

**Effects of Power Asymmetry and Competition Intensity:  
The Role of High Involvement and Economics Practices in  
Supplier Performance**

**by**

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## Abstrak

Fokus kajian ini adalah untuk mengenalpasti bagaimana amalan pengurusan pembekal dapat mengubah perhubungan antara faktor kontekstual dan pencapaian pembekal. Faktor kontekstual yang dipilih ialah “power asymmetry” dan intensity persaingan. Tinjauan yang dilakukan menggunakan sebuah firma pengilangan dalam bidang telekomunikasi. Data diperolehi daripada 100 orang pekerja daripada beberapa lokasi dalam firma ini. Kesemua pekerja ini ada penglibatan dengan pembekal. Cara analisis yang dikemukakan oleh Baron dan Kenny (1986) yang melibatkan empat langkah telah digunakan untuk menentukan kesan pengubahsuaian. Hasil kajian dijangka dapat menyumbang kepada karya mengenai pengurusan pembekal berasaskan faktor kontekstual. Dari segi aspek pengurusan pula, pengetahuan ini berupaya meningkatkan pemahaman mengenai mengapa sesetengah organisasi lebih berjaya berbanding dengan yang lain dari segi pencapaian pembekal. Penemuan menunjukkan bahawa amalan kerja penglibatan tinggi merupakan pembolehubah pencelahan yang mempengaruhi perhubungan antara intensiti persaingan dan pencapaian kualiti pembekal. Ia memberikan kesan pencelahan separa dalam perhubungan antara intensiti persaingan dan fleksibiliti pembekal. Walaubagaimanapun perhubungannya ini negatif yang mencadangkan bahawa organisasi kajian tidak mengamalkan amalan HIWP dengan berkesan. Bagaimanapun apabila HIWP digunakan dalam persekitaran yang kompetitif, hubungan negatif ini berkurangan. Penemuan kajian ini menyokong penemuan lampau mengenai kebergunaan amalan HIWP kepada pencapaian. Kedua-dua amalan HIWP dan amalan transaksi ekonomi digunakan secara serentak bila persaingan adalah sengit. Sekatan kemasukan menyebabkan pembeli lebih bergantung kepada pembekal.

## Abstract

The focus of this study is to observe how supplier management practices alter the equation of organizational context and supplier performance. The contexts selected are power asymmetry and competition intensity. The survey was conducted in a telecommunication hardware manufacturer. 100 key informants who deal with suppliers were sampled from multiple sites of the multinational. The four-step analysis method by Baron and Kenny (1986) is used to determine the mediating effect. The result is expected to contribute towards literature on contextual based supplier management. On management aspect, knowledge is supposed to enhance understanding of why some organizations are more successful than others in getting good performance from suppliers. The findings showed that high involvement work practices mediated the influence of competition intensity on supplier's quality performance and partially mediated the effect competition intensity has on supplier's flexibility. However the influences were negatively related prompting a suggestion that the organization under study did not practice HIWP well. However when HIWP was applied in a competitive environment, the negative effect was mitigated. The findings support past studies on the usefulness of HIWP on supplier performance. Both HIWP and economics transactional practices were simultaneously applied when competition was intense. High entry barrier caused buyers to be more dependent on suppliers

