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Feasibility Study of Localization and Local Sourcing for Factory-In-A-Box Solution for Contribution to Humanitarian Development in Turkey

Master's Thesis in Supply Chain Management

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SUMMARY

Disasters in today's world result in a significant housing shortage that has a profound impact on the society and countries affected. In addition, those harmed by natural disasters have lost their employment opportunities and economic power. Neighboring nations taking in refugees in camps and settlements from the nations affected by these disasters. Although these camps offer shelter to those in need, it is not always easy or effective for them to integrate into the local population. Localized factory-in-a-box facilities would therefore have a significant impact on how well refugees integrate into society. Additionally, it would be more practical to build portable houses, field hospitals, temporary schools, and other infrastructure. The local population and refugees who are incompetent in terms of skills, education, and language would also make up the labor force in these mobile factories. Therefore, setting up factory-in-a-box facilities in nations that host large numbers of refugees who are willing to work could help build humanitarian settlements. Turkey was chosen as the location for Factory-in-a-Box because of the country's history of natural disasters, demographics, physical infrastructure, and refugee camps. The establishment of a factory-in-a-box solution in Turkey can provide temporary housing and jobs for those affected by the disaster. The localization of a factory-in-a-box in Turkey is made possible by extensive research on variables including incentives, the nation of origin of the brand, and supplier accessibility. After conducting research on localization, industrialists and academics were interviewed to learn more about the difficulties in localizing the bill of materials, including the availability of raw materials, quality and the search for environmentally friendly products, high inflation rates. Finally, a new raw material is recommended by the implementation of the Pugh matrix and the results that were derived.

Keywords: Factory-in-box, Localization, Sourcing, Turkey

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1. Introduction

Following chapter indicates comprehensive information regarding the study, including the sections that are background, purpose and research questions, scope and delimitations.

1.1 Background

People who are affected by disasters lose economic and social assets (Few, 2003; Daniel E. James, 2014). As a result, individuals tend to relocate to other safe areas within their own country or depart to other countries in order to protect their lives and find a source of income through employment and a place to live.

Relocating to another country for refugees constitutes several challenges. Affected people are only given basic essentials including food, housing, and temporary shelter. Furthermore, contemporary study reveals that many refugees work in informal employment that pays less than minimum wage and are occasionally assisted by the public (Lee et al., 2020). Natural disasters force refugees to flee to other countries. When compared to other migrants, they have legal, physical, and psychological challenges that cause them to perform poorly at work (Lee et al., 2020). As a result, developing a career strategy becomes challenging (Desiderio, 2016). In conclusion, disasters primarily affect people in the disaster area, but they also affect governments.

From the standpoint of the host country's government, consistently subsidizing refugee camps would be superfluous because creating job positions does not generate cash and it is difficult to create new occupations for refugees in crisis based on their skill set. Integration of refugees into a foreign society can be challenging due to cultural and linguistic hurdles, a lack of legal rights, and a lack of safety and security due to unemployment. As a result, basic government support such as work, housing, and health can aid in the process of integrating refugees into the new society (Lee et al., 2020).

For refugees and other types of migration, housing is a crucial issue. People are usually given temporary shelters where people can go about their regular lives, such as cooking, working, and sleeping until they recuperate from the disasters (Félix et al., 2013). Temporary housing can provide protection and safety until residents can rebuild their permanent dwellings. Most of the time, temporary shelters are not designed with the needs of the people and weather conditions in mind (Félix et al., 2013), which leads to increased costs due to high maintenance and may be harmful to the environment due to the use of unsustainable methods or materials (Félix et al., 2013). As a result, a method for quickly constructing well-conditioned temporary shelters that are ideal for certain weather conditions, inexpensive, and can be relocated to any site as needed must be developed.

Companies may implement the localization idea to build mobile factories in disaster-affected areas to produce portable shelters for those in need of immediate housing in order to achieve flexible production and fast delivery times. Localization strategies

enable effective and speedy supply chain responses, which are critical in humanitarian logistics (Frennesson et al., 2022).

After establishing a factory-in-a-box in a disaster-affected area, material sourcing must be organized in order to commence manufacturing of temporary shelters. Sourcing from the firm's origin nation to the manufacturing facility's established location would result in time delays and an increase in costs. Furthermore, global sourcing may result in transit delays that are crucial for humanitarian help (Pazirandeh, 2011). As a result, enterprises aiming to meet the urgent demand for portable shelters can source in disaster-affected nations to cut supply, production, and transportation costs, as well as lead times.

However, localization and developing factory-in-a-box in disaster-affected nations necessitate extensive research into the enablers and impediments specific to disaster-affected countries. Because of these complex issues, there is a need for a feasibility study before implementing factory-in-a-box in disaster-affected countries to determine how a firm that produces portable shelters can localize the production facility and explore the challenges in local sourcing of process materials that are needed for production in the foreign locations and overcome the respective challenges.

1.1.1 Factory-in-a-Box

Factory-in-a-box is considered a feasible and viable solution for building up portable houses in short output times. The factory-in-a-box, according to Jackson & Zaman (2007), is a transportable production capacity. The major goal of the factory-in-a-box is to make the production facility available everywhere and easily transportable to any site. Furthermore, factory-in-a-box solutions were created in response to increased flexibility, shorter lead times, and low-cost and low-volume manufacturing requirements; additionally, these standardized production modules can be transported by truck or rail (Jackson et al., 2008). As a result, higher manufacturing flexibility contributes to faster response times during disasters.

On the other side, the factory-in-a-box production cells serve as a learning environment for the immigrants who will be engaged as laborers. Since portable factories provide skills ranging from lean manufacturing to digital technologies, participants will play an introductory role in terms of efficient learning (McHauser et al., 2020). The firm's social sustainability aims would be satisfied by incorporating the refugee workforce in the manufacturing stages, because a factory-in-a-box solution would provide jobs for those affected by disasters.

Furthermore, because producing movable shelters creates a sense of ownership for the disaster-affected people, the unpleasant physiological side effects of disasters would be decreased. In the case of previous decades' reconstruction initiatives, these projects aided refugees in minimizing the harmful physiological side effects of conflict by fostering a sense of ownership for the buildings that refugees built (Matopoulos et al., 2014).

Finally, the factory-in-a-box's transportable production capacity would bring certain advantages in terms of lead times, transportation costs, and indirect positive effects on the well-being and integration of disaster-affected people through employment.

1.1.2 Localization

Foreign enterprises can benefit from localization by increasing their market size and revenues. According to Christensen & Drejer (2005) research, the need to reduce costs leads enterprises to localize due to access to infrastructure and the local labor market. Furthermore, the ability of foreign enterprises to teach local management teams shows to be an important aspect in ensuring long-term success (Selmer, 2003). Obtaining local benefits through localization promotes their business. For example, in COVID-19, disruptions and uncertainties encourage enterprises to regionalize their supply chains, resulting in shorter lead times and a narrower business. According to Nandi et al. (2021), supply networks became more localized as a result of the effects of COVID-19. As a consequence, during uncertain times, multinational corporations seek to maintain their respective market share by regionalizing in local marketplaces.

However, when multinational corporations use localization to improve their individual operations, there will be potential opportunities as enablers as well as particular country-specific difficulties. Government policies, creating value for customers, and cost-saving potential are very important for a manufacturing firm aiming to change manufacturing procedures (Petersen et al., 2013). Based on this, gaining a deeper understanding of the business environment of a foreign country is critical for a company looking to expand into a new market.

