes the similarities and differences between a credit card and a fleet card:

Table 2: Similarities and differences between a credit card and a fleet card (purchases made at the petrol stations)

Description	Credit Card	Fleet Card
Issuer	Financial institutions	Oil companies, financial institution or third party operators
Card Usage	Electronic purchase	Electronic purchase
Odometer required	No	Yes
Point of Acceptance	At all service stations and other participating merchant outlets	At issuer's service stations or at other stations
Product Allowed	All products	Fuel products or non fuel products available at service stations
Transaction Information Availability	Only transaction information	Detailed reporting

Product Restriction	No	Yes
Merchant Restriction	No	Yes
Card Limit	One single limit	Transaction, daily and monthly limits
Card Issuance Fee	No	No
Card Renewal Fee	Yes	No
Card Replacement Fee	Yes	Yes, amount is lower than credit card
Government Levy	Yes	No
Card Validity Period	5 years	2 - 3 years
Personal Identification Number (PIN)	No	Yes
Data Storage	Europay, Mastercard and Visa Chip	Magnetic Stripe

(SPCSB Head of Marketing, personal communication, Feb 2, 2011)

2.2.5 Fleet Card Customer Support

There are three main customer touch points, i.e. through customer service centre, fleet card online website and sales person. These are the three common channels used by the major oil companies in this country.

Its customer service centre is manned by almost twenty dedicated customer service consultants who work on 3 shifts a day. The operating hours are from 07:30-23:00 hour, Monday-Saturday, inclusive of public holiday, except the first day of Hari Raya and Chinese New Year. The customer service centre provides first level of support and handles all sorts of inquiries from the customers. Issues that require further investigation would be logged and escalated further to the respective units who would resolve and respond to customers accordingly.

All card maintenance such as product changes, limit changes, new cards or urgent card termination due to card lost/stolen cards are handled by the customer service centre. Customers can fax or email the completed forms to the centre or card centre directly at designated mailbox and number.

Fleet card customers are encouraged to go online for self-service support. Various services are available online, for instance, online statement viewing and printing, online limit and balance inquiries, viewing and downloading of unbilled transactions and many more. In order to access the website, the customers are required to apply for an ID. User ID and password would be notified and emailed to customers.

The third customer touch point is through its sales force. The customers are allowed to call the sales person in charge directly should they require any assistance. This is a personalized service not encouraged by its close competitor.

After looking at the company and industry background, the below sections explain customer lifetime value concept in details.

2.3 Definition of Customer Unit

The entity where the profitability is calculated is called the customer unit. The organization usually will try to identify various categories of customers (e.g., consumer versus corporate customers for a telecommunication industry, click versus brick and mortar for a retailer). Basically, the characteristics of the customer will very much affect the scope of profitability analysis where based

on the purpose of the application, a profitability analysis could be performed for all customers, or some specified customer units.

It is always a good practice to perform profitability analysis on every individual customer unit. However, to be more realistic, a computation of profitability at a higher aggregation in required. This is due to the fact that sometime individual customer purchase data are not available or individual level marketing is not feasible. Apart from that, a higher level of aggregation might also indicate a market segment that included customers that should receive the same communication message. Customer unit in business marketing is far more complex as compared to individual where the latter is usually studied at the household level. There is variety of customer units that can be defined, this includes: strategic business units (SBUs), divisions of SBUs, whole corporation with several holdings, departments within divisions, or specific corporate locations (Francis, 1999). Close consideration on the comparability of the customers is a must when choosing the units of analysis as the result generated can be affected when there is the existence of significant size differences in the customers.

2.4 Customer Value

Customer value is a reflection of profitability of individual customer in reference to a company. In other words, it is what the firm expected from a customer which included the customer management cost (Blattberg & Deighton, 1996). Also according to Berger and Nasr (1998), the customer value ultimately is the net profit or net loss of a particular customer as the result of the relationship it makes or causes in its life cycle. On the other side

of the coin however, the concept can be viewed in three distinct categories of customer which are old loyal customers, high profit customer and small potential customers. The former can yield a very lucrative profits for the company due to the fact that they often involve undisturbed information exchange and work flow, time require to serve, staff involvement where as time past by, the service cost on such customers reduce year by year and profits going up.

Furthermore, the effect of words of mouths came into the picture for the old customer as they will introduce new customers and reduce cost involve for the market development. They will also act as opinion leader where they have their own rallying point which can be taken as “reference customers” or “example customers” by the company in their quest to create new customers market, thus reduce significantly the cost involved in market development. Lastly for the small potential customers, they are the group of customers that have great potential to the firms which to be further developed and their contribution to the firm profitability increases at a constant rate as customer business advances.

2.5 Definition of CLV

CLV has been given many names by different researchers. Among others, it is also known as Customer Equity or Customer Profitability (Hwang, Jung, Suh, 2004). They defines a CLV as sum of the revenues gained over the lifetime of transactions, after deducting the cost of acquiring, selling and servicing the customers, taking time value of money into consideration.

CLV measures the total value contributed by a customer over the entire lifetime of customers which reflects the period that the customers will be staying as customers (Hwang et al., 2004). The duration of transaction period is very subjective. In a very competitive and ever changing market environment of wireless telecommunication industry, the above study focused on very short term lifetime value of customers, i.e. 6-months. Nevertheless, according to Kumar and Rajan (2009), most applications adopt 3 years period, mainly due to product life cycle, customer life cycle and generally the first 3 years transaction accounts for 80 percent of the profits. Generally researchers consider a customer's revenue stream as the benefit from the customer to the firm. A case study done in IBM was also using a time frame of three year as an estimate time horizon with regards to technology and competition factor (Venkatesan, Kumar, Bohling & Denise, 2008),. Thus, most CRM decision are made based on three years window and it is supported by the fact that majority of the cases capture customer lifetime value within first three year (Gupta & Lehmann, 2005).

Different models of CLV have been introduced by different researchers to predict and calculate the customer value effectively. Fader (2005), Rust (2004), Berger and Nasr (1998), Schmittlein and Peterson (1994), have suggested various methods to use customer-level data to measure the CLV. Basically there are two types of context considered, which are non-contractual and contractual (Reinartz & Kumar 2000, 2003). A non-contractual context is where the firm does not observe customer defection, and the relationship between customer purchasing characteristics and lifetime is not certain (Fader et al.,2005; Schmittlein & Peterson, 1994; Reinartz & Kumar, 2000, 2003). A

contractual context, however, is where customer defections are observed, with longer customer lifetime period implies higher CLV (Thomas, 2001; Bolton, 1998; Bhattacharya, 1998). Different estimation for different models to measuring CLV is derived from the expectations of future customer purchase behaviour. For instance, some models take into account discrete time intervals and assume that each customer spends a given amount (e.g., an average amount of spending in the data) during each interval of time. Having this information, along with some assumptions about the customer lifetime length, it is therefore used to estimate the lifetime value of each customer by a discounted cash-flow method (Berger & Nasr, 1998).

