



Supplier's Price Evaluation in the Purchasing process.

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Abstract

The purchasing process has been increasingly modernized over time, and the management of supplier quotes became more complex. This requires businesses to invest effectively in Supplier's Price Evaluation (SPE for short). SPE is a familiar concept in practical purchasing, but references to it are scarce due to its academic unpopularity. SPE was discovered as a pioneer activity in the TCO analysis. It provides a visual view of the purchase price and conducts an assessment by breaking down the price structure and comparing the price components in the relevant market. Thereby, there is a basis for negotiating better prices and increasing savings for the company. SPE research did not delve into the cost issue, it is just a premise for a perfect cost analysis after gaining a good view of the purchase price.

The objective of the study determined the SPE approaches of Vietnamese firms, SPE's obstacles, and the applicable solutions for improvement. Although the knowledge base on SPE had many limitations, the empirical results provided a specific conclusion for the study. A qualitative method was applied to clarify the research object through interviews with Vietnamese companies. Firm representatives from diverse industries reinforced the theory of the three most common SPE methods: purchasing positioning, supplier benchmarking, and market research. Solutions were also proposed such as the SAP Ariba system, Coupa, eAuctions, and Excel programs that combine VBA and SQL for a more efficient SPE implementation.

Every company has its own approaches and solutions for SPE to fit the long-term budget. ERP solutions like SAP Ariba and Coupa are usually used by large enterprises because it facilitates operating and managing all business functions. Meanwhile, small companies often outsource simpler software built on Excel and VBA platforms.

Keywords/tags (subjects)

SPE, Supplier price evaluation, price comparison, quotation management, supply market research, positioning purchasing power, internet-based tools, SAP Ariba

Miscellaneous (Confidential information)

N/A

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Abbreviation

SPE	Supplier Price Evaluation
TCO	Total Cost of Ownership
SCM	Supply Chain Management
SRM	Supplier Relationship Management
PR	Purchase Request
PO	Purchase order
RFQ	Request for Quotation
RONA	Return on Net Assets
ROI	Return on Investment
COGS	Cost of Goods Sold
OEM	Original Equipment Manufacturer
ERP	Enterprise Resource Planning

1. Introduction

1.1 Preface

Purchasing today plays an important role in all manners of business models, especially for manufacturing companies and Supply Chain operators from local to global levels. It takes up a significant proportion of the company's annual payments, potentially up to 50% of the total spending on products and services from suppliers. This pressures on the buying team into responsibility for financial health protection via appropriate strategies, by lowering costs and increasing profits while still ensuring adequate supplies of high-quality raw materials (Indeed Editorial Team, 2021). However, the position of the buyers has changed due to Covid-19's disruptions. Purchasing leaders must adopt a crisis-management regime to protect their companies and suppliers. At this point, purchasing becomes a key factor in restoring and supporting the company to re-establish its "Next normal". Purchasing risk and cost management should be a top concern to adapt to new economic realities and coordinate ventures to reduce the supply chain's complexity while increasing supplier obviousness (Kutzner & Rajal, 2020).

According to a McKinsey & Company report, spend analytics is one of the most highly regarded solutions during a business's financial recovery. More than half of the votes support the excellent bottom-line of spend that has a great influence on the purchasing results. One thing to be aware of is that supplier's price evaluation is one of the vanguard activities to optimize spending strategy. A reasonable price dealt with a qualified supplier can increase the percentage savings for a business' annual outcome. Specifically, most respondents claimed that the use of price determination has great potential to support buying activities to capture value creation opportunities and identify factors impacting the commodities' price, such as a diverse market and catalog system. From another perspective, evaluating quotes is a prerequisite for effective TCO analysis, leading buyers to have an overview of its reasonableness in the supply market before switching to a more complicated step

as cost-breakdown. Summarily, the supplier's price evaluation is about pinpointing the rationality of the purchased price and increasing the firm's possibility of savings.

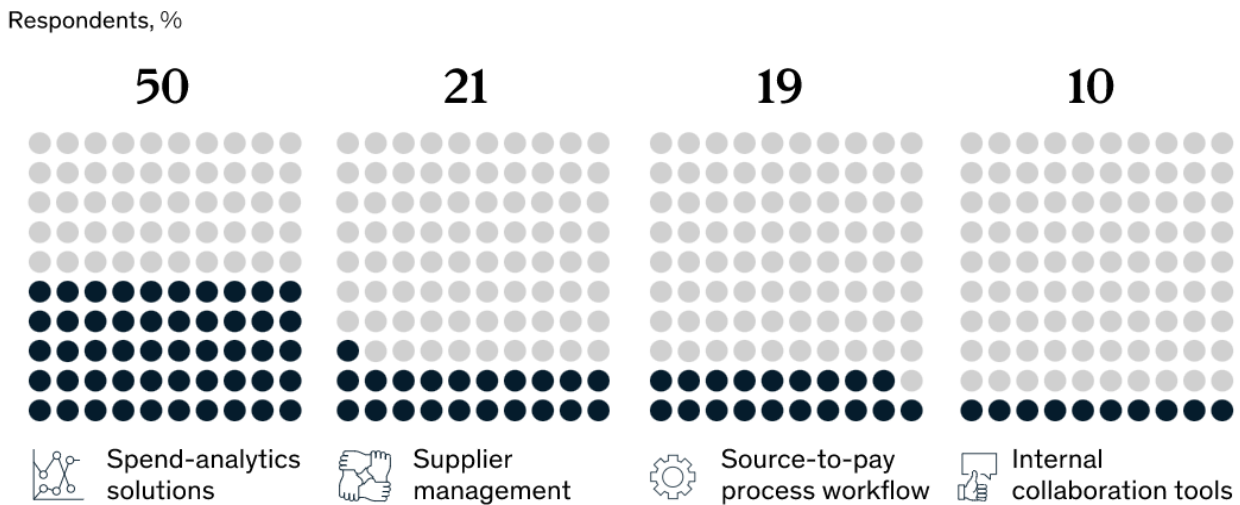


Figure 1: The latest survey of procurement functions (McKinsey&Company, 2020)

Price appraisal is one of the crucial phases in purchasing; it is when the buyer needs to take on the responsibility to review and analyze the price offer from suppliers (quotations) and then evaluate whether it is fair and reasonable. This process should be based on the Win-Win principle, bringing benefits to both parties to achieve the savings target and get well-managed vendor relationships. The conclusion base is determined by data that the purchasing team can collect and examine, typically a pre-qualification form asking the supplier to fill in the required information and an overall assessment from buyers afterward. Being knowledgeable and right action on this strategy lead to optimally reduced expenditure and profitability improvement in over-time company's financial results.

1.2 Objectives

Supplier price evaluation (SPE for short) has been popular along with the development of the purchasing industry. There is no denying that this meticulous work accounts for great pressures on cost-effectiveness, even contributing to the revival of the negatively impacted organization by global corruption through profit growth. However, applying this process to different business models faces a common barrier. Many companies have unconsciously tried to apply various strategies to cut purchasing costs, and most of them are the ones who do not appreciate the items' price importance to

their revenue. That unprofessional attitude results in a firm's internal struggle in economic inflation - Prices on the Rise to pursue substantial savings.

According to many purchasing experts' perspectives, most of the SPE processes remain decentralized and fragmented. Analytical steps and criteria for a price evaluation are normally based on the purchasing personnel and selective formulas. Materials/services are purchased at which reasonable price depending on the decision of the superior levels, without any standards. This leads to a waste of time and useless investment in such a potential strategy, and the efforts on cost reduction are not as desired. Concerning this matter, the author determined on SPE strategies in the purchasing process as an investigated subject, particularly how SPE can be implemented in different types of companies. There has not been much research concerning pricing obstacles, or methods to destructure price components and to compare supplier prices for spending optimization. The lack of relevant documents to further exploit the price appraisal is the author's motivation to conduct this research.

This work strives to gain an understanding of how enterprises evaluate purchase prices, examine the barriers, and suggest solutions for a better SPE process. The questions below were asked to solidify the issue's validity and proclaim the research's credibility.

- **What methods do companies use to evaluate supplier's price?**

SPE background as definition, benefits, and challenges are described for easier usage. Subsequently, businesses determine what methods they use to deal with supplier's quotes.

- **What difficulties and challenges while evaluating supplier's quotes?**

In order to uncover the obstacles and challenges the company has experienced in implementing the SPE process, different firms with diverse industries will be interviewed in depth. The obtained answers depend on the operational environment as well as the working culture of each company, which can lead to internal or external conflicts.

- **What are typical firm's solutions for better SPE implementation?**

Each company has its preferred IT- solutions to practice SPE fitting the budget. The final question aimed to explore the company's wishes or suggestions to evaluate purchase price in a more optimal way. The solution is not universal for every organization in any industry and the answers can be limited due to the small size of the subjects investigated. However, the results of this study can be used as a reference for further research in terms of purchasing financial issues.

1.3 Research methods & Approach

Research is an attempt of an exploratory process to verify knowledge or develop additional aspects of an existing problem through some proven methods. Whether the results of the study are true or false, it is also considered a reference for future ones. To better understand the definition and functions of research terms, P.M. Cook (as cited in Singh, 2006) gave a clear interpretation:

Research is honest, exhaustive, and intelligent searching for facts and their meanings or implications concerning a given problem. The product or findings of a given piece of research should be an authentic, verifiable contribution to knowledge in the field studied. (p. 3.)

Besides, Singh (2006) also emphasized that the importance of a research paper is truthfulness and comprehensiveness, which must be done on an understanding and problem-centered basis.

The research paper typically uses one or more research methods that work together systematically to ensure relevant and reliable results which address the purposes and goals of the study. Choosing the proper methods requires the researcher to be familiar with the research objectives, epistemological concerns, and performance patterns of prior research in the given field. Qualitative, quantitative, and mixed methods are different approaches for research implementation, which are distinguished by their emphasis on words, numbers, or both (Jansen & Warren, 2020).

Quantitative research systematically studies an object through statistics, mathematics, and numerical data processing. The process of data estimation provides the basis for the foundational link between empirical observations and the mathematical expression of quantitative relationships. A

quantitative scheme helps researchers easily compare data, simplify when dealing with a large amount of data, and obtain results with high accuracy without being influenced by emotions or personal perspectives in representing the studied subject (Basias & Pollalis, 2018). In quantitative research, data is usually chosen and dissected numerically.

In contrast, qualitative research is an all-encompassing term covering research methodologies that deal with phenomena through the analysis of experiences, behaviors, and relationships without using stats and math as well as numerical data processing (Basias & Pollalis, 2018). Specifically, if a given phenomenon has yet to be clarified by theories or supported models, it is of utmost importance to establish research in a qualitative fashion. This kind of method helps the researcher gain a firm handle on the nature and complexion of any research problem through consolidated results, then the conclusion can be drawn objectively in the study with limited space and time. However, the quality of the recording, understanding, and analyzing of any given phenomenon is significantly lowered when the writings are quantified (Kaplan & Maxwell, 2005).

In some investigations with higher complexity, a mixed method that combines qualitative and quantitative research is believed to increase the reliability of the study. If quantitative research can define "What" then qualitative research can answer the "Why". In this hybrid method, the database can include numerical data linked together by mathematical formulas and a survey of the human experience on the research subject.

To objectively consider the firm's determination of price, the author chose qualitative methodology for this thesis. As the study is purposed to find out preferred methods and the barriers of analyzing supplier's quotes, then toward directions for further improvements, the qualitative method has advantages over the quantitative method due to its flexibility in depicting the phenomenon. Specifically, it is flexible in its approach to developing detailed research and unlimited participants. Otherwise, quantitative research seeks to systematically investigate phenomena through numerical data and mathematical analysis. In addition, given the benefits of each method presented above, the strategy of the qualitative method tends to investigate the depths of research via interviews/surveys whereas the quantitative method aims to put hypotheses related to the phenomenon to the test using questionnaires and high-level statistical tools. This becomes trouble because it concerns organizations' willingness to share metrics or confidential data. This presents a significant challenge in the data collection phase as most organizations must adhere to a disclosure policy for strategic

data. Therefore, the numerical data for the quantitative method cannot be quantified in a specific and highly accurate manner and is limited to measurement through small-size databases.

1.4 Limitation of thesis

Any given research work has certain limitations and scopes. With such a sensitive topic that has inadequate documents, the author planned to narrow the subject scope in order to access different models of companies, which leads to diverse results analysis. The goal of this study is mainly to map out how SPE can be implemented in various industries. Therefore, a theoretical theme of a complete purchasing will be taken as a base to have an overview of SPE activities. The definition, pros and cons of evaluating and comparing purchased prices will be exploited to drive further improvements for any field's purchasing work. The topic is researched within the the purchasing process scope followed in Vietnam businesses. The actual SPE barriers are also generalized thanks to the diversity in obtained results. It is essential to identify the limits of this research, which are shown as below:

- **Suitability and level of usage needs**

Every firm will choose a different kind of purchase to serve its business. The decision of adopting SPE is based on the suitability of the purchasing platform selected by the company. In addition, the degree of the need for thrift and sophistication of spending analysis will result in how the pricing system is established.

- **Required cooperation from many departments**

When a supplier offers a quote, a cost analysis report requires data exchange and censorship from many different departments. The internal circulation of information in the company is not always smooth and easy during procedures. Moreover, the collected documents are not only limited to the company's range; benchmarking reports between the preferred suppliers are also essential for analysis. Finding information from various sources and collecting and examining figures are a series of works that requires detailed research and smart choices so that the results can be obtained almost exactly and give the possibility of great savings.

- **Non-standardization of the purchasing process**

As discussed above, SPE process in purchasing has never had any accuracy standards. This study is not intended to show the correct use of pricing methods or provide any typical solutions, but the results obtained are based on the analysis of the different purchasing experts' answers from various industries. Thereon, draw an objective general conclusion for the research.

2. Supplier Price Evaluation

Supplier price evaluation (called SPE for short) is one of the essential activities to select the right supplier in a complete purchasing process. In this chapter, the concept of SPE is explained. To clarify the role and influence of SPE on subsequent actions in buying procedures, the author will conduct research on its benefits, barriers, and strategies that support effective SPE, typically supply market research.