1.1.3 Humanitarian Logistics

According to Thomas & Mizushima (2005, p. 60) humanitarian logistics defined as “the process of planning, implementing, and controlling the efficient, cost effective flow and storage of goods and materials as well as related information from point of origin to point of consumption for the purpose of meeting the end beneficiary’s requirements”.

When it comes to business logistics, firms are already familiar with suppliers, warehouses, and stable demand. However, In humanitarian logistics, the location of the disaster is unknown, as is the demand that needs to be met by the impacted people. It is difficult to source materials for the impacted region because the providers are unknown. Furthermore, the resources available to acquire the products are insufficient.

As a result of these problems, humanitarian logistics takes three steps to provide disaster relief: preparation, immediate reaction, and reconstruction. During the planning phase, catastrophes are classified as either quick onset or gradual onset (Kovacs & Spens, 2007). Even if the disasters are unexpected, there is a pattern, such as the region where they occur (Kovacs & Spens, 2009).

Preparation includes activities such as locating suppliers, determining the most effective routes, conserving financial resources, and stocking warehouses. Local governments or assistance organizations might follow the strategy established by humanitarian logisticians in the immediate reaction phase and set up transportation between warehouses and impacted areas to convey resources to the populace. During the reconstruction phase, saved financial resources can be used to create camps for the disaster-affected population until they recuperate.

1.1.4 Case Study

A Swedish construction firm would be researched as the focal firm. Strategy for the focal firm to enter the foreign market by implementing a localization strategy in foreign nations that entails the establishment of movable factories known as factory-in-a-boxes that will build portable shelters for different uses. The primary reason for localization is that sourcing raw materials from Sweden would be costly and time-consuming. Furthermore, in times of disaster, the response speed is crucial for humanitarian help. As a result, a Swedish company that manufactures portable shelters using a factory-in-a-box model plans to join a foreign market. However, establishing a firm in a foreign country presents hurdles; on the other side, facilitators would bring benefits. As a result, Turkey was chosen as a case country in the analysis for the focal firm to establish a business. The case study chapter explains why Turkey is a suitable country to begin investing in the focal enterprise. To inspire the feasibility search for localization in a disaster-affected country, country-specific enablers and barriers were explored and discussed.

1.2 Purpose and Research Questions

The purpose of this study is to conduct an exploratory study to highlight enablers and challenges that would be crucial for the focal firm to produce portable shelters by factory-in-a-box solution when initiating localization in Turkey. Furthermore, recommendations to the respective challenges sourcing locally are proposed in the study. Hence, the research questions below constituted in order to seek solutions for the focal firm to smoothen the process of localization in Turkey .

Feasibility study on local sourcing was conducted to determine potential challenges that the focal firm could face in Turkey when sourcing local construction materials needed to produce portable shelters by factory-in-a-box solution. Hence in order to overcome the local sourcing challenges, potential solutions would be proposed to the focal firm.

RQ1) What would be alternative solutions to the challenges that occur for the focal firm during local sourcing for the construction of portable shelters in Turkey?

After the feasible solution is determined for the portable shelter, respective enablers of localization are highlighted in the report as well as effects on factory-in-a-box establishment. Therefore, research question 2 was formulated to demonstrate the link between localization enablers and establishment of factory-in-a-box and production of portable shelters.

RQ2) What are the localization enablers that the focal firm should consider in Turkey for the establishment of a factory-in-a-box?

1.3 Scope and Delimitations

Feasibility study focused on localization enablers in Turkey for the establishment of factory-in-a-box. Furthermore, local sourcing challenges were studied related to portable shelter production in Turkey. Transportation of portable shelters to the refugee camps and usage areas of portable shelters in the refugee camps are considered as limitations as the aforementioned topics are not studied.

2. Methodology

This chapter provides an explanation of the study's methodology. The study's argument would be strengthened by the methodology section (Shahalizadeh et al., 2009). The first section of the methodology chapter describes the procedures used to obtain the data, which included interviews and a review of the literature. Additionally, the empirical data from the literature and the interviews served as the foundation of the case study. In the discussion part, findings from the case study and the theory are compared and examined. Hence, figure 1 (see below) constituted to schematize the design of the study.

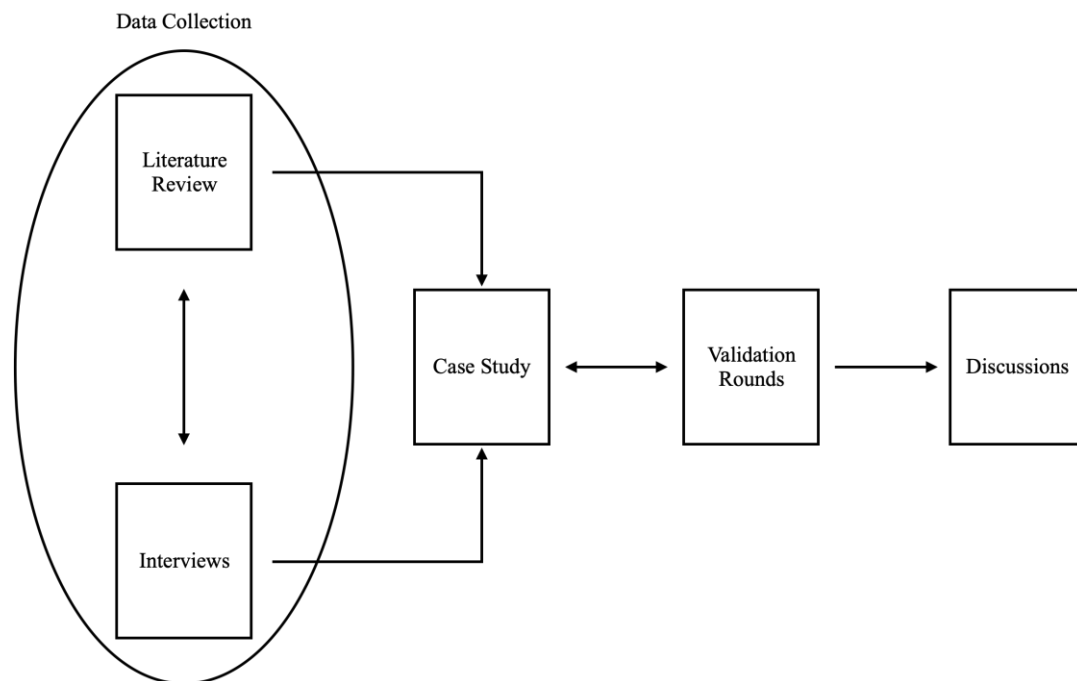


Figure 1: Design of the study

Semi-structured interviews and literature reviews are the two subsets of data collecting. A thorough grasp of the pertinent topics pertaining to the research areas was developed through an iterative process between the literature review and interviews. Literature review played a constructive role in order to have a well structured interview to gather the empirical findings for the case study.

A literature analysis and further interviews were undertaken to strengthen the findings and enhance the case study for the research. Following the presentation of findings to the CEO of the focal firm and the case project manager, which the authors refer to as validation rounds, empirical data from the case study was reviewed. The purpose of the validation round discussions is to validate the case study's findings. Furthermore, case study findings were modified in accordance with comments made by the case project manager. The empirical data is compared to pertinent literature in the discussion chapter and examined to propose the final recommendation.