2.5.1 CLV in Finance Context

The concept of CLV could be traced back to Kotler more than 30 years ago (Michael, Andreas & Detlef, 2006). CLV has since been adopted to solve various real life business problems from mailing decisions in catalogue sales (Brian & Mondschein, 1996) to financial related areas such as merger and acquisition (Selden & Colvin, 2003) and firm valuation (Gupta, Lehmann & Stuart 2004). CLV use in finance is further strengthened by Courtheaux (1986) who argued that "CLV can play a key role in list valuation in business acquisition decisions" (Dwyer, 1997).

Customers are assets to firms, thus it is justified to equate customer relationship to the conceptual notion of an asset. The definition of customer lifetime value is related to the present value and valuation used in finance theory through the word value. While net present value (NPV) is commonly used in financial strategy to justify for investment decisions and return on investment, CLV uses the same technique as NPV by taking the time value of

money using discounting and traditional present value technique to derive expected cash flow projected over the lifetime of a customer. The difference, as claimed by Benninga and Tolkowsky (2002), is that the true value of an investment is often underestimated under NPV analysis. NPV assumes that a project can be planned beforehand and the project's potential to create future options foreseeable based on current stock of knowledge is ignored totally (Michael, Andreas & Detlef, 2006)

Apart from that, acquisition strategies and programs should be guided by capital budgeting, not a short run break-even analysis (Dwyer, 1997).

In a stiff competitive market, maximizing shareholder value is always the ultimate goal of a business entity. In this context, shareholder value implies a company's estimated long term profitability, based on the concept of a net present value (NPV) (Buhl & Heinrich, 2008).

Customers are the marketing based assets. A company's profitability is contributed by its customers. Literally, this means that an increase in profitability or customer value translates into an increase of shareholder value (Rappaport, 1998). This relationship has led to various customer valuation methods to maximize company value. According to a study on banking industry conducted by University of Muenster, Germany, 100% of the banks under study consider customer valuation management as a tool to increase company return (Ahlert & Gust, 2000). CLV is a customer valuation concept that appears to be compatible with financial theory's principle of shareholder value (Buhl & Heinrich, 2008). Shareholder value approach adopts two (2) assumptions, i.e. maximising the returns for ordinary shareholders in a

business is the primary goal of the managers and that investors' expectations of cash generating abilities is reflected on the company's stock market value. These assumptions lead to the developing of strategies to maximize firm value via cash flow generation over time. CLV is similar to Shareholder Value Added (SVA) in the sense that both estimate the total value of an investment strategy by discounting the cash flow generated (Peter et. al, 2009)

An empirical research conducted by Kumar and Shah (forthcoming) managed to find a direct link between shareholder value and CLV (Peter et. al, 2009). The CLV was first calculated and then related to a firm's share price over time. This is the important step which suggests that marketing investment can be tracked and measured to show a direct consequence to firm value. Despite this, there were earlier researches which attempted to link marketing and finance. In 1997, Capraro and Srivastava's research noted that among the Fortune 500 companies, intangible assets form more than 70 percent of its market value, suggested by its market-to-book value of approximately 3.5 times (Rajendra, Tasadduq & Liam, 1998). CLV is said to be an appropriate metric to assess the return on investment in marketing activities as well as developing strategies at customer and firm levels (Rust et. al, 2004; Venkatesan & Kumar, 2004). Besides, research to compute CLV using information published on annual report of public listed companies has shown that it reflects the firm's shareholder value reasonably well (Gupta et.al, 2004).

2.5.2 CLV Models

The usual approach adopted in measuring CLV, is to estimate the present value of the net benefit to the firm from the customer (generally measured as the income from the customer subtract the cost to the firm for maintaining the

relationship with the customer) over time (Blattberg & Deighton, 1996). Dwyer (1997) has attempted to calculate CLV through modelling the migration and retention behaviour of customers. Meanwhile, Hansotia and Rukstales (2002) focused on making decision of marketing investment, have suggested an incremental value modelling using tree and regression based approach. Hoekstra and Huizingh (1999) also emphasizing on conceptual CLV model that categorized input data of the model into two categories, time frame and source of interaction data. Another model, Rust et al. (2004) suggested a combination of the frequency of category purchases, firm's contribution margin, brand-switching patterns and average quantity of purchase to estimate the lifetime value of each customer. Due to customer purchase behaviour fluctuates over a customer's lifetime with the firm; ways that included past customer behaviour to predict an expectation of future customer behaviour and subsequently the remaining CLV are believed to yield advantages over other methods (Schmittlein & Peterson, 1994). Majority of known CLV models are based on a basic equation, due to there are other CLV calculation models having various realistic problems. The said basic model from the proposed definition is as follows (Dipak & Siddhartha, 2002):

$$\mathrm{CLV} = \sum_{i=1}^{n} \frac{(R_i - C_i)}{(1+d)^{i-0.5}} \tag{1}$$

where i is the period of cash flow from customer transactions, R_i the revenue from the customer in period i, C_i the total cost of generating revenue R_i in period i, and n is total number of periods of projected life of the customer

under consideration. However, the model above is the most basic model that ignores the fluctuation of sales and costs. Expanding this basic model, many researchers including Berger and Nasr (1998) have proposed CLV calculation models, which reflect the fluctuation of sales and costs.

Despite considerable numbers of CLV models have been created so far, there does not exit a generally accepted superior approach (Jackson, 1992). The majority of CLV models do not yield marketing-relevant information about customer specific information like expected cross selling revenues or referral recommendation behaviour. Also, the failure to consider the construct of customer retention rate (for models which do not integrate retention rates see Bruhn et al., 2000; Cornelsen, 2000; Homburg & Schnurr, 1999; Koehler, 1999; Wilde & Hickethier, 1997; Jackson, 1985; Mulhern, 1999; Niraj,Gupta & Narasimhan, 2001), further contributed to the scenario. For example, Thomas (2001) and Reinartz, Thomas, and Kumar (2005) simultaneously captured customer acquisition and retention. Fader, Hardie, and Lee (2005) captured the recency and frequency in a single model and construct a separate model for monetary value. However, the approaches for modelling these components or CLV vary from one researcher to another. Rust et al. (2004b) applied the survey results from consumers from two different north-eastern US towns to find out the drivers of customer choice and CLV. Venkatesan and Kumar (2004) in other examples, used samples of B2B customers from a multinational high-tech firm to first assess the behavioural and demographic drivers of CLV. Some researchers focus more on determining the various relatively crucial components. For example, Reichheld (1996) proposed that retention is the most critical component that influences CLV. In other

instances, Reinartz and Kumar (2000) suggested that customers with longer duration may not be necessarily the most profitable. Whereas Gupta et. al. (2004) used data from five companies to show that CLV may give a good approximation of firm value. Kumar (2006) on the other hand, showed that CLV, using a longitudinal analysis of a firm's data, is highly correlated with firm value. Different researcher will have their own idea of what factors is far more superior in predicting the CLV and its accuracy indirectly.