## CHAPTER ONE

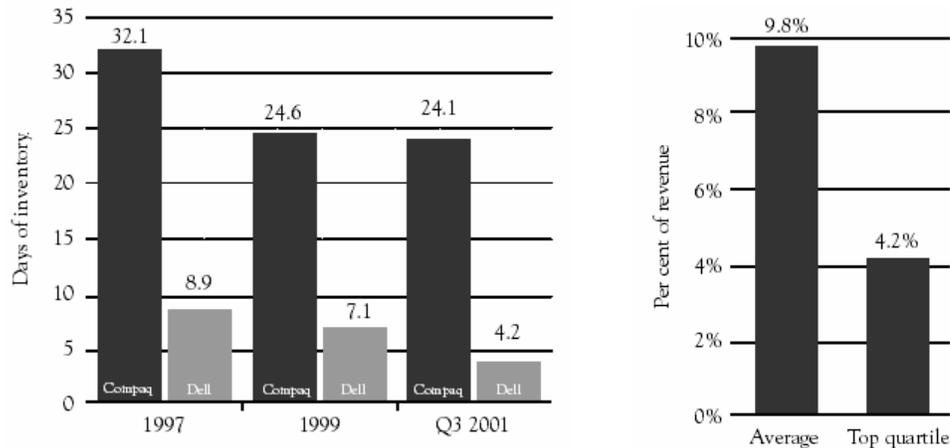
### INTRODUCTION

#### 1.1 Why is Supplier's Performance Important?

Application of management theory starts within organization. As environment becomes more competitive and application skills become more mature internally, organization starts to look outside the organization to strengthen its competitiveness. Supply chain management is relative new in management history. Supply chain starts from supplier at one end to customer at the other end. Material cost is approximately 60~70% of product cost for an average manufacturing organization. Purchasing and supplier quality personnel often lament on the poor line of sight in supplier operation especially when the suppliers are located abroad. A close watch on supplier's performance is the priority of an organization. Organization that manages suppliers well enjoy core competency which is hard to emulate by competitors. Figure 1.1 shows the comparison of an average company against top-in-class company in inventory turns and revenue. When one mentions success story in supply chain, stories of companies like Dell, Wal-Mart and Tesco immediately surfaces. These top flight companies spent 4% of revenue in supply chain against 10% from average companies. In year 2001, Dell inventory is four days against HP's 24 (Cook & Greenspan, 2003). These are real statistics compiled from industries which show case how good supplier management improves operating margin.

Suppliers are external to organization, whose output, the organization relies on to complete a product. Traditionally they are those supplying raw materials, components, production equipment and consumable materials. Lately they are further processing subcontractors, service providers and information providers. Supplier's performance affects several aspects of organization. Product cost, quality and lead

time to market are some of the impacts. A manufacturing organization purchases parts and assembles them into systems according to bill of materials. Bill of materials can run for 10,000 parts for an automotive to 3 for a plastic injection molder.



*Figure 1.1.* Comparison of average company against top- in-class in inventory turns and revenue to demonstrate the power of supply chain management.

It is impossible for buying firm to understand the characteristics of each part well. Suppliers are usually experts in their own products. Buying firm depends on suppliers' technical knowledge and application expertise to provide design guidelines, failure analysis and material testing support (Tan, Kannan & Handfield, 1998). Early supplier involvement in product development allows an organization to shorten launching lead time. Successful organizations are often strategically, operationally and technologically integrated with their suppliers. Outsourcing activity is increasing lately. Organization outsource because it can focus resources on core competence. Thus suppliers that specialize in whatever field they are good at enjoy economy of scale to invest in specialized equipment to produce product of cheaper and better quality. It is very common among industrial buyer to ask for annual committed cost reduction. Supplier has to master the skill of continuous improvement in order to do business with industrial buyers. Toyota, which adopts an admired manufacturing

approach, believes in reduced supplier based. Only one or two suppliers are selected for each component to reduce variances in piece part. Supplier is given life of product contract. In this kind of supply chain environment, failure in the supplier's product is really unimaginable.

As recent as year 2000, research still reported that most buying firms feel the needs of supplier improvement in the areas of delivery, cost reduction, product quality, new technology adoption, financial health and product design. Buyers also feel that these deficiencies in capabilities probably hinder suppliers from competing in the markets. For example, according to a survey done by Bain and Company in 2003, 85% of senior executives in U.S. admitted that supply chain management was their top priority, however less than 10% ever tracked their suppliers' performances. The reason of such poor record was due to poor visibility of supplier performance as well as incorrect reward type was given to supply chain executives. A typical buyer is rewarded for preventing stock out but goes un-noticed although supplier inventory turns improves (Cook & Greenspan, 2003).

Only large organization e.g. multinational corporation (MNC) can afford to do supplier management. When venturing overseas, MNC has the social obligation to develop local suppliers and to improve overall skills of the host country. Success of the supplier is tied to the development and pride of the country. If the MNC has strategic intent in the host country, performances of these local suppliers are closely tied to its operation strategy. Thoo's (2004) study in supplier-buyer relationship in Malaysia showed that there was a distinct gap between MNC and local companies. The latter still need serious catch up in supplier management when compared to foreign invested companies.

The proliferation of quality awards such as Malcolm Baldrige National Quality Awards (MBNQA) in United States, Deming Prize in Japan, European Quality Awards Model (EFQM) in Europe draw attention to the need of totality in supply chain where supplier is an important element. To win these prestigious prizes, it is of organization's interest that the supplier does well.