2.1 Data Collection

In the data collection chapter, the sources of data were explained. Data collection consists of a set of interviews and a literature review.

2.1.1 Interviews

To gather data for the study, interviews were conducted with individuals from various academic backgrounds, as well as professionals from the construction industry and the consultant firm. Six interviews were done in all. The number of interviews, interviewee roles, and duration time are listed in the table below (see Table 1).

Table 1: Interviewee table

ID	ROLE	Duration
Interviewee 1	CEO of the Focal Firm	45 min
Interviewee 2	Case Project Manager	Regular meetings (60 min)
Interviewee 3	Regional Specialist for United Nations	60 min
Interviewee 4	Researcher on Humanitarian Logistics	60 min
Interviewee 5	Vice Chairman of Executive Board at Turkish Construction Firm	30 min
Interviewee 6	Consultant (Turkish Business Environment Specialist)	75 min

Supported information about local sourcing difficulties in Turkey and localization enablers, which is stated in the case study chapter. All additional interviews were conducted online using digital means, with the exception of those with the vice chairman of a Turkish construction company and the manager of the case project. Meeting invitations were sent out ahead of time, and meetings were conducted as semi-structured interviews, with an appendix of interview questions sent to interviewees prior to the meeting. The authors contacted the interviewee 3 and interviewee 4 via email after connecting with them through the thesis examiner. The majority of the interviews took place via online sessions.

2.1.2 Literature Review

By examining research publications from sites including Science Direct, Emerald, Chalmers Library, and Google Scholar, the literature review was carried out. In order to get the necessary information from the respondents, the information gathered from the research papers is used to create questions for the interviews. Moreover, the academic journals and the data gathered from the interviews are compared, which aids in addressing the relation between the literature and the case study. Additionally, the World Bank, reports from consulting firms, and the website of the Turkish Investment Office determined as data sources all contributed to the broader collection of facts regarding the project's scope. Additionally, the case study's empirical data regarding

localization enablers and local sourcing challenges that were analyzed in the discussion was gathered through a literature review.

2.2 Case Study

The case study's structure is described in this chapter. Information on the focal company, justifications for localization in Turkey, localization enablers in Turkey, and challenges associated with sourcing construction materials for the focal company are all addressed in four different subsections. Table 2 (see below) highlights the data sources that were used for the case study chapter.

Table 2: Data Sources Used for Case Study showed with X letter

Chapter 4. Case Study				
Sources That Used for Data Collection in Case Study	Company Background	Reasons for Selection of Turkey	Enablers of Localization in Turkey	Challenges for Local Sourcing of Construction Materials
Semi-structured Interviews	X	X	X	X
Academic Journals	X	X	X	X
Focal Company's Website	X			
World Bank Country Survey		X	X	
Consultancy Reports		X	X	
Turkish Investment Office Website			X	

The interviews, academic journals, and the focal company's website were used to gather information about the focal company. The company's website and academic journals are used to acquire information about the production of portable shelters. The main firm's criteria for producing portable shelters were provided through interviews. Based on the interviews, the case study on local sourcing in Turkey included research on the availability of construction materials, the quality of those products, and the significance of using environmentally friendly building materials.

The main justifications for choosing Turkey were established in light of the results of interviews, World Bank surveys, and consultancy reports. Initial interviews gave some key insights into why a factory-in-a-box solution needed to be localized. The authors

also identified four distinct factors, including the occurrence of natural disasters, demographic traits, Turkey's physical infrastructure, and refugee camps in Turkey, as the causes for the focal firm to start the localization and production of portable shelters in Turkey based on the findings from academic journals, consultancy reports, and World Bank Country Surveys.

Incentives, Swedish brand image, and supplier accessibility are derived from the consultancy reports which were discussed as localization enablers. The Turkish Investment Office website has information about incentives. In addition, empirical information about the Swedish brand's perception and supplier accessibility in Turkey was gathered through interviews and other means, including research published in academic journals, country surveys conducted by the World Bank, and consultancy reports.

Following the interviews with the CEO of the focal firm and case project manager, issues in local sourcing in Turkey were highlighted as being material availability, building material quality, and environmentally friendly materials. Therefore, empirical information about these particular difficulties in local sourcing was gathered via interviews and academic journals.

2.3 Validation Rounds

The CEO of the focal firm and the project manager of the case project participated in validation rounds to discuss the presentation of the empirical facts about the issues of wood availability, quality and environmentally friendly materials in Turkey. Alternatives to the present materials used to create the portable house were looked into and studied in the discussion chapter based on the conversations in validation rounds in order to form recommendations for alternative construction material alteration for production.

2.4 Discussions

Case study and respective findings proposed and presented to the CEO and case project manager, from the validation round, it was concluded that construction material should be changed for the production of portable shelters.

In order to determine the most feasible option, the Pugh matrix methodology was implemented. Elements that constitute the Pugh matrix have been explained. Furthermore, each iterative step of the matrix is highlighted and justified. Therefore, a feasible alternative solution for construction material selection for portable shelters was proposed. In further discussion, the roles of enablers were interpreted as initiating the localized production of portable shelters by selected feasible materials.

2.4.1 Pugh Matrix Method Explanation

In the text below, the methodology of the Pugh Matrix is explained.

Step 1 : Select the material or any item that needs to be compared. Choose other alternative material that needs to be compared with the reference material. The materials are listed in the horizontal side of the Pugh matrix table.

Step 2 : Criterias that will be used for evaluation of the selected materials are listed. The scores for each criteria is set based on the Importance. In the pugh matrix, the criterias are listed horizontally.

Step 3: Impact levels of criteria assigned within the range of 0 to 5 positive integer numbers. Which emphasized the importance of criterias by the authors for the alternative material selection.

Step 4 : In the Pugh matrix, set the base reference material score to zero for all the criterias. Then, score other alternative materials for all the criteria to compare the materials with the base reference material. The Pugh matrix is marked using "+X", "-X", "0", X= numerical score. "+" signifies that a particular solution performs better than the base reference material on a specific criterion. "-" signifies that a particular solution performs better than the base reference material on specific criterion. "0" signifies that a particular solution performs similar to the base reference material on the specific criterion.

Step 5 : The scores from the pugh matrix for all the alternative materials against the criterias are multiplied with the criteria importance score which was set in step 2. Finally, total all the scores for the alternative materials and choose the alternative material which scored higher than base reference material.

Factors used to determine the scores included accessibility to building supplies, the environmental impact associated with the supplies, desired quality, affordability, ergonomics, climate compatibility, and earthquake resilience. Based on information gathered from the literature on the factors along with various interviews, the authors filled the scores in the matrices. The CEO and the case project manager provided direction as well as comments after the scores had been validated.

It is possible to identify which building material is most effective for using to build portable shelters in Turkey is one of the Pugh matrix's strengths. The Pugh matrix's resolve may offer the company with information about the risks of using the initial constructing material for the temporary shelter in Turkey and could recommend an alternate choice of construction material. Although many crucial variables are taken into account when utilizing the Pugh matrix, other criteria that are not taken into account may nevertheless have an impact on the choice of building materials. On the other hand, the study's overall inputs are more qualitative than quantitative when evaluating alternative construction materials for portable shelters, that can work contrary to the firm's desired result in terms of overall design changes, cost analysis, and ability to deliver the product on schedule.