2.5.3 Components of CLV

There are different components of CLV that currently being introduced to the market which can be varied according to different industries. These include purchase frequency, contribution margin, and marketing costs. However there are three most distinct components that ultimately will affect the accuracy of the resulting CLV. By assessing the basic CLV models, it is very clear that the main variables or drivers are **revenue, costs** and **retention rate** (Reinartz & Kumar, 2000). Blattberg and Deighton (1991) proposed that company should segmentize their customer bases in a homogenous segment that contain variation lifetime value. Each and every value of the components will be determined individually in order to create sufficiently detailed individual CLVs and at the same time minimize calculation efforts. Ultimately, the obtained values will be used as a basis for the calculation of individual CLV. Major components of CLV are as below:

a. Revenue

Typically there are two types of revenue to be considered, i.e. Autonomous Revenue and Up/Cross Selling Revenue. The former implies the factors that are not directly influenced by the company or that are only affected by the

standard marketing measures such as TV advertising, where basic revenue does not include targeted measures to raise up selling or cross selling. Autonomous revenue is determined by the way of conventional procedures of demand forecast, e. g. analyses of time sequences or stochastic brand choice models such as multinomial Logit models (Schmittlein & Peterson, 1994; Lilien, Kotler & Moorthy, 1992). Up Selling, on the other hand, is determined by the additional selling of the same product or services as an effect of increased purchase intensity and frequency in long-life relationships as more transactions and values as time pass. It also derived from a price effect where the customers are less price sensitive even though being sold with higher-price substitutes (Reinartz & Kumar 2000; Reichheld & Teal, 1996). Thus, up selling revenues can represent the retention value of a customer where it can be estimated with the assistance of frontier function model where these models provides details pertaining to the maximum revenue that can be derived on the basis of efficient marketing and sales processes. Cross selling, in the contrary, meant the selling of product categories or complementary products where it is not been purchased from the firm before. (Reichheld & Sasser, 1990)

b. Costs

The concept of cost are commonly being used in a product-related accounting where a customer cost is predicted with only the reference object has changed over various stages from the product to the customer. Conventional forecast means are being boosted by findings about cost-reducing effects of long-term customer relationships (Bruhn et al., 2000; Diller, 2001; Reichheld & Sasser, 1990; Reichheld & Teal, 1996). In order to record the revenues and

costs, a firm typically goes to the extent of capturing the past transaction purchases. In the context of direct marketing, the firm is able to assign the costs of direct communication, delivery of the product, and promotions to individual customers (Berger & Nasr, 2001; Dwyer, 1989; Keane & Wang, 1995). However, in more traditional businesses, ways of accurately attributing the indirect costs of the marketing effort must be created (Niraj, Gupta & Narasimhan, 2001). For example, emphasizing on the critical of logistics-related costs in the lifetime value calculation and by introducing activity-based costing as an alternative to identify the relevant costs accurately. It is no doubt very challenging in order to accurately allocate cost for services based industries such as telecommunications where marketing effort can include programmatic efforts like service improvement efforts or investments in physical infrastructure, as well as direct marketing communications.

There are different categories of cost that typically being used by firm in capturing their capital outlay in their effort of serving their customer. The following sections detail four types of costs as below:

1. **Acquisition costs**

This type of cost is normally known as sunk cost where it only incurs one time and it can be characterized as a company's irreversible investment in the customer. The customer-specific calculation and implementation is operated depending on the acquisition procedure used (for example direct marketing vs. mass marketing through advertising).

2. **Marketing costs**

Marketing cost is associated with the costs of customer retention and development. It consists of all marketing measures which target at improving the customer profitability, such as when the customer's attention is drawn to higher-priced variants (up selling) or other product categories of the same company (cross selling). Apart from that, promotional expenditures and costs for soliciting, mailing catalogues also belong to this category as well. Besides, recovery costs are also included as one of the cost drivers in this category. It can be further broken into two, i.e. costs obtained before the termination of the relationship in order to avoid defection (*"churn costs ... as the costs of persuading a current subscriber to renew his or her subscription"*) (Keane & Wang, 1995) and the costs derived after the completion of the relationship, stemming from efforts targeted at regaining a customer.

3. **Sales costs**

Sales costs include both the production costs of the goods sold and all costs of providing services to the customers, which include the cost of order procession, handling, warehousing and shipping.

4. **Termination Cost**

This cost is incurred when customers who have defected but are not regarded as worth recovering. From a firm point of view, termination costs of a business relationship normally are considered as the 'final costs'. The good examples are administrative expenses when closing an account or costs of taking back products is a case in point. However, this type of cost by far has been integrated into a CLV model so far.

c. Retention Rate

Basically it is a factor which is normally defined at the individual customer level. Retention rate means the likelihood that an individual customer remains as a loyal customer to a specific firm and continuing yielding expected revenue to the firm as well as cost within a determined time period. With the means of the retention rates, an expected contribution margin is modified to the probability of occurrence (Dwyer, 1997). With the assistance of empirical validated determinant like switching barriers, attractiveness of substitute and customer's satisfaction, the retention rate can be predicted (Peter, 1999.; Jones & Sasser, 1995).

In general, retention rate can be categorized into two broad classes where the former take into account customer defection as permanent or "lost for good" and normally adopt hazard models to predict probability of customer defection. The second class on the other hand considers customer switching to competitors as transient or "always a share" and most of the time uses migration or Markov models. Rust et al. (2004) argued that the "lost for good" approach have greatly understates CLV as it does not permit a defected customer to return. In other view however have argued that this is not a critical issue due to customers can be treated as renewable resource (Dréze & Bonfrer, 2005) and default customers can be reacquired (Thomas, Blattberg, & Fox, 2004). Thus, the possibility of choice of the modelling approach depends on the context. In some example, majority of industries (e.g., banks, cellular phone, and telecommunication), customers are usually monogamous and kept their relationship solely to one company. In other instances (e.g., B2B, consumer goods), consumers at the same time involved

in business with multiple companies, and the “always a share” approach may be more suitable.

Some companies calculate their customer retention rates and publish in company annual reports as noted in two publicly traded Germany Internet service providers in the case study by Thornsten and Bernd (2005) that estimated the shareholder values of these two companies. According to researchers, should this information is not readily available, alternate way to calculate it is by using the customer movement table which details the number of customers in subsequent periods and the number of new customers in the same period (Thornsten & Bernd, 2005).

2.5.4 Types of CLV Models

Jain and Singh (2002) highlighted that there are four basic models of CLV that depend on the data availability and variations based on user.

A. Customer Migration Model

This model was proposed by Dwyer (1997) where he described a customer migration model for CLV. He proposed that customers can be widely broken into two distinct groups, which is “always-a-share” and “lost for good”. The former implies that customers may source from several vendors and can alter their share of business done with each vendor. As for the latter category, customers have made long term commitments to a vendor because switching vendors is costly and assets allocated to the transaction cannot be reallocated easily. Dwyer further highlighted that two basic CLV methods associated to the two categories of customer. For a lost-for-good situation, is more suitable to model as a customer retention problem.