## 1.2 Problem Statement

Paragraph 1.1 summarizes the benefits of supplier performance. However often buying firms are reluctant to commit resources on supplier management due to no immediate benefit and a mentality of quick change in supplier pool. This is aggravated by large organization which enjoys power advantage against its suppliers. Very often buying organization introduces programs that take advantage of suppliers. Examples of these programs are supplier manage inventory, annual cost reduction, electronic data management and bar-coding procedure that only benefit buyer. Mediated power relationship is bad for the buying organization (Maloni & Benton, 2000; Molm, Petersen & Takahashi, 1999). Power disadvantage suppliers are not always submersible; they seek method to rebalance the power asymmetry. Conventional interpretation often assumes conflict free relationship between buyer and supplier. Knights and McCabe (2002) argued that real dyad relationship involves power struggle. Buying organizations that believe in benefits of supplier management and recognize the ever changing buyer-supplier dynamics could adopt management practices that build loyal supplier.

When input effort does not yield result, competition could be an explanation. When facing similar organizational contexts, some organizations do better than others in managing suppliers. Practices implemented by these companies must have made

the difference. Large organization is bureaucratic and likes to rely on factual indices to make decision. Economics transactional practice is built into management accounting and has been a management decision tool for years. Involvement practices are supported by past literatures as better tactics to retain loyal suppliers. Perception of such commitment from buying firm has profound impact on supplier's engagement. However they are unique to the buyer-supplier dyad and need time to develop.

There is a time lag between organizational context and management practices, if the study is centre on context, practice and performance, it is appropriate to put practice as the mediator. The study intends to explore tactical approaches that allow better management of suppliers for sustainable results.

The problem statement is how do supplier management practices mediate the adverse effect of power imbalance and competition intensity on suppliers' performances.

### 1.3 Research Objectives

This study intends to fulfill the following objectives:

1. To determine the influence of supplier management practices on supplier performance in industrial purchasing.
2. To determine the relationship between power asymmetry and competition intensity against supplier performance when mediated by supplier management practices.
3. To investigate the effect of competition intensity on the adoption of power asymmetry approach from buyer's perspective.

#### 1.4 Research Questions

This study adopts a direct formula of what organization context affect supplier performance when mediated by supplier management practices. The study intends to address following questions:

1. What is the choice of supplier management practices when product is critical to buying organization?
2. When product is critical to buying organization, does buyer adopt high power asymmetry strategy?
3. Do Involvement Practices and Economics Transactional Practices influence supplier performance?
4. Which supplier management practice is preferred when power imbalance favor buying firm?
5. Which supplier management practice is preferred when buying firm faces high degree of market competition?
6. Does competition intensity influence the demonstration of power relationship?
7. Does supplier management practices mediating the effect of high power imbalance and high competition intensity on supplier performances?

#### 1.5 Significance of the Study

Research into buyer-supplier's relationship is very recent when compared to the management theory. Initially it emerged as a little area of knowledge in quality system management principles. Gradually it grew to become a body of knowledge by itself when the phrase supply chain management (SCM) was coined. This study seek to confirm the inter relationship of context, practice and performance. It helps to

clarify some gap exist in the literature of power relationship and supplier performance.

Automotive industry is where most of the buyer-supplier literature is anchored (Gonzalez-Benito & Dale, 2001; Nobeoka, Dyer & Madhok, 2002; Park, Hartley & Wilson, 2001). Other industries do not look particularly interested in supplier research. From the methodology view point, supplier management originates from practitioners' needs, thus case study and normative approach are very common. Both lack the rigor required by academic research because its findings cannot be generalized. This study will survey suppliers for the telecommunication hardware industry. Practices in this industry can be easily extended to other electronic industry. Electronics industry is a worthy watch because of its short historical perspective and its peculiarity of short life cycle, protocol adherence and shifting nature which does not give advantage to any incumbent.

A review into literature as tabled in Table 2.4 shows that there are many studies assessing practices against performance as well as context against performances. This research adds on to the study of Mohd Ikram (2002) by introducing context of power relationship as well as economics transaction practices into the model. It is the belief that buying organization introduces appropriate practices to mitigate the adverse effect of organizational context the organization is subjected too. Thus context and practices is expected to have longitudinal relationship. Similarly practices adopted take time to demonstrate their effects. This study probes deeper by reviewing the mediating effect of supplier management practices in the relationship of power relationship and competition against supplier performances. This helps to explain why under same power and competition context, some suppliers perform better than others.

From managerial perspective, knowledge gained from this study should convince buying organization to allocate resources for supplier management. It confirms that proper supplier management practices could mitigate the negative effect of organizational context on supplier performances.

## 1.6 Definition of Variables

According to the research objectives, the main block of variables are organizational context leading to supplier management practices that produce performances. Definitions of key terms are listed as follows.

### *1.6.1 Supplier Management Practices*

Supplier management encompasses planning, implementing, developing, and monitoring company relationships with current and potential supplier. It functions to organize the optimal flow of high quality, value for money materials to manufacturing companies from a suitable set of innovative supplier (Wagner, 2003).