3. Theoretical Background

In the theory section, the following research areas were reviewed from the literature and were found related to the research. The theoretical background chapter highlights the concept of factory-in-a-box, Pugh matrix, localization concept with respective enablers that are incentives, accessibility to suppliers, brand country of origin, sourcing, differences between global sourcing and local sourcing, and local sourcing in humanitarian logistics in order to create theoretical background for answering research questions.

3.1 Factory-in-a-Box

The term "factory-in-a-box" refers to "mobile production capacity on wheels." The major goal of the factory in a box is to make the production facility available everywhere and easily transportable to any site (Jackson & Zaman, 2007). The product manufacture and distribution process becomes more flexible, transportable, and quick by implementing a factory-in-a-box solution. Furthermore, factory-in-a-box solutions were created in response to increased flexibility, shorter lead times, and low-cost and low-volume manufacturing requirements; additionally, these standardized production modules can be transported by truck or rail (Jackson et al., 2008). Furthermore, mobile factories allow capabilities ranging from lean manufacturing to digital technology. As a result, the participants will play an introduction role in terms of efficient learning. (McHauser et al., 2020).

According to Bengtsson et al. (2006), the flexibility, mobility, and speed of factory-in-a-box designs will influence future manufacturing systems. Flexible equipment and fixtures provide short lead times in cabinet assembly, while the reconfigurability of production features ensures efficient manufacturing. Furthermore, the mobility component provides for efficient relocation in terms of standardized characteristics that allow for reconfigurability. Finally, in comparison to standardized manufacturing needs, the pace of production capabilities would be greatly reduced.

Due to the complexities of material delivery, there are numerous configuration alternatives. Figure 2 below was created by Stillström & Johansson (2006) to schematize the logistic setup choice and displays numerous setup options. To begin, assembled parts might be sent from a stationary assembly line while only operators work in a factory-in-a-box. Second, pre-assembled pieces might be brought from an immovable location to the factory-in-a-box, where final assembly and testing processes would take place. As a third method, all parts might be shipped from the immovable site to the factory-in-a-box as a material kit. Finally, all materials might be sent to the assembly in factory-in-a-box form by the provider.

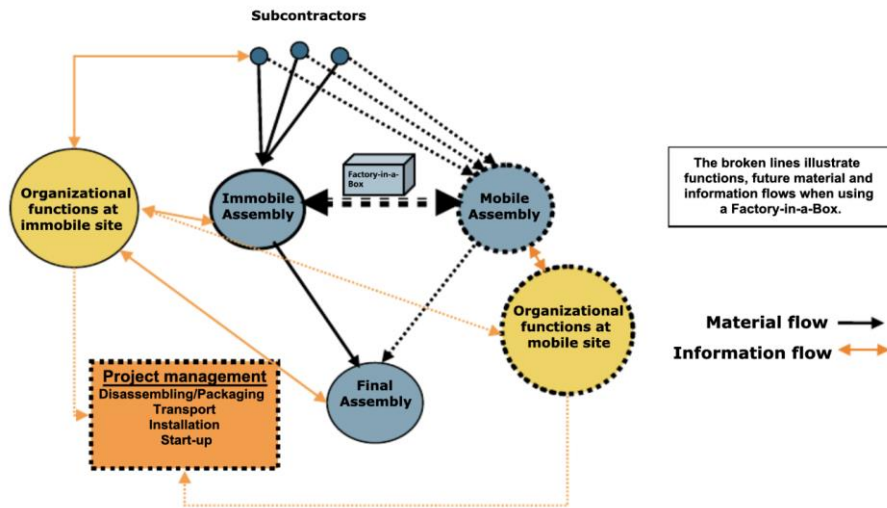


Figure 2: Material and Information Flow (Source: Stillström & Johansson, (2006))

Furthermore, as mentioned by Peltokoski et al. (2015), factory-in-a-box allows businesses to enter new markets that will be profitable following investment. Because of cost savings in areas such as transportation, production, labor, and materials. According to Stillström & Jackson (2007), figure 3 (see below) emphasized that the factory-in-a-box solution offers significant contributions to local markets, such as the mobility aspect of the factory-in-a-box enabling local employment and the benefits of local production. Furthermore, the necessity for information sharing, resources, and expertise competency would be comparable to the typical outsourcing method for establishing a factory-in-a-box. The factory-in-a-box solution's reuse capacity would be achieved by configuring the model to a specific order. Modules might then be transferred to other sites for use. After the production phase is completed, the manufacturing models could be relocated to another place for reconfiguration and new module implementation for production.

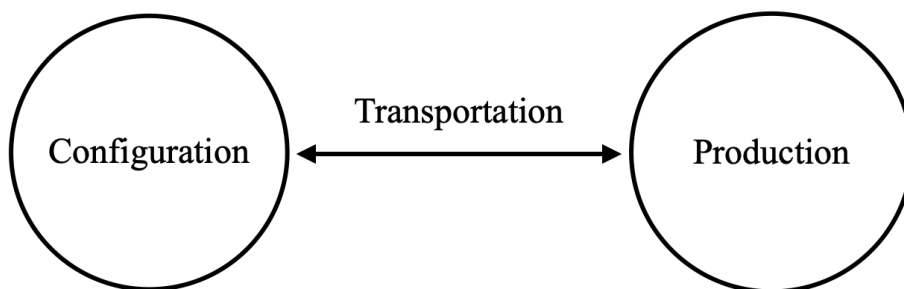


Figure 3: Factory-in-a-box life cycle (Adapted: Stillström & Jackson (2007))

Furthermore, according to Kurdve & De Goey (2017), factory-in-a-box benefits to the social sustainability element such as creating these modular houses with respect to factory-in-a-box solutions. Housing prospects in humanitarian development would be improved. When using the factory-in-a-box, the employment rate would rise. Assembly procedures teach new personnel on the production line and allow for ongoing performance improvement.

3.2 Localization Concept

“When western Multinational enterprises build end-to-end supply chains to produce and distribute a product or deliver a service in emerging economies, the process is called supply chain localization” Wu & Jia (2018, p. 27). Moreover, Frennesson et al. (2022) stated local actors are crucial for an optimal response as a driver for localization.

3.2.1 Advantages of Localization

Because of the benefits of localization in terms of improving trade stability and lowering trade barriers (Dong, 2022). Another essential aspect to note is that in the humanitarian sector, transferring capacities and resources to local actors is a positive contribution to a localization strategy that allows for effective and speedy responses even when the supply chain is disrupted (Frennesson et al., 2022). Furthermore, when it comes to localization, manufacturing stabilizes and businesses respond more effectively when demand changes (Hawkins, 2022). Additionally, locally direct purchase could cut logistics and tariff costs (Chen et al., 2022).

There are numerous applications of localization adoption in various sectors' supply chains. In South Africa, for example, an energy generating project called REIPPPP is an energy generating project called REIPPPP that aims to contribute to economic development in rural regions through localization (Leigland & Eberhard, 2018). According to Goosen (2021), localization initiatives promote a consistent supply of health products as well as provide stakeholders with the resources they need to be self-sufficient, allowing for resilience. Localization has a number of advantages in the agriculture industry, including lower transportation and production costs (Atallah et al., 2014). Furthermore, home-based localization provides a competitive edge in the development of social goals (Filippi, 2014).

3.2.2 Enablers for Localization

In this chapter, theoretical framework regarding localization enablers that are incentives, accessibility to suppliers and brand's country of origin discussed.

