Chapter 2

Theories and Concepts

In the development process of business strategy simulation game, various business frameworks will be used to analyse important factors and variables.

To implement the game, object oriented design and programming concept are used to speed up the game development process. The implementation of computer client and server architecture enables the game to run across a computer network with ease.

The relevant theories and concepts are explained in separate topics.

2.1 Strategic Management

Strategic management is a process that combines three major interrelated activities: strategic analysis, strategy formulation and strategy implementation (Dess & Miller, 1993).

- **Strategic analysis** - a process to develop an appropriate strategy.
- **Strategic formulation** - a process that turns a strategy into a plan.
- **Strategic implementation** - a process of putting a plan into action.

Strategic management can be divided into three levels. There are:

Functional-level Strategy: It is a strategy that directly improves the effectiveness of functional operations within a company, such as manufacturing, marketing,

financial management, materials management, research and development and human resources (Hill & Jones, 1995). There are many techniques that used to implement in this level.

Business-level Strategy: The business-level strategy of a company encompasses the overall competitive theme that a company choose to stress, the way it positions itself in the marketplace to gain a competitive advantage, and the different positioning strategies that can be used in different industry settings (Hill & Jones, 1995). The following three generic methods are used:

cost leadership - A strategy that focuses on keeping overall costs lower than its competitors.

product differentiation - A competitive strategy for creating brand loyalty by developing new and unique products and services that are not easily duplicated by competitors (Laudon & Laudon, 2000.

focusing on particular market niche - A strategy to develop new market niches for specialised products or services where a business can compete in the target area better than its competitors (Laudon & Laudon, 2000)

Corporate-level Strategy: This strategy level deals with two questions: (1)What businesses should a company be in to maximise the long-run profitability of the organisation? and (2) what strategies should it use to enter into and exit from business area? (Hill & Jones, 1995). The strategies include: **vertical integration**-either backward into the production of inputs for the company or forward into the disposal of outputs from the operation, **diversification** into a new business area and find strategic alliances.

A strategy must be carefully chosen and implemented for each level in order to increase a company competitive advantage and efficiency.

2.2 Five Forces Model

Five forces model was invented by Michael E. Porter of the Harvard School of Business Administration. This is a framework that helps managers to analyse competitive forces in an industry environment (Hill & Jones, 1995). The model appears in the figure.

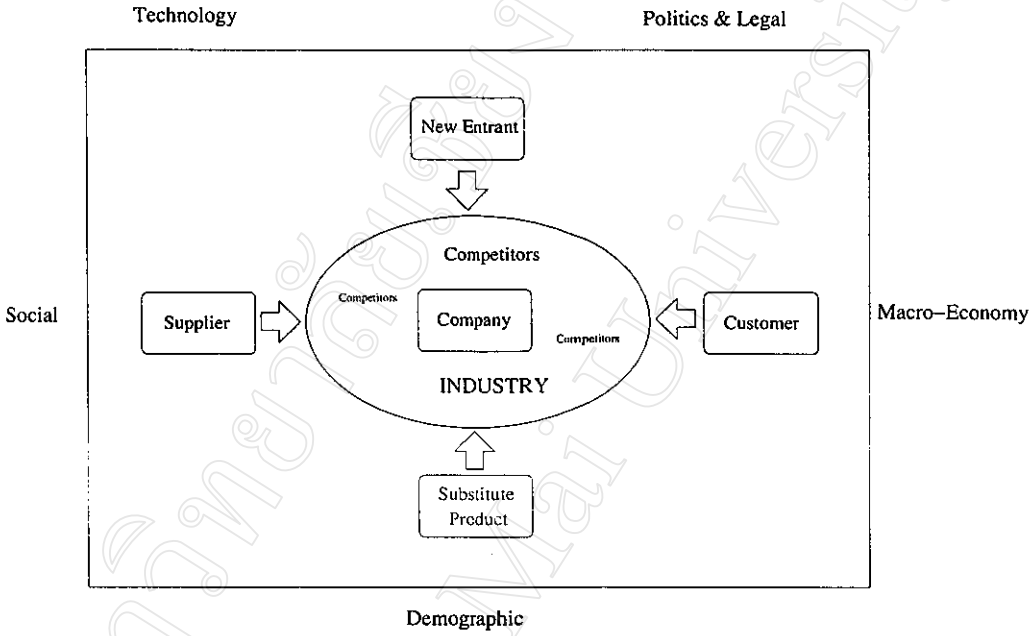

Figure 2.1: Five Forces Model

As illustrated in the picture, this framework comprises of 5 important elements:

Supplier: The supplier is one of the most important element in the model because it supplies all goods that are used as inputs for a company. The quality of company's products or services is affected by inputs from supplier. The supplier can have more bargaining power when (Hill & Jones, 1995):

- the product that the supplier sells has no or few substitutes and is important for the company.
- the company is not an important customer to the supplier.
- the switching cost to other suppliers is considerably high.
- supplier can do the vertical integration forward to directly compete with the company.

- the company cannot do vertical integration backward to supply itself.

Competitor: The competitor is any company that does the same business in the same industry as the company. The competitor directly competes with the company by using different strategies ie. cost leadership, product differentiation and focused differentiation, in order to maintain or increase competitive advantages.

Customer: The customer is important to the company as they create demands for the company's products or services. Customers can be viewed as a threat when they force down price or demand for higher quality and better service (Hill & Jones, 1995). In contrast, weak customers give the company a chance to raise prices and make greater profit. There are some circumstances where buyers are most powerful:

- When the supply industry is composed of many small companies and the buyers are few in number and large.
- When customers purchase in high volumes. They have more bargaining power for price reduction.
- When a company's health relies on customer's order.
- When customers' switching costs to other companies are low.
- When customer's inputs are economically supplied from many companies.
- When customers can supply themself i.e., they do vertical integration.

New Entrant: New entrant can be considered as a future competitor. There are chances that a new-born company would like to enter into the same industry as well as supplier that does a vertical integration forward and customer that does a vertically integrates backward. To have more competitors in the market could mean less profit for the company in the future.

Substitute Product: Substitute product is a product that can be used instead of or use to substitute the company's product. For example, companies in the cof-

fee industry compete indirectly with those in the tea and soft-drink industries (Hill & Jones, 1995).

Apart from industry environment, there are numbers of important external environments to consider:

Technology Environment The rapid changes in technology creates a host of new product possibilities, mean while they can make a product obsolete faster than it could in the past. The technology changes can affect the barrier of entry to the industry, and change the structure of the industry.

Politics and Legal Environment This factor can cause major threats and opportunities. There are laws and restrictions to control or force the industry. While some regulations can be opportunies for some companies, they can be big threats for the others.

Macroeconomic Environment This factor determines the general health and well-being of the economy (Hill & Jones, 1995). The better the economy it is, more opportunities exist for a company to increase its rate of return.

Demographic Environment the changes in population composition can create opportunities and threats. For example, the baby-boom generation of the 1960, created a lot of demand for the consumer appliances.

Social Environment While the social environment is changing, it creates opportunities and threats like some of the above factors. Some products are selling very well because they can get along well with specific social believes or social trends.

These forces play important roles in strategic management as managements need to carefully analyse how these forces affect the company. The company which can log in suppliers and customers, on the other hand, logs out competitors, and will get the competitive advantages and will survive in the business.

2.3 Value Chain Model

Value chain model is a model that highlights the primary or support activities that add a margin of value to a firm's products or services where competitive strategies can be best applied and where information system are most likely to have a strategic impact (Laudon & Laudon, 2000). All basic activities are linked as a chain that creates value for company's products or services. These activities can be divided into two categories:

Primary activities are activities that directly relate to the production and distribution of products or services. Such activities are in-bound logistic, production, out-bound logistic, sales and marketing and service.

Support activities are activities that make the primary activities possible i.e., administrative tasks, financial and accounting, information system and etc. In order to add value to products or services, both primary activities and support activities may need to be improved. However, it may not be likely to improve every activities, so only activity that considered to add more value to products or services will be improved.