As for always-a- share customers, Dwyer proposed a model that adopts purchase recency to predict purchase behaviour. There are some benefits that the model can provide as compared to the basic model where it considers the probabilistic nature of customer service usage. Relying on past behaviour, the purchase probabilities are updated. Therefore a customer may still be considered retained by a company even if they do not buy in any particular period.

However Dwyer's model does have some critical limitations and downsides. One of them on the time period where it is assumed to be fixed and the sale as well as the cash inward also happen in the same period even though in real life it may not be the case. Also this model is not suitable to be used in cases where the revenue stream from customers is more unpredictable.

B.Optimal Resource Allocation Models

This model is aimed at finding the optimal balance between spending on customer acquisition and customer retention in order to maximize CLV (Blattberg & Deighton, 1996). The model can be separated into two parts;

Optimal level of acquisition spending

$$a = (\text{ceiling rate}) [1 - \exp(-k_1 * \$A) \quad (2)$$

Net contribution margin for securing a customer for the first year = a$m - $A

Where $A is the expenses for securing a customer; a is the rate of securing a customer derive from the cost of acquisition; ceiling rate is the threshold to lure new customer, k1 is the constant that determine the shape of the exponential curve

Optimal level of retention spending:

$$R = (\text{ceiling rate})[1-\exp(-k2*\$R)] \quad (3)$$

where this formula reflects the customer equity in reference to retention spending

$$\text{Year y contribution from retention} = r[\$m - \$R/r] \quad (4)$$

Where $R is the retention expenditure per customer; r is the rate of retention obtained from the retention expenditure; k2 is the constant determining the shape of the exponential curve; $m is the profit obtained the year the customers is acquired and the assumption is made the it will be constant for the subsequence year.

It adds up all annual values of projected life of customer for each year, discount to the present value at a rate of return adjusted for marketing investments and thus yielding the amount of customer equity attributable to that customer. To maximise customer equity, the optimal level of retention and acquisition spending is consulted. This model basically uses CLV as a yard stick for making optimal decisions of marketing resource allocation. It considers the expenses on customer acquisition for determining the CLV. Even though it seems like this model is more superior to previous model, it still suffers the very same weaknesses where assumption were made for constant time period for cash flows and occur at the same time in each period. Also the model does not take into account customer acquisition and retention jointly to maximize customer lifetime value

C. Customer Relationship Models

In the context of customer migration, it is usually referred to such a condition where a customer might remain inactive for some periods, but still consider as a retained customer on his/her return. Thus, a mathematical model called Markov Chain Models (MCM) is proposed by Pfeifer & Carraway (2000) which deem to be more appropriate for modelling customer relationships. This is supported by Jain and Singh (2000) where they believed that MCM are very flexible and can tackle the condition reflected in models by Berger and Nasr (1998), Blattberg and Deighton (1996), and Dwyer (1997). It used to model both customer retention and customer migration situations.

Majority of CLV models treated the customer as dead when they stop being active and returning customers are treated as new customers. MCM does not consider the situation where a customer becomes inactive for some time while still being retained. The probabilistic nature of MCM permits for inherent stochastic in customer relationships. As experienced by other models, MCM, having to be the most flexible model, still relies on the assumption that time period for purchase by all customers is the same and fixed. It is noted that the calculation of transition probabilities is critical to the effectiveness of such models; however these probabilities are not easy to compute (Jain & Singh, 2002).

D. Models of Customer Base Analysis

These models are capable of deriving the probabilities of purchase in the next time period by considering the past purchase behaviour of the entire customer base. Also, the stochastic behaviour of customers is considered in making service usage. Hence, the model looks at each customer individually in order

to calculating the probability of purchase in the next time period. One of the examples of the models is the model proposed by Schmittlein, Morrison and Colombo (1987) named the negative binomial distribution (NBD)/Pareto model. This model is determined by calculating the probability that the customer is still active. They proposed that the model can be used to address the number of retained customers that a firm has, the expansion of the customer base, which individuals in the group who are likely to represent active and inactive customers and the expected level of transactions for next year.

The NBD/Pareto model is suitable in the sense where the time when the customer becomes inactive is unknown and the customer is able to make any number of purchases at any time and also able to become inactive at any time. It serves as a crucial twist in the literature as majority of research in CLV is carried out in a contractual setting (Bolton, 1998) where predicted revenues can be forecasted fairly accurately and the time when a customer becomes inactive is known. However, a substantial number of settings can be described as non-contractual such as the catalogue businesses, where customers who start at a particular time may then be repeatedly buying at some unpredictable pattern. Hence these raise the question whether should these customers expect to buy in the near future and how much they are likely to purchase. In coming out with a better estimation for the NBD/Pareto model parameters, Schmittlein and Peterson (1994) proposed a far more suitable method. In the calculation of CLV, the most important components are the determination of the number predicted to be active in each future period. The models assist in getting these probabilities.

2.5.5 Advantages of CLV over Other Models

CLV is far more superior compare to other methods such as Recency-Frequency-Monetary value (RFM), Past Customer Value (PCV) and Customer Spending Score (CSS) due to some limitations by those metric even though they are more commonly used compare to CLV. For example RFM and PCV do not provide a forward looking insight and also it does not consider whether the customer will be active in the future. It basically only considers the observed purchase behaviour and makes assumption that the past behaviour mirrors the future behaviour. Besides, RFM metric also unable to account for other factors like marketing action, apart from the normal assumption of recency, frequency, and monetary where the formal can assist in giving explanation of the future purchase behaviour and customer's worth to the company. Meanwhile PCV also fail to explain for factors such as cross buying that will affect the calculation of customer value. This metric also does not include the expected cost to maintain the customer in the future where it limits its ability to design better marketing strategies. CSS also suffers from the limitations where it only focuses on the customer profit and forgo the incurred cost to serve the customer. CLV on the other hand, manages to incorporate the probability the customer will be active in the future, the associated costs in retaining them particularly marketing cost and as well as the projected contribution margin. The above mentioned factors are the hearth of creating a customer level marketing strategies that can maximize the firm value ultimately. Also, the long term value of customers (CLV) is suggested to be a more relevant and stable metric of firm value than financial metrics such as market capitalization or price-earnings ratio. Thus, it appears crucial to

consider the concept of customer lifetime value as a suitable metric to assess the overall value of a firm (Bauer & Hammerschmidt, 2005).

The table below summarizes the comparison of different models as below:

Table 3: Comparisons within different profitability modelling

Models	Forward Looking	Retention Cost	Projected Contribution Margin	Purchase Behaviour
CLV	Yes	Yes	Yes	Yes
RFM	No	No	No	No
PCV	No	No	No	No
CSS	No	No	No	No

Adapted source: V. Kumar Customer Lifetime Value, Chapter 29, University of Connecticut

2.5.6 Importance of CLV

Most of firms do not utilize CLV measurements effectively. This maybe due to the fact that they do not know how to customize the customer's experience to create the highest value with the CLV value in hand (Thompson, 2001). They run into the risk in several ways such as effectiveness of resource allocation for marketing effort that produce larger short term gain at the expense of the long term performance. Also, they might spend considerable amount of money in monitoring metrics that do not give significant meaning in determining the customer's behaviour change. Thus, it is not surprising that organizations are devoting substantial resources to the attainment of competitively significant improvements in CLV (Gale, 1994).