3.2.2.1 Incentives

The role of incentives and benefits is widely explored in the present research. According to David (1983), fiscal incentives are a good way to attract foreign investment to a country. Furthermore, according to Simay Karaalp (2014), because less developed regions have low income and a lack of employment, investment incentives would help these regions. As a result, financial incentive tools would aid investment in these designated areas. Financial incentives, tax incentives, and indirect incentives are the three types of financial incentives. Grants and loans are financial inducements. Tax breaks and corporate tax breaks are examples of tax breaks. Finally, indirect incentives are regulatory incentives that benefit the environment, labor, and health. In terms of financial incentives, the state directs the location of plants to relatively less developed regions.

According to Dabney (2011), enterprise zone initiatives target less developed regions and provide various incentives such as tax and regulatory breaks to boost economic

development in the designated areas. These zone initiatives provide tax breaks and refunds, as well as other incentives to encourage investments for job creation. However, investments in human resources and infrastructure would increase the attractiveness of enterprise zones to foreign investors.

Small enterprises, on the other hand, are frequently drawn to enterprise zones since the relevant incentives would have a good impact on investment. The size and variety of incentives influence the attractiveness of larger enterprises for investment decisions. However, Peters & Fisher (2002) use employment in the specified zones or nearby less developed communities to gauge the success of the enterprise zones.

For example, in Turkey following the crisis, foreign investments were critical in mitigating the negative consequences on employment (Erdogan & Ataklı, 2012). Furthermore, Akan & Arslan (2008) found that in the East Anatolia region, implemented incentives contribute positively to local development and ultimately lead to job employment and job creation prospects for the local population. Furthermore, according to Uysal (2013), social security premiums and tax breaks aided in the development of women's employment in skilled manual labor in Turkey. In addition, according to Kaya & Hughes (2020), tax breaks assist both consumers and green building suppliers. As a result, the good benefits of these incentives would result in both environmental and employment contributions.

3.2.2.2 Accessibility to Suppliers

Accessing suppliers has a variety of benefits for numerous industries and provides benefits to both local residents and foreign businesses. According to Peters et al. (2021), implementing deglobalization and supporting regional production, for example, leads to improved access to strategic products for community health. According to Redding and J.Venables (2004), there is a favorable association between proximity to suppliers of intermediate goods and supplier access. This could be construed as localizing production in other countries shortening the distance between suppliers of process materials for product production. Furthermore, manufacturing efficiency rises in relation to the buyer-supplier network (Baldwin et al., 2008). Furthermore, quick access to suppliers provides advantages that allow for the formation of networks for cooperation and collaboration (Overby & Min, 2001).

Neidik & Gereffi (2006) studied suppliers in Turkey following the 1980 globalization initiatives. The EU's preferential supplier status created enormous prospects in Turkey. Regarding these chances, Turkey was able to create partnerships with numerous enterprises that aspire to produce in the supply chain. Turkish full-package suppliers established a number of ways to fulfill the increasing demand of international corporations' conditions regarding pricing, delivery, quality, and labor standards in order to meet the expectations of foreign firms.

Accessing suppliers, on the other hand, has been shown in studies to improve the innovation capacities of both suppliers and foreign enterprises as buyers (Raines et al., 2010; Petersen et al., 2003). Foreign enterprises share their knowledge of the most recent and cutting-edge technologies with local suppliers. Quality control, inventory management, innovative product and process technology are examples of the latest technology. Furthermore, foreign investments would put constructive pressure on local enterprises to improve their business procedures (Blalock & Simon, 2009).

3.2.2.3 Brand's Country of Origin

The nation of origin of a brand has a substantial impact on whether a client has a favourable or negative perception of that brand's image (Yasin et al., 2007). Companies are establishing themselves in many emerging countries as globalisation takes hold. As a result, all brands are competing with one another to improve productivity, quality, and price (Srikatanyoo & Gnoth 2002). However, a country's brand image can improve brand identity among consumers, causing them to prefer one country's products over others, as people have stereotypes about certain countries, such as Germany being known for automobiles, Japan for electronics, and Italy for fashion brands (Srikatanyoo & Gnoth 2002).

According to Lopez et al. (2011), there is a link between country of origin image and brand image. Several proposals were stated as a result of the analysis. For starters, the business image influences the image of the country of origin. Otherwise, if the country and brand image are not well known by clients, the firm's image has little effect on the country's image. Furthermore, both the brand image and brand origin influence each other's reputation. If there is a match between a company's image and its country of origin, it will have a good impact on both the brand and its origin country. Lastly, a firm image needs market visibility to contribute to the image of the country of origin.

According to a study by Parente-Laverde & Rojas-DeFrancisco (2022), reputation transfer between country of origin and respective enterprises can be done. A firm's internationalization process can be sped up by transferring its reputation. For example, if a company is innovative and trustworthy, these qualities might be transferred to the reputation of the place of origin abroad. Vice versa country of origin known values can also extract and influence the reputation of firms in foreign markets. As a result, country brand image has a favorable effect on firm reputation, and firm image adds to country of origin perception in overseas markets. However, the internationalization process should begin early because the firm's business activities will have a greater impact on the firm's reputation in the long run. These operations include financial commitments, competitiveness, and supplier training skills.

3.3 Pugh Matrix for Product Development

Pugh's method is a methodology that was invented in 1990 to determine the best alternative among many alternatives (Joshi & Dandekar, 2019). In addition, Ström et al. (2016) studied the Pugh matrix to highlight benefits of the evaluation of product design by comparing suitable alternatives within each other. Evaluation is subjectively conducted via using data to compare alternatives which enables a better environment for understanding.

3.4 Sourcing

Sourcing is critical to the company's everyday operations because purchasing is an unavoidable action that is responsible for material movements. Furthermore, firm growth is dependent on profit in purchasing operations. The purchasing department is in charge of making supplier and sourcing decisions. Purchasing can help you build long-term business ties with suppliers (Zeng, 2000). Furthermore, Khan K. & Pillania

(2008) discovered a link between strategic sourcing and organizational supply chain agility and performance.

Following the investigation, it was determined that there are numerous characteristics that define strategic sourcing in terms of experimentation. According to the study's findings, strategic partnerships are the most important aspect of strategic sourcing. Then there's flexible sourcing and supplier evaluation, and finally the trust factor among supply chain actors.

3.4.1 Local Sourcing vs Global Sourcing

In today's business practices, sourcing is important to the firm's operations. However, understanding local and global sourcing would be critical in adapting to issues that organizations experience in order to keep supply chain parameters operational. Firstly, local sourcing researched by various academicians.

Local sourcing becomes increasingly crucial for enterprises with goals to participate in highly competitive markets, as political and customer lobbying pressures influence the firms' choice of local sourcing (Wagner et al., 2005). According to Wei et al. (2012), for indigenous enterprises, local sourcing would be advantageous in order to capitalize on economies of scale. According to the study Esteves & Barclay (2011), writers identified local sourcing as an efficient method for getting social licenses and maximizing profits in sourcing. Especially for multinational corporations that shift their sourcing strategy toward local sourcing in order to acquire a competitive advantage over local competitors (Niu et al., 2020).

