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Supply Chain Resilience by Strategic Sourcing: A Case Study

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Supply Chain Resilience by Strategic Sourcing: A Case Study

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Abstract

Purpose- To briefly explore the topic of improving supply chain resilience using strategic sourcing and its benefits to businesses when adopted. The project also develops a framework for the implementation of the principles of strategic sourcing for an HVAC manufacturer and supplier in the UAE, considering the pandemic and its impact on market requirements.

Approach- Define the need for strategic sourcing to meet the current market condition in the UAE. Develop a strategic sourcing framework tailor-made to the company based on the requirement of the case study to offer an advantage in the current market. Develop methodologies to implement strategic sourcing and supplier development.

Research Findings & Implication- Advantages that could be had switching to a local supplier during the pandemic and the how to develop a sourcing strategy to meet the changing market landscape and establish the company with improved supply chain resilience.

Keywords- Resilience, Pandemic, strategic sourcing, advantages of local supplier, Supply chain, HVAC

1. INTRODUCTION

The Pandemic and the year 2020 will always be a year the world will remember. This year brought about numerous challenges in the way business is being done at a global scale and has impacted every business in terms of the business strategy and areas of focus.

Inevitably the pandemic has had severe impact on the ‘status quo’ of businesses across the world. Any company that failed to have earlier plans to improve and modify their business model is struggling now to find solutions. In addition to that, companies have to adopt dynamic and resilient supply chain practices in order to remain competitive, avoid supply chain disruption and maintain their bottom line. The closing of many borders has had significant impact on the availability of goods and raw materials which are lifelines for retail and manufacturing industries. The closing of shipping lines and ports have broken down supply chains and has had significant impact on many largescale industries across the world.

The recent chip shortage is an example that drives home how supply of one component can disrupt numerous industries. Chip supply was curtailed due to the shift toward remote working model. As a result, imbalance between demand and supply grew worse over time. The problem aggravated during the Delta surge in the middle of 2021 and Omicron will extend chip shortage to 2022 although supply chain management has improved in the last two years ***[1].***

Of the many strategies in use to improve and adapt supply chains to changing market needs, the effective implementation of Strategic sourcing and strategic procurement is one of the ways forward. The rapid globalization of markets had driven the requirement for strategic sourcing early on and this pandemic placing extreme stress on supply chains has shown how imperative this is for cost reduction, reliability, and performance in a supply chain.

In the current situation, "a company's ownership of processes or capabilities is not what matters but the company's ability to dictate and use its critical capabilities to its utmost." noted by Mark Gottfredson, Rudy Puryear and Stephen Phillips ***[2]*** identifying key traits of successful companies in the 21st century.

Companies are investing in improving the value chains while making their processes flexible and agile. Strategic and capability sourcing are crucial in improving a company's value chain. Strategic sourcing helps companies streamline the organization, reduce costs, and improve the quality of their service. It also provides a competitive advantage, especially in current challenging time, by emphasizing the JIT (Just in time) model. Strategic sourcing also plays a key role in keeping the supply chain reliable and operational amid the pandemic.

Having a well-developed and suitable strategic sourcing framework goes a long way in mapping out the managerial decision-making for making supplier selection and decisions

such as make/buy. Strategic sourcing helps build on a products/company's competitive advantages and help mitigate cost, improve delivery times, reinforce supply etcetera depending on the focus of the company.

This capstone paper would be split into two sections; the first section is developing a suitable strategic sourcing framework that works for the company's requirement at hand and the second would be the analysis the benefits from the developed strategic sourcing model using world real data. The advantages to the company during the current pandemic time can be interpolated using the data. Additionally, a decision matrix will also be proposed to offer the company ease of decision making while selecting between its various manufacturing facilities to supply for projects while playing to its strengths to assist with project wins.

2. LITERATURE REVIEW

2.1 How to build Resilience in a supply chain

Paul Michelman ***[3],*** summarizes the approach to increase supply chain resilience in three main ways:

1. Increasing Redundancy

2. Building Flexibility

3. Changing the corporate structure

However, the abovementioned paths are generic. While increasing redundancy is very limited to the type of industry and company, building flexibility and changing the corporate structure are extremely essential in the changing business landscape. Building flexibility and changing the corporate structure plays a key role in the case study under investigation.

As defined by Sarah Hippold ***[4]*** there are six main strategies for improving Supply chain resilience:

FIGURE 1. SUPPLY CHAIN RESILIENCE STRATEGIES SARAH HIPPOLD FOR GARTNER FOR VISSION 2020 ARTICLE

1. Nearshoring

Nearshoring is the strategy of having the manufacturing facilities or activity centers close to the market location where they are the most effective, whereby the companies are able to alleviate some of the risks and delays involved with long distance logistics disruptions.

2. Multi-sourcing

Multi-sourcing is the strategy of souring components from multiple suppliers to prevent supply chain failure if one or more suppliers are not able to supply or meet the demand. This ensures that the organization will always an alternate option to go with and there is not drastic failure of supply chain.

3. Manufacturing network diversification

Manufacturing network diversification is where the company maintains multiple manufacturing locations and have an extensive network for manufacturing, thus enabling the company to provide products from multiple origins. This ensures there are multiple options available for the company at any given time in case there is a disruption in one or more of the facilities like, port closures, lockdowns, riots, natural calamities, etc. Having multiple manufacturing facilities also present the company with an opportunity to provide more options for the customer and a better chance of meeting specific customer requirement.

4. Inventory and capacity buffers

Maintaining Inventory and capacity buffers is a strategy were the company carefully curates and closely monitors the inventory levels and maintain a buffer inventory to meet the demand fluctuation to never run short on product(s). This is possible only when there is clear understanding of the market demand and how it varies with seasonality.

5. Ecosystem partnerships

Ecosystem partnership is a strategy where the company partners up with service providers for services like logistics, after sales service, administration, manufacturing etc. Having a close partnership and communication with service providers helps the company ensure that the supply chain is resilient, and the company can react quickly and effectively to changes.