An involved management practices include establishing a systemic process that involve people; providing appropriate level of empowerment, an interdependent organization structure. The core practices required are information sharing, skill of supplier, accountability and processes. (Krause, Scannell & Calantone, 2000).

Supplier-buying organization is highly dependent on economic transaction as motivation for further commitment. Practices referred to are competitive pressure when more than one supplier is used for a material which allows switching. The second practice is supplier incentives whereby supplier is given the carrot of more business for return of good performances (Monczka, Trent, & Callahan, 1993).

### *1.6.2 Organization Context*

Organization context are internal or external organization contingency that is not directly controllable. Examples of contextual variables are size, product, industry, intensity of competition, length of supplier-buyer relationship, tier of supplier, power asymmetry etc.

Power asymmetry is seen as inverse function of relative dependence between buyer and supplier and the corresponding strategy adopted to manage the relationship (Anderson & Narus, 1990; Emerson, 1996). Power bases are mediated and non mediated.

Competition intensity is defined as degree of market rivalry. When there are many suppliers of the same product, degree of rivalry for supplier is high, thus competition intensity is high. Competition is a function of barrier of entry and degree of differentiation. Typical characteristics of high competition intensity are short product life cycle, critical customer demand on cost and quality and rapid product launch.

### *1.6.3 Supplier Performances*

Supplier performance has multiple definitions depending on the objectives of buying organization. They can be straight accounting measurement such as cost, first pass yield, asset management (Sakakibara, 1995). Others prefer to use a basket of integrated measurement including delivery reliability, responsiveness, flexibility, cost, assets management efficiency, customer service, productivity and quality (Supply Chain Council, n.d.; Gunasekaran, Patel & Tirtiroglu, 2001; Lambert & Pohlen, 2001).

## 1.7 Organization of Dissertation

This dissertation is divided into six chapters. Chapter 1 is introduction which explains the background of the study, historical perspective, problem statement and objective. Chapter 2 reviews recent literature available on the topic and identify the missing gap. Then a research framework is proposed. It shows relationship between dependent and independent as well as moderator. Chapter 3 shows the methodology adopted in the research. Chapter 4 reports the findings and analysis and chapter 5, discussion and conclusion.

## CHAPTER TWO

### LITERATURE REVIEW

Review of knowledge in supplier performance follows the schematic shown in

Figure 2.1.

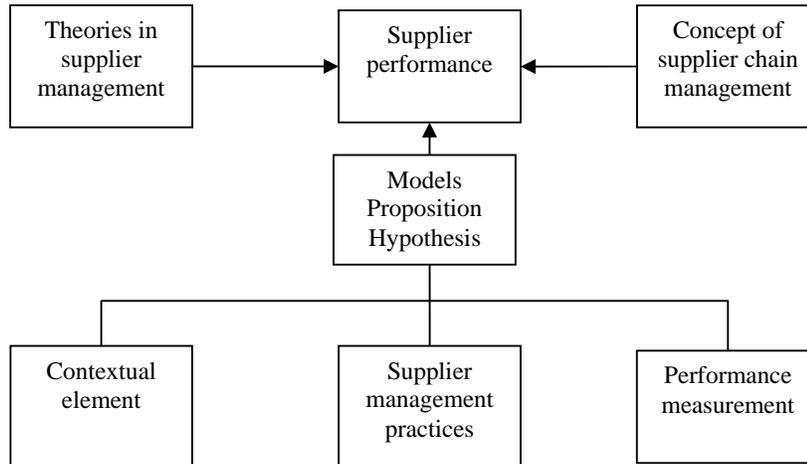


Figure 2.1. Schematic diagram of supplier performance review.

#### 2.1 Historical Aspect of Supplier Management Application

Thirty years ago, supplier quality is synonymous with stringent outgoing inspection. Quality is the very first aspect the buying organization expects. In the early days, supplier management is equivalent to supplier quality management. Buying organization would compile a list of criteria very close to the ISO9000 certification when selecting a supplier. This practice persists until today. However as time passed by, other criteria slowly crop up in the selection checklist such as delivery, cost, flexibility and early product development involvement.

In the 80's the Japanese successfully penetrated the European and the US markets with quality but reasonably priced products. They did this with their unique supplier management system ala the Toyota style. This was an awakening call for US companies. Supplier development, certification, competitive enforcing and incentive

were put up as remedial packages. In the 90's some of these fix all packages blipped on the radar and disappeared. In the late 90's both researchers and practitioners realized there were no fix all packages. Systems and practices must be implemented, contingent on other supporting context. Introduction of this idea corresponding to a movement of reducing supplier base which reduces part variation and improve product quality.