Regionalizing business operations typically has a favorable impact on organizations by emphasizing cost reduction as well as mitigating the negative consequences and impacts of disasters on supply chains (Sodhi & Chopra, 2014). Because of the major reason that local sourcing is advantageous for enterprises with time constraints (Jin, 2004). Furthermore, cost effectiveness is another reason why local sourcing is advantageous for businesses (Van Hoek & Dobrzykowski, 2021). Because sourcing from local vendors minimizes transportation and purchasing cost elements (Patti, 2006). Furthermore, foreign firms can transfer knowledge to domestic suppliers, enhancing manufacturing and management capacities (Wei et al., 2012).

In summary, as stated by (Patti 2006;Tunisini et al., 2011;Wei et al., 2012), local sourcing is a viable sourcing strategy when a firm seeks to improve supply risks, transportation disruptions, capacity limitations, speed to tariff processes and market growth, production flexibility, efficiency in cost parameters, and delivery performance.

On the other hand, there may be potential implementation barriers for localization. Host countries, for example, can assess the viability of local sourcing (Amendolagine et al., 2018). As a result, governments should develop policies to encourage local suppliers and support them in matching the quality of imported and intermediate products (Wei et al., 2012). Furthermore, because of the complexity of inputs, local pharmaceutical sourcing may not be viable in industries such as automotive (Amendolagine et al., 2018).

On the contrary, there are numerous advantages described in the literature that demonstrates the benefits of global sourcing. Global sourcing, according to Fagan (1991), aims to purchase the appropriate products at the right price at the right time. Furthermore, eliminating trade barriers facilitates the flow of goods, which leads to

enhanced competency for a foreign corporation seeking to extend its market share. Finally, it would result in cheaper prices for supply chain activities, less restrictive labor standards, availability of respective items, uniqueness criteria for materials sourced, quality limits, technical supremacy, and the opportunity to reach the world's growing markets. However, there are global sourcing considerations to smoothly attain the beneficial outcomes.

According to Fagan (1991), firms should commit from the top down, beginning with top management, conduct detailed cost analyses, develop trust and respect among the actors involved in global sourcing, use technologies to enhance optimization in activities, and identify potential risks in global sourcing to manage risks and potential consequences. Furthermore, global integration of engineering and logistics was required to sustain a competitive advantage (Trent & Monczka, 2003). According to Holweg et al. (2011), organizations should analyze three different cost characteristics when pursuing global sourcing: dynamic costs, static costs, and hidden costs.

Table 3: Cost parameters in global sourcing (Adapted: Holweg et al., 2011)

Cost Parameters in Global Sourcing	Dynamic Costs
	Static Costs
	Hidden Costs

To begin, table 3 shows three important characteristics that organizations should examine in order to mitigate potential risks that may arise during global sourcing. For starters, dynamic costs emerge due to product stock-outs in the business. The parameter of dynamic costs consists of lost revenues, lost transportation lead times, and order expenses. Second, there are static costs, which include transportation, customs, and insurance. Third, hidden costs arise as a result of uncontrollable supply chain operations by enterprises, such as currency changes, market energy cost volatility, and political instabilities in the operated country. To summarize, organizations that want to source globally in another continent should examine these cost criteria and potential problems (Holweg et al., 2011).

In conclusion, the above paragraphs indicate the features of local sourcing and global sourcing that differentiate.

3.4.2 Local Sourcing in Humanitarian Logistics

Local sourcing in humanitarian logistics has several aspects that set it apart from regular supply chains. According to Schiffing et al. (2022), one of the greatest challenges in sourcing is getting aid into afflicted communities. As a result, humanitarian organizations began to source locally (Kovacs & Spens, 2011). The main reasons for enterprises to source locally could be currency volatility, quality difficulties, political instability, and avoiding shipping delays (Pazirandeh, 2011). Local sourcing, according to Heaslip (2015), began as a tendency to restore purchasing power as well as the role of other actors such as customers and beneficiaries. Sheppard et al. (2013), investigated the importance of local actors in humanitarian logistics, specifically in terms of local sourcing. Moreover, the local population have a crucial role as a problem solver in the logistical problems.

Local communities would enhance supply quantity while substantially reducing respective lead times and transportation costs by establishing efficient and feasible

communication. Furthermore, learning from local populations would save foreign agencies time and money during disasters. Local development would be sustained by community development through local sourcing, as well as having a favorable impact on local economies and aid material transportation costs. Kovacs & Pazirandeh (2011). Furthermore, local procurement facilitated collective-use services such as school, hospital, and canteen equipment (Matopoulos et al., 2014). Furthermore, in humanitarian logistics models, local sourcing would reduce logistical costs (Schiffling et al., 2022).

Several studies, on the other hand, highlight the incorporation of local sourcing concepts into systematic improvement. Jahre et al. (2009), developed the idea of regional logistics units. The logic behind the approach is to mitigate the harmful impacts of a lack of local knowledge and lengthy distances to disaster-affected communities. Vlachos et al. (2014), on the other hand, said that dual sourcing might be advantageous in emergency scenarios for constructing robust humanitarian supply chains. Dual sourcing would increase efficiencies in backorder clearing times while also providing risk hedging, time required for backorders, and improving time-to-recovery factors. Pazirandeh (2011), developed the phrase strategic sourcing, which seeks for long-term relationships with a few carefully selected suppliers after strategic segmentation. Criteria identified for strategic supplier selection will assist development and improve product availability, quality, accessibility, and innovation. According to Matopoulos et al. (2014), the voucher mechanism in the FYROM program improved aid efficacy.

Pazirandeh (2011), suggested that infrastructure compatibilities, economical, cultural, communication, and political factors in the countries in the local sourcing environment should be investigated. In addition, cash flow issues for local suppliers cause material costs to rise by dramatic percentages in the construction for upstream purchases (Matopoulos et al., 2014). To summarize, local sourcing provides numerous benefits to humanitarian organizations; nevertheless, careful thought at the implementation stage is required to prevent hazards in local sourcing.

4. Case Study

The feasibility study on how the focal firm could localize in a disaster-affected foreign country is detailed in this chapter. As previously stated, the focal firm intends to join a foreign market by implementing a factory-in-a-box to provide portable shelter. Turkey was chosen as the case study's starting point. The earthquake disaster frequency in Turkey creates a significant demand for emergency and post-stage portable shelters. As a result, it creates a setting for the feasibility search, which will identify and demonstrate respective barriers and enablers for a foreign company to take into account when making a decision to establish a presence in a new market.

4.1 Company Background

Husmuttern AB is a manufacturer of construction machinery used in the construction of temporary houses. Currently, the company is planning to be a part of a Humanitarian supply chain in which it will give machinery to local and international communities so that they can build portable houses using local resources and labor. The control system is of high-quality, and the instructions are delivered digitally, allowing the workers to assemble the modules with no construction abilities (Kurdve & Goey, 2017). In brief, the Husmuttern project intends to reach out to people of any gender and offer them with knowledge that will help them find work in the construction business (Husmuttern AB, n.d.). As a result, the company's primary goal is to make it easier for people with no language skills or constructing abilities to build houses using a training video created by the company, as shown in Figure 4 (see below).