6. Platform product or plant harmonization.

Platform product or plant harmonization is a strategy where the company develops multiple products on the same platform or can manufacture multiple products in the same factory. This guarantees that the company's manufacturing is flexible to meet the supply chain disruptions & seasonality in demand.

These above strategies are more in-depth and easier to incorporate in the new day and age and business strategies. The case study adopts strategies like nearshoring, multi-shoring, manufacturing network diversification and ecosystem partnerships to improve the supply

chain resilience. This is done by proposes the strategic sourcing exercise to ensure competitive advantage and improves supply chain resilience.

Strategic sourcing drives the companies to focus their efforts on strategic purchases of goods or services that would provide them with competitive advantages in areas where the company falls short or fails to perform.

Strategic sourcing is the art of implementing sourcing strategies that help reduce operating costs, reduce delivery times, provide better customer experience etc. in line with the company requirement to remain competitive in the market.

Strategic sourcing starts by identifying the area of the business that needs to be outsourced or strategically sourced. It can be done internally through business analysis and studying the internal processes.

The importance of supply chain resilience has been recognized during the pandemic in both retail and manufacturing as identified by R. Handfield, H. Sun & L. Rothenberg ***[5]***. Whereas retailers initially experienced mostly demand risks, manufacturers predominantly experienced supply risks were observed Hoek ***[6].***

2.2 PICKING WHAT NEEDS TO BE SOURCED

The driving forces of implementing strategic sourcing in the case study are the current market orientation and trends due to changes brought about by the pandemic. Understanding the market orientation and the company shortcoming/areas to improve is the key to developing a powerful strategic sourcing strategy.

With respect to the case study under investigation in this research, the process of selecting the product to be outsourced/strategically sourced is already defined hence, an in-depth process of selecting the right product/service to be sourced is omitted. There are several routes that can be followed to formulate and execute strategic sourcing as defined in the book by Sahit Parniangtong ***[7].***

According to Quinn and Hilmer ***[8]***, a major strategic concept in sourcing decisions is a core competence. The authors base their arguments on the work done by Prahalad and Hamel ***[9).***

2.3 SELECTING SUPPLIERS

One of the most crucial parts of strategic sourcing is selecting a supplier in line with the company principles that meets the expectations and requirements of the strategic sourcing exercise. There are numerous studies on methodologies of selecting and rating suppliers based on the factors relevant to the strategic sourcing exercise.

Sourcing activities include analyzing expenses, identifying potential suppliers, requesting quotations, negotiating contracts, monitoring, and improving suppliers are defined and analyzed by Kumar, Sameer; Bragg Richard, Creinin, Dan. ***[10])***.

The book by Sahit Parniangtong ***[7]*** covers three levels of suppler selection analysis criteria: general, operational, and cost.

Since the case study under investigation deals with a scenario where the manufacturer already has a supplier handling other product range locally, ideally it would be advantageous to develop on this venture that is already in place, to meet the requirement for local supplier for AHUs. Hence, the research does not cover the realm of supplier selection for strategic sourcing.

2.4 DEFINING FRAMEWORK

To implement strategic sourcing, a framework that suits the company's focus needs to be established. This framework would be guiding the implementation of the strategic sourcing strategy and acts as a point of reference for the management to ensure the process remains in line with the company's focus.

Elements of the framework proposed are discussed in terms of primary and secondary factors. Primary factors are internal, related to the company management and the secondary, has to do with all the external factors such as the process and supplier.

Over the years many different frameworks have been proposed, each to meet the market requirements at the time and the industry. The case study aims to develop a hybrid framework inspired by the works of Eric Sislian and Ahmet Satir; Strategic Sourcing: Framework ***[11].***

The paper works at preparing a yes or no flowchart framework for decision making, that assists in deciding which of the products meet the criteria to be strategically sourced. The case study defined in the paper leans towards identifying factors and highlighting requirements of the strategic sourcing exercise to meet the market landscape in U.A.E HVAC industry during and the post-pandemic condition.

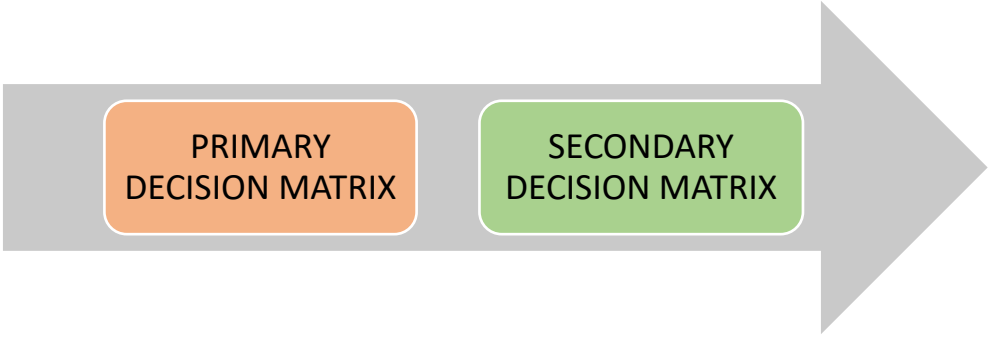

FIGURE 2 DECISION MAKING FRAMEWORK

3. CASE STUDY

The case study proposes a framework of strategic sourcing to improve the company's supply chain resilience. The case study is based on a Global HVAC manufacturer with manufacturing facilities in multiple countries.

3.1 Problem definition:

Due to the economic crunch, the business landscape in the middle east especially in the UAE has changed. The requirements and priorities of clients especially in the construction field have shifted since the pandemic began and with the EXPO-2020, every fiscal week is of utmost importance and timely delivery of projects is crucial. Immense strain is being put on the supply chains and numerous projects had to be put on hold due to delays in shipments caused by port closures internationally during the outbreak of the pandemic in 2020.

The company has noticed a shift in the client/consultant/contractor mentality for procurement HVAC equipment. Emphasis was given to more budget-friendly options while compromising on specification at times. Where lead times were of critical importance, these conditions were being easily met by local suppliers who were able to undercut major HVAC companies to win projects using their competitive advantages that suited the new market mentality. This change in the market requirement meant many major HVAC suppliers lost out to local suppliers in numerous projects where they either could not match the prices quoted or meet the specified delivery times. Closing of ports and delays in shipping meant there was no guarantee of delivery dates due to the looming uncertainty the pandemic brought with it.