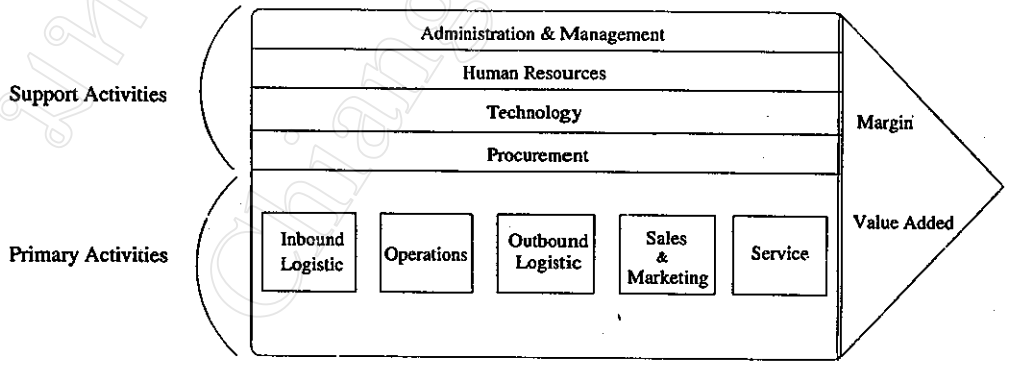

Figure 2.2: Value Chain Model

2.4 Generic Model

Companies pursue a business-level strategy to gain a competitive advantage that allows them to outperform rivals and achieve above-average returns. They can choose

from three generic competitive approaches: **cost leadership**, **differentiation** and **focus**. These strategies are called *generic* because all businesses or industries can pursue them regardless of whether they are manufacturing, service or not-for-profit enterprises. Each of the generic strategies results from a company making consistent choices on product, market, and distinctive competencies-choices that reinforce each other (Hill & Jones, 2000). The following table summarises the choices appropriate for each generic strategy.

	Cost Leadership	Differentiation	Focus
Product differentiation	Low	High	Low to high
Market segmentation	Low	High	Low
Distinctive competency	Manufacturing	R&D sales and marketing	Any kind

Cost-Leadership Strategy: A company which implements this strategy tries to outperform competitors by doing everything it can to produce goods or services at a cost lower than theirs. There are two advantages using this strategy. First, a company can charge a lower price than its competitors, yet make the same profit as they do. Second, if industry rivalry increases and companies start to compete in price, the cost leader will be able to withstand competition better than the other because of its lower costs. The cost leader chooses a low level of product differentiation. Differentiation is expensive. The cost leader does not try to be the industry leader in differentiation; it waits until customers want a feature or service before providing it. To develop distinctive competencies, a cost leader must develop competencies that enable to increase its efficiency and lower its costs compared to its rivals.

Differentiation Strategy: A company need to achieve a competitive advantage by creating a product, good, or service that is perceived by customers to be unique in some important way. The differentiated company's ability to satisfy a customer need in a way that its competitors cannot means that it can charge a premium price, a price considerably above the industry average. The customers are willing to pay a premium price because they believe the

product's differentiated qualities to be worth the difference. A differentiator choose a high level of product differentiation to gain a competitive advantage. Product differentiation can be achieved in three principal ways: quality, innovation, and customer responsiveness. An advantage of product differentiation strategy is that it develops **brand loyalty** which is valuable asset because it protects the company on all fronts.

Focus Strategy: A focused company concentrates on serving a particular market niche, which may be defined geographic, by type of customer, or by segment of the product line. Once it has chosen its market segment, a company may pursue a focus strategy through either a differentiation or low-cost approach. A focus company's competitive advantages stem from the source of its distinctive competency: efficiency, quality, innovation or customer responsiveness. It provides goods or services which its rivals cannot provide.

2.5 Ansoff's Matrix

Ansoff's matrix is a common tool used within marketing, developed by Igor Ansoff in 1957. The model gives a business five strategic business options. The following figure illustrates those options.

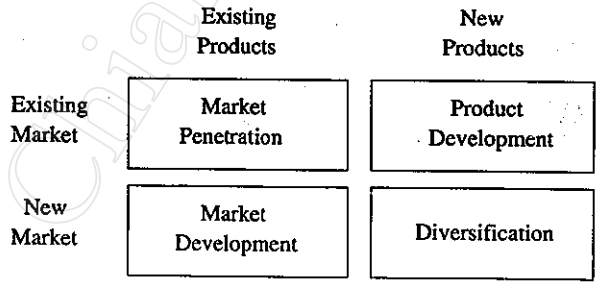

Figure 2.3: Ansoff's Matrix

Market Penetration: This involves increasing sales of an existing product and penetrating the market further by either promoting the product heavily or reducing price to increase sales.