From industry perspective, automotive is the first industry to drive improvement not only in the first tier but also the second and the third tier suppliers. It is driven by needs because any recall involve automobiles could possibly bankrupt any supplier besides putting a bad name for the company. Practices from automobiles industry has been adopted in electronics. The unique point of electronic industry is its necessity to conform to product protocol and part interchangeability. Thus its suppliers have to produce within a narrow specification window which in turn requires a better process control.

Corresponding to the above development, the relationship between suppliers and buying organizations change from animosity to cordial partnership. A few papers have shown that power tactics only bring short term improvement. Partnership is a form of elevated strategy.

## 2.2 Research in Supplier Management

Rungtusanathan, Choi, Hollingworth, Wu and Forza (2003) did a meta analysis on 285 research articles in operations management published between 1980 and 2000 covering six operations management journal. Their research showed that research in operations management showed exponential increase since 1995 and supply chain management stood out as showing fastest ascendancy to prominence.

There are several streams of research in supplier management. Since supplier management is pretty new phenomena and originated from the industry, early literatures were concerned with the implementation. Implementation literatures from 1990 to 1996 were normally compiled by practitioners who were heavily influenced by implementation experiences and were highly prescriptive. Dean and Bowen (1994), Powell (1995) and Hackman and Wageman (1995) are the exceptions. Their empirical papers carry academic rigor which are founded on management theories but have yet to be fully tested. One problem is the difficulty to operationalize results of implementation. This leads to second stream of research, measurement. Researchers argue which measurement indices best measure the implementation success. Short term achievement such as product quality, delivery and cost are proposed. The Malcolm Baldrige National Quality Award (MBNQA) criteria is an instrument often used to assess maturity of an organization because its conceptual framework addresses the principal domains of good business model. Throughout the years, the award criteria have been repeatedly updated by experts (Dean & Bowen, 1994). However MBNQA does not adequately evaluate an organization's quality culture, active leadership, quality cost and supplier management (Sila & Ebrahimpour, 2003). More practical measurements are using cost of accounting and a string of supply chain metrics (Gunasekaran, Patel & Tirtiroglu, 2001; Lambert & Pohlen, 2001; Supply Chain Council, n.d.). When organization starts to face competitive environment, integration of supplier becomes very crucial. Indices such as volume flexibility, new product launch, joint research and development becomes long term measurement. Some examples of literature in this area are Talluri, Vickery and Droge (2003); Chan and Qi (2003).

After the late 1990s, it was recognized that supplier management could not be isolated from other business practices. The third stream of researches discusses what practices are best suitable to develop suppliers. These practices are tied to some management principles, e.g. organization that believes in control management asks its supplier to inspect the products before delivery. Organizations who believe in empowerment are more likely to install organic like governance structure. Some of the papers in this area are Forker (1997); Krause, Scannell and Calantone (2000); Ramdas and Spekman (2000); Shin, Collier and Wilson (2000); Romano (2002) and Hult, Ketchen Jr. and Slater (2004).

However very soon researchers realized that the same practices did not necessary ended with the same performance. Thus the fourth stream of study appeared. Sousa and Voss (2003) used different context of OEM and subcontracting businesses to explain type of process monitoring tools most effective. Krause (1997) compared the effectiveness of direct firm involvement, incentives and enforced competition as factors affecting supplier performance.

From soft aspect, supplier management borrows extensively from marketing literature to debate the element of buyer-supplier relationship and impact on performance. Extensive studies into trust, information exchange and commitment using distribution channel produces valuable insights into dyadic relationship. Example of these literatures are Buchanan (1992); Fynes and Voss (2002); Ganesan (1994); Gassenheimer, Houston and Manolis (2004); Heide (1994); Kalwani and Narayandas (1995); Kumar, Scheer and Steenkamp (1995); Lusch and Brown (1996); Mohd. Ikram (2002); Pagell and Sheu (2000) as well as Thoo (2004). A higher level of buyer-supplier dyadic relationship is buyer investment into assets specificity and supplier involvement in new product development. Using automotive industry as a

backdrop, researchers look at utilizing supplier expertise as product co-developers (Von Corswant, Wynstra & Wetzels, 2003; Echtelt, Von Wynstra, van Weele & Duyters, 2004).