In light of this new trend in the market and recognizing the need to have an option for local make units, this case study will propose strategic sourcing locally to mitigate some of the losses and in turn win a lot more projects using this new sourcing strategy to the company's advantage.

3.2 Selections of product that need to be strategically sourced

The current market trends are analyzed, and the company's performance is evaluated against the market sand the jobs that were lost in the recent months during the pandemic were also revisited and investigated. Out of the several conclusions, the one inference that pertains to this case study is losing out on projects to local suppliers for Air handling unit supply. Some jobs lost were package jobs where the customer wanted all equipment from the same supplier, and some were lost purely on the fact that the specified cost/delivery times could not be met.

The main pain point over last several jobs lost were the need to AHUs of local origin, this should help come close to the price of local suppliers.

During the Strategic sourcing process there is an internal analysis done, which involves analyzing the current product and the cost centers.

Currently the company manufactures and sells AHUs from K.S.A & Tukey to cater to demand in the U.A.E market. As discussed earlier, during the early stages of the pandemic there were significant shipping and delivery delays due to port closures and lockdowns across the globe.

The below figure differentiates the complexities between the supply chains of units from Turkey origin (International Supplier), K.S.A origin (Neighboring Supplier) units & Local origin units.

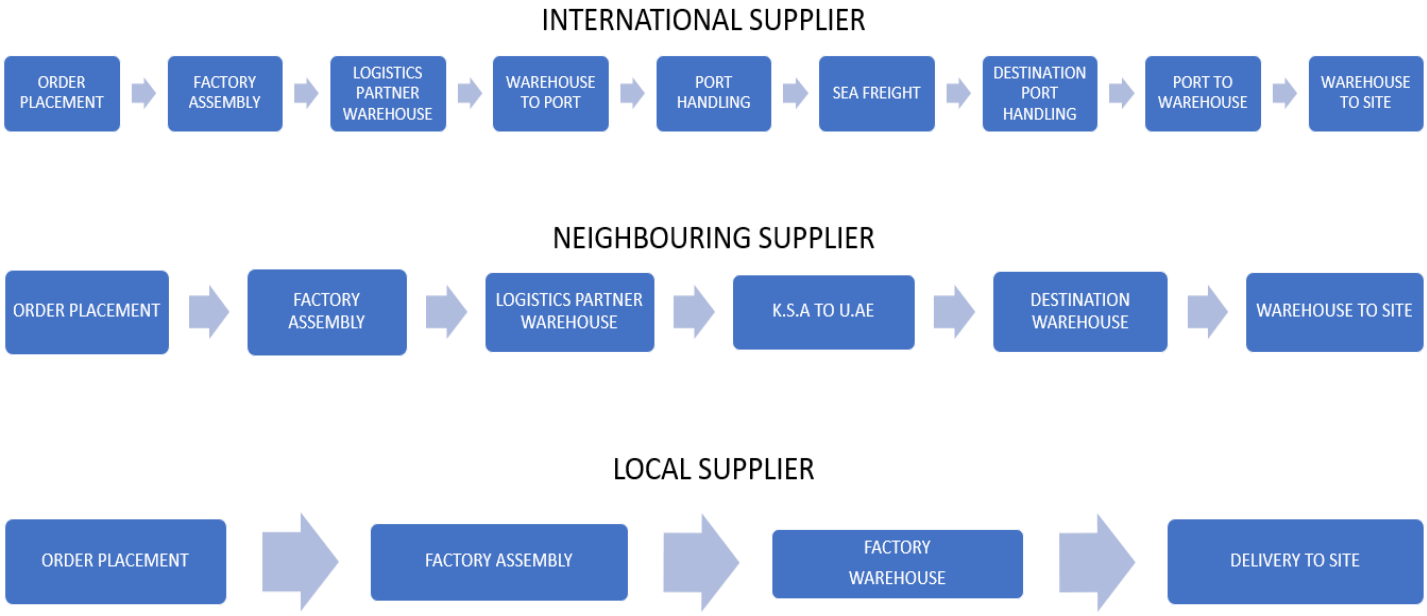

FIGURE 3 SUPPLY CHAIN COMPARISON OF THE DIFFERENT ORIGINS

As the figure depicts the units coming from Turkey has a lot many stages of transportation and storage, these multiple points of movement mean there are more point where things can go wrong and might influence the supply chain, hence creating delays in deliveries. The units coming from K.S.A have a less complex supply chain, hence less points where things can go wrong creating delays in the supply of units. In these two supply chains there are many different activities and third parties involved, wherein lies earlier highlighted points of possible failures.

3.3 APPLICATION OF STRATEGIC FRAMEWORK

The framework will have a distinctive two-step process to make the decision; Firstly, will be the sourcing decision i.e., the decision to implement strategic sourcing or not and secondly the managerial actions required to implement the decision.

Five factors are considered in the strategic sourcing framework to make it applicable to the HVAC company based on the current market situation. The factors are:

1. Competitive advantage

   This includes any advantage the product if sourced strategically might have over the competition in the market. This includes product cost, delivery times, after-market support etc.

2. The ability to process flexibility

   The requirement is to have low turnaround times and the ability to accommodate for changes/modifications in initial order with minimal delay. The chances of having requirements of quick turnaround and modification for immediate delivery.

3. Expertise to offer customized products

   Standards of Company products should be up to par with other manufacturers and Company's set standards in terms of the ability to customize the products to project specifications and requirements in line with the market. The supplier should be able to meet these requirements.

4. Product quality and standard

   The products the Company sells should be compliant with the relevant HVACR standards defined by bodies like ASHRAE, EUROVENT, ESMA, ASTMB, NFPA etc as per industry standards. The supplier should be able to meet these standards as per Company set guidelines.

5. Strategic Risk and process flexibility

   The flexibility in the strategic partnership and adaptability in terms of adjusting to market demands and trends for the most advantage. The Risk incurred to the company because of loss of Intellectual properties or propriety information is also covered in this.