2.1 The concept of SPE

Supplier price evaluation process (SPE) is a sub-activity of the purchasing TCO analysis. Therefore, to get a comprehension of this practice, a concept of TCO manner is briefly described. TCO stands for Total Cost of Ownership, a familiar term in purchasing as well as the supply chain with the purpose is to analyze the actual costs of doing business beyond the purchase price offered by the supplier (Ellram L. , 1994). Here, the total cost of ownership is referred to in a literal sense, including all costs associated with purchasing a certain number of goods/services from a particular supplier (Ellram, 1995), for example, quality & inspection costs, shipping costs, handling costs, and other costs of warranty, etc. (Degraeve & Roodhooft, 1999). References to TCO and related concepts have been widespread for some time, but its empirical limitations still exist. In essence, the total cost of ownership analysis is extremely complicated work that compels continuous communication between the buyer and the end-user to weigh which type of cost is the most important for purchase requirements. In traditional approach, TCO was a primary tool to analyze 'purchase price' only and evaluate supplier performance through qualitative methods using categorical or weighted point/matrix approaches (Gašo et al., 2019). As a result, buyers lose many saving opportunities because they ignored the internal costs that are considered important. Therefore, today's TCO analysis

has been further refined for a more effective purchasing result. The purchase price is the starting point of the analysis process, and the buyer then considers the costs associated with life cycle and usage to suit the business model (S. Bhutta & Huq, 2002). In brief, TCO analysis is applicable to every type of purchase, from analyzing purchase prices to making decisions to choose a particular supplier.

Evidently, the total costs of ownership can be broken down into various costs beyond solely the purchase price, including costs of the ongoing use and maintenance of goods, services, and equipment as soon as applicable (Figure 2). These are considered *standard costs*, which are pre-determined once manufacturing of products is underway, with the goal of cost reductions (Sollish & Semanik, 2012).

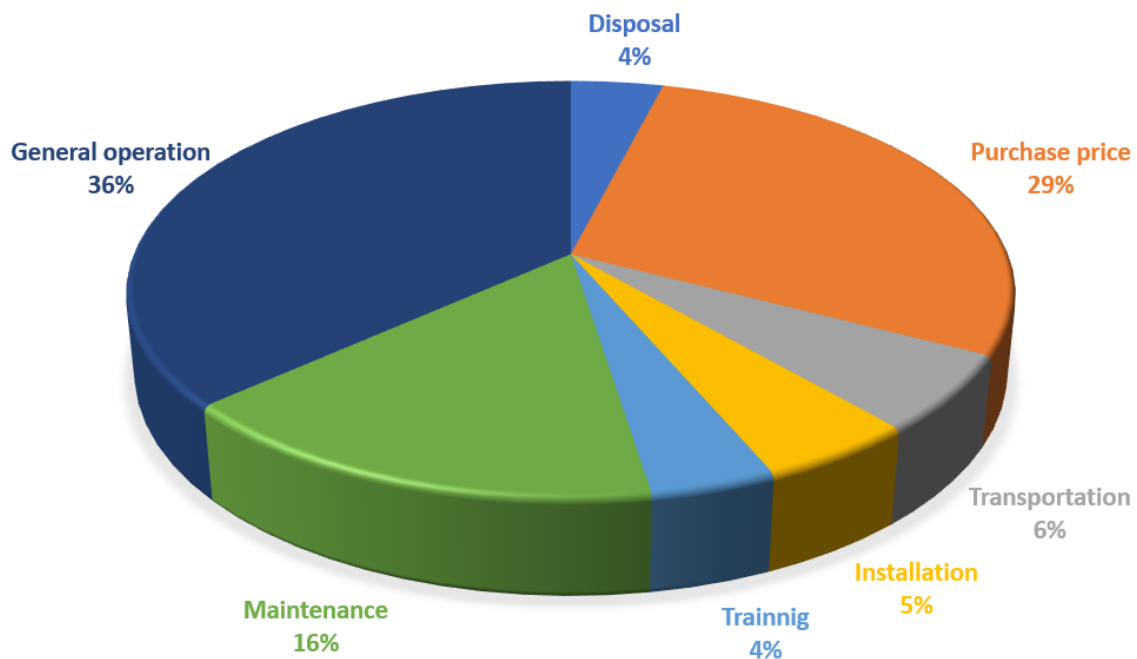


Figure 2: Example of TCO analysis, adapted from (Sollish & Semanik, 2012)

The application of TCO analysis in considering the cost components requires purchasers to attempt to get an in-depth view of the supplier before any purchase decisions are made. According to related studies, there are about 53 cost drivers that were filtered out for supplier evaluation. It requires the purchasing personnel to stay proactive in grouping suppliers into different kinds of drivers, based on cost proportions discussed previously by the buyer and internal customers, the business can justify allocation decisions (Ellram & Siferd, 1998). From those cost drivers, Roodhooft (2003)

proposed to divide groups of drivers into three main cost hierarchy levels, including Supplier, Order, and Unit level (as Table 1). This integration allows the purchasers to clarify which cost levels and associated drivers are important for a comprehensive assessment of supplier performance on cost factors.

Hierarchical levels	Cost drivers
Supplier level	<ul style="list-style-type: none"> • Tooling cost • Labor cost • Production cost • Inspection cost • Local market condition
Order level	<ul style="list-style-type: none"> • Freight cost • Administration cost • Lead time • On-time delivery • Safety stock • Small quantity order • Exchange rate effect
Unit level	<ul style="list-style-type: none"> • Unit cost • Useful life • Disposal • Field failures • Returns • Replacement parts

Table 1: : Example of three hierarchical purchasing levels with sorting cost drivers (Roodhooft et al., 2003)

The demonstration above has shaped a part of the role and activities of a supplier's price evaluation process. As shown in Figure 2, it is unsurprising that purchase prices take up to a third of total standard costs to produce a product (29%). When receiving a quote, an initial action of the supplier evaluation and selection is price assessment, which means analyzing the price components that make up the selling price and comparing it with the relevant market at both local and global levels. The price components here can be fixed costs, variables, or other costs and they will be clarified by

effective interaction between buyer-supplier sides. As explained by Newman (1992), an author of the book on Supplier Price Analysis, there is no foundation for buyers to judge whether the supplier's price is correct, and it will be very frustrating if the purchased price is overpriced against its current quality or at least deviates too much from the general market. Therefore, the buyer has the right to be knowledgeable about how the selling price is structured. This is accomplished with the supplier's price evaluation (SPE).

The quantity purchased is usually too small to affect the seller. The best we can do is shop around for the best prices possible. The industrial buyer may have the leverage to negotiate price, but whose price? If the price negotiation is based on the seller's offer without analysis, then it is an exercise in groping in the dark. The buyer must have some idea of the seller's price structure. (Newman, 1992, p. 14.)

It should be noted that SPE is not a foolproof method as it is based solely on assumptions (Newman, 1992, p. 14). It requires the supplier's willingness to share price data or at least information on cost constituents in creating purchased products. This leads to difficulties for the purchasing department to gather enough data to assess the purchase price's reasonableness. However, SPE is also considered an improvement in purchasing in terms of supplier evaluation. An intuitive and correct view from the beginning will reduce the level of frustration and the possibility of deception from the suppliers.

2.2 Benefits of the SPE

Supplier's price evaluation (SPE) is one of the cost hierarchical levels in a comprehensive TCO analysis. Therefore, it is widely believed that the application of these methods to deal with the purchase price will bring many potential benefits. According to Ellram (1994), the most frequently presented advantages of SPE, based on the TCO analysis concept, are divided into 5 main highlights as follows:

Supplier performance measurement

The supplier's price evaluation approaches in purchasing help find the required cost framework of purchased items. Price data is standardized in dollars or euros to evaluate easily and accurately. Proper determination on cost drivers allows the purchasing company to track tightly the supplier's

performance through their price structures aggregated by dashboards or mini dialogues. Definitely, the intuitiveness of this approach also helps buyer have a comprehension of their suppliers and easily spot cost-related problems or irrational pricing components, which reflects the potential for increased negotiation power with data collected from SPE (Ellram L. , 1995).

Purchasing decision making

SPE practice brings greater objectivity in making purchasing decisions. It gathers information from different sources and the buyer gets access to pricing data as well as structural elements. Thereon, a summary of the evaluation and comparison with the actual price in the market is established as a core for later negotiation. Based on SPE data, buyers can justify higher prices with better quality for a specified time period. This contributes to the efficiency of savings in the purchasing process and increases the company's RONA results. For example, a study has shown that actual savings in purchases range from 2-25% for household components as well as merchandise categories (Petersen, Prayer, & Scannell, 2000). In addition, SPE helps buyers draw up alternative solutions to a given price benchmark and weigh the return-on-investment scenarios (Monczka et al. 2009); consequently, the effectiveness of purchasing decisions is improved by a thorough quote assessment not only of the purchase price but also the factors behind it. This shapes the problem-solving mindset of the purchasing personnel in dealing with price issues more carefully and systemically.

Internal and external communications

The data collected for SPE requires comprehensive interdisciplinary communication. This means that buyers are entitled to participate in other departments and functions from an embryonic stage to get more specific price information. For example, for a manufacturing company with a standard purchasing system, the link between departments such as production, warehouse, finance, and human resources is necessary to be able to understand the related costs, thereby determining the cost factors to assess its reasonableness. The good coordination of all departments will facilitate the purchaser to early propose solutions for alternative suppliers once cost problems arise, as well as to achieve the goal of savings on available purchased items optimally (Degraeve & Roodhooft, 2000). In addition, SPE increases the interaction between purchasers and suppliers, both parties are about exchanging information with the goal of a good price to buy - and profits to sell. This involves

the ability to manage relationships with the company's suppliers (SRM) and provides an opportunity to define clear objectives for both supplier-acquiring companies to develop (Ellram L. , 1993)

Insight/Understanding

By taking the SPE approach, the purchaser can get an overall picture of the cumulative costs that are included in the order. While not as comprehensive an assessment and calculation as the TCO analysis, at least the possible price components can be mapped out using SPE, which can enhance the company's awareness of its purchases and cost structure. This insight helps the buyer to recognize and eliminate the non-price factors in the negotiation to achieve a fair price and long-term cooperation. In addition, supplier price evaluation facilitates tracking supplier performance over time thanks to its excellent data exchange and provision capabilities, from which buyers uncover trends and access invaluable information to weigh supplier performance. (Dalrymple & Kelly, 2003).

Continuous improvement

Determination on supplier price supports continuous improvement for the company by defining and prioritizing supplier performance issues. That is, when the buyer receives beneficial data to evaluate SPE, it is easy to figure out the internal/external problems of the business and even the supply chain. Appropriate solutions are then suggested and the opportunity for cost savings is further increased. Moreover, the causes leading to the price increase can be discovered like inflation or stemming from internal requirements such as changes in production processes, technological improvements, changes in labor laws, and advertising., etc, from which there is proper adjustment and negotiation for a collective agreement. SPE also helps to broaden the buyer's perspective in purchasing and to develop more professionalism in their expertise (S. Bhutta & Huq, 2002). However, the SPE methods are just applicable to important types of purchases with large quantity, so a business should have certain regulations and standards for which purchase categories need to determine SPE to avoid wasting time and human resources.

2.3 Barriers to the SPE

Theoretical themes of SPE are described in a simplified manner based closely on the TCO concept, but its practice still has many limitations. Ellram (1993a) stated that the complexity of data collection is a major barrier to the price approach gaining popularity. Not having all available accounting

data and cost structures is a challenge for certain businesses because the process of information-gathering, in order to evaluate and compare supplier prices, is very time- and resource-intensive. In general, adverse factors to SPE could be aggregated into three main reasons: culture, education and training, and resource allocation (Ellram L. , 1994).

Cultural/Environmental working issues

Approaching a new method always has certain internal cultural barriers. It takes time for purchasing reps to be able to transform their old mindset into a more flexible and insightful form in dealing with 'price' to become purchasing experts. According to another study by Ellram (1998), some resistance occurred when changing the price approach in supplier evaluation, which refers to SPE reducing the amount of unnecessary work, i.e., some activities by buyers and colleagues can be eliminated. In addition, changing the bid approach could change the psychology of buying organizations, governments, and ultimate customers (Ellram & Siferd, 1998). Therefore, culture can be considered a challenge in SPE operations.

Education and Training issues

As mentioned in the introduction and section of SPE concept, supplier price evaluation/comparison is aggregated based on assumption. The standards for evaluating a quote depend on the logic of high-level purchasing. Since there is no standardized approach for SPE, organizations ought to set aside resources to get acquainted to the implementation these methods (S. Bhutta & Huq, 2002). The data required to practice SPE can be manually collected for the small purchasing organization. For businesses with a more professional purchasing model, software or IT solutions can support this activity. The cultivation of working with complex data and technology practices also needs intensive training to reduce costs and labor in the long run.

Data sources

Collecting the necessary data for price comparisons requires effective communication between interdisciplinary departments. Purchasing seniors can get data from the accounting department as well as request cooperation from the sales team to capture important supplier information, for instance, financial statements, depreciation of production materials, etc. Besides, price data can be

searched on e-commerce platforms related to the company's industry. This helps buyers have a solid basis and stance to judge whether the supplier's price is reasonable or not based on a comparison with market fluctuations and transaction history with suppliers. However, prices are subject to sensitive data and not all companies are willing to make their price structure public. Additionally, dealing with price issues requires meticulousness and patience, which takes time, and is considered confusing to understand/explain when ready (Ellram L. , 1993).

3. Supply market research supports SPE process

Today, with the explosive growth in the use of the Internet as an effective information retrieval tool, the B2B market has become much more transparent (Van Weele, 2014, p. 115). Indeed, the Internet provides convenient purchasing tools because it contains a wealth of relevant data of products/services and suppliers such as prices, supply sources, and financial reports. Consequently, purchasing power has increased over time and the quality of purchasing decisions has also improved thanks to ability of buying-risk detection. In this study, supply market research determines only the suppliers' side to compare the quote offered by one supplier to market variance and then evaluate its reasonableness. Also, some research tools that can be utilized are indicated.

The supply market research and the market structure has been well-explored conceptually by Van Weele – an author of the book 'Purchasing and Supply chain management' (2014). According to his interpretation, supply market research is defined as a system of seeking, synthesizing, classification, and analysis of data related to factors affecting purchase, such as the market price of strategic commodities. This kind of research is carried out by qualitative, quantitative, or a combination of both methods to satisfy short-term and long-term purchasing requirements. Specifically, qualitative research is gathering views or opinions and development trends of a certain industry, usually based on interviews with experts in the field to be purchased. With a quantitative approach, buyers will search and analyze numerical data on common statistical platforms or publicly available sources, such as the market share of a supplier, supplier's supply and demand charts, and cost-breakdown analysis to see if the price components are fair or not. In addition, another method that also supports the SPE process is the supplier benchmark, which is performed by a pairing of qualitative and quantitative methods.

It's clear that the supplier's market conditions greatly influence the price spread, although the factors affecting the market are difficult to be predictable. The market environment is more often than not dictated by the number of competitors in said industry, the relative (or lesser) similarity of their products as well as the pre-existing barriers-to-entry for newcomers. (Monczka , Handfield, & Guinipero, 2009, p. 391.). In fact, any category of goods has a limit on the number of suppliers and buyers, from exclusive products with only one supplier to popular products with many suppliers and buyers. A matrix is proposed to clearly see the distribution of supply and demand in purchases with some typical industries respectively. Depending on the number of suppliers in the market and their competitors, the buyer's position might be superior, equal, or inferior to the supplier's position (Van Weele, 2014, p. 120). In short, to evaluate the supplier's price compared to the relevant market price, the buyer needs to determine the power of his position against strategic suppliers in accordance with different categories.