Product Development: A company develops new products to aim within an existing market, in order to gain more customer and market share.

Market Development: A company adopts a strategy of selling existing products to new markets. this can be done either by a better standing of segmentation.

Diversification: A company is moving to a new industry to provide new products to a new market.

Consolidation: A company adopts a strategy of withdrawing from particular markets, scaling back on operations and concentrating on its existing products in existing markets.

2.6 Retail Marketing Concept

The study focuses on retailing business, especially specialty stores. Specialty stores carries a narrow product line with a deep assortment within that line (Kotler & Armstrong, 1989). For example, a specialty store may sell only clothing products, or to be a *single-line-store*, it may sell only men's clothing products.

Retailer Marketing Decisions

Target Market A retailer must clearly define the target market and its position in the market. Its position in the market will affect all its marketing decisions including product assortment, services, pricing, advertising and store decor (Kotler & Armstrong, 1989). Furthermore, a retailer should do periodic marketing research to check if the company is satisfying its target customers.

Product Assortment and Services Decision A retailer must make a decision on three major product variables: products assortment, services mix and store atmosphere (Kotler & Armstrong, 1989).

- product assortment must match customers' expectations. The factors to consider are *width* and *depth*. A shop's products or services can be

narrow and shallow (counter bar), narrow and deep (delicatessen), wide and shallow (cafeteria) or wide and deep(large restaurant).

- service mix can be different among different types of retailers. A retailer should find the way to *differentiate* itself from competitors. The old "mom and pop" grocery store may offer close relationship to customer, home delivery or credit.
- every store has *look* and *feel*. The physical store layout, colours and area can create different atmosphere to the store and allow it to stand out among competitors. The store atmosphere must be designed to match the characteristic of a business, for example a bank should be quiet, solid and peaceful while night club should be colourful, loud and vibrating.

Price Decision Price is a very important key. Price decision must match the target customers. Normally, a retailer wants to sell their product with a high markup and high volume. Unfortunately, these rarely go together. High markup products tend to sell with a much lower volume than lower markup products.

Promotion Decision Normal promotion tools are advertising, personal selling, sales promotion and publicity. Advertising can be done through different media: magazine, newspaper, television, radio, publicity, etc. Whatever media is being used, it should reach the target customers. Sales promotions may include in-store demonstrations and trading stamps.

Place Decision Location is a key to a businesses ability to attract customers (Kotler & Armstrong, 1989). Where a store is located may depend on different variables: target customer, afford-ability and availability. While a big franchise store may have specialist to find a location, a small store might find an affordable site.

2.7 Business Games Concept

"A business game is a business simulation. Game players will be divided in to teams and manage simulated companies. Each team makes decisions based on informa-

tion. The game uses quarter systems. After each quarter, each team's decisions are getting processed on the computer and the results will be compared. The time domain in real world is shorten in the game i.e., 2-3 years in real world is shorten to 12-15 hours in the game." (Ruenjinda, 1996)

"A business game is a tool for management students to experiment with their management knowledge gained in class. A player will gain management experiences via the game which simulates the real world. A player will learn: decision making based on the information, team-work, pricing strategy, human resource management, social responsibility, business ethics and joint-venture concept." (Buranapin, 1997)

"A business simulation game designed for students enrolled in a management course or management development programme. It provides student player with simulated real world experience in managerial decision making and enables them to see the relevance of the principles being taught in the course. This management business simulation game is simple enough to learn in about an hour and yet includes all of the variables a student needs to know to understand the major concepts of an introductory business/management course or organisational training. An additional benefit for students is that they will experience how the various functional areas of business mesh together and affect each other." (Smith, 2002)

Smith and Gold have created numbers of business simulation games. Each game has its own objectives and characteristics. These are some examples of business simulation games that are widely used in both undergraduate and postgraduate levels created by them:

BIZsim: The industry simulated in BIZsim is the highly competitive and quickly changing personal audio player industry, the simulated firms is manufacturing and selling Digital Video Disk(DVD) portable player. Teams make 11 decisions each "round" of the game. These decisions include number of audio players to produce, the capacity of the production plant, the budget for a total quality management program, pricing strategy, the advertising and sales promotion budget, the size of sale force, the budget for product development and enhancement, the purchase of research studies, loans pro-

curement, dividends payment, and decisions on a critical mini-case involving business ethics, corporate responsibility, human resource decision, and technology plans. BIZsim accommodates from 3 to 20 teams per group with as many as 25 groups, and play may be played for four to twelve quarters.