Discussing dyadic relationship from trust, communication and commitment promotes comfortable feeling from both parties. There is another dim side of the relationship which is an uneasy point in buyer-supplier relationship, i.e. power asymmetry. The concept of power asymmetry dated back to 1960's. It was in the late 1990's, power relationship was studied in the buyer-supplier dyad (Maloni & Benton, 2000; Mohd. Ikram, 2002; Morgan & Hunt, 1994; Sivadas & Dwyer, 2000). Power asymmetry is inevitable in dyadic relationship and is generally destructive if not applied properly.

### 2.3 Theories in Supplier Management

Supplier management can be looked at from two aspects: microeconomics or behavioral. The phenomena seen in these two aspects can be explained by three theories as follows.

#### 2.3.1 *Transaction Cost Theory*

Transaction cost theory views relation between supplier and buying firm through a governance structure that enables economic transaction. Transaction cost includes cost of searching for information, cost of contract monitoring and enforcement. The dimensions involved are transaction-specific investment and internal and external uncertainty. Transaction specific investment involves physical or human assets that are tied to a particular buyer-supplier's firm. This premise gives rise to the safeguarding issue where the transaction mechanism is designed to minimize risk of opportunistic exploitation. In managing supply risk, Agency Theory is adopted

where buying organization proactively assess supplier risk through quality indices, improve processes and reduce supply disruption. The aim is to verify supplier's behaviors, and align goals of buyers and suppliers, thus reducing uncertainty (Zsidisin, Ellram, Carter & Cavinato, 2004). External uncertainty is when environment is unpredictable that does not allow specification ex ante into contract. Adaptation issue arises that require mechanism for flexibility when the event unfolds. Internal uncertainty poses evaluation problem whether contract compliance has been met. The result is the crafting of unilateral trading relationship that integrates all functions to provide a framework for safeguarding, adaptation and evaluation capabilities. Bilateral trading relationship is also being proposed to minimize potential governance problems (Ring & van De Ven, 1992; Heide, 1994).

### 2.3.2 *Social Exchange Theory*

From the behavioral aspect, Social Exchange Theory by Emerson and Cook (1978, as cited in Social Exchange Theory, n.d.) recognizes that the exchange of material and social resources are fundamental forms of human interaction. Social exchange theory could explain the extent of inter-dependence between buyer and supplier. However it lacks antecedent conditions. Thus resource dependent theory fills up this gap. Resource dependence theory views inter-firm governance as a strategic response towards uncertainty and dependence. No organization is completely self sufficient and during decision making there is always an element of uncertainty. All these have to be mitigated through inter-firm relationship through formal or informal links with other firms. Even though resource dependence theory is clear on the variables of uncertainty and dependence, it lacks specific mechanism to govern the relationship (Heide, 1994).

### *2.3.3 Relational Contracting Theory*

The third theory is a combination of the above two; relational contracting theory compares discrete versus relational exchange. Discrete exchange assumes individual transaction independent of past and future relations and constitutes just the transfer of goods between contracting parties. Relational exchange, on the other hand, accounts for the historical and social context in which transaction takes place. Enforcement of obligation is of mutual interest for the contracting parties. Deviance is dealt with in a proactive manner. This theory captures the spirit of bilateral governance. This theory recognizes the need for adapting relationship in changing environments (Heide, 1994).

Heide (1994) recognized the need of all two typology of market governance, unilateral and bilateral governances. He did one step further to propose models of implementation of these three forms of governance. It is a three step model covering initiation, maintenance and termination. The content of the model describes the practices commonly seen in operation of supplier management. It is summarized in Table 2.1.

### *2.4 Concept of Supplier Management*

Before discussing supplier management, one needs to understand supply chain management (SCM). SCM and supplier management has been used interchangeably. SCM encompass all aspect of delivering products to customers, while supplier management emphasizes the inter-organizational relations known as buyer-supplier relationships (Paulraj & Chen, 2005). Operational wise, supplier management can be viewed at from three angles: management of the supplier which includes supplier selection and supplier base reduction; supplier development i.e. long term development of supplier capabilities and finally supplier integration (Wagner, 2003).