Table 2: Market structure (Adopted by Van Weele, 2014, p. 120)

Number of buyers \ Number of suppliers	One	Few	Many
One	Bilateral monopoly, 'Captive market' (Spare parts)	Limited supply-side monopoly (Fuel pumps)	Supply-side monopoly (Gas, water, electricity)
Few	Limited demand-side monopoly (Telephones, exchanges, trains)	Bilateral oligopoly (Chemical semi-manufacturers)	Supply-side oligopoly (Copiers, computers)
Many	Demand-side monopoly (Weapons systems, ammunition)	Demand-side oligopoly suppliers (Components automobile industry)	Polypolistic competition (Office supplies)

	= demand-side stronger than supply-side
	= Demand and supply more or less in balance
	= Supply-side is stronger than demand-side

Subjects of purchasing market research

Obviously, there is a wide range of subjects to conduct market research in the buying segment. Van Weele (2014, p. 121) has summarized the investigation subjects into three main areas as follows:

- **Materials, goods and services:** The target of this work is to uncover saving opportunities per order or the possibility of minimizing supply chain transaction costs. In addition, finding alternative sources of supply also reduces the risk of product shortages or in case of a rush to meet production progress.
- **Suppliers:** Supplier-related research is carried out on a particular supplier to determine their capacity to satisfy the purchasing company's requirements in long run, for example, the supplier's ability to serve customers well when it comes to technology, quality along with logistics while maintaining competitive prices.
- **Systems and approaches:** The purchasing department ought to have a complete and convenient information system so as to be able to access a variety of internet-based resources. This is very important for buyers as it helps in retrieving information in time with market price trends and simplifies the procedures between stakeholders, namely buyers, internal customers and suppliers.

Reasons for supply market research

The demand for systematic supply market research has increased in recent years along with the strong development of the internet. Each individual buyer should have the ability to search and analyze the market in their responsible category. They will search for the best-in-class supplier of

raw materials and products to purchase, and the internet provides up-to-date information platforms in a fast and convenient way for buyers. Some of the reasons that explain the importance of supply market research are discussed below:

- **Adapt to technological innovation:** Any company, manufacturing or trading, always needs to update technology and improve the operational quality unless they want to be eliminated by falling behind with their competitors. One question arises if to develop existing technology or buy a new one. Limited financial resources cause managers to carefully consider which options are appropriate for a certain time. Therefore, it is important for buyers to strengthen the knowledgebase of technology developments in their supply markets through product and supplier research. (Van Weele, 2014, pp. 123-124.)
- **Supply market dynamics:** The product price on the market fluctuates every minute, even in seconds due to the direct influence of the margin of the companies involved. For international markets or major global exchanges, the price level can fluctuate in a couple of months, from very high to very low depending on the economic situation. This requires buyers to have a backup strategy to always meet the required quantity by understanding the price dynamics of goods and the supply-demand level of the market in each economic period.
- **Exchange rate:** For companies that buy internationally, currency changes have a profound influence on purchasing strategies. Inflation causes rapid and unpredictable fluctuation in exchange rates, which requires immediate action from buyers to reallocate their supply resources for material requirements.
- **Offset obligations and changes in tax regime:** For exporting companies, it is necessary to offset their revenue by purchasing local raw materials. Concerning the tax changes, for example, import tax into Vietnam ranges from 5%-10% depending on the type of product coming from a certain country, normally China. This is one of the reasons why buyers need an extensive supply market research to consider which country to export to and supplier from which to achieve a reasonable price (Van Weele, 2014, p. 124)

From the beginning of this section, Internet is emphasized as an excellent tool to assist buyers in conducting supply market research. In fact, many companies have designed their own specialized

IT tools for their purchasing departments to look up purchase data with certain functions. For instance, some companies have websites that contain databases of their potential suppliers, from which buyers can easily survey the market in a short time through transaction profiles assessment of available supplier capacity. Communication between stakeholders, suppliers, buyers and end-users can be performed on familiar chatting platforms in Vietnam such as Zalo, Viber, or Microsoft Teams, in the most convenient and fastest way. In addition to the use of the Internet, SAP software is also a proposal to support supply market research due to its ability in tracking purchase spend of all branches across product categories and suppliers. Besides, previous supplier experiences and vendor ranking are professionally presented by SAP, allowing buyers to determine the supplier with the best performance. Also, SAP simplifies the information-sharing process between the firm's interdisciplinary for better results in market research. (Van Weele, 2014, pp. 128-129.)

4. Purchasing Process

In this part, the theoretical basis underpinning the purchasing process is considered to give an overview of the main stages and the significance of each stage. The purchase model, applied by Van Weele (2014), is about buying activities and their relationships to clarify concepts of purchasing. Thereon, the buyer determines which are the key phases to establish SPE and then sets up a further development path for saving costs on acquired items.

Traditionally, purchasing function in a supply chain encompasses the buying process. The goal can be understood as making the correct purchases of objects or services with the right quality, in necessary quantities, delivering them to the correct destination, and last, but not least, buying at a reasonable price. However, today's business globalization requires the supply chain to quickly adapt to advanced technologies in order to reduce manual/paperwork and optimize process quality, as well as operating time. Therefore, businesses with a long-term vision will attempt to invest in purchasing results, which contributes to improving the company's RONA. The purchase work is modernized using Enterprise Resource Planning (ERP), automation programs (RPA), or some AI-driven technologies. Unquestionably, purchasing process becomes a strategic position as a cost-killer that protects the firm's financial health year after year. The effect of cost savings is illustrated by percentage and backed up with DuPont analysis. More expertise speaking in (Van Weele, 2014), the modern purchasing process is primarily aimed at "managing a company's external resources so that the supply of all goods, services, capabilities and the knowledge which are required for running,

maintaining and managing the company's primary and support activities are secured with the most favorable conditions" (p.9).

The purchasing process is a continuous course of activities and there is a causal relationship between operational phases. When customers raise a purchase request (PR), this process is performed on the system in a sequenced manner. Every stage of that takes time differently, depending on the classification and quantity of required items as well as the coordination of external stakeholders. Van Weele's model as mentioned above can be used to illustrate the basic stages of a purchasing process.

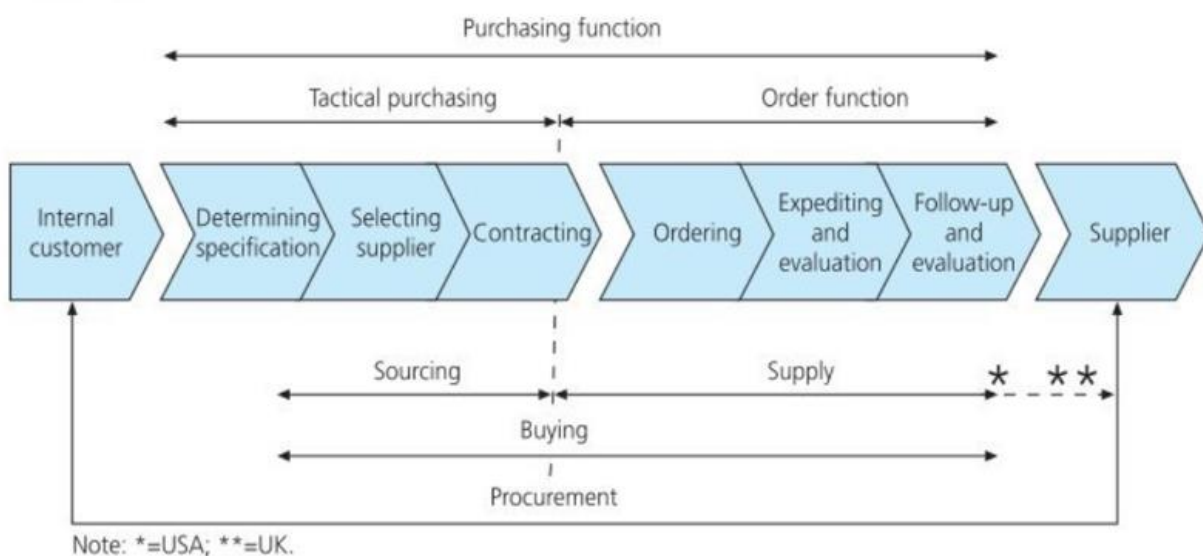


Figure 3: Purchasing process model and related concepts (Van Weele, 2014, pg. 8)

Determining specification

The purchasing process is started once an internal customer submits a purchase request (PR) to the system; then, the buyer goes about analyzing that PR with regards to quantity as well as desired quality. Besides, the category of required goods/services is also determined to transfer to the buyer in charge of the industry. An initial clarification of what to buy is a good premise for follow-up buying tasks as it helps shorten the lead time on subsequent purchases and avoid conflicts with clients. (Van Weele, 2014, p. 32.).

Selecting supplier

The practice of selecting suppliers takes place after the first step. As Van Weele's description (2014), the supplier selection plays a major role in purchasing process, including several activities that precede this decision. Activities begin with abridging the pre-qualification requirements that are based on purchase order specifications. Ranking schemes with scores were created to evaluate the initial list of suppliers (so-called the bidder's long list). Next, to each of these long-listed suppliers, a request for information (RFI) will be sent. These vendors are contacted to provide general information that will help them qualify for the order. (Van Weele, 2014, p. 35.). Based on the backgrounds that were gathered, the most potential suppliers are selected. All the "promising vendors" in the shortened list will receive a Request for Quotations (RFQ), meaning they are invited to submit a detailed bid as laid down in the requirements against the lowest possible price. After receipt of the quotation, the purchasing team will come to a step of commercial evaluation. The supplier's proposal in terms of price needs to be weighed whether it is reasonable. This step is essential because it becomes the premise for the preparation of the negotiation framework. Typically, for a company with a complete set-up purchasing department, buyers prefer focusing on TCO analysis (Total cost of ownership) to gain a holistic view of the estimated total expenditure that the company has to pay over the lifetime of the product. The support is required from the supplier to provide detailed price information for analysis. This depends on at which level of the company's SRM (Supplier Relationship Management), as it is difficult to ask one business for their pricing data public. The ultimate intent of these events is to help buyers easily compare prices among vendors. Obviously, this step ends up when one supplier is selected with whom the delivery of the product/services will be negotiated. Suppliers who fail to bid will be notified of the reason their request was denied.

Contracting

Once the right supplier is selected, it comes to negotiation and signing legal contracts with them. The types of purchase contracts vary depending on the supplier's firm industry, the type of goods, the quantity purchased as well as the duration of cooperation. Typically, the purchasing department will address the following factors while negotiating a contract: prices and terms of delivery, payment terms, penalty clauses & warranty conditions alongside other arrangements. (Van Weele, 2014, pp. 35-38.).

Ordering

After passing the step of negotiation and signing the contract, the buyer will create a PO on the purchasing system (Purchase Order). An established purchase requisition must detail the following information: PO number, product description, unit price, quantity, estimated delivery time and location, and payment terms (15-30 days postpaid is prioritized). All these data should be accurately reflected and sent by the supplier in delivery documents and invoices to ensure those information matches upon receipt. For routine purchases, a call-off agreement can be dealt with between both parties. The contract duration is usually long-term (1 year or even longer), in which a purchase order can be placed against this agreement. In those cases, the steps of contracting and ordering are separately proceeded. There are two basic ways to create a PO: electronically or manually. This process can be closely linked with the MRP system to ensure smooth and timely coordination between the purchasing department and others. When the production and inventory items start getting lower compared to the allowable level, the MRP system will generate a signal to the purchasing department through a purchase request with specific raw materials and quantities. For large-scale businesses, MRP software can be more professional and create POs automatically, whereas purchase requests have to be done manually through the approval of the budget holder before transferring this to the purchasing team. (Van Weele, 2014, pp. 40-41.).

Expediting

This stage aims to accelerate the supplier's work to ensure on-time and quality, which requires their continual attention and effort. Van Weele (2014, p. 41) pointed out three ways to speed up the supplier's progress: exception expediting, routine status check, and field expediting. In the case of 'exception expediting', the buyer's action always takes place after-the-fact since they were informed of the late deliveries from internal customers. Here, the buyer needs to have an immediate solution depending on how the delay affects that customer's operational processes. Hence, a better preventive approach called "Routine status check" can be adopted. Buyers will keep in touch with the supplier's side to confirm the possibility of delayed shipping to prepare for unexpected situations in advance. This action can be used as a risk hedger, but it is not the most effective way. Another method is known as 'field expediting', or 'Advanced status check'. This approach targets key suppliers and essential purchases. It is necessary for the buyer to be more proactive in regularly monitoring the supplier's progress and forcing them to meet the delivery time as agreed on in the contract.

More importantly, the buyer can appoint a person to inspect the supplier's production side. This is definitely high-cost and time-intensive, so it is only applicable to critical or problematic suppliers for the best risk minimization.

Follow-up and evaluation

The final stage plays an important role in learning how to work dependably and maintain long-term relationships with suppliers. That is, the buyer side should have an updated and detailed record of the supplier's changes in quality, delivery documents, competitiveness, and improvement based on the mutual previous work experience. Those kind of information helps the buyer assess the actual capabilities of each supplier and then lead to a repeated adjustment in the bidder's long list. Consequently, businesses can more concentrate on the shortened supplier base, who got excellent vendor rating scores and have proven their best capability. (Van Weele, 2014, p. 42.).

4.1 Important role of the purchasing process

The part which the purchasing process plays has evolved constantly over time. In the traditional view, purchasing was defined as a supportive endeavor of operational activities, with little significance on a firm's performance. During the 1970s purchasing department were established to process buying orders for other departments with the main objective of achieving maximum price reductions (Gadde & Håkansson, 1994). In other words, business leaders in the old days underestimated buying tasks, they valued it as a passive job that does not contribute to the company's operation (Carter & Narasimhan, 1996). Since the 1980s, however, purchasing has been recognized as a strategic activity thanks to the 1973's oil crisis and subsequent supply disruptions that changed the minds of manager levels. Buyer's position was gradually improved and became a professional trained career in supply chain management as Kraljic's words in his publication. Up to this point, the role of purchasing is widely recognized and developed to become a firm's competitive lever through integrated activities, including the decision to buy products, SRM, negotiation & contract management, and customer centric. The rapid growth of the purchasing function significantly improves the company's annual profits.

The importance of purchasing results is best demonstrated through a company's cost analysis. Apparently, Van Weele (2014, p. 12) stated that "In general, the biggest proportion of the cost of

goods sold (COGS) or sales revenues seems to be in purchased materials and services". The graph below shows that purchasing value in most of the company's categories accounts for approximately 50% and more of the COGS presented. For industries that have an important buying component, purchase value may make up 60-80% of the cost of goods sold.