   Below Figure 4. Shows the Framework developed for the strategic sourcing exercise to improve supply chain resilience.

   There are two crucial matrices in the strategic sourcing framework, namely, primary and secondary matrix. The Primary decision matrix deals with internal company decision on going ahead with the sourcing decision based on the competitive advantages to be gained. The secondary decision matrix is about the managerial steps that would be required to implement strategic sourcing decision.

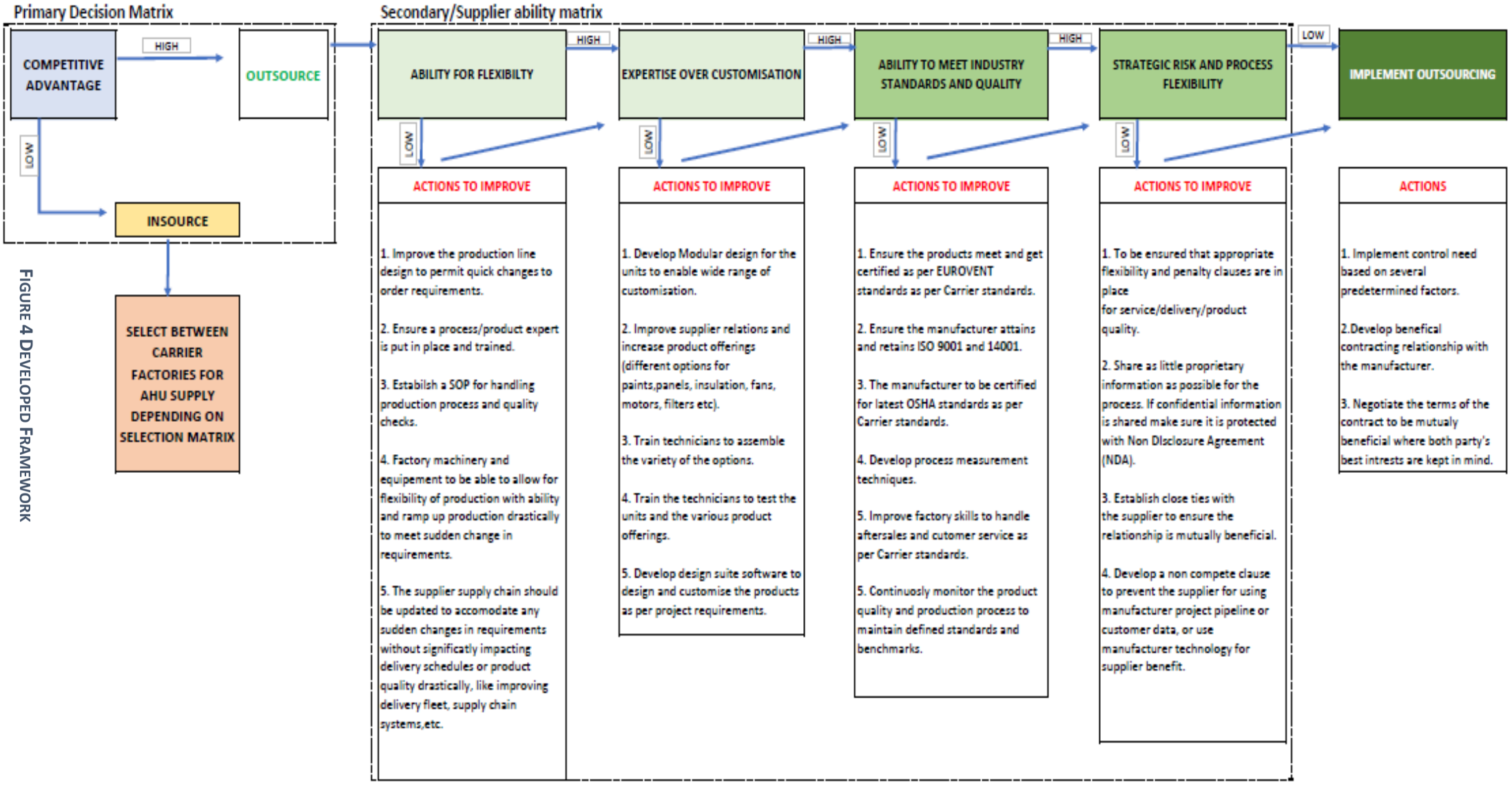

FIGURE 4 DEVELOPED FRAMEWORK

In the primary decision matrix, the company studies the situation to check the advantages from outsourcing and decide whether outsourcing will provide the competitive advantage in the current market that the company is looking for. Competitive advantage as defined for the case study, is being able to offer local origin AHUs (Air handling units) that can match or improve upon the competition cost, delivery time, quality, after-sale service, and specification.

Moving to a local manufacturer would reduce the landed cost of the product compared to sourcing from other factories (K.S.A or Turkey) for the company. This would cut costs like shipping, port handling charges, higher labor cost abroad, higher material costs etc. This should close the gap with local manufacturers and reduce the cost of company AHU offerings by 8% – 13% based on the internal analysis.

A major advantage of outsourcing of AHU manufacturing to a local OEM supplier is that these units being locally manufactured are not affected by the closing of ports or shipping delays would not affect the delivery period and in turn, does not affect the project progress. Earlier delays in shipping and delays in customs clearance have had impact on delivering the AHUs on time.

The manufacturer being in U.A.E, any after-sale support/warranty requirements at site the factory would be able to assist directly and send their technicians which makes it very convenient for the HVAC company as they do not need to intervene or send their technicians for the same.

In the secondary decision matrix or supplier ability matrix, the company evaluates the supplier on four key indices or factors that closely meets the market and company requirements. If the supplier falls short of company requirements or industry standards, various actions to improve are pre-determined and further improved working closely with the supplier.

i) Ability for Flexibility (Demand, design)

This factor deals with the ability of the supplier to be able to accommodate sudden changes in demand, specifically the ability to ramp up the production either to meet revised closer deadlines or urgent requirements for extra units.