AIRLINE: The team assumes the management of a "mom-and-pop" airline. Currently the airline has 3 small 19-passenger commuter aircraft. Each firm in the simulation begins with the same general market structure, aircraft, assets, and the same passenger loads (i.e., sales). Each firm is competing with one or two other firms in four markets and each has a market which currently has no other carrier in it. There are also markets which have just had a major carrier pull out and are therefore now open to the commuter airlines in the simulation. Routes range in length from 200 to 600 round-trip miles. In addition to these regular routes, there are resort markets which are 600 miles round trip. The simulation automatically creates a certain number of routes (city pairs) according to the number of teams competing. For example: if 8 teams are competing, there would be a total of 35 markets available and if 12 teams are competing there are 52 markets.

Corporate: Each decision period is assumed In playing the simulation, players acting as management teams make a variety of decisions that will have an impact on the future of their company. These include the type and size of strategic business units, the quality of product/service that will be delivered to the marketplace, and the risk-taking behaviour of the strategic management team as they make decisions about new ventures. Prices must be established for all products in the portfolio, and the size of the sales force established. Some unique features of the simulation are the ability to acquire or merge with similar business units of other companies; the ability to control product/service quality; and the opportunity to make decisions about critical management such as social responsibility, ethics, and unusual business opportunities.

2.8 Object Oriented Analysis and Design

"Object oriented and design model the world in terms of objects that have properties and behaviour, as well as events that trigger operations that change the state of the objects. Objects interact formally with other objects" (Martin, 1993).

(Coad & Yourdon,1990) mention 7 key motivations and benefits in favour of OOA/OOD instead of using traditional analysis methods. These motivations and benefits are:

- Tackle more challenging problem domains.
- Improve analyst and problem domain expert interaction.
- Increase the internal consistency across analysis, design and programming.
- Explicit represent commonality between class and objects.
- Build specifications resilient to change.
- Reuse OOA, OOD and Object Orient Programming (OOP) results.
- Provide a consistent underlying representation for analysis, design and programming.

2.8.1 Object Oriented Analysis (OOA)

OOA involves the following five steps according to Cord & Yourdon's approach (Brinkkemper, Hong, Bulthuis & Goor, 1995).

Identify objects: An object is an abstraction of an entity (tangible or intangible) about which information has to be kept. An object has its own attribute values and exclusive services(behaviour). A analyst must identify what kind of objects that involve in a problem domain.

Identify structures: This process is to define how objects are structured. The relationship among the objects and class hierarchies are formed at this stage.

Define subjects: For a big problem domain, objects may need to be grouped into many small subjects to reduce the complexity of the analysis.

Define attributes: Each object must have its own attribute to hold values or states of an object. For example, a human object may have the following attributes: hair colour, eyes colour, height and weight.

Define services: At this stage, the behaviours of each object are to be defined. Behaviour or service is what object can do. For example, the services of human object could be: walk, talk, think, etc.

Although all five steps are listed in a logical order, they need not to be done sequentially in the real analysis process. Analyst can go back and forth among those steps.

2.8.2 Object Oriented Design (OOD)

"The purpose of design is to create an architecture for the evolving implementation. Design, just like analysis, never really stops until the final system is delivered.

Design focuses upon structure, both static and dynamic. Further analysis may occur during the design phase, mainly to explore the areas of uncertainty regarding the system's desired behaviour, but design mainly serves to create the system's concrete skeleton upon which all the rest of the implementation hangs." (Brinkkemper, Hong, Bulthuis & Goor, 1995)

"Analysis may apply to a whole business area; design applies to one system. For on system, the distinction between analysis and design may be blurred; analysis flows into design." (Martin, 1993)

In the process of OOD, the following components are identified:

- Classes that will be implemented in a system.
- A class data structure.
- A class services or behaviour that will be used in a system.
- Class hierarchies are built.
- User interface is design. Prototyping is employed with end users.
- Variants of classes are identified.