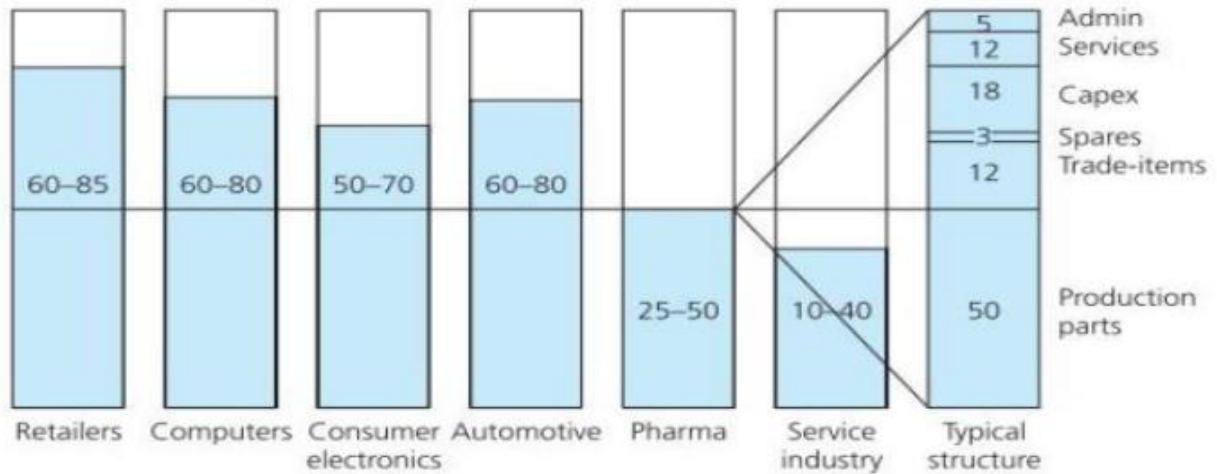
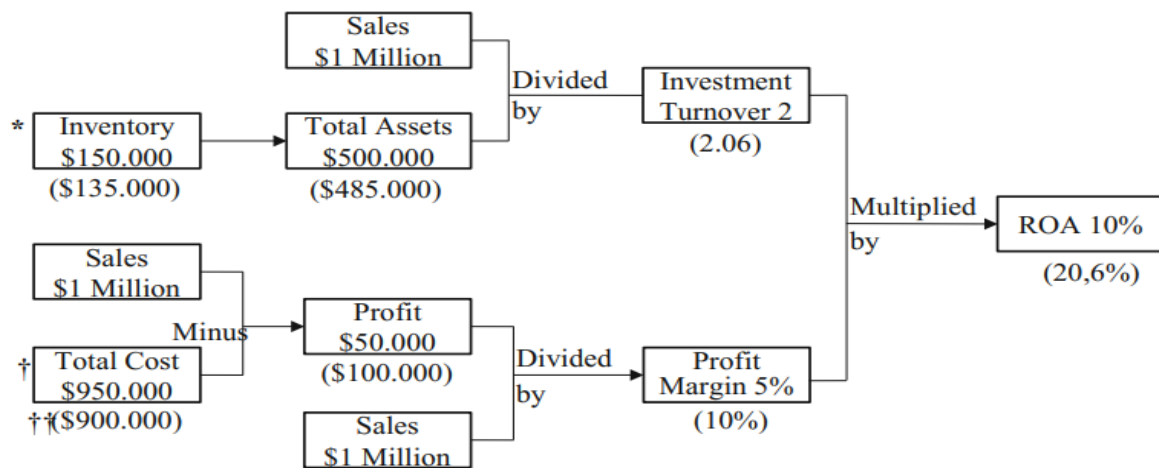


Figure 4: Percentage of purchased goods/services of COGS (Van Weele, 2014, p.12)

As a matter of fact, a corporation can better the purchasing process to improve RONA's significance by analyzing the price of every purchase batch with the most optimal reduction as possible. Figure 5 is an example of how purchasing costs concern the RONA index.



- * Inventory is approximately 30 percent of total assets.
 † Purchases account for half of total sales, or \$500.000.
 †† Figures in parantheses assume a 10% reduction in purchase costs.

Figure 5: Small reductions purchasing volume substantially increase ROA results (Johnson, Leenders, & Flynn, 2011)

This is a simple calculation that shows the relationship between the purchase costs and the bottom-line value representing a business's revenue. Assuming an industrial company gets a 10% decrease on purchase costs, its return on assets would double. In other words, the more purchase savings, the more profits for the company. Financial results are efficiently diagnosed via DuPont analytics, meaning sales margins and capital turnover give results in ROI percentage. Accordingly, solutions to improve the company RONA could be undertaken in three different ways (Van Weele, 2014, p. 13).

- **Reduction of all direct material costs:** The minimization of this cost contributes to boosting the company's sales margins. Some suggestions for businesses to have lower direct material costs are to shorten the supplier list and mainly focus on those suppliers that are the company's key customers, improve product standardization, create vendor competition, and be able to find substitute materials.
- **Reduction of net working capital:** This method is geared towards the company's capital turnover ratio. The value of capital employed can get lower by extending payment terms, reducing the inventory of base materials via JIT agreements with suppliers, improving supplier quality, and prioritizing equipment leases over purchases.

- **Improving the company's revenue:** This approach focuses on creating new customer values through the challenge of product and process improvement on the supplier side. Due to the industries' innovation today, it requires purchasing managers to mobilize technical experts from the supplier to play a role in the new product development process early on.

One conclusion can be drawn that the efficiency of purchasing activities profoundly affects a company's returns. The higher ratio of capital turnover, the greater savings in the direct materials segment. This also requires the buyers to always monitor purchase expenditures regularly to optimize savings. (Van Weele, 2014, p. 14.). Therefore, a successful purchasing practice depends not only on the efficiency of operational stages but also on purchasing management tactics.

4.2 Price evaluation in the purchasing process

Van Weele's model of essential activities for purchasing process is described briefly above. Off of that, the adoption of SPE is discovered at the selecting suppliers stage; within the same phase, further analysis is performed to determine appropriate roles and strategies for the pricing course. In the supply chain, the selection and evaluation of suppliers have become crucial because their performance directly affects the business's operation and finance (Bilişik, Çağlar, & Bilişik, 2012). The proper selection and strong management of supplier relationships will contribute to increasing purchasing output through cost savings and creating more value for the company such as competitive advantages and internal customer satisfaction. However, successfully implementing this stage in the purchasing process requires certain methods and requisites to accurately assess the influence of the supplier on classified items. Regarding numerous research papers, several key criteria are set as the basic premises for supplier ranking.



Figure 6: Several important criteria for Supplier evaluation

- **Quality:** Any purchasing company has special requirements to evaluate the product's quality from the supplier. Those requirements are expressed in terms of specifications or percentages, through which the purchasing department can accurately assess the supplier's ability to respond to the demands. Each manufacturer looks for their desired quality and has follow-up policies to control arising problems, therefore suppliers will have different qualities for different manufacturers. An article written by Kermani, Navidi, & Alborzi (2012) stated that "each manufacturer has its quality control policy that evaluates the quality of the purchased commodity from the supplier according to the percentage of the flawless commodities in each purchased patch." This percentage should be more than a predefined level to satisfy manufacturers. However, it has to be mentioned that the quality of provided services also greatly affects customer satisfaction (Sarode, Sunnapwar, & Khodke, 2008). ISO BS/EN ISO 9001:2000 certification is commonly used to measure supplier performance, it shows the supplier is proficient in responsible management, managing resources, realizing, measuring, analyzing as well as bettering products. (Feldsine, 2022).

- **Delivery:** The punctual shipping is a huge plus from the buyer's perspective. Most manufacturing companies place a high emphasis on the on-time delivery of important and routine materials, and the supplier side must also ensure that the product is shipped to the right place in the right quantity, with a perfect and pristine package although their lead time can be longer. In addition, the supplier's ability to promptly respond to urgent orders in unexpected cases, by maintaining excess capacity, is also highly appreciated and can build long-term cooperation with manufacturers. These factors help suppliers boost a competitive advantage over their competitors by consistently improving order processing and using faster transportation (Sarode, Sunnapwar, & Khodke, 2008).
- **Price:** Cost is a sensitive criterion that is preferred to consider the potential of a supplier list by category. When a supplier quotes, it requires the purchasing department to have a sound analysis not only in terms of price but also in terms of competition against the market. Buyers at least understand the components that make up the purchase price, linked to the operational activities of the supply chain and therefore evaluate its reasonableness. Costs to be determined include direct purchase price, and breakdown costs such as production, labor, and service from the supplier side; combined with logistics, inventory, and other processing capability costs of the purchasing company itself. The more effective the cost analysis, the higher the purchasing efficiency and the more profitable for the company.

Quality, price, and delivery time are the three priority factors to weigh the supplier's significance. But here, this study determines only the 'price' and the strategies that the purchasing department uses to assess the reasonableness and competitiveness of quotation, thereby contributing to the shortened potential vendor list. With the referred elucidation combined with SPE concepts, it is easy to conclude that price comparison is one of many key activities in the supplier selection and evaluation process. Specifically, this work is one of hierarchical levels of purchasing TCO analysis, where the buyer will figure out issues behind the price offered by the supplier as their types of expenditure to make up the product's price, compared with the market variance (Ellram L. , 1994). A diagram can be drawn to illustrate the stage as follows:

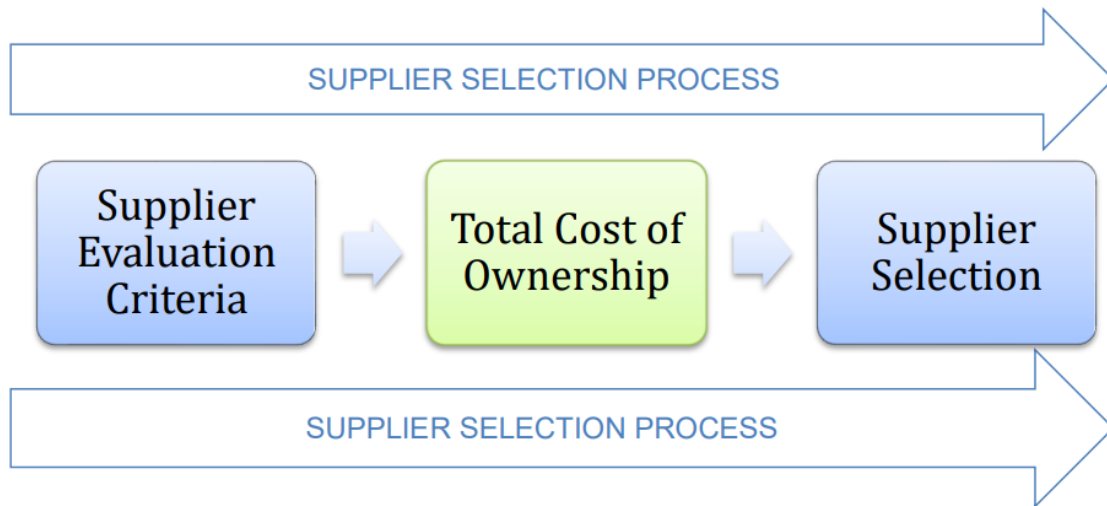


Figure 7: TCO analysis in the Supplier selection and evaluation process

Each organization has its purchasing criteria to evaluate suppliers. A list of qualified suppliers that meet those criteria will be sent an RFQ. The next task of purchasing department is price evaluation to find the best place and then move to the negotiation and purchase decision phase. This process presents many challenges for buyers to be able to consider whether such a price is reasonable or not, even though it just contributes as one of the cost drivers in the general TCO analysis.

	Price components	Supplier 1	Supplier 2	Supplier 3
<i>Variable cost</i>	Direct materials	1,000.00 €	950.00 €	1,100.00 €
	Handling fees	200.00 €	300.00 €	250.00 €
	Equipments & Technologies	200.00 €	300.00 €	225.00 €
	Package	70.00 €	60.00 €	80.00 €
Total		1,470.00 €	1,610.00 €	1,655.00 €
<i>Fixed cost</i>	Rental premises/Working place	150.00 €	170.00 €	200.00 €
	Salary	500.00 €	600.00 €	550.00 €
	Management fees	100.00 €	150.00 €	175.00 €
	Insurances	30.00 €	25.00 €	30.00 €
Total		780.00 €	945.00 €	955.00 €
Original Price/unit		4.00 €	4.125 €	4.010 €
	Units (pc)	1,000.00 €	1,000.00 €	1,000.00 €
	Discount	50.00 €	75.00 €	115.00 €
	Quotation	3,950.00 €	4,050.00 €	3,895.00 €

Figure 8: Example of price components for 3 Suppliers

This table is an example of how buyers approach suppliers' quotes. Obviously, in terms of quotation, supplier 3 is the best choice as they offer the cheapest price. However, the purpose of price evaluation is not only merely towards the minimum, but also to consider the reasonableness of price components and market fluctuations concern. This research does not go into the mathematical relationship between variable costs and fixed costs to the selling price but explores the methods for purchasing department to evaluate a supplier's quote. At least the buyer can figure out what components to build up the price and compares it to the labor and commodity markets. In order to optimize purchasing costs and consider equanimity on a stricter level, it is compulsory to breakdown costs and delves into TCO/unit analysis. Regarding the table, although the offer price of Supplier 3 is the lowest thanks to incentives when buying in certain quantities (depending on the vendor's promotion strategy), Supplier 1 dominates with their original price per unit. Buyers can rely on these data correlations and see if the estimated manufacturing costs are reasonable compared to the difference between market margin and competitors. In brief, the supplier's price evaluation is a broad view of the factors making up the price, while the reasonableness depends on the measurements and standards of each purchasing company. Almost, it depends on the decision of superiors for small companies in Vietnam.

5. Research implementation

As mentioned in the introduction part, the research topic is not too strange in the purchasing scope, but it belongs to sensitive information for business as well as contains limited reference sources. This proves that the qualitative method is perfectly suitable for carrying out the study thanks to flexible approaches and abundant data collection. The empirical results can broadly reflect the firm's actual experiences with the SPE process against its theoretical findings. The research process can be done based on the diagram of Creswell (2002), which shows the six sequential steps of the qualitative methodology.



Figure 9: Qualitative research process (Adapted by Creswell, 2002)

Identify research problem

The study determines on three main points: SPE approaches in different enterprises, their obstacles, and IT-solutions. Each industry has its methods for evaluating supplier price, this also closely depends on the working environment and purchasing manager's qualification. Both theoretical findings and research results would draw up an overview of the SPE implementation within Vietnamese firms' purchasing process.

Reviewing literature

Supplier price evaluation backgrounds such as definition, benefits, barriers, and supply research strategies to support SPE were conceptually discussed. Those knowledge bases relied on available literature and previous research papers. Specifically, SPE was exploited as a pioneer activity of a TCO analysis in the purchasing manners. Although the references on TCO are quite complete, some blind spots still exist in the output, which leads to limitations in further research on 'purchase price'. Therefore, this study can be considered the theoretical base for forthcoming investigation on purchasing financial issues.