It is often the case that there are changes at a site with require rework in design and possible change in the number of units required. In other situation, the change in design would prompt minor changes to the unit's design. This sudden change in demand should be able to be accommodated at least to a reasonable degree by the supplier.

The production line design, capacity and skill of the factory would play a crucial role in being able to achieve this ability of demand flexibility.

ii) Expertise over Customization

The supplier should be able to meet standard specification offerings in the region. Additionally, the product should be made to project-specific requirements that vary from project to project in terms of AHU/FAHU components options, for example, interior light, viewports, filters, insulations, fans, motors, configurations various panel thickness, coil coatings. The supplier should have the resources to be able to accommodate the AHU/FAHUs customization options that are listed out by the company (this list is populated based on frequent design requirements in the region) without a significant increase in the lead time. This also includes the development of a design software suite for ease of unit design to save valuable time on job turnaround.

OPTIONS REQUIRED

Few of the options and customization expected from product offerings for UAE projects.

1. Varying panel thickness as per company recommendations.
2. Various insulation options (Rockwool, PU or Glasswool) or one insulation type as per company recommendation or HVAC standards.
3. Paint options for varying levels of corrosion protections.
4. Various filter classes and filter types for different models of the AHU.
5. Varying options and finishing of unit base frame options.
6. Components like pressure gauge, lights, viewports, various frame options and bracket materials.
7. Multiple fan and motors selections from multiple suppliers.
8. Fan coatings and various motor types.

9. Various unit configuration options (double deck, vertical, heat recovery options) to meet site conditions.
10. Multiple sourcing options for components.
11. Ability for integration with various control and BMS options.
12. Various cooling coil configurations (number of rows, fins per inch, circuiting types, materials used, coils tube sizes, header options and coatings).
13. Multiple models and unit combinations to meet dimensional limitations at site.
14. Various damper configurations and types.

For the supplier to have expertise over customization the supplier needs to have a vast supplier network and good relations in order to expediate orders quickly. The ability of the units offered to be able to meet the specifications required by the consultant is very critical to wining jobs.

iii) Ability to meet industry standards and quality

The supplier should be able to manufacture products that meet the HVAC industry standards followed by the company in the region. The standards followed are EUROVENT, ASTMB/NFPA, ISO, OHSAS, AMCA, VDI/DIN etcetera.

The ability to meet stringent industry standards for performance and quality helps classify and speaks to the product's performance, design and quality. The clients trust the standards and the third-party tests conducted and these certifications will ensure that the offered units are in line with the industry standards and thus be acceptable for the application.

Below is a list of industry standards applicable for Ahu's design and production.

INDUSTRY STANDARDS

1. EUROVENT (EN 1886: 2007) (unit performance)
2. CE (European conformity)
3. AHRI (component performance)
4. ASTM B117 (corrosion protection)
5. AMCA 200,300 & 301 (performance &sound measurement)
6. ASHRAE Standard 52-76 or EUROVENT Standard 5/6 (Air filter)
7. IEC (fans)
8. ASTM A 653 (coating)
9. DIN 4102, EN 13501-1 (fire class)
10. ASTM D-2201 & 2092 (paint properties)
11. ASHRAE 15 (coil performance)
12. AISI 321 AND 430 (heating element)
13. ISO 5136, DIN 45635 part 9, BS 848 or AMCA 330-97
14. DIN ISO 281 section 1 (bearing life)
15. EN 13053, DIN 1946/4, VDI 6022 (hygienic units)
16. ISO 9001 (Quality management system)
17. ISO 14001 (Environmental Management system)
18. ISO 5001 (Energy Management system)
19. ISO 27001 (information security Management)
20. OHSAS 18001 (Occupational Health and safety Management system)
21. SA 8000 (Social accountability)
22. ISO 1940-1 (mechanical vibration)

iv) Strategic Risk and Process Flexibility

This deals with the managerial action required to keep the risk in check during the strategic sourcing process. Actions are taken to reduce and prevent as much as possible the Appropriation risk and Diffusion risk. Strict regulations and contracts in place can mitigate some of the risks. The contracts should be airtight enough to be able to protect the company in terms of any liability.

3.4.1 Actions to improve supplier requirement

In case the supplier falls short in any of the specified requirements specified by the HVAC company. A set of actions in line with the standards and business requirements of the company are specified to be followed by the supplier to assist in getting the supplier's management, production, logistics any other processes up to the standards pre-determined by the company to ensure the best business practices for smooth operation and quality products.

3.4.2 Actions to Improve Supplier Ability for Flexibility

Basic actions to improve the supplier's ability to be able to accommodate a sudden change in order requirements. The actions to be implemented aim to prepare the suppliers' production line, operations, supply chain and logistic capabilities to be able to handle a sudden influx of demand or order changes at the last minute.

3.4.3 Actions to improve Expertise over Customization

Implement actions to develop the ability of the supplier production process and technician skills to be product experts and have the skills to be able to offer required customization options from the factory. This includes the ability to design and make changes to the unit to meet the project requirements.

3.4.4 Actions to improve to maintain product quality and meet international HVAC standards

Implement and set quality standard benchmarks to be followed by a supplier in order to maintain the product standards and quality expected of the supplier. These actions help set a route map and goals the supplier will need to achieve by improving the management processes, factory operations, product line improvement, employee skills and product offering.

3.4.5 Actions to Improve Process flexibility and reduce risk to company

These actions help to alleviate some of the risks associated with strategic partnerships where the transfer of technology happens. The action includes having strong legal documents ensuring neither of the parties is exposed to any sort of malpractice or have to face any sort of loss of proprietary information in the partnership. The actions also include clauses of performance and penalty, ensuring the supplier sticks to the performance requirements set by the company.

3.4.5 Actions to Implement Outsourcing

These are the actions and the steps out of many that the company can implement while implementing strategic sourcing and forming a partnership with a supplier. These include the financial and operational contracts for the partnership that legally binds both parties to stick with mutually agreed upon performance indices to ensure smooth workflow.

3.5 Benefits and justification of local origin units

Why should we consider local origin units and how much of an impact a local supplier will make on projects?