CLV has become an important metric in marketing and specifically in customer relationship management (Rust et al., 2000). In the context of customer relationship management, CLV, or customer equity, becomes

crucial due to its ability to evaluate and influence marketing decisions (Blattberg & Deighton, 1996). The increase in attention for CLV very much fits well in the emerging literature on customer behaviour and customer profitability (Hogan et al., 2002). Among the key issues when firms use the CLV-metric is whether the company can provide a sufficient prediction of the CLV of each customer in their database (Malthouse & Blattber, 2005; Venkatesan & Kumar, 2004). Based on these predictions, firms can decide on their investments in (segments of) customers (Zeithaml et al., 2001). Furthermore, an overview of CLV predictions of customers that results in a valuation of the total customer base is very important for firm valuation purposes (Gupta et al., 2004). In addition, a marketing manager can use each customer's predicted value (CLV) strategically to determine which customers to select for a given marketing campaign that will encourages buying behavior (Kumar & Petersen, 2005). Because not all customers are financially attractive to the firm, thus it is critical that their profitability be determined and that the scare resources be allocated in line with the customer lifetime value (CLV). These notions are also supported by recent research (Dowling & Uncles, 1997; Reinartz & Kumar, 2000) which has shown that not all loyal customers are profitable.

There are a few factors that account for the growing interest in this concept. First, there is an increasing pressure in companies to make marketing accountable. Second, financial metrics such as stock price and aggregate profit of the firm or a business unit do not solve the problem either. Although these measures are useful, they have limited diagnostic capability. Third, improvements in information technology have made it easy for firms to collect

enormous amount of customer transaction data where it allows firms to analyse and utilize the data for better decision making.

All in all, it is very crucial for firms to understand the value of customer and know the most profitable customers are essential to retain customers (Hawkes, 2000; Hwang et. al., 2004)

2.5.7 CLV Industry Application

There are various studies made on the usage of CLV in several industries where few models are proposed for calculating the CLV. From these studies, it is evidently obvious that companies do gain a lot of benefit in term of strategizing and segmenting their customer to effectively distribute their scare resources. However, there are also some limitations and issues arise while adopting the model in their business strategy.

a. CLV Model in Wireless Telecommunication Industry

A case study has been conducted by Hwang et. al. (2004) which used 6-month raw data comprised socio-demographic and wireless service usage information of a Korean company as an input. Mean values and mode values have been used as substitution for missing value.

The resulting new CLV model considers past profit, potential value and customer defection probability. 3 main characteristics which differentiate this study from others are as below:

1. Short term customer value is used instead of long term customer value. This is especially so due to the dynamic and rapid changes of market conditions of wireless communication industry.

2. Unlike earlier studies which merely use prediction model to predict future value of customers based on past profit contribution, this new model includes future potential values of customers as one of the dimension in calculating CLV.

3. Unlike other similar CLV models such as Recency Frequency Monetary and Markov Chain Models, this new model factors in customer defection in CLV calculation. It measures customer values using 3 dimensions, i.e. current value, future value and customer loyalty.

The benefits of knowing customer value is used to categorize customers according to current value, potential value and customer loyalty in 3-dimension space, which effectively divide the customers into 8 segments. This information is used to develop various marketing strategies to move customer from one segment to another. For instance, long term strategies to be formulated to move low current and potential values but high loyalty customer to a high value customer segment.

b. CLV Model in Credit Card Industry

Credit card has been replacing currency in almost all B2C transactions. It provides a revolving credit facility which empowers the customers to manage cash at their convenience while the issuers earn a fee by providing the credit facility. Hence, it is of paramount important for the credit card industry to know their customers so that the right managerial decision can be made to acquire the right customers at the time.

Generally there are two broad categories of CLV models, i.e.

a. Metrics that calculates total value attributed by a segment of customer or a particular customer. The metrics can be further derived to sub-classify metrics for a customer or a customer portfolio.

b. Metrics that calculates value attributed by a particular customer during acquisition, retention or expansion period.

The research solely concentrates on unsecured credit cards, i.e. the customer is taking credit on a card. It does not include secured card, cash withdrawal and foreign transaction. The CLV value calculated is the sum of revenue contributed by a customer from the point of acquisition up to the current time period when CLV is calculated. The revenue model of a credit card company is in the form of late payment fee, interest, transaction fees, annual fee and others. The customer is given a revolving line of credit and is allowed to spend within the limit despite the outstanding balance from previous months. A customer who still maintains the business relationship is given 5 states: Inactive, Transact, Revolve, Delinquent and Default, at the end of statement cycle based on the borrowing and payment behaviour in a particular cycle.

Card issuers earn revenue as customers change from one state to another due to borrowing and payment behaviour. The probabilities of different state changes and amount from each state are then calculated using the below formula (Harsha, Tarun, Ramasubramanian, Ashwani & Janakiraman, 2008):

$$Revenue_t^{State} = Probability_t^{State} * Amount_t^{State} \quad (5)$$

Meanwhile, the costs incurred by the credit card issuers are cost of maintenance, cost of fund (for outstanding amount) and loss due to default.

2.6 Customer Segmentation Using CLV

In current modern marketing strategy, the concept of market segmentation has become a central tenet of company competing in the hostile business environment. Market segment is a comparatively a homogeneous group of customers that will respond to a marketing strategy in a similar way (Kara & Kaynak, 1997). The history of this concept can be referred back to Wendel Smith's trailblazing article of the 1950's which highlighted the idea as being 'based upon developments on the demand side of the market and constitute a better fits of product and marketing effort to consumer and user need and want (Smith, 1956). This idea also being supported by Dickson (1982), where he claimed that market segmentation is one of the most crucial concepts in the study of marketing we have ever know. Thus, it has created a surge in marketing literature pertaining to the process of market segmentation, including guidelines for how segmentation should occur in theory. Having said that, much lesser effort has being put into the practicality of the concept, as well as the need of management or the most appropriate variables to use (Wind, 1978).

Market segmentation was first given a meaning of looking at a heterogeneous market as a number of much smaller homogeneous market to respond to different preferences, attributable to the needs of consumers to obtain more precise satisfaction of their different wants. (Wendell, 1965). Segmentation is known to enhance marketing effectiveness and develop or maintain an organization's ability to leverage from pre-determined marketing opportunities

(Weinstein, 1987). McDonald and Dunbar (2004) acknowledge this resource-based approach to manage organizations where they suggest that segmentation can help businesses allocate financial and other resources more optimally. Also, Dibb (2002) highlighted that a more suitable marketing programmes can be created by having a better understanding of customers. There is now widespread agreement that segmentation can form a crucial base for successful marketing strategies and activities (Wind, 1978; Hooley & Saunders, 1993).