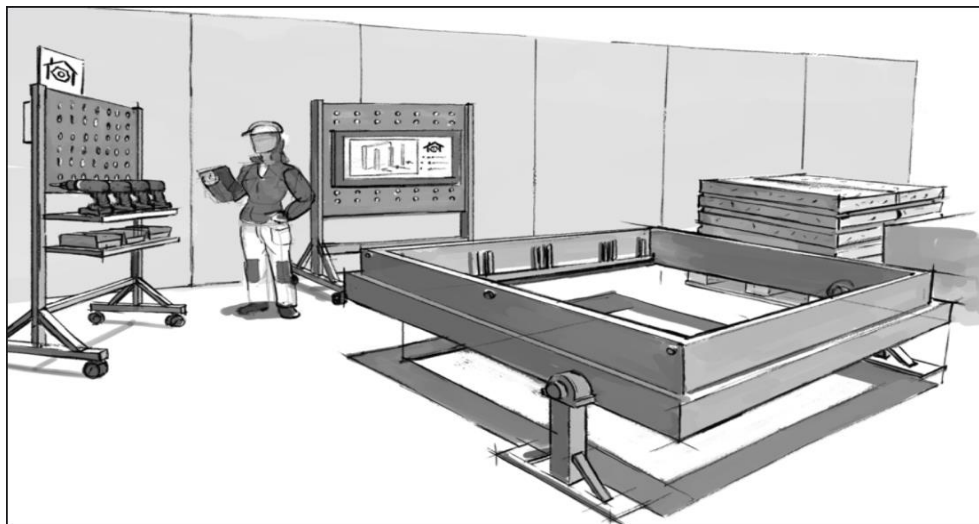


Figure 4: Sketch of factory in-a-box solution (Adapted from Husmuttern.se)

Husmuttern's design and manufacturing processes are standardized, resulting in lower costs and resource utilization (Kurdve & Goey, 2017). However, the utilization areas of manufactured portable houses are flexible and versatile, depending on the necessity for usage in various circumstances. To begin, it is critical to comprehend the focal company's vision for the manufacture of portable housing, as well as its desire to engage individuals from poor economic conditions and geographical areas.

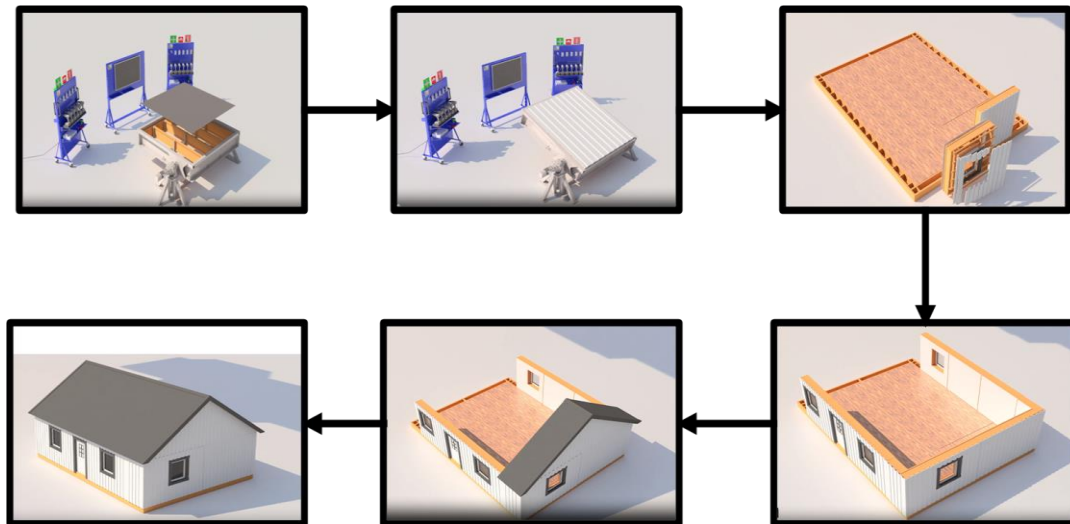


Figure 5: Production stages of portable shelter by factory-in-a-box solution (Adapted from Husmuttern.se)

Figure 5 (see above) illustrates the portable shelter production step by step and the creation of the final product, which is the portable shelter. First, the television screen that displays the visual instructions and tool stands essential for construction is set up. Building with visual instructions is an easy process. Workers in micro factories need to be trained quickly to assemble process materials in an assembly cell. Process materials are kept close to the production cell, which is close to the wall pattern. Process materials would be assembled to form a normal wall for the portable housing based on the fixed schematic descriptions and video instructions around the board. The metal frame is put horizontally so that the builder may begin constructing the wall. Fixtures are installed inside the metal frame, and then wooden objects, insulation materials, and other accessories are installed inside the wall and tightened with nuts and bolts. As a result, the wall is constructed and removed from the metal frame. Similarly, multiple walls are put together and attached to the timber floor. The roof is built and installed on top of the home once all of the walls have been integrated. The house will be completed once the walls and roof are attached.

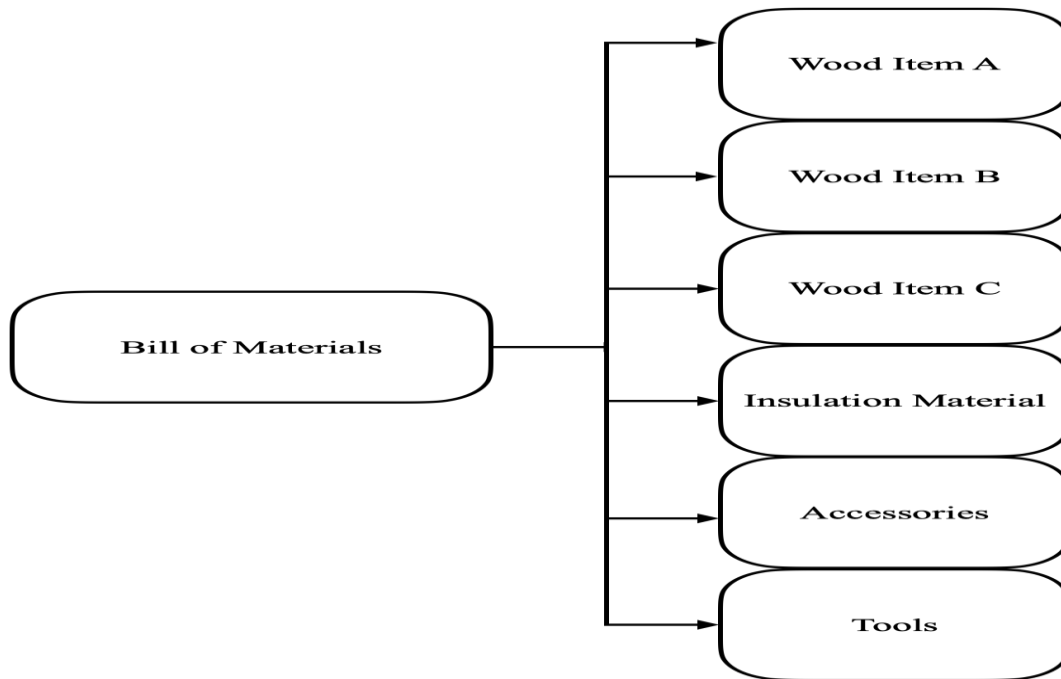


Figure 6: Bill of materials for portable shelter which would be produced by factory-in-a-box

As illustrated in Figure 6, the focal firm prepared a bill of materials to build the walls and roof of the portable house. The bill materials include several types of wood, accessories, insulation material and tools. Because the corporation intends to set up micro factories in Turkey. In order to lower product costs and transportation costs, all materials in the bill of materials will be purchased locally in Turkey rather than buying raw materials from the company's country of origin.