Figure 1 below shows the current Company AHU origin landscape, the cost comparison of AHUs from the two sources on offer now (K.S.A & Turkey) and shows in an AED/CFM chart. The chart indicates the price change (AED) over the airflow range (CFM), to give a better picture of the price of the unit across the model range. The cost comparison chart also shows the target Local AHUs pricing over the model range.

The Y-axis value range shows AED/CFM this is an indicator that shows the cost of AHUs in terms of airflows on X axis, this makes it easier to classify and compare the AHUs since not two manufacturers makes the same models or have the same components. Having this direct comparison gives a clear picture of the AHU pricing across the board.

This graph depicts a graphical representation of the cost advantage of moving to a local supplier for projects. The assumed cost of LOCAL origin AHUs is based on information from previous projects and general market trends. This can act as a target pricing scale to be matched during this strategic sourcing exercise.

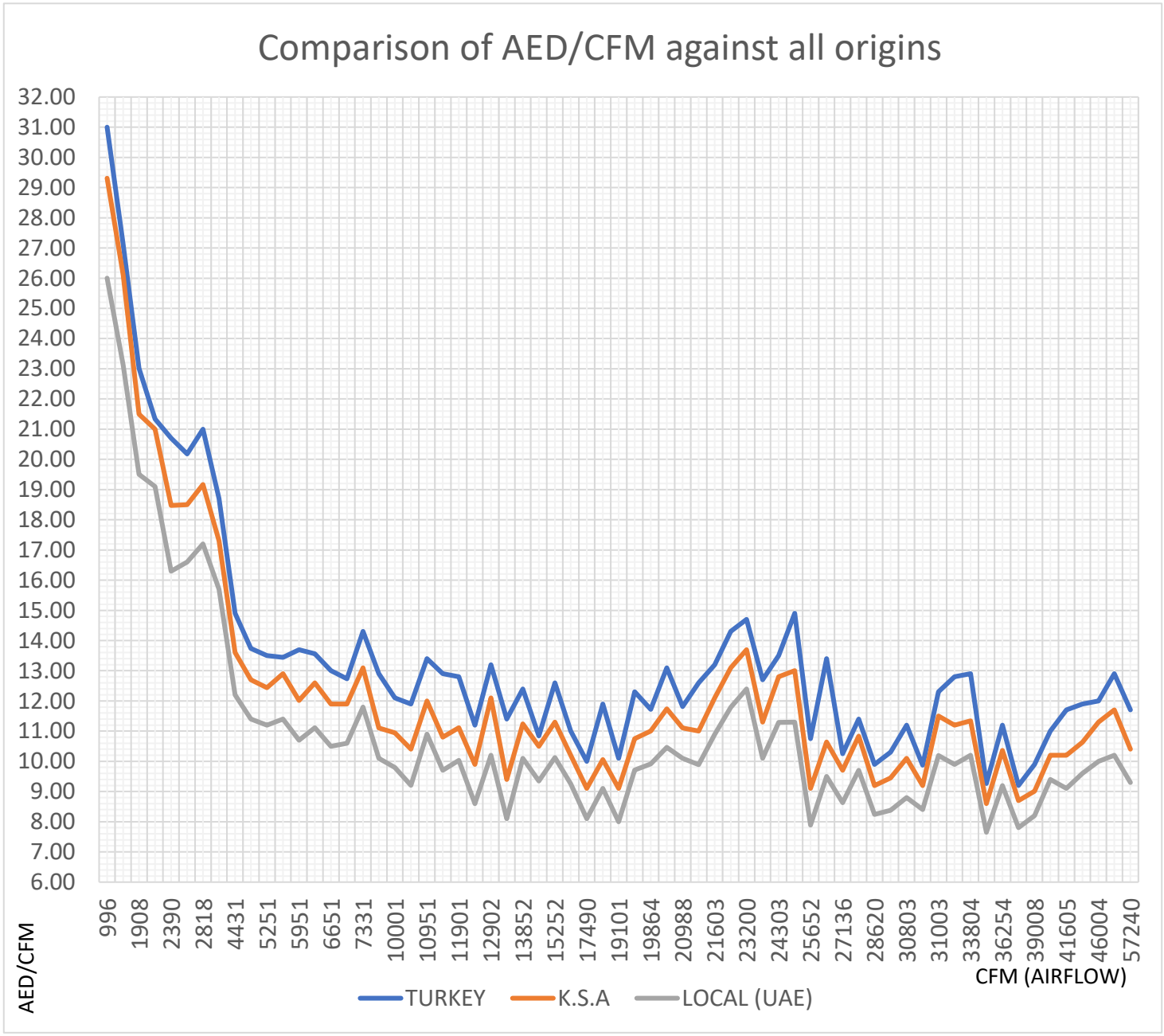

FIGURE 5 ORIGIN PRICE COMPARISON BASED ON CFM

Below **Graph 2** shows a real-time comparison of AHU prices from various origins for 4 different projects in the U.A.E. The table is indicative of the price increase that comes with Origin and the cost of shipping the units to the project site.

This graphical representation is very effective in the selling price comparison of the two origins because this is an apple-to-apple comparison as the graph shows the price difference between the two origins for the same project.

In Grey, the approximate price of the local origin units is highlighted to indicate what would be the selling price of local origin AHUs for the same projects.