However, the issues still arise where market segmentation may not necessary yield the promising result even though the heterogeneity in demand is found to exist. This is because, according to Wedel and Kamakura (1998, p. 4), market segmentation will only be successful if the effectiveness, efficiency and manageability of marketing activity are influenced significantly by discerning separate homogeneous groups of customers. Wood and Ehrlich (1991) suggested that there are five means in evaluating which segments is more attractive than others. They outlined the following: sales potential cost of reaching the segment, growth, competition and fit with the company resources.

Lastly, with the increase applications of customer segmentation, it is noted that the difficulty in articulate a segmentation strategy without a concurrent analysis of CLV and a thought process that makes the CLV calculation explicit (Gupta & Lehmann, 2003). Also judging from the current practice, CLV is being used more often as a means of segmentation device rather than as ways to manage profitability of marketing activities at the individual level (Zeithaml et al. 2001)

The following sections elaborate various segmentation techniques.

2.6.1 Customer Segmentation Technique

The techniques that can be deployed in segmenting the customer differ in wide varieties. According to the literature (Storbacka, 1994, Shapiro et al., 1987, Bellis & Jones, 1989; Howell & Soucy, 1990), there are four basic methods in doing so, i.e.

- combinations of revenue and cost relationship segmentation
- volume relationship segmentation
- customer relationship profitability segmentation
- combination of volume and customer relationship profitability segmentation

Currently there are a numbers of authors that have suggested the selection of criteria that must be met in order to make the market segmentation a viable strategy (Frank et al., 1972; Loudon & Della, 1984; Baker, 1988; Kotler, 1988; Hiam & Schewe, 1993). This includes:

- Identifiable: segments can be identified
- Substitutability: the targeted segments are lucrative and significant in size to serve. Segments should be the largest possible homogeneous group worth going after with a tailored marketing program. It would not pay, for example, for an automobile manufacturer to develop cars that do not sizable market such as for those who are under four feet height.
- Accessibility: the segments can be reached and served effectively without too much difficulty
- Stability: temporal dynamics of segments

- Responsiveness: the chosen segment must be responding to marketing efforts and programs
- Actionability: the chosen segments must capable of formulating an effective programs for attracting and serving purposes

Few researchers argue that there is no generally accepted and validated means of market segmentation (Beane & Ennis, 1987; Schauerman, 1990). However, there are four most popular ways of segmenting emerged: The first one is base on Demographic. These include variables such as age, sex, educational level, income size and family type, race and nationality or combinations thereof. According to Frank, Massey and Wind (1972), this method was supported by literature in term of its validity. Even though demographics based segmentation proven to be useful, but it can not be used solely to segment the whole market (Beane & Ennis, 1987)

Geographic Market Segmentation is the second way where markets are grouped into clusters according to geographic regions, population concentration or climate.

Thirdly is the Psychographics Market Segmentation where it includes the more complex measurement of social class and way of living or life-style variables. It incorporates part of the inner personality or their motive in order to understanding the market. In comparison, the psychographics segmentation is far more superior to the demographic segmentation alone (Plummer, 1974; Wells, 1975).

Lastly is the behaviouristic market segmentation. It involves various factors like purchase occasion, user status benefits sought, buyer readiness stage,

degree of usage and loyalty, and marketing focus sensitivity. McDonald and Goldman (1979) noted that variable such as attitude, knowledge of product and response to the product are used to segment consumers. Mixture of psychographics and behavioural segmentation also being introduced as method of segmenting markets on the basis of the consumer's self-image or self-concept and its relationship to the image of the product (Sirgy, 1982).

Besides, literatures show that there are two means of segmenting available in the market. The first which is also known as breakdown method assumes that the market is made of customers with the same requirement and the objective here is to locate this group of customer which share particular differences. Build-up method, on the other hand, assumes that the market consist of customers who are all different. Hence the focus is to find the similarities. Also, it emphases on the move from the different individual level to a more general level of analysis, in reference to the identification of similarities (Freytag & Clarke, 2001).

In comparison, the breakdown approach is perhaps the most well-known approach to be used for segmenting consumer markets. Having looking at the difference between the two approaches, however, the objective of both methods is the same, i.e. it strives to identify segments in the market where identifiable differences exist between segments (segment heterogeneity) and similarities exist between members within each segment (member homogeneity).

Apart from the above mentioned methods of segmentation, some researchers have distinguished between a priori or post hoc segmentation methods

(Green, 1979). For the formal, segments are predetermined using the researcher's judgment beforehand (i.e. a priori). Typically it involves along seven stages encompassing the following steps (Wind, 1978) including:

- Selection of the base (a priori) for segmentation (e.g. demographics, socio-economics)
- Selection of segment descriptors (including hypotheses on the possible link between these descriptors and the basis for segmentation)
- Sample design—using mostly stratified sampling approaches and occasionally a quota sample
- Data collection
- Establishment of the segments are based on a sorting of respondents into categories
- Creation of the segments profile using multivariate statistical methods (e.g. multiple discriminate analyses, multiple regression analysis)
- Conversion of the findings about the segments' estimated size and profile into details marketing strategies, including the selection of target segments and the design or modification of specific marketing strategy.

As for post hoc approach, the segments are deduced from the research and involve the following processes:

- Sample design: using mostly quota or random sampling approaches
- Determination of appropriate statistical methods of analysis

- Data collection
- Data analysis: creation of significant segments using multivariate statistical methods (e.g. cluster analysis, CHAID)
- Creation of the segments profile using multivariate statistical methods (e.g. factor analysis) and selection of segment descriptors (based on the key aspects of the profile for each segment)
- Conversion of the findings about the segments' estimated size and profile into specific marketing strategies, including the selection of target segments and the design or modification of specific marketing strategy

2.6.2 Segmentation in Business Markets

Segmentation in a business markets should indicate the relationship needs of the parties involved and must not be just merely based on the traditional consumer market approach, which is primarily the breakdown method. Wind and Cardozo (1974) defined it as the identification of 'a cluster of current or potential customers with some similar characteristic which is relevant in explaining (and predicting) their response to a supplier's marketing stimuli'. Due to the fact that 80 percent of profits are usually generated by just 20 per cent of customers, there is a significant need to segment markets and create precisely targeted marketing programmes. Apart form that, segmentation process has become part of crucial components in developing of a in-depth competitive advantage for services (Sudharshan & Winter, 1998) where not every customer need, want and desire are of the same level (Merrilees, Bentley & Cameron, 1999). This notion was concurred by Mitchell and Wilson

(1998) where they also highlighted the needs to identify customer segments to be avoided.

2.6.2.1 The B2B market segmentation

B2B market segmentation literature comprises of variety of methods. According to Wedel and Kamakura (1998), there are six commonly adopting factor to segment B2B markets. These include identifiably (segments can be identified), substantiality (segment size), accessibility (segments can be reached with marketing efforts), stability (temporal dynamics of segments), action ability (matching with the formulation of effective marketing strategies), and responsiveness (responding to marketing efforts). However, there are certain overlapping issue with the currently well-known characteristics introduced by Philip Kotler (1991) which are measurability (size and potential), accessibility (segments can be reached), substantiality (sufficiently large and profitable) and action ability.