Selecting participants/Interviews

Qualitative methodology was conducted via in-depth interviews to provide a profound investigation into the research. The representatives came from three firms specializing in different fields, who possessed unique purchasing schemes and showed interest in SPE adoption at the researched time.

The investigated scale concerns Vietnamese firms varying from small and medium-sized enterprises (SMEs) to gigantic corporations. Details on these companies are laid out in Table 3. One can deduce from the data gathered the interviewer's grasp of the SPE process as well as the companies' organizational purchasing. Also, firms offered insight into the approaches to weighing purchase prices. These enable comprehension of how SPE processes work in distinctive business fields.

Company	Position	Industry	Duration
X	VILC Procurement manager	Logistics Services	90 minutes
Y	Procurement manager	Food Manufacture	45 minutes
Z	Head of purchasing	OEM Trading	30 minutes

Table 3: Selected firm's information

The information of SPE is considered confidential to the business. It explains why the study just determines the evaluation exteriorly, such as the methods of comparing purchase prices and observed difficulties in the procedure. Though the size of the interview was relatively narrow, the author tried to contact purchasing firms with diverse industries, including products, services, and trading companies. The diversity in SPE implementation is mainly reflected by the types of the company's purchasing model, allowing readers to recognize SPE in its distinctive aspects. At the same time, the IT- solutions to effectively lever the price comparison was also suggested by the interviewees, which increases the research's experimentality. Abundant data gained from interviews can be a valuable resource to delve into price analysis studies.

Collecting data

The data collection began with interview planning, by submitting a list of key questions and organizing interviews separately to fit each company's schedule. On average, it took place within 45 minutes to intensively exploit the crucial issues. However, it might take more than 1 hour depending on the sub-questions that the author posed to clarify the main points. The interview's contents revolved around SPE establishment in purchasing, how SPE's importance was assessed in a particular firm, and the company's investment in duration as well as human resources to compare prices. From that basis, the author gave questions about methods, difficulties, and IT tools to assist buyers in evaluating quotes. All interviews were recorded for research purposes. The perfect

layout of an interview was to go from overview to detail. It would be more comfortable and smoother to see it as a knowledge-sharing session between an apprentice and experts. The interview layout was set up as follows:

- Introduction:
 - ✓ Company's working concept
 - ✓ Description of interviewee's position and roles
 - ✓ Typical methods that the company uses to evaluate supplier prices
- Barriers to SPE:
 - ✓ Internal factors: cultural or working environments, personnel training, etc.
 - ✓ External factors: Lead time, communication with outside stakeholders, etc.
 - ✓ Data collection
- IT-solutions:
 - ✓ Internet-based tools for supply market research
 - ✓ SAP implementation

Analyzing and interpreting data

All interviews were transcribed and presented respectively in the section of research results. The author analyzed the interview's essence to avoid a rambling conclusion that leads to meaningless research. The interview's contents were compared parallelly with the theoretical findings as discussed in sections 3 and 5. The details of interview results were condensed into three core issues: the enterprise's available SPE adoption, arisen difficulties, and effective SPE support tools. Each company has its way of handling SPE and vice versa, SPE behavior does not apply equally to all organizations. The theories combined with research results would provide a closer conclusion of the SPE's approaches in purchasing.

Reporting and evaluating research

Supplier price evaluation is a prerequisite activity for a standard TCO analysis. This process only takes place when the buyer and internal customer agree on purchasing requirements and determine the criteria's weigh of products, services, or materials. As shown in section 4.2 (figure 7), it is a visible remark on the importance of supplier price evaluation because it acts as a mediator between interdisciplinary communication and purchasing decisions. A great SPE certainly leads to a

positive purchase result with potential savings for the business, even as little as 1% of the total order value. Therefore, Vietnamese SMEs to large corporations are now increasingly investing in strategic purchases to improve their yearly profits. Yet, there have been not many firms that have a complete SPE model, that is, not all buyers are qualified and experts to perform optimally an SPE in terms of data collection, reconciliation, and calculation. In addition, there is an internal controversy over the independent right to make the final decision on the purchase price after the SPE's completion. Most decisions about the purchase price level are approved by purchasing superiors, while several companies allow buyers to decide individually on their responsible commodities. The issue of SPE's lead time was questioned for selected firms to conclude as an SPE barrier.

Besides the SPE concepts as well as the discovered obstacles in its procedure, the author went over the solutions mentioned by the firm representatives in supporting and improving SPE productivity. Internet-based tools or SAP applications, as referred in Van Weele's study (2014), are useful in supply market research and tracing supplier performance over time. Both theoretical and empirical findings would deliver objective and accessible answers to the final research question, which determines the firm's preferred solution for SPE.

6. Empirical findings

This section is a presentation of the interview content with selected companies. Conversations were recorded and translated later from Vietnamese to English to make the research accessible to all readers as well as individuals working on further related research. The author presented the talk and quoted several important points of view from the firm representative. The other points were combined to summarize all interviews and provide an overview of the results to deliver a clear conclusion.

6.1 Interview results

Company X

The X company representative is a purchasing specialist with 12 years of experience on the local level. Currently, he has been invited to work at a company of worldwide Beer brands, as Procurement VILC Manager - specializing in Raw Materials and Package. His duties are planning and monthly

purchasing variance investigation (VILC). In particular, he is accountable for buying logistics services for raw materials and packaging schemes.

"As an international company, it is obvious to have a fairly complete quote analysis system that can be combined with both universal approaches and technological solutions. There is a well-selected list of suppliers available, and they have been in long-term cooperation with the company over the years. This facilitates the process of price comparison and negotiation as it is based on a comprehension of each other."

Once receiving supplier quotes, purchasing staff could completely ask the supplier to share about the components that make up the offered price. They probably do not want to share the pricing structure in detail, but employees can approach cleverly by relevant questions to glean information. This work can be done via email exchanges or popular chat platforms. Then, the purchasing staff conducts a supplier benchmark and compares the prices of each element based on dedicated market websites for products, raw materials, and labor prices at the time of purchase.

Besides, the major barrier of SPE was also mentioned which was data collection. Internal factors such as work culture, training, and personnel qualifications, as covered in theoretical findings, were denied by the representative in practice. He asserted that there were no specific training methods for an SPE model, but it depended on the logical thinking of the manager.

"Supplier price evaluation will be effective if the purchase price's decision of each category is controlled through leadership review. This reduces the risk of buying at inappropriate prices, being exposed by suppliers, and at the same time, helps the process have end-to-end rigor."

Also, company X has been investing in SAP software to manage quotations and compare prices. One of the great benefits that SAP offers in purchasing is to help monitor supplier performance and retrieve transaction histories with specific vendors. In addition, SAP also acquired auction software to work on quotes such as SAP Ariba, or a similar one Coupa to process automatically SPE and consider supplier resumes.

"Coupa or SAP both provide a perfect interface to work with stakeholders simultaneously and reach relevant markets via web-based apps."

However, in terms of price comparison efficiency, SAP does not completely meet the firm's desire for the evaluation of the purchase price. There are still many limitations in the SAP operation, such as the disconnection between processes from PR to PO and copious manual work, which all lead to time intensive. Comparing prices on the diverse markets mainly based on the experience, broad relationship, and arithmetic thinking of the purchaser. Therefore, the application of SAP or ERP in Vietnamese enterprises can be considered weak.

Company Y

The firm Y's representative is a purchasing expert with more than 10 years of experience with a variety of purchasing models, from manufacturing, and service to trading firms. Currently, she is working for a large domestic food production company.

"When making strategic purchases in large volumes, the company acts as a major customer for the supplier. Hence, the team has the right to review the capacity and supply continuity of the suppliers; Thereon putting them in a position with a purchase price as low as possible, or equal to the desired budget. It can be said that the strength of the purchasing position is very important to evaluate whether a supplier's price is reasonable or not."

The Kraljic matrix of the relationship between buyers and suppliers based on categories was mentioned by the representative as an initial action in conducting SPE. She emphasized that the working style of the purchasing department is "To know oneself is true progress", it would be difficult for the supplier to deceive if the purchasing team knows how their position is compared to the supplier, as well as understand the category management.

"For orders under VND 30 million VND, price comparison is not necessary if it is a regular item. If over 30 million, employees need to collect data of price structures and proceed the benchmarking in the market."

Price comparison becomes effective when it is able to break down the price components, which can be done by any means depending on the buyer's experience. The more detailed the breakdown of the price structure, the higher the possibility of price modification and negotiation. Besides, the sources for price benchmarking should be official sources due to the large size of the cooperation. Food-related price listings are used as the main source of data access for company Y.

For sourcing or scarce items, the buyer almost has to accept the initial price offered by the supplier because of the item's low popularity. As for strategic items, it is not too difficult to know the price structure of quotes because employees can gather information from many different sources and people, especially both parties in long-run cooperation. Even if the buyer is highly specialized, it is possible to break down most of the costs that make up the selling price and use that as a basis to ask for a better price from the supplier.

“One difficulty that can be seen here is the lead time between stakeholders. In cases of force majeure, the production side needs the materials urgently and requires immediate supply or vice versa, the supplier side has problems in production and delivery to the buyer. Cases related to lead time all need to review the purchase price to compensate for the loss.”

In addition, it is a common case that internal customers do not really understand the item they want to buy and provide the specific purchasing requirements. Especially technological products, engineers sometimes have no idea of technical specifications. In such cases, familiar suppliers provide advice and product selections at various price points. This does not definitely make quote analysis difficult, but it did take time for the parties to communicate effectively.

Company Y refused to invest in an ERP system to gain a saving possibility. Employees conduct the SPE process based on each person's arithmetical thinking, and they have the right to make independent pricing decisions. Price comparison processes and final price results are presented via excel and Tabulation platforms.

Company Z

Company Z's representative is from a local small and medium-sized enterprise (SME) and is a purchasing manager cum quality inspector. Company Z mainly orders agricultural machinery spare parts (OEM) and resells them. As a small business, the total number of employees in charge of purchasing is only 3 people, and she takes care of most of the stages related to planning, product quality control, and shipping to the destination.

"Employees fully evaluate quotes by manual approaches. Specifically, they enhance communication of prices with suppliers via popular chat platforms or email. Then, enter price

information into Microsoft Excel and conduct analysis by basic maths and record relevant factors to weigh against market fluctuations."

The company focused on the working history with suppliers in the previous time and compares offers between suppliers in terms of price and other factors such as payment terms, liabilities, etc. in the contract. However, a barrier that can be visible is being difficult to know the supplier's price structures because of the relatively small trading volumes and their unwillingness to public price data. Hence, the company has several tips for data collection such as cooperating with the sale department and combing with internal customers' knowledge bases.

"The company has unofficial sources of information to research on market price. Price data can be collected mainly thanks to sales personnel as they grasp the competitor's information. Due to a small-sized company, it does not require a methodical SPE model and being an expert in price analysis".

In addition, the representative stated that the company could not afford to run ERP because of low efficiency in the SPE process as well as its expensive cost in operation.

6.2 Interview's summary

A summary of the interview results is essential because it is the empirical base to reflect the theoretical findings above, which would be the conclusion of this research. The interview results of the three companies were summarized according to three core issues in the table below:

- Evaluation methods
- Difficulties/ challenges
- Applicable solutions

Company	Evaluation methods	Difficulties	Applicable solutions
X	Kraljics models, supply research via worldwide exchanges	Data collection	Internet-based tools SAP SAP Ariba Excel, VBA, SQL
Y	Kraljics models, supply research via worldwide exchanges, supplier benchmark.	- Leadtime - Ignorance of internal customers	Refuse ERP Internet-based tools Excel & Tabulation
Z	Supplier benchmark and supply research	- Unofficial sources for market research - Data collection	Refuse ERP Manual work Excel

Table 4: Summary of Interview results

After aggregating the results from the in-depth sessions, it is unsurprising that all three companies take the same approaches to supplier price evaluation. However, company Z hardly cares about determining the position's strength of the purchasing team against the supplier. This is understandable because it primarily depends on the size and type of business's purchase. Each firm has different sources to access price data, such as major trading exchanges in Vietnam or global exchanges. Upon receipt of a quote, it is the buyer's duty to promote effective communication with stakeholders, including internal customers, suppliers, and buyers who play a role as the bilateral bridge to clarify the issue and fulfill purchasing requests. Vendors may be asked to give details of the price structures via a variety of questions. However, the answers can not be as desired because of their unwillingness to make sensitive data public. The purchaser then continues gathering the price information by diverse means to get a breakdown of certain price components. Thereon, each component is benchmarked to the market through e-commerce platforms. For instance, manufacturing companies such as company Y, could research price data on the exchanges according to industry, be it food, agricultural products, or machinery; Company X also conducts supply research for logistics services, but it relies on world-class petroleum and metal exchanges, which are quoted and fluctuate solely with the economic cycle. One thing to keep in mind, is repeatedly mentioned by reps, is that purchase price is not the only issue in SPE practice. The price may be the cheapest but not the best for most cases. SPE should focus on the best price, only if the purchasing criteria are

met and the price components are all reasonable relative to the market in general. Another method used in most purchasing models is the supplier benchmark, that is, comparing quotes between suppliers. This method is helpful in identifying the cheapest price, or the price close to the minimum provided that all essential purchase requirements are met. Last but not least, it is the Kraljic models applied by two large companies such as X and Y. Not every buyer is professional and trained to weigh the strength of the purchasing position relative to the supplier. This requires knowledge of purchasing portfolios and category management. The rationale for this matrix will be presented in the conclusion part.

Regarding the barriers to conducting SPE, all three companies agreed that data collection is a major obstacle to a perfect price assessment. The fact is that suppliers can only share their price information with key customers, that have long-term cooperation to jointly achieve profits. In a case like Company X, the rep is a well-known local buyer and is experienced enough to circumvent the price structure on his own as well as offer suggestions or advice for the seller to improve profits, then, suppliers are obviously willing to disclose their business secrets. In addition, lead time working between stakeholders from the manufacturing plant, transportation, supplier, and buyer to the end-user, all causes price adjustments to compensate for the loss. Internal customers' ignorance also hinders the time to process SPE as being unknowledgeable of the specific requirements of purchase.

Existing solutions from companies allow SPE to be implemented in different ways. There is no standard measure to evaluate the effectiveness of SPE, as it is based on the logical thinking and experience of each individual making the purchase. According to representatives, the common solution to access price data is internet-based research, that is accessing trading platforms from a local to a global level. Besides, Microsoft Excel is the main interface for companies to input data and perform price comparisons based on basic maths. For someone with a qualification like company X's purchasing specialist, combining VBA and SQL into Excel is a great way to automatically aggregate quote data over time and perform comparisons in a fast way. This requires proficiency in data analysis and purchasing expertise to build the right logic for price settlement. In addition, ERP application is almost always rejected because of high operating costs and not much benefit in fully evaluating supplier's prices. Company X's representative also proposed designing an MRP (Material Resources Planning) system to optimally support purchasing activities. Also, the SAP implementation as SAP

Ariba is recommended by X's rep to leverage quote management, which will be discussed in detail in the next section.