Table 2.1  
*Model proposed by Heidi (1994) for implementing supplier management*

Governance Dimension	Market Governance	Non market Governance	
		Unilateral/ Hierarchical	Bilateral
1.Relationship Initiation	No particular initiation process	Selective entry; skill training	Selective entry; value training
2.Relationship Maintenance			
2.1 Role specification	Individual roles applied to individual transactions	Individual roles applied to entire relationship	Overlapping roles; joint activities and team responsibilities
2.2 Nature of Planning	Nonexistence; or limited to individual transactions	Proactive/unilateral; binding contingency plans	Proactive/joint; plans subject to change
2.3 Nature of Adjustments	Nonexistent; or giving rise to exit or immediate compensation	Ex ante/explicit mechanism for change	Bilateral/predominantly negotiated changes through mutual adjustment
2.4 Monitoring Procedures	External/ reactive; measurement of output	External/reactive; measurement of output and behavior	Internal/proactive; based on self-control
2.5 Incentive System	Short-term; tied to output	Sort and long term; tied to output and behavior	Long-term; tied to display of system relevant attitudes
2.6 Means of Enforcement	External to the relationship; legal system/ competition/ offsetting investment	Internal to the relationship; legitimate authority	Internal to the relationship; mutuality of interest
3.Relationship Termination	Completion of discrete transaction	Fixed relationship length, or explicit mechanisms for termination	Open-ended relationship

There are two objectives for supplier management. First is to reduce cost, improve quality, delivery and expedite time to market. The second is to teach suppliers a systematic process that they can use for continuous improvement. Buying organization expects suppliers to be self sufficient in continuing improvement effort (Hartley & Choi, 1996). Buying organization has four alternatives when suppliers are not performing. (1) Invest resources to improve supplier performance; (2) take back the product to build it in house; (3) select an alternative supplier and (4) a combination of all above. Alternative (1) supplier development, is a more rational option when buying firm has vested interest in the supplier.

Through iterative research, several models have been proposed for supplier association. Each adds on to the previous one to produce a model which is contingent to certain organizational needs. They are as follows (Hines & Rich, 1998):

The structural model is where buying organization creates a network of higher performance suppliers. Suppliers are benchmarked against the best in their class. Supplier is coached to achieve action plans. The second model is the efficiency model. The essence is the same as the structural model. However, buying organization is included in the benchmarking too because in a lot of time, buying organization is no better than the suppliers. The third model is the network sourcing model. This is a tier based supply chain management very popular in Japan. The model is geared towards cost reduction, quality, delivery and new product processes. The fourth type is the value stream model. It covers both internal and external supply chain. Buying organizations set performance measures for the teams managing those suppliers. The team then decides the best measure and work closely with supplier to achieve both the internal and external goals. An enhancement to the previous model is the extended value stream model. This is a multi-tiered structure involving suppliers and their vendors. It includes raising awareness, education and training, and improvement. The structure is complex and requires a dedicated supplier management team. The sixth model is the network development model. This consists of buying organization identifying a few suppliers that the organization likes to see more consistent performance and apply high involvement practices on the suppliers. The last model is the extended network development model. This is the same as network development model but extended to include a group of buying organizations that have common supply need for a product or service. The suppliers are benchmarked and the buying organizations collectively facilitate the suppliers achieving the resulting action plan.

Supplier development is one component within supplier management. Supplier development programs are more common in large organizations which see the need to have one. When looking at the supplier development programs of various multinationals, they are commonly adapted from established quality management system. The approach is generic, prescriptive and strictly from buyers' perspective rather than suppliers' perspective.

The various models available to establish supplier management coincides with the sophistication developed in supplier management over time. They also explain an organization has different needs of supplier association at various development phases. Nowadays supplier management tends to be broad scoped with varying emphasis and do not conform to a definite format.

In 1996, sensing the difficulty faced by the industry in managing the supply chain for results, Supply Chain Council (SCC) endorsed a model called Supply-Chain Operations Reference-Model (SCOR) as a broad scope integrated model governing the entire supply for competitive advantage. Supplier management is definitely an important link in the chain. Figure 1 shows the SCOR model which consists of five phase: plan, source, make, deliver and return. Supplier management is tied to buying organization and supplier as well as supplier's supplier. This model is process decomposition based, across horizontally and vertically along the supply chain. Each process is composed of process elements which allow for reconfiguration. The activities closely follows the resource based view, internalization-externalization framework and dependent theory. According to the resource based view, organizations possess package of knowledge which they apply to their advantage. Capable organizations internalize core competencies and externalize non core competencies. When organizations outsource their non core competencies, they are

depending on third parties to complete competitive advantages they may gain from their supply chain management. Thus develop suppliers' capability becomes omnisciently critical.



Figure 2.2. SCOR model

While supplier performance is getting more prominent in organizational strategy, there are opinions that cast pessimistic view against depending on suppliers alone to accomplish competitive advantage in supply chain. Monczka, Trent and Callahan (1993) suggested that while organizations developed their suppliers, they also aggressively implemented better sourcing and purchasing strategies. Suppliers were not meeting expectation of buying organizations for future needs and capabilities without intervention from buyers. As such, buying organizations treated supplier development as a black hole. Only large firms were involved in supplier development. The focus on supplier development was likely to be short term performance targeted rather than capability targeted (Watts & Hahn, 1993).