In other examples, Piercy and Morgan (1993) fancy a strategic perspective on B2B segmentation separating segmentation into various levels where it is normally being applied by the top management in relation to visions, missions and strategic purposes. Other than that, decision regarding to the allocation of resources via marketing planning and the operational segmentation level was included into part of sales and its operative management. Also, product type and section (Palmer & Millier, 2003), intuition (Millier, 2000) and decision-making process have been accepted as criteria for segmentation.

Ultimately, market segmentation must be base on actual customer need and want, as well as perceived benefits (Mitchell & Wilson, 1998). As stated by

Dibb and Simkin (1994), however, industrial companies with limited experience of market segmentation should not stop themselves as a start of their journey to segment their customer's base.

In theory, there are two main groups of interrelated variables used to segment business-to- business markets, i.e. Organizational Characteristics and Buyer Characteristics as shown in Table 4. For the first category of organizational characteristic, it is normally used for those seeking to segment markets where transactional marketing and the breakdown approach dominate. As for the latter, it is used by organizations that seeking to establish and develop particular relationships, and build up their knowledge of their market and customer base.

Table 4: Business to business segmentation bases

Base Type	Segmentation Base	Explanation
Organizational characteristics	Organizational size	Grouping organization by their relative size (MNCs, international, large, SMes) enables the identification of design delivery, usage rate or order size, and other purchasing characteristic
	Geographic location	In many situations, the needs of potential customers in one geographic area are different from those in another area
	Industry type (SIC) code	Standard industrial classification (SIC) is the code used to identify and categorize all types of industries and businesses
Buyer characteristics	Decision making unit structure (DMU)	The attitudes, policies, and purchasing strategies used by organization provide the means by which organization can be clustered
	Choice criteria	The type of product/services brought and the specification that companies when selecting and ordering products and equipment may also form the basis for clustering customers and segmenting

		business markets
	Purchase situation	This approach segments buyers on the way in which a buying company structure its purchasing procedures, the type of buying situation, and whether buyers are in an early or late stage In the purchase decision process

Adapted source: Paul Baines (2008) Retrieved from http://www.amazon.com/Marketing-Paul-Baines/dp/0199290431, Chris Fill, Kelly Page, Oxford University Press, USA; Pap/Psc edition

For business-to-business segmentation, it will be ideally to adopt method that would merge low cost and ease of access of the demographic (macro segmentation/outer nest) means with the knowledge of specific customer needs (micro segmentation/ inner nest). This strategy would make use of demographic variables as surrogates for the actual benefits sought by business customers (Moriarty & Reibstein, 1986; Peltier & Schribrowsky, 1997)

It is essential for a company to understand all the exchanges and customer demographic variable in order to segments its customer which ultimately set apart each group from the other. The reason being that these variables will help in explaining reason some customers are more profitable than others. For instance, Reinartz and Kumar (2003) have studied the exchanges and demographic variables that affect the duration of lifetime of customers in a non-contractual setting. In the study, some key variables are identified; among others were amount of purchase, degree of focused buying, degree of cross buying, number of product returns, average inter-purchase time, and income of customers, mailing effort by the firm, location and ownership of loyalty instrument. It is proven that each of these variables has variation of impact on the customer lifetime duration and possibly on CLV.

Thus, it is possible to profile the customers based on various exchanges and demographic/firmographic variables, which are key determinants of CLV duration and CLV. Practically, the customers are first broken into deciles or demideciles based on their CLV scores. The profile of these deciles/demideciles or a segment (a set of deciles/ demideciles) is then analysed. Profiling give us a better understand the customer composition of each segment. It also assists firms to understand the characteristics of their best customers, the way they prefer to do business with the firm, the best way of communication or touch channel to reach their best customers, and how frequent their best customers buying from them. Armed with the customer profile analysis, firm can identify the segments in which they should concentrate their marketing efforts on and to create the most suitable marketing messages to these segments. Another way of segmentation for the firms is grouping based on historical profits and future profitability of customers. Apart from that, firms can use CLV with any other loyalty metric and come up with customer segmentation most suitable to the firm or type of business. These are only some of the segmentation methods that firm can follow.

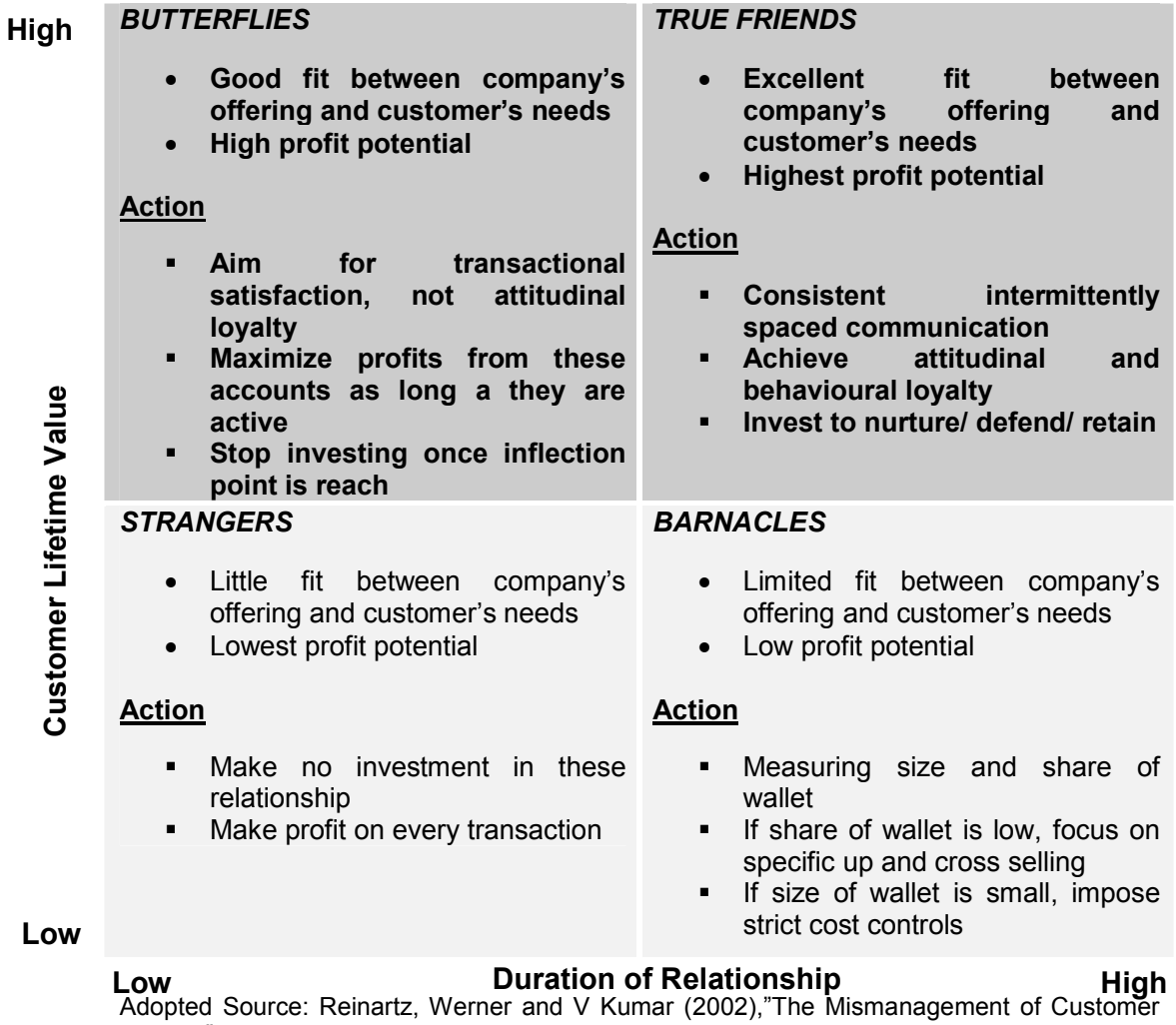
2.7 Adoption of Customer Base Segmentation Technique