7. Conclusion

In this part, the research issues will be drawn conclusions based on theoretical background and interview results. The author found that empirical searches seemed simpler and more subjective than knowledge in the literature, such as barriers to SPE implementation. In addition, the interview results also provided several software that supports Vietnamese enterprises in analyzing quotes and comparing prices between suppliers. Consequently, the author can state a general assertion for the study by covering the research questions as previously mentioned.

7.1 SPE approaches in Vietnamese firms

Theoretically, SPE is a pioneering series of activities built on the TCO analysis concept in purchasing. The importance of purchase price has been strongly asserted which accounts for almost one-third of the total standard costs in forming a product or commodity. As proposed in Roodhooft's study (2003) of typical price dynamics, the process of evaluating the purchase price and encompassed factors belongs to the Supplier hierarchical level. In an accessible way, SPE is a stub process of quote evaluation and price comparison among suppliers. That is, upon receipt of quotations, the buyer's responsibility is to investigate the components of the purchase price and compare those with the relevant market one to assess its reasonableness. The more detailed the ability to break the price structure, the higher the chances of saving in purchases thanks to the transparency and clarity of the mainstream market. As a result, the company can achieve more profits through strategic purchases, although the percentage of savings may be less than 1% per month. Each firm has typical approaches for a purchase price breakdown and quotes comparison from multiple suppliers. The level of professionalism depends on the size of the company and the buyer's analytical mindset. There are three typical ways to practice SPE in the Vietnamese business scope: Identify the power of purchasing position, supplier benchmark, and market research.

Regarding the method of **identifying purchasing power** compared to the supplier's position, the author exploited Van Weele's viewpoints in the theoretical part, that buyers need to have the ability in analyzing the supply-demand situations of each commodity group. It is important to consider the

number of available suppliers of a certain category and their competition levels against contestants. Thereby, taking into account the buyer's position that can be superior, equal, or subservient to the opposite side. According to Van Weele's argument (2014), apparent determination on the supply-demand relationship of purchased products/materials/goods helps the buyer not to be easily overtaken by the supplier, that is, the buyer can weigh up whether the price is reasonable or not, based on their position's significance relative to other parties. The supply-demand correlation of some classic commodities is entered into a matrix called 'typology of market structures', which was shown in section 3 (Table 2). To be comprehensive the role of the current position and come up with the right purchasing strategies, purchasing manager needs to establish a matrix's mindset by prompting questions (Van Weele, 2014, p. 120), as follows:

- What types of the market are applicable for the purchased commodity, and how many suppliers are available to satisfy the desired order?
- If product A is purchased in volume B and priced at C, what reactions of other suppliers?
- What is the popularity of a particular product in the selected supply market, are there any alternative suppliers or substitutes available?
- What is the capability to supply product A in the short and long term? What changes can be predictable to product availability and price levels?

In addition, empirical findings from two large-scale Vietnamese firms provided another approach to rate the purchasing power that could be seen as the basis for a better purchase price. It is the portfolio approach suggested by Kraljic (1983), which helps managers design purchasing strategies for categorized commodities. The interview results referred to the Kraljic matrix to assess the strength of both buyers and suppliers in the supply market. This requires purchasing staff to acquire knowledge of portfolio management and have a solid foundation in the company's business model to properly identify product portfolios with various investment's degrees.

The portfolio approach of Kraljic (1983) is no longer an unfamiliar concept in the purchasing process because it is a standard model for classifying goods. It allows the company to group products with common characteristics into a classification, such as the number of suppliers, product's popularity or scarcity, etc., and is commonly used across manufacturing industries (Kraljic, 1983). The two Kraljic matrices in his article *Harvard Business Review* are presented as below, which are developed with two-way arrows representing purchasing's or supplier's impact on financial results corresponding to the supply risk. The idea of these two matrices is formed from both buyer-seller sides, helping to determine the company's role in the supplier's view as well as the supplier's importance to each product group that is profitable to the company.

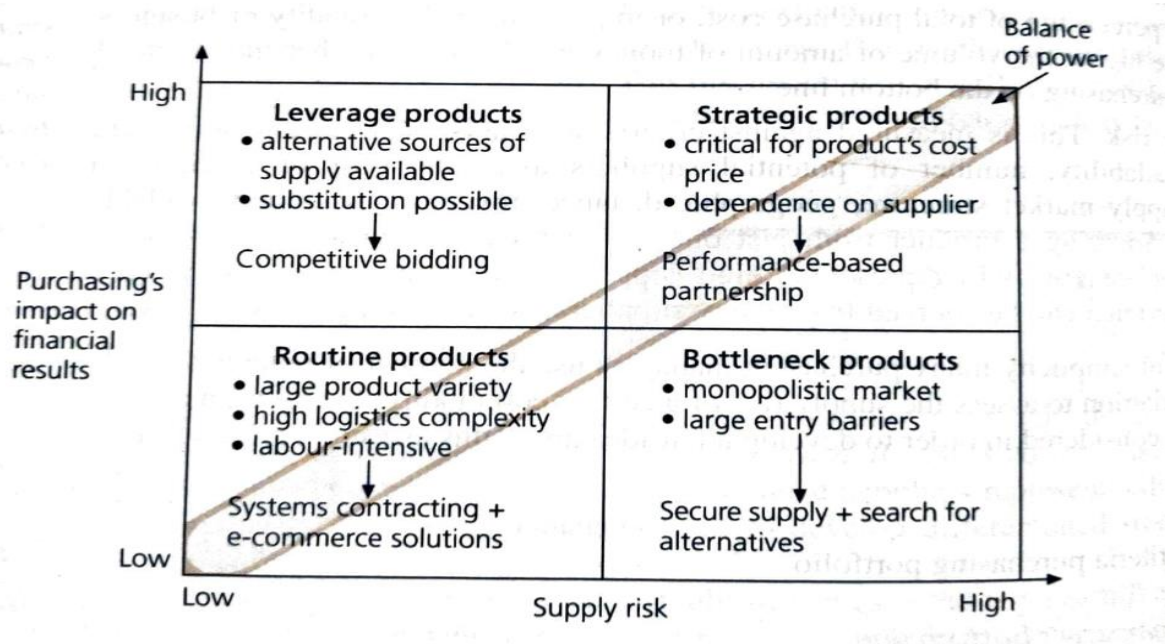


Figure 10: Purchasing product portfolio

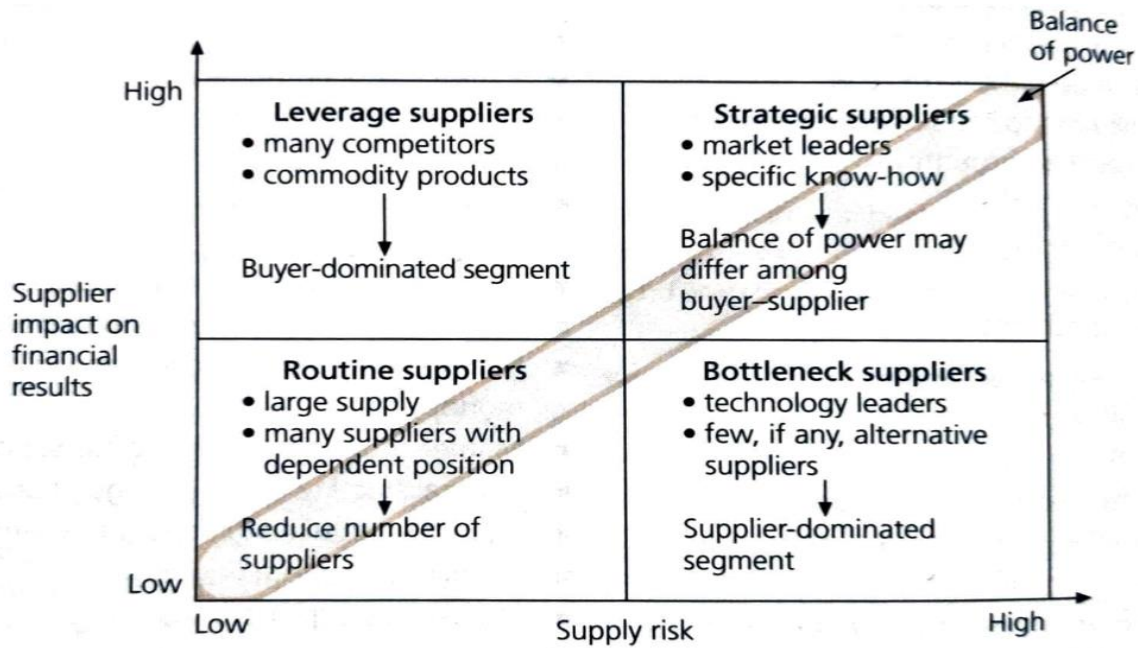


Figure 11: Supplier portfolio

Four categories are defined according to two vectors, which are leverage, strategic, routine and bottleneck. The author does not delve into the definition and properties of categories in these matrices because this is an in-depth knowledge of the portfolio management field - an aspect that managers or purchasing specialists need to master. The financial impact is measured by material cost or total cost, profit, risk, etc. And supply risk is about the complexity of the supply market, expressed through the number of suppliers, entry barriers, or product diversity. This method has received a lot of criticism because it is highly subjective and there is no basis for establishing a fixed model for each company. However, large corporations have applied it with a mindset that evaluates the purchasing's importance relative to the supplier. From the Kraljic model, it is possible to clearly identify the degree of balance between the stakeholders:

- **Buyer-dominated position:** Here, the buyer has various selections of potential suppliers due to the product's popularity. Raw materials can also have many alternatives or substitute possible. This is common in the automotive industry. The purchasing company at this point becomes an important customer for the supplier and they can only fulfill the requirements given by the buyer. (Van Weele, 2014, p. 165)

- **Supplier-dominated position:** This is the opposite case where the purchasing company is strongly dependent on the supplier. A good example is IT solution providers. The company purchases software or hardware from a supplier (SAP, Microsoft, etc.) at what is believed to be the best price on the market, and warranty and repair issues may be valid to the selected supplier. It is very difficult to continue working with new technology leaders. Therefore, the buyer must fully accept the terms and prices of that supplier. Outsourcing can lead to a situation where buyers are not able to negotiate a better price. (Van Weele, 2014, p. 165)
- **Balanced position:** This case is where the buyer and supplier positions are balanced. It can be considered a stable and developed 'partnership relationship' over time. (Van Weele, 2014, p. 165)

In short, a proper assessment of purchasing position is a prerequisite for conducting SPE. Van Weele and Kraljic both fairly offer concrete models as a basis to consider the reasonableness of quotes, then create negotiating power to get better prices as well as saving possibilities. Nevertheless, this method can only be applied smoothly to large-scale enterprises and international corporations. It requires expertise in strategic purchasing and portfolio management, which not every individual buyer can easily pursue. In addition, the classification of the category is suitable for manufacturing or construction companies, with the service purchase or re-commerce segment, the usability is limited.

A second method that contributes to SPE results is the **supplier benchmark**. The theory did not much refer to direct price comparisons between suppliers, but the interview results explore some of the basic ways in which businesses can reflect suppliers' prices. Supplier benchmark allows buyers to closely monitor supplier performance and evaluate them against agreed-upon standards in the contract. Purchase RFQs will be sent to potential suppliers that meet the purchase requirements, and buyers will aggregate qualified vendors for the purchase order to conduct price comparisons. (Achilles, 2022). Typically, suppliers are evaluated through the following criteria:

- Product Quality
- Capacity profile
- Business ethics

Vendor rating scores at each point in time are backed up and can be referenced later to detect trends and changes in supplier performance. In most cases, the historical prices of suppliers is aggregated over time to compare with current quotes between different suppliers. Each enterprise has different frameworks for supplier benchmarking for diverse purposes, such as purchasing, operational control, and supplier administration. This approach is mainly presented on the Microsoft Excel platform, which provides a mathematical interface for buyers to perform supplier’s historical price data aggregation according to any historical periods, as well as compare the capabilities of multiple suppliers for a given order. Below is a simulation of how a business conducts this approach.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	5%		Sold_To	Ship_To	Criteria1	Criteria2	Gia Khang-13/12/2021	Phu My-28/12/2021	Vinh Tri-28/11/2021	Gia Khang-13/12/2021	Phu My-28/12/2021	Vinh Tri-28/11/2021	
2	10%		DNF	AN GIANG 2NGAN	15T		1,980,251	4,555,812	5,310,128	MIN	MIN1	NOT CHOOSE	
3	>10%		DNF	AN GIANG KHO	15T		3,985,883	5,374,406	2,211,932	MIN1	NOT CHOOSE	MIN	
4			DNF	AN GIANG 2NGAN	2T		3,739,496	3,684,892	3,690,191	NOT CHOOSE	MIN	MIN1	
5			DNF	AN GIANG KHO	2T		2,547,307	1,242,288	5,279,317	MIN1	MIN	NOT CHOOSE	
6			DNF	AN GIANG LANH	2T		4,776,877	1,463,138	4,080,172	NOT CHOOSE	MIN	MIN1	
7			DNF	AN GIANG 2NGAN	30T		627,387	4,852,714	3,732,333	MIN	NOT CHOOSE	MIN1	
8			DNF	AN GIANG 2NGAN	45T		4,263,130	2,382,399	2,434,638	NOT CHOOSE	MIN	MIN1	
9			DNF	AN GIANG 2NGAN	5T		2,667,429	2,456,920	4,350,270	MIN1	MIN	NOT CHOOSE	
10			DNF	AN GIANG KHO	5T		4,992,989	3,353,584	6,993,636	MIN1	MIN	NOT CHOOSE	
11			DNF	AN GIANG LANH	5T		1,567,833	4,207,776	6,396,953	MIN	MIN1	NOT CHOOSE	
12			DNF	AN GIANG 2NGAN	8T		1,468,775	3,287,959	3,577,470	MIN	MIN1	NOT CHOOSE	
13			DNF	AN GIANG LANH	8T		2,847,852	3,632,262	2,090,630	MIN1	NOT CHOOSE	MIN	
14			DNF	AN GIANG 2NGAN	15T		1,474,350	2,590,473	2,777,970	MIN	MIN1	NOT CHOOSE	
15			DNF	AN GIANG KHO	15T		1,858,090	3,181,124	6,832,937	MIN	MIN1	NOT CHOOSE	
16			DNF	AN GIANG 2NGAN	2T		1,221,415	5,534,175	5,887,033	MIN	MIN1	NOT CHOOSE	
17			DNF	AN GIANG KHO	2T		905,638	1,261,797	6,762,998	MIN	MIN1	NOT CHOOSE	
18			DNF	AN GIANG LANH	2T		3,956,005	1,313,005	2,741,014	NOT CHOOSE	MIN	MIN1	
19			DNF	AN GIANG 2NGAN	30T		2,942,097	1,422,381	3,870,901	MIN1	MIN	NOT CHOOSE	
20			DNF	AN GIANG 2NGAN	45T		3,185,323	2,348,538	3,044,173	NOT CHOOSE	MIN	MIN1	
21			DNF	AN GIANG 2NGAN	5T		4,420,648	5,118,641	2,007,645	MIN1	NOT CHOOSE	MIN	
22			DNF	AN GIANG KHO	5T		4,486,452	2,848,289	5,425,082	MIN1	MIN	NOT CHOOSE	
23			DNF	AN GIANG LANH	5T		4,825,554	1,208,130	5,232,526	MIN1	MIN	NOT CHOOSE	
24			DNF	AN GIANG 2NGAN	8T		2,521,329	1,644,808	4,220,023	MIN1	MIN	NOT CHOOSE	
25			DNF	AN GIANG LANH	8T		899,814	2,735,008	4,815,744	MIN	MIN1	NOT CHOOSE	
26			DNF	AN GIANG 2NGAN	15T		2,256,475	4,655,979	4,227,399	MIN	NOT CHOOSE	MIN1	
27			DNF	AN GIANG KHO	15T		1,521,980	3,107,885	4,431,540	MIN	MIN1	NOT CHOOSE	
28			DNF	AN GIANG 2NGAN	2T		636,647	3,193,975	3,697,204	MIN	MIN1	NOT CHOOSE	