In summary, the main purpose of OOA/OOD is trying to tackle the complex problem into smaller subjects. The method offers some advantages over the classical system analysis approach. OOA and OOD always go together. Both process are being done back and forth until the system is delivered.

2.9 Client and Server and N-Tier Architecture

Client-Server application and n-tier architecture have always played a key role in operation of businesses. Ability to input, process, store and access data from anytime, anywhere and any device is powering eBusinesses of today.

The creation of an n-tier software solution, where "n" represents any number of physical or logical layers, allows software systems to be separated and scaled (duplicated) to improve performance and accessibility. Each layer is made up of software components that interact with other components within and across layers. An n-tier solution consists of at least three layers: presentation, business, and data.

A simple explanation of *client and server* architecture is that: there are two different sets of computers that do their own roles, so called *two-tier architecture*.

Client side computer: A client is for receive user inputs and displays the processed output to a user. A client computer also does the information processing both *application logic* and *business logic*.

Server side computer: A server computer usually is a very high performance computer. Servers today are mainly file and database and file servers(d-tec, 1998). Therefor, their roles are to store shared data and let authorised clients to retrieve data from.

However, the following disadvantages are to be considered:

- A client is needed to do both application logic and business logic which leads to monolithic application that are expensive to maintain.
- Data being processed need to be transported forth and back between a server and a client. This increases an unnecessary network load.

- Application logic cannot be reused because it is bound to an individual client application.
- The two-tier-model implies a complicated software-distribution-procedure. Every time the business logic of an application is updated, every remote client application need to be updated.
- The security is considerably low. The client machine is relative easier to crack, compared to a server machine. Once the client machine is cracked, there is a chance that business logic of the application is to be modified.

Therefore, it has been a development on a simple *client and server* concept to a better *n-tier architecture* concept.

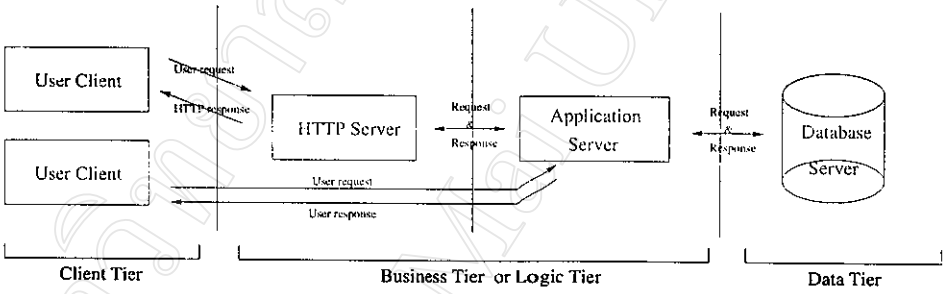

Figure 2.4: n-tier architecture

Client Tier: A client is responsible for the presentation of data, receiving user input and controlling the user interface.

Business Tier: This tier is a newly created tier to handle a business logic. This means all business object is implemented in this tier. This level now forms the control key to solve two-tier problems. This tier protects the data from direct access by the clients.

Data Tier: A database or file server is responsible for data storage. Besides the widespread relational database systems, existing legacy systems databases are often reused here.

These three tier can be separated either logically or physically. With logical separation, a single computer can run all three tiers. The main importance is that

the system is neatly structured, and that there is a well planned definition of the software boundaries between the different tiers (d-tech, 2002). With physical separation, each tier resides on different computers. The new architecture provides these advantages:

- Clear separation of user-interface-control and data presentation from application logic.
- Re-definition of the storage strategy will not influence the clients. This means whatever database system is being used, the client side need not to be modified to adjust to the new database system.
- Network load is reduced by having the server gets necessary information and processes before sending an output to a client.
- It is much easier to maintain a good security on a few numbers of servers more than a thousand of clients.
- Dynamic load balancing is possible. If there is a performance bottleneck occurs, the server process can be moved to the better servers at runtime.

The chapter gave descriptions about all the important concepts and frameworks used in the game. By studying these concepts and frameworks in details, it is noted that there are many internal and external variables involved in a specific industry. When each variable or factor changes, it could affect an industry in some form.

The study uses an object oriented analysis and design approach to tackle the complexity of the business environment. As well as a n-tier architecture is introduced to ensure the the robustness of network capability of the game.