Segmenting customer base has become a norm to current business environment. Furthermore, it is noted by Porter (1985) which according to him, the greatest opportunity for achieving a competitive advantage most of the time obtained from new ways of segmenting. This is due to the reason that a firm that embrace this practice can meet buyer needs better than competitors or improve its relative cost position" (Porter, 1985, p. 247). For

the purpose of the study, 2 parameter which are CLV (profitability) and loyalty (duration of the relationship) will be selected for customer base purposes.

The resulting of these segmentation efforts yields a four-by-four matrix with CLV value at the vertical axis and duration of relationship at the horizontal axis. With this, as adopted from Reinartz, Werner and V Kumar (2002), the customer can be grouped into four (4) segments which are Butterflies, True Friends, Strangers and Barnacles. Each and every of these groups reflect different characteristic which variation of strategies are needed to serve them in the most profitable manner.

Figure 2: Segmentation of customer base using CLV and duration of relationship



Adopted Source: Reinartz, Werner and V Kumar (2002),"The Mismanagement of Customer Loyalty," Harvard Business Review, July, 1-13.

As observed from the matrix, True Friends is the most profitable customer segment to the firm. This due to the fact that they are satisfied most of the time and comfortable with the offering and relationship that firm has to offer. They depict a constant yet not intensive transaction over time which ultimately produces the highest profit for the firm. To serve this group, firm should engage in a consistent yet intermittently interval communication such as advertising, personal selling or even direct marketing (Kotler, 2003). In this context, it means making frequent courtesy calls and visits to the customers in

this segment to check on any problems or issues faced while using the products/services. With this, the firm can discover early sign of dissatisfactory and resolve the problems there and then. It will create a sense of importance that makes the customers feel appreciated and the firm care about them. However, a continuous bombardment of communication, on the other hand, will have a converse effect that might give negative perception as well as scare them off from continuing doing business with the firm. This is supported by Fournier, Dobscha and Mick (1997) where they highlighted that a too frequent communication will result in relationship becoming dysfunctional. By making sure customer expectations and perceived value are met, it is crucial for the firm to design a competitively superior value proposition aim to serve the segment that are backed by superior value-deliver system (Michael, 1998). Ultimately, to best manage this segment, firm must put their best effort to covert and retained them as a loyal customer, attitudinally and behaviorally.

Butterflies, on the other hand, are the second most profitable customers even though the business relationship is a short term relationship. Generally, they are group of customers who are price sensitive where they are looking for the best value and deal constantly, most of the time they avoid having a long term relationship with a single firm. One of the reasons why they are price sensitive is mainly due to the factors such as the products are bought frequently. Firm should not invest in them anymore once they stop using the firm service and products as they are opportunist in nature. Firm should find ways to milk the most profit from this segment while they can and must be in the highest alert to terminate the relationship timely to prevent from over investing in them. Nonetheless, the firm still can try to convert the Butterflies to True Friends by

reducing the level of price sensitiveness of the customer. This needs to be done so that the customers will be using other criteria in evaluating the decision to continue the relationship with the firm in a longer period instead of just focusing solely on price. This can be achieved by convincing the customer that it offers the lowest total cost of ownership as compares to other organizations (Kotler, 2003).

Second least profitable customers are the Barnacles where they do not provide a substantial profit as their size and volume of transaction are too small despite being long term customers. They do not yield a satisfactory return on investment where they are seen as more as an excessive load to the firm overall profitability. However, the Barnacles sometimes can give some profits to the firm if it is managed properly. This can be done by assessing the source of the issues causing the small size and volume of purchase. By assessing the size of wallet and also share of wallet, the firm can has a better view or strategy to handle this group of customers. Should the size of the wallet is small; the firm must enforce strict cost control strategies in order to minimize loss to the firm. No additional cost should be invested as these customers will not have any future potential revenue stream. The relationship must be treated as one time transaction only. Should the share of the wallet is low, then more up-selling and cross-selling can be adopted to extract more profit from this group of customers. However, point to be cautious is that firm should not overly do this as research has shown that there is nonlinear relationship between share of wallet and level of satisfaction. Firm should only put extra effort in this if they

are certain that it will increase the level of share of wallet concurrently (Timothy & Tiffany, 2004).

Lastly, the most unprofitable customers are the Strangers where they are the ones whose requirements totally do not fit with what the firm has to offer. To manage this group of customers, it is crucial for firm to identify them as early as possible and stop making any investment onto the relationship as they do not and will not bring any profit to the firm. Should there are business transactions between them and the firm, the company must milk the maximum profit that they can get from every transaction made.

From the above discussion, it is clear that marketing effort and resources must be diverted from the Strangers and Barnacles segment as they do not yield much profit to the firm. What is necessary for both of the segments are to get the most that the firm can obtain each time when there is a transaction. Contrarily, a more concerted effort must be given to the Butterflies to convert them into True Friends where the marketing investment allocated will harness the most return and profit to the firm. However, this must be done with cautious as not all Butterflies will ultimately become a True Friends. By observing their transactions pattern such as value of transaction, inter-purchase period, and others, firm can distinguish those who can be changed from Butterflies to True Friends, not to Barnacles. This, in turn, will assist firm in their effort to migrate customers from one quadrant to the other. Firm must always be cautious in deciding which customers to invest in order not to waste their limited resources.

2.8 Conclusion

From the finding, there is various customer profitability models used. The data requirement for each model also varies from model to model. However, it is concluded that CLV is the most recommended model as it provides forward looking capability. CLV model uses various components; the most important ones are revenue, cost and retention rate.

Meanwhile, in B2B business environment, customer segmentation can be done based on a few techniques. It is recommended to use two parameters, i.e. CLV and Duration of Relationship to segment the fleet card customers.

Literature review is the essential part for information gathering to get an idea on how to calculate CLV and to segment customers. The outcome of this chapter provides guideline to define the data requirement and analysis. The next chapter will explain type of the methodology used.