Figure 12: Example of comparing quotes (Adapted by ERX Vietnam, 2021)

As Figure 12 shown, the company would like to aggregate information about suppliers' prices in the period from 15/11/2021 to 28/12/2022 of potential suppliers that satisfy both criteria 1 and criteria 2. Here, there are 3 qualified suppliers: Gia Khang, Phu My, and Vinh Tri. Subsequently, the simplest comparison that can be made is to find the minimum value of the quotations using the Min function. Also, the buyer can set additional conditions to access better prices in case the supplier whose lowest price cannot fulfill the order at the moment. Three levels of purchase price’s tolerance are shown in column A in three different colors: less than 5% (Blue), less than 10% (Yellow), and greater than 10% (Grey), all are compared to the minimum price. Taking the example from range J1 to L4, it is clear that Phu My is a superior supplier in term of price relative to the two others, so it should be noted MIN. However, in the case that Phu My has no stock or the product/ material quality is not guaranteed, Vinh Tri will be chosen because it costs 5% less than the Min price (note MIN1 in the

Blue cell). This is the most common approach to comparing suppliers' prices with each other, with the premise that they must pass the necessary evaluation criteria.

Supplier benchmark is applicable to all types of companies from small and medium enterprises (SMEs) to large corporations. The effectiveness of each benchmark structure depends on the individual buyer's comprehension of technology solutions. Supplier benchmarks are effective in driving supplier performance through continuously comparing criteria and price levels, encouraging interaction, and facilitating communication with the supply chain. Specifically, the price data in research can be used as an information source for new suppliers. (Achilles, 2022).

Finally, the extremely popular and widely adopted SPE approach in purchasing models is the **research market**. According to the SPE process, it is the buyer's task to seek information about the price components by all means possible and conduct a one-by-one comparison in the relevant market. The main purpose here is to consider the level of the price's reasonableness. This minimizes the possibility of being overtaken by suppliers when they offer prices exceeding product quality or higher than one's overall market. Interoperability between departments is important because it is the means by which information is discovered. The more effective the internal crossover and the broader relationship, the more detailed the price data collected. For manufacturing or OEM industries, the market is relatively wide from commodity e-commerce platforms to international exchanges. At the exchanges, the continuous trading density impacts the general selling-buying price for a commodity on the market. These exchanges are influenced by supply and demand and no individual can control the price. There are several types of exchanges that are globally popular such as agricultural products, metal exchanges (LME - London Metal Exchanges) or gems.

There are three dimensions of market research discovered by Van Weele (2014, p. 122):

- **Macroeconomic:** This research focuses on the general situation of the world economy and the factors affecting the balance of supply- demand. For instance, the unemployment rate in a country, inflation, change in labor costs and so forth.
- **Meso-economic:** It refers to the economic sectors of a certain industry, which have specific figures in the form of percentages and related data stored in the statistical center. All countries and individuals seeking information can access official sources, and it is established

differently for each country. This information includes industrial growth, labor costs, resource or energy consumption, capacity utilization, etc.

- **Microeconomic:** This level of research allows buyers to gain deeper insight into the supplier's characteristics and products. The goal of the research is to understand thoroughly the company's partner, the supplier's supply capabilities, and their position in the market over the long term.

All in all, positioning purchasing power, supplier benchmarking, and market research are the three most popular methods that the author can synthesize from theory and interview results with Vietnamese firms. Respectively, the approach is implemented in different ways based on the purchasing nature of the company and the buyer's qualifications. If these methods can be practiced at the same time, there is a great chance for the company to achieve the desired savings because strategic purchasing evidently improves the firm's financial health by the year. SPE is not an activity that enquires into the costs, but it focuses on analyzing the purchase price and breaking the price structure on the surface. However, SPE is a prerequisite to the effectiveness of total cost of ownership analysis (TCO) and supplier relationship management. An intuitive view and the right decision right from the start can create many savings opportunities for businesses through reasonable purchase prices and cost reduction per order with the right SPE approaches. Figure 13 below illustrates the benefits of determining the right purchase price.

Quantity	Price each
1 – 10	\$1.00
11 – 20	\$0.90
21 – 30	\$0.80
31 – 50	\$0.60
51 – 100	\$0.50

Quantity Break	10	20	30	50	100
Price	1.00	.90	.80	.60	.50
Q X P	10.00	18.00	24.00	30.00	50.00
Diff. Q X P		8	6	6	20
Diff. Q		10	10	20	50
Variable Cost		0.80	0.60	0.30	0.40
Lowest Variable Cost	0.30	0.30	0.30	0.30	0.30
Variable Cost/Run	3	6	9	15	30
Set-up Cost	7	7	7	7	7
Target Cost	10.00	13.00	16.00	22.00	37.00
Savings		5.00	8.00	8.00	13.00
%		28	33	27	26

Figure 13: Example of price list analysis (Adopted by ERX Vietnam, 2022)

It is assumed that the supplier provides a quantity-based bid list. In particular, the quantity of 1-10 costs 1\$, and 51-100 is 0.5\$. The more quantity is purchased, the more promotion for the order. Here, superiors may arise questions about the reasonableness of the quotation.

- The price list is just provided from quantities 1-100, what will the price be if the purchase is different from the given quantity?
- How much is the savings?

From the data provided, the buyer can simulate a simple analysis as shown in the figure on the right. Quantity 1-10 with a bid of 1\$ will be taken as a milestone for calculation. Specifically, when buying product X in quantities 11-20 for \$0.9, the amount saved is \$5, equivalent to 28% of the savings for the purchasing result. The work continues until the end level of volume. This spreadsheet will be the basis for purchase decisions with diverse quantities. For instance, if a company wants to buy product X in quantity 120, the buyer can immediately provide the results of the estimated price and the savings ratio on the total order. This helps the buyer understand the supplier's pricing and thus determine if such a price is fair relative to the market and whether estimated fixed costs and variable costs are tolerable or not. Buyers then can completely create purchasing position power in negotiation to achieve better prices and higher possibilities for savings. All of these demonstrate the SPE's positive impact on purchasing efficiency as well as the company's profit.

7.2 Obstacles of evaluating and comparing supplier price

There is a conflict between theoretical findings and empirical results regarding the potential barriers of SPE. Most of the interview representatives posed that the factor of data source greatly obstructs an effective SPE practice. Other literature views such as working environment or culture and staff training are not a big deal because they are highly subjective and strongly dependent on purchasing patterns as well as the company's operation scale. In addition, the lead time between stakeholders was also mentioned as an invisible barrier, which occurs in the duration of order processing or manufacturing operation.

Data is an essential ingredient of an evaluation or analysis. Indeed, no scientific decision can be made without the relevant data being clarified. (Newman, 1992, p. 51.) The buyer needs to collect all the documents and parameters related to the industry of purchased items, including information

of the industry leader and market shares. Besides, one of the most difficult things for the purchasing department is the effort of in-depth discovery of the supplier. It is important to understand the company's partners working with and their supply market capability in the market in long-term. The information about the supply company is easily obtained via publicly available sources. This is different from information regarding suppliers' costs and selling prices because it is confidential. Purchasing personnel should start with the basics, such as searching and archiving supplier profiles, their competencies, and business ethics, as well as potential competitors. The more understanding of suppliers, the more the company gains profitable deals. Subsequently, an important turning point is to dive into the supplier's operations and performance. The purposes are to gain relative insights into the product's price and create an opportunity to break the price structure. Of course, this cannot be done directly via surveys, but via secondary sources of information. The buyer needs effective inter-departmental communication to get information on finances, technology, marketing, sales, and so on. As a result, the employee has a strong understanding of the purchasing requirements, the suppliers' financial health in recent years, and their dealings with other partners. The selling price structure of a product normally includes fixed costs, variable costs, and other costs.

- **Fixed costs:** The expenses remain stable over a specific period, and they are hardly affected by changes in the business's operational activities. These costs can be depreciation, interest paid on capital, rent, salary, property taxes, insurance premiums, etc.
- **Variable costs:** The expenses change constantly, and they are strongly influenced by the company's output. Any changes in running a business lead to modification in the cost value. They could be direct labor, promotions, taxes, operational expenses, etc.

In practice, these types of costs are difficult to access directly because of suppliers' unwillingness to disclose their pricing structure. An exception is that the buyer is an expert with many years of local purchasing experience and wide relationships. At this point, the supplier may need more information about the buy-sell situation in rival companies and the buyer can give them advice to make more profits; Therefore, they are willing to exchange their sensitive data. In a conventional approach, the purchaser can gather price data through internal interactions with the accounting department, technologists, and sales teams. They provide an intermediary data source through which to understand supplier status as well as the specification of orders. For example, purchasing manager obtains the supplier's annual financial statements, depreciation of raw materials, labor wages by region; Or technical issues, the specification sheet from the IT department; And price data from

the sales department. All the information gathered from internal and external relationships help buyers build a price structure in a simulated way. Thereby, compare each price component in the relevant market to figure out the quote's vulnerability.

Moreover, lead time is a possible factor that makes the SPE process difficult. Suppose once the production process has a shortage of raw materials, it requires the supplier to fulfill them in a timely manner. The buyer needs to renegotiate the price to buy a certain volume with urgent shipping time or find substitutes. At this stage, the buyer's position is reduced, and falls into the situation to accept any price offered by the supplier. In contrast, if the supplier has problems affecting the delivery progress, the purchase price will be changed accordingly. This is not a negative impact on the SPE implementation, but it is time-consuming for both parties. Besides, the personnel training factor can be considered insignificant in obstructing the supplier price evaluation. The empirical findings showed that the SPE model's effectiveness does not depend strongly on training issues, but rather on logical thinking and personal experience in the purchasing field. For Vietnamese businesses, purchasing is not an academic discipline but a profession. Any individual can become a buyer once that vacancy is available. There is no training center or qualification for a purchasing specialist, so the buyer's expertise in a Vietnamese firm is mainly formed by outside learning, experiences, and important characteristics.

7.3 Solutions to improve SPE

Solutions for conducting quotes evaluation are mentioned by Van Weele (2014) with two basic approaches: internet-based tools and SAP. Since the theoretical research on this issue is limited, the author has discovered many different methods to support a more efficient SPE process and improve purchasing performance through interview results. Representatives from large-scale enterprises provided their perspectives on the use of ERP, that it has not created significant value to purchasing activities while operating costs are high. However, ERP application is still mentioned in this section with a broader level related to SAP such as SAP Ariba and Coupa. Also, another software is eAuctions that can be briefly covered. Thereby, the author gains a more open view of digital transformation in the purchasing process.

Evidently, the way SPE is practiced requires continuous and effective interaction between stakeholders, including buyers, suppliers, end-users, and a number of other participants if possible. The

goal of enhanced communication is to exchange information about orders in specific and negotiate for the best purchase price. The Internet-based tool here plays an important role in providing communications for individuals in the company via chat and mail software. In addition, the social network allows buyers to access websites related to the industry and suppliers, as well as e-commerce platforms to collect essential price data. Some familiar chatting platforms in the Vietnamese business can be listed as Zalo, Viber, and Gmail. Buyers can interact quickly through internal chat groups and send RFQs to suppliers via email. At the same time, manager levels can also regularly monitor the activities and employees' performance by direct join and making important decisions in a timely manner.

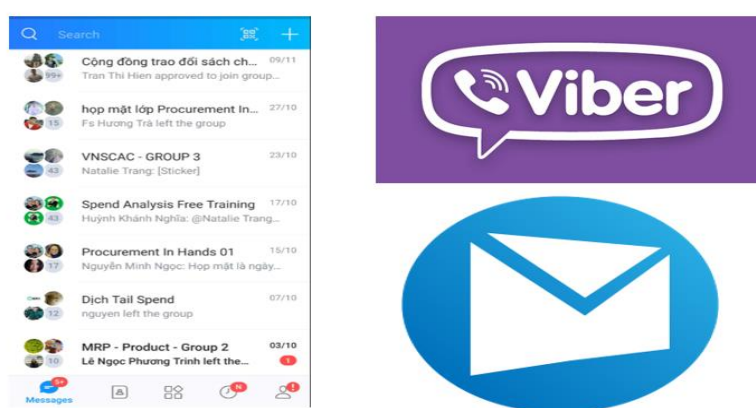


Figure 14: Communication platforms in Vietnamese firms

In purchasing, the fact is that buyers daily receive and manage a lot of quotes from different suppliers. The number of quote files increases over time, and price comparison becomes more difficult. Therefore, the application of Microsoft Excel combined with VBA and SQL can create a price-priority management and analysis tool. This implement helps buyers to automatically aggregate supplier's price data from historical and current periods for a certain item, then tick the criteria that the supplier needs to satisfy the purchase requests. From the aggregated list of qualified suppliers, a detailed summary of price data and supplier information is presented with just one click on the 'Data consolidation' button. The second function of this tool is to compare quotes for a specific period. Buyers can fill in the timelines that need to retrieve quotes from many suppliers for item X, click the 'Compare' button and it will immediately show a relatively perfect price list. The application of VBA and SQL in Excel helps buyers manage multiple quotes depending on memory capacity and process thousands of data automatically in less than 10 seconds. This is a great solution for the approach

supplier benchmark in the SPE process. However, it requires a high level of expertise in data analysis and investment of time in research.