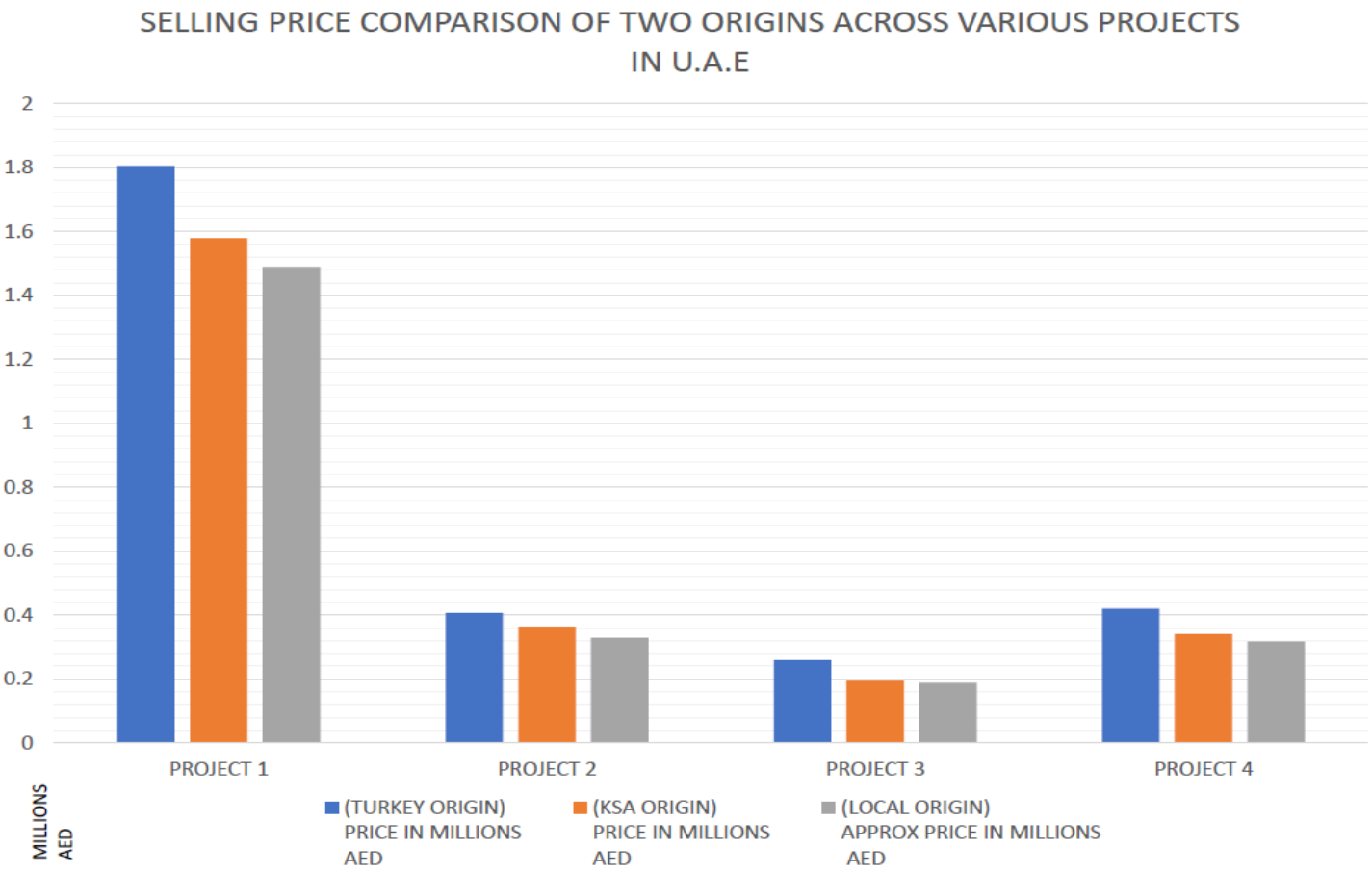

FIGURE 6 ORIGIN SELLING PRICE COMPARISON

How much of an impact does international Shipping of AHUs have in landed cost?

Figure 3 shows the impact of shipping cost, customs duty and delivery to site cost on the unit selling price indicated in orange. This is indicative of the reduction in unit cost that can be achieved by changing the country of origin. Moving to a local supplier for AHUs can significantly entirely remove the shipping cost and port charges and the delays that come along with it, thus effectively helping reduce the unit selling price and mitigating risks involved with shipping delays. This is in addition to the reduced production costs involved with local production and assembly of units.

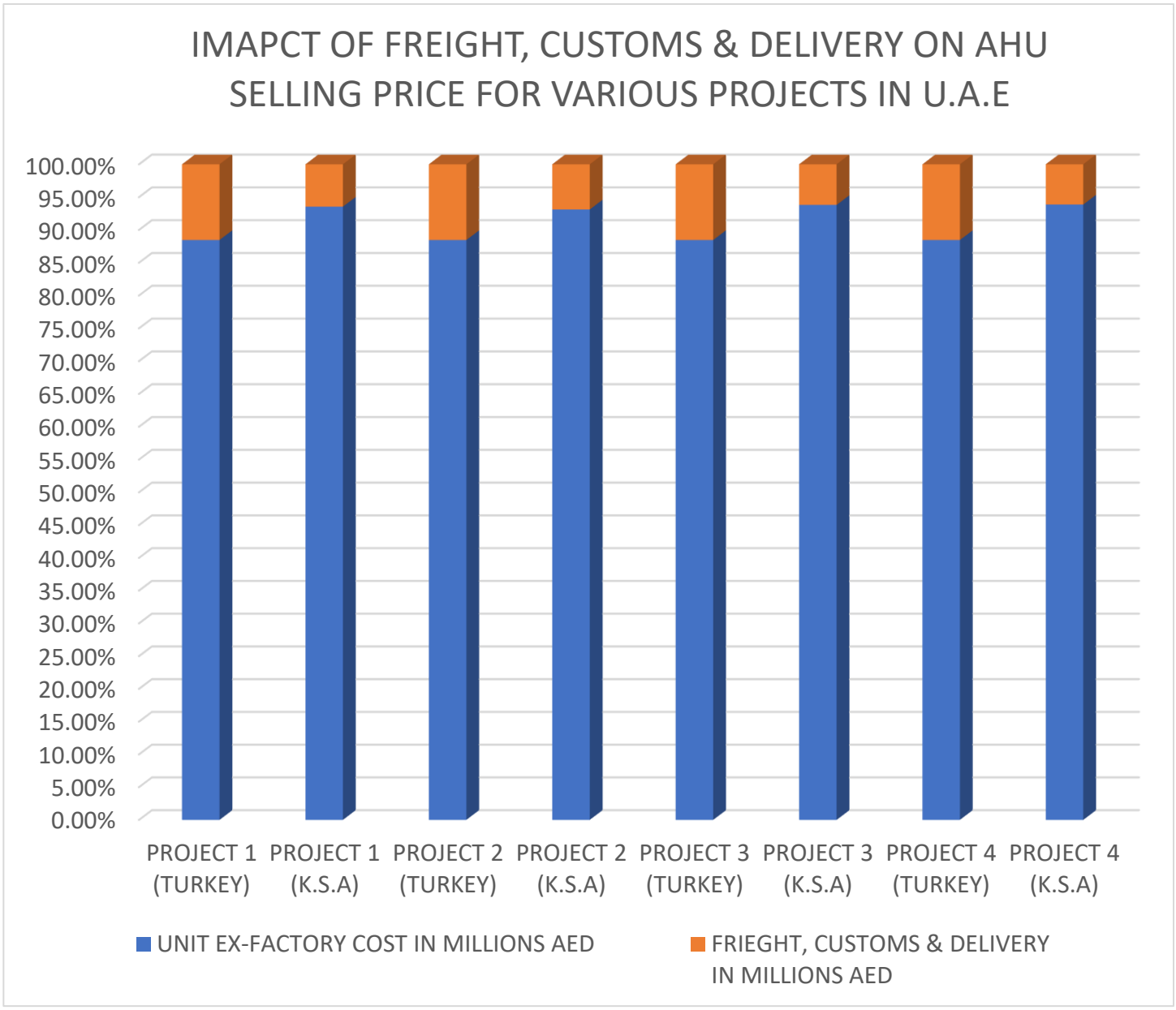

FIGURE 7 IMPACT OF FREIGHT ON SELLING PRICE OF VARIOUS ORIGIN

In the current situation, the shipping cost has increased tremendously especially for the far east sector, increasing the shipping cost by a factor of 40% for shipping products from CHINA to the U.A.E. Many such socio-economic factors affect the product cost that is out of the control off the company, these can be offset with strategically sourcing the AHUs as and when the certain projects call for it. Having this locally sourced option will help with making the supply chain more resilient ensuring product availability even if the shipping lines or ports are compromised.

3.6. ORIGIN SELECTION MATRIX

Below figure3. Was developed as tool during the case study to be used by the sales to determine the ideal AHU Origin to source for a project based in the priorities and the matrix goes to indicate the advantage and the disadvantage that comes with using each of the available origins.

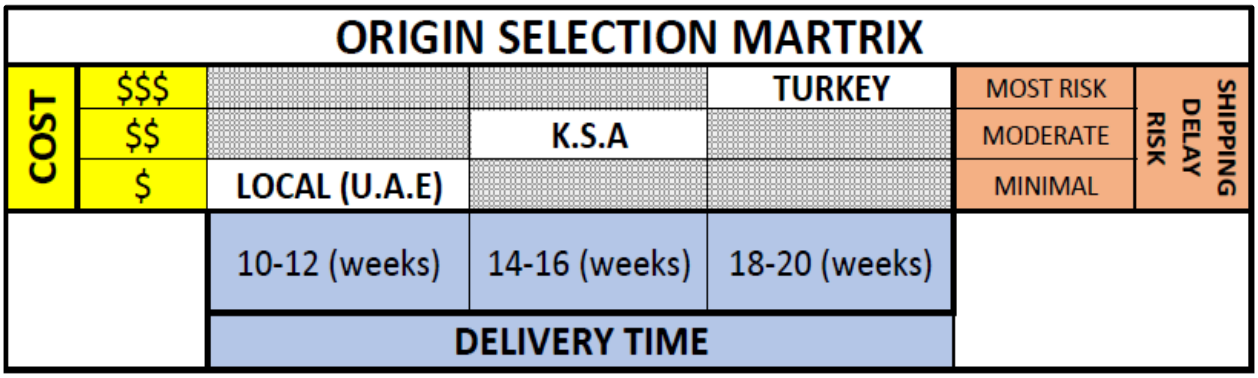

FIGURE 8 ORIGIN SELECTION MATRIX

For example, if a client specifically for any prestigious project requires high-end AHUs with superior specifications the Turkey origin can be proposed but the origin matrix helps understand that opting for the Turkey origin AHUs would mean the increased risk of shipping delays and additional cost that can be incurred with freight and customs.

Whereas AHUs from K.S.A origin have lower shipping risk as these units are brought to the country via roadway, hence from our experience with the pandemic, would not be affected by port closures or shipping delays. The unit freight and transportation cost also is much lower in this case. Further, being manufactured in K.S.A means lower production costs as labor and raw materials are cheaper to source compared to Turkey.

The Local AHUs offering can be proposed for projects with aggressive competition in pricing or in projects where delivery times and local factory support are crucial. Having local factory support to handle minor issues and rectifications at the project site means the company does not have to allocate resources for these jobs and leaves the responsibility with the factory technicians.

4. SUMMARY

- This Case study aims to provide a proposal to address the problem the Company is facing currently due to the changing market trend in the U.A.E.

- Strategic sourcing as a tool is looked at to improve supply chain resilience while also addressing the sourcing and problem at hand.

- A framework was developed keeping in mind the specific requirements of the Company from this strategic sourcing exercise.

- It was depicted that going with a local manufacturer, to locally source quality AHUs, will not only help give the company a competitive edge but also helps the company to go for aggressively priced jobs against the local manufacturer. Having a local AHU manufacturer helps bolster the supply chain by diversifying the company's resources and suppliers.

- This case study depicts the advantages of having a local equipment supplier to meet the changing HVAC business requirement in the U.A.E.

- This Case study also provides an initial framework to base the strategic souring exercise upon, while highlighting the risks involved in the process.

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6. FURTHER READING

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- Small Business and Strategic Sourcing by **Nancy Y. Moore, Clifford A. Grammich, Judith D. Mele**
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- Strategic sourcing for supply chain agility and firms' performance by **Arif Khan K** & **Rajesh K. Pillania**
- Strategic sourcing management's mindset: strategic sourcing orientation and its implications by **Reham Eltantawy, Larry Giunipero** & **Robert Handfield**
- Demand shocks and supply chain resilience: An Agent based modelling approach and application to the potato supply chain by **Lian Lu, Ruby Nguyen, Md Mamunur Rahman** and **Jason Winfree**
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