4.1.1 Vision of the Focal Firm

The focal firm's main goal is social sustainability, material efficiency, and logistic efficiency; thus, it concentrates on offering jobs to those who find it difficult to find work in today's job market (Kurdve & Goey, 2017). According to Interviewee 1 ;

It's simple: I'd like to contribute to society. The 2017 refugee crisis highlighted the need for housing and education. Furthermore, there is a demand for employment that require easy working conditions and do not require language capabilities — Interviewee 1

In Sweden, the goal is to hire immigrants or refugees who do not need to take language classes. Immigrants are able to start working straight away as they arrive in the country, because of the instructional videos provided by the company. Rapid employment of the local labor force in Sweden has the potential to accelerate more efficient integration and productivity within society. Second, demand for buildings could be accounted for by the production of factory-in-a-box solutions. According to Engerstam et al. (2022), even with Sweden's growing population, there is a shortage of rental housing.

On the other hand, the company seeks to contribute to social sustainability by enhancing employees' living conditions and retaining employment roles. Furthermore, the construction of portable houses would provide a supply of housing, hospitals, and schools during the crisis. As a result, factory-in-a-box portable houses provide emergency relief in disaster response as well as long-term projects that lead to the establishment of social services in rural and underprivileged locations worldwide. As a

result, solutions would be easier to adapt to meet the demands of individuals. In summary, portable shelters can be used as a short-term option to address the need for housing during the catastrophe and relief stages. Furthermore, in the long run, could be utilized to compensate for a lack of houses, schools, and hospitals in diverse geographies. Figure 7 (below) shows an example sketch of how temporary shelters might be used as schools to showcase the versatility of the usage areas of portable shelters produced by the focal firm's factory-in-a-box solution.

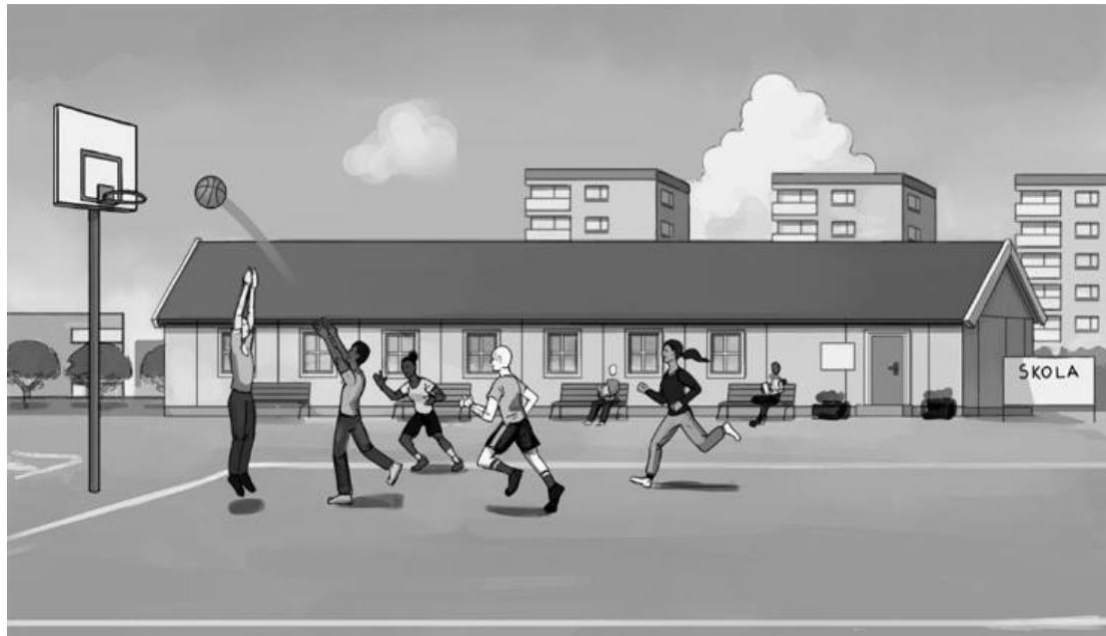


Figure 7: Demonstration Sketch of Portable Shelter Used as a School (Source: Husmuttern AB)

We sought to provide long-term and short-term answers to individuals in need by providing shelters, so we are able to state that it would be a hybrid solution. – Interviewee 1

The focal firm gained funding from various institutes that provide funds for business ideas in order to implement the project in Sweden. Following proposals to the institute's proposed projects, the focal firm and its respective project for the building of portable housing were chosen and provided sufficient funds as financial support for the business model.

VINNOVA (Swedish Agency for Innovation Systems), Alma (Swedish State-owned Financial Intermediary), and Tillväxtverket (Government Agency Under the Ministry of Climate and Business) are Husmuttern AB financiers (Husmuttern AB, n.d.).

We submitted on projects that financing institutions offered and after the selection process, we received the funds — Interviewee 1

In summary, the focal company illustrates rural social development through the creation of jobs that support humanitarian development. As a result, regional development would be improved.

4.1.2 Perspectives of the Focal Firm on Localization

This chapter explains the criteria followed by interviewee 1 (CEO of the focal firm) and interviewee 2 (Case project manager) to create portable shelters. As stated

previously, the most important step in building portable shelters is locating suitable materials. Furthermore, selecting ecologically friendly and high-quality materials is vital.

Although the firm has a present location in Sweden, there are areas that need investigating to determine how the focal firm could localize to build portable shelters in foreign countries, particularly in locations where natural disasters occur frequently. Following an interview with the CEO of the focal company, the company's initial thoughts on localization in the overseas business environment became apparent. Although the term "localize" differs based on the country and business practices, the focal firm values good quality sourced from local suppliers.

*Basically, we want good products from good companies that are validated—
Interviewee 1*

When it comes to localization, the focal firm, on the other hand, places a high value on environmental considerations. The company prioritizes sourcing low-carbon products. As a result, the materials used should be ecologically friendly or have a lower carbon footprint than comparable products. In short, environmental sustainability is crucial in the firm's choice of suppliers. Since the organization values environmentally responsible choices (Husmuttern AB, n.d).

*When it comes to localization, environmental products are crucial—
Interviewee 1*

Furthermore, the focal firm considered a variety of other problems while entering a new country. Because, as pointed out by interviewee 1, variations would have an impact on the networks, agreements, and sourcing procedures of Turkey's local actors. As a result, seeking guidance to learn the local business context is critical before beginning the localization process.

It is critical to grasp the country, culture, building materials, negotiations, and how everything work—Interviewee 1

We reduce the energy consumption so there is no big use of energy—Interviewee 1

In the framework of energy consumption, the focal firm optimized the energy consumption for emergency fixtures, so there is no high demand for energy usage. Solar cells, battery storage, solar panels, and, less preferably, fuel-based generators might all be used to power computers and tools.

Assistance from a consultant firm has become a realistic choice for the focal firm in order to study the market environment in a foreign country as well as advantages, enablers, and hurdles before undertaking localization.

When localizing in other countries, restrictions vary depending on country and disaster. Receiving consulting to understand the business climate of a foreign country is critical to easing the process of going localized in other countries— Interviewee 1

4.2 Reasons for Selection of Turkey

In this chapter, features of Turkey's business climate will be examined for the focal firm in order to establish whether or not a localization decision in Turkey is a viable alternative. Figure 8 (see below) was created based on the data collection from the

academic journals, interviews and displays the reasons behind the selection of localization in Turkey.