Check "X"	Fields Name	InvntID,Trandesc,Price,Criteria1,Criteria2,Vendor_code,Vendor_name,Quotation_date	InvntID	Trandesc	Price	Criteria1	Criteria2	Vendor_code
x	InvntID		A20019	Xe đua F - Đen, 66	9968722	Factory1		1100
X	Trandesc		A20015	Khung xe đua LL - Đỏ, 60	795172	Factory1		1100
x	Price		D10106	Khung xe đường phố LL - Vàng, 66	4270954	Factory1		1100
x	Criteria1		D10090	Xe leo núi-B Bạc, 38	6196581	Factory1		1100
x	Criteria2		D10109	Xe đua G - Đen, 58	23950488	Factory1		1100
x	Vendor_code		B20209	Khung xe leo núi HL - Bạc, 158	11120249	Factory1		1100
x	Vendor_name		B20549	Khung xe đường phố HL - Vàng, 72	15078494	Factory1		1100
x	Quotation_date		A90015	Khung xe leo núi LL - Đen, 48	34539236	Factory1		1100
			C54025	Lốp xe đua HLL	6594992	Factory1		1100
			A10021	Khung W xe leo núi ML - Bạc, 142	22515806	Factory1		1100
Folder_address	D:\Bidding and Quotation Management\Quotation2		A10003	Khung xe đua ML - Đỏ, 44	23122926	Factory1		1100
No of Criteria	1		H00020	Khung xe leo núi LL - Đen, 72	34510706	Factory1		1100
			H00019	Xe leo núi-E Đen, 216	24422773	Factory1		1100
Fields Name	Parameters		B20108	Khung xe leo núi LL - Đen, 88	26598475	Factory1		1100
InvntID	%		S10267	Khung găm có gắn động cơ HYUND 28168447		Factory1		1100
Trandesc	%		S10510	Quần short leo núi nữ, M	26734293	Factory1		1100
Price	<>0		A20056	Xe đua B - Đỏ, 48	1668936	Factory1		1100
Criteria1	%		A90022	Khung xe leo núi ML - Đen, 104	19300807	Factory1		1100
Criteria2	%		D10111	Xe leo núi-A Bạc, 152	22578752	Factory1		1100
Vendor_name	%		D00109	Khung xe leo núi ML - Đen, 122	21965540	Factory1		1100
Quotation_date	01/01/2021		A90035	Xe leo núi-E Đen, 372	25876061	Factory1		1100
	28/12/2021		A10015	Khung W xe leo núi ML - Bạc, 110	7060577	Factory1		1100
			A20038	Xe leo núi-E Bạc, 52	3620157	Factory1		1100
			A90024	Khung xe leo núi HL - Đen, 68	13833285	Factory1		1100
Diff % from Min_1st	10%		A20039	Xe đua D - Đỏ, 72	33375430	Factory1		1100
Diff % from Min_2nd	15%		A20026	Khung xe leo núi HL - Đen, 42	11239824	Factory1		1100

Figure 15: Bidding and Quotation Management Tool (Excel - VBA - SQL)

Another solution recommended by international firms located in Vietnam is eAuctions. Auctions are not a new concept to the purchasing area, but electronic auctions are built differently from on-site auction methods. eAuctions is considered a form of E-Procurement, it is a tendering process that takes place through information and networking systems. Here, potential suppliers can bid directly against competitors to improve their offer. This provides the opportunity for significant savings on purchases and optimize the SPE's performance as the win bidder is the person who qualified the order requirements with the lowest offer price. Implementing eAuctions into the purchasing model saves time through transactions being processed much quicker than traditional auctions. At the same time, transparency throughout the auction process is guaranteed because it disables hidden agreements and corruption schemes. Depending on the purchasing nature, the types of company purchases and the breadth bidders list, eAuction is considered to suit the company's operation within 4 categories as shown below.

Auction types

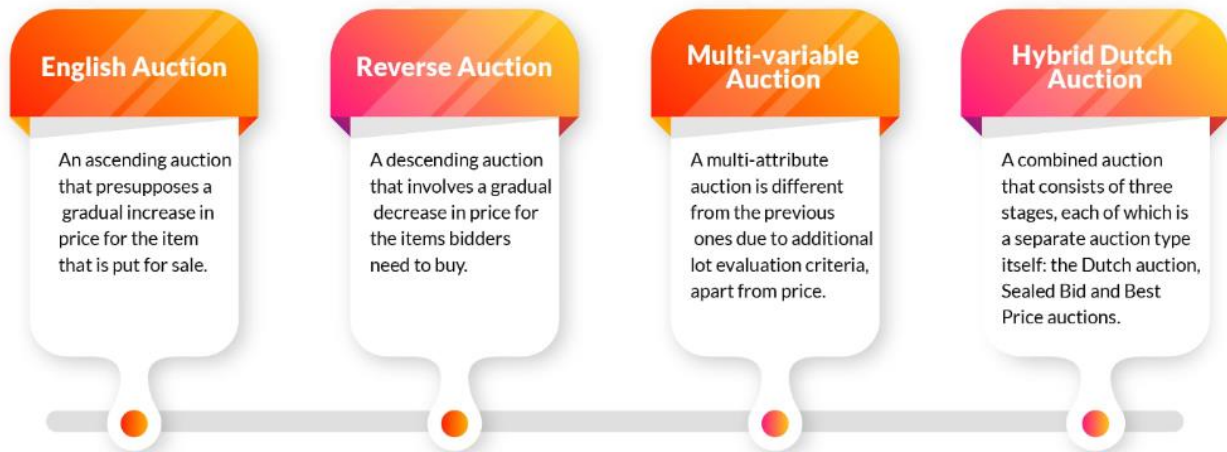


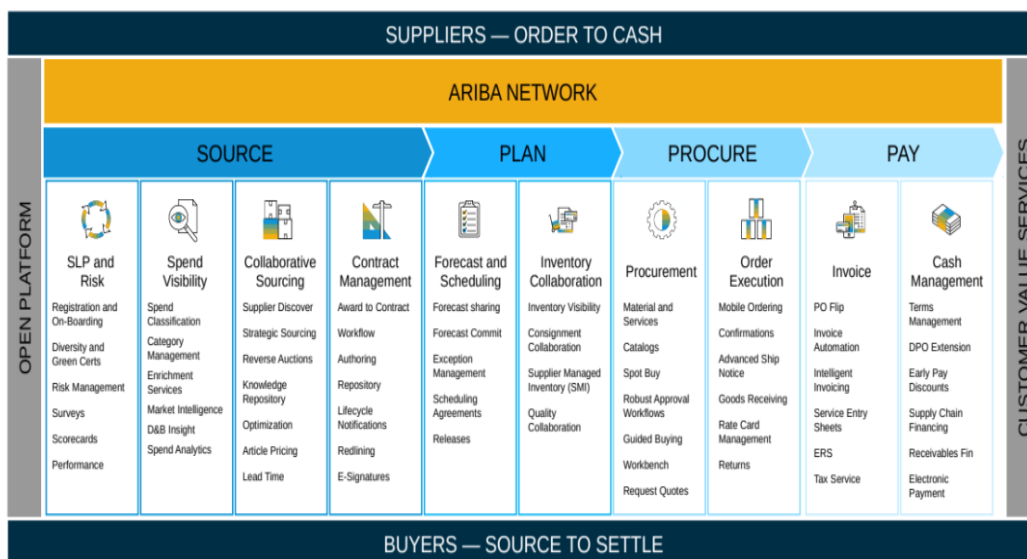
Figure 16: Four primary eAuction types

- **English Auction:** This is a simple and common form of auction. It is organized by moderators or individuals who want to attract bidders. Buyers respectively provide price levels, and the winner will have to pay what they bid to get the item.
- **Reverse Auction:** This type of auction is most used in purchasing. Here, sellers will bid against competitors to attract purchasing companies. Buyers have the right to choose the desired price levels and incentives. The winner will be the one who meets all the buyer's requirements.
- **Dutch Auction:** Dutch auctions start with the highest price of the item being auctioned and decrease gradually until the buyer accepts that price. The first bidder for the lowest possible price will be the winner. This manner helps buyers make quick decisions.
- **Japanese Auction:** With this auction, buyers have the advantage of offering a price that fits their budget and the amount will decrease over time. For example, \$100 every 2 hours. Within this time, if any supplier can supply the goods at that price, the transaction proceeds.

Next, Ariba is a software integrated with SAP to provide smart and convenient solutions for the connection between companies and suppliers. It creates many modern interfaces with diverse functions to optimize procurement and the supply chain. For purchasing, SAP Ariba helps buyer control and manage the entire purchasing process through strategic decisions. Purchase spending is controlled and improved with a quick analysis of competitive purchased prices and finding savings

sources for both direct and indirect goods while building a healthy and ethical supply chain. According to the figures provided by the Ariba website, it shows that purchasing costs can be reduced by 10% and processing costs by 25%-60% under the intervention of SAP Ariba solutions. This is a significant percentage of saving for the purchasing industry. (SAP Ariba, 2022). Considering the SAP application in the SPE process, it can be beneficial as follows:

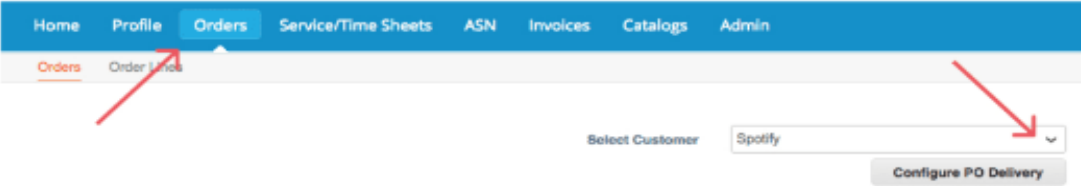
- Buyers can directly obtain a list of competitive suppliers for each specific market.
- Vendor profiles and their historical transactions are managed and evaluated by the software. It creates trust for users and reduces the time spent on supplier evaluation.
- Supplier relationship management
- Supplier Benchmarking is handled directly under the guidance of SAP Ariba, and it has diverse templates and frameworks available for different purposes of the supplier benchmark.
- Access the savings opportunity with a high ratio.
- Create a convenient, fast, and transparent environment from personal information to payment transactions.



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Figure 17: SAP Ariba in procurement

Similarly, the Coupa software also provides a supposedly perfect interface to the purchasing cycle. Unlike ERP which does not support effectively price analysis and improve purchasing performance, Coupa is one step ahead of becoming a supply digitization tool. By this, the expenditure and supplier risk are minimized. Coupa facilitates SPE in supplier selection and supplier relationship management (SRM), digitizing PR to PO process and order processing to save time. Moreover, quotes can also be retrieved over time and Coupa offers a solution to manage and analyze the purchase price that increases the chances of better price negotiation.



Purchase Orders

PO Number	Order Date	Status	Acknowledged At	Items	Unanswered Comments	Total	Actions
SPUS12345	01/18/18	Closed	None	Project Description or Identification	No	2,400.00 USD	
SPUS12346	01/11/18	Closed	None	Project Description or Identification	No	400.00 USD	
SPUS12347	01/10/18	Issued	None	Project Description or Identification	No	32,400.00 USD	
SPUS12348	01/05/18	Closed	None	Project Description or Identification	No	3,500.00 USD	
SPUS12349	01/05/18	Issued	None	Project Description or Identification	No	800.00 USD	

Figure 18: Coupa cloud platforms for procurement

The software listed above are not completely a specific application for SPE but rather supports the entire purchasing process. Each business has a thoughtful choice to use a solution that is suitable for the company's long-term budget. In particular, ERP software is often rejected by small and medium-sized enterprises (SMEs) due to its lack of specificity in terms of purchasing and high costs. These firms will buy outside-engineering software that is simpler and cheaper or have the company's IT department design a specific one for the purchase schemes. Although it may not a highly effective solution, it is cost-effective. For the large companies the Beer company X interviewed, the representative said that they are applying SAP Ariba and at the same time, the purchasing manager is also a data expert who can build the platform for SPE using Excel combined with VBA and SQL. That creates confidence in evaluating and comparing purchase prices. In short, the software is just a tool, the mindset and expertise of the individual buyer are what determines purchasing performance and SPE results.

8. Discussion

The research questions shown in the objectives part were answered through a combination of theories and empirical results.

- What methods do companies use to evaluate supplier's price?
- What difficulties and challenges while evaluating supplier's quotes?
- What are typical firms' solutions for better SPE implementation?

SPE is generally a familiar approach to purchasing, but there is scarce literature for in-depth study. Almost, researchers tend to focus on the topic of total cost analysis and spend management, as these are important financial metrics for a purchasing company. The lack of available documents and references made it difficult for the author to fully explore how SPE works, so the theoretical bases presented are incomplete. However, it is amazing that the interview results with three representatives from three firms of different sizes and industries have given some views on SPE in practice with the more accessible ways. This helps the author to come to a fairly complete conclusion about approaches for evaluating supplier prices, obstacles of SPE, and applicable solutions. Therefore, this research paper with such a topic can provide a basis for one's further research that shows interest in the issue of price in particular and purchasing finance in general.

One thing that remains controversial is the SPE's procedures. As shown in the introduction part and experimental results, there has been not a clear concept of SPE in the public literature. It is primarily understood and practiced based on the experience of purchasing professionals. The background of SPE presented is based on the TCO analysis of purchasing, which is considered a pioneer activity of the cost analysis process. The lack of SPE's conceptual clarity leads to a lack of experimental standardization. Vietnamese purchasing experts claimed that there is no standard to evaluate the perfection or right/wrong results for SPE. At what price the order is purchased is significantly up to the purchasing managers' discretion, or best price reports must be approved by the management. This sometimes is time-consuming to wait for the approval and the decision can be highly subjective. However, it creates a centralized and end-to-end workflow for the superior to easily control employee performance and reduce the buying risks at uncompetitive prices or being overtaken by

suppliers. In summary, the process of supplier price evaluation is focused widely in large companies while small companies conduct SPE in a sketchy way and burn the stages.

The difficulties in implementing SPE were mentioned from the practical perspective of Vietnamese firms, in which data source has been considered the main obstacle for most companies. The approaches discovered in this study are unquestionable given their academic popularity. There is great literature on the Kraljic matrix, supply and demand analysis, and market research. Also, the author covered several common solutions introduced by Vietnamese businesses, such as Internet-based tools, ERP/SAP Ariba/Coupa, eAuctions software, and Excel applications combining VBA and SQL. Large corporations show their interest in using ERP or SAP because it supports operating and managing all company's functions. Meanwhile, small companies usually purchase or outsource simpler software to digitize the purchasing procedure, and they approach SPE manually via Excel programming.

It is remarkable that solutions given in the conclusion part are not specific to the purchase price comparison and evaluation, but rather support the overall supplier selection activities in purchasing. One proposal for SPE's further development is that businesses can invest and thrive in an MRP system suitable for their industry. MRP (Material Requirements Planning) is useful for manufacturing companies in managing and planning materials through the simultaneous linkage between related functions such as accounting, inventory, demand forecast, and production planning. At the same time, MRP also has access to market trends and consumers, helping review information about rival companies and price levels by the market to buy products at competitive prices.

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