While above rhetoric is one aspect of supplier management, Hartley and Choi (1996) opined that buying organizations have inborn advantage in pushing through improvement activities among their suppliers. Suppliers would find means to accommodate changes required by customers. Customers' demand legitimized the

need to change and generally overcome the suppliers' organizational inertia that tends to resist change.

## 2.5 Supplier Performance Measurement

### 2.5.1 Objectives

Once organizations implement suppliers' development plans, they expect results. Supplier performance becomes critical review information. Buying organization expects quality product delivered at the required time at reasonably prices. Buying organization also expects suppliers to react according to the flexibility demanded by the market and diligently participate in new product development. A bonus point will be when a supplier actually adds value to normal supply chain expectation. Example of this value added activities are contributing to better product or process knowledge, providing testing facilities, absorbing risk of logistics and distribution process.

### 2.5.2 Ineffective Measurement

It is a common error that supplier performance is ineffectively measured causing obstacle to supplier management. For example, calculation of profit and loss of a business unit is determined by accounting procedure. Buyer's performance is measured from the ability to prevent stock out in the buying firm rather than inventory reduction at supplier. Range of potential supplier management issues to be measured is larger than profit and loss statement (Dunn & Young, 2004).

Shin, Collier and Wilson (2000) argued that measuring supplier alone was insufficient. The same argument is supported by Supply Chain Council (n.d.); Gunasekaran, Patel and Tirtiglo (2001) as well as Lambert and Pohlen (2001). The research of Shin, Collier and Wilson (2000) went further by including a framework

that measured both supplier's performance and buyer's performance. Supplier's performance was measured using indices proposed in the above mentioned paragraphs. Buyer's performance was measured by product quality, delivery, flexibility and cost. These three teams of researchers proposed an integrated supply chain. They concurred that establishing metrics for supplier was difficult because supplier was part of an integrated supply chain with overlapping functions with buyer and its own supplier. There is a lack of a widely accepted definition for supply chain management too. Nevertheless they agreed that the metrics should be process based covering the entire supply chain rather than functional based as the traditional way. The important point is to align performance along the objectives of all members in the supply chain and convince each member to work collaboratively to generate mutual gains and savings. This means the measurement should encompass cost accounting and strings of other functional indices such as customer satisfaction, productivity, quality, assets utilization, timeliness etc.

### *2.5.3 Common Measuring Indices*

Most researches in supply chain management and supplier management used indices such as quality, delivery, cost, lead time, supplier rating and flexibility as measurement indices (Forker, 1997; Kanji & Wong, 1999; Khaw, 1999; Krause, Scannell & Calantone, 2000; Mohd. Ikram, 2002; Shin, Collier & Wilson, 2000). Some used economic terms such as revenue and market success (Ramdas & Spekman, 2000; Talluri, Vickery, & Droge, 2003; Tan, Kannan, & Handfield, 1998). Others looked at the soft side such as satisfaction, relationship index, propensity to leave etc. (Gassenheimer, Houston & Manolis, 2004; Krause & Ellram, 1997).

Walter, Muller, Helfert and Ritter (2003) used a unique concept of functional fulfillment as measure of relationship quality. They said that supplier's fulfillment of

direct and indirect relationship functions for the customer improved customer's perception on relationship quality. Latest stream of researches saw new product development as the management scope and measuring indices such as supplier involvement started to appear (Laseter & Ramdas, 2002; Loo, 2002; McGinnis & Vallopra, 2001). SCOR model level 1 sets the fundamental of measurement. It measures customer interface and internal interface. The indices used are reliability, responsiveness, flexibility, cost and assets. The full performance metrics is shown in Figure 2.3.

Performance Attribute	Customer-Facing			Internal-Facing	
	Reliability	Responsiveness	Flexibility	Cost	Assets
Delivery performance	✓				
Fill rate	✓				
Perfect order fulfillment	✓				
Order fulfillment lead time		✓			
Supply-chain response time			✓		
Production flexibility			✓		
Supply chain management cost				✓	
Cost of goods sold				✓	
Value-added productivity				✓	
Warranty cost or return s processing cost				✓	
Cash-to-cash cycle time					✓
Inventory days of supply					✓
Asset turns					✓

*Figure 2.3.* Full performance metrics of SCOR model process level 1 (Supply Chain Council, n.d.)

## 2.6 Empirical Models

There are several models presented on the research of buyer-supplier relationships. Dimensions discussed in these models have positive correlation between the dimensions and compliment each other in buyer-supplier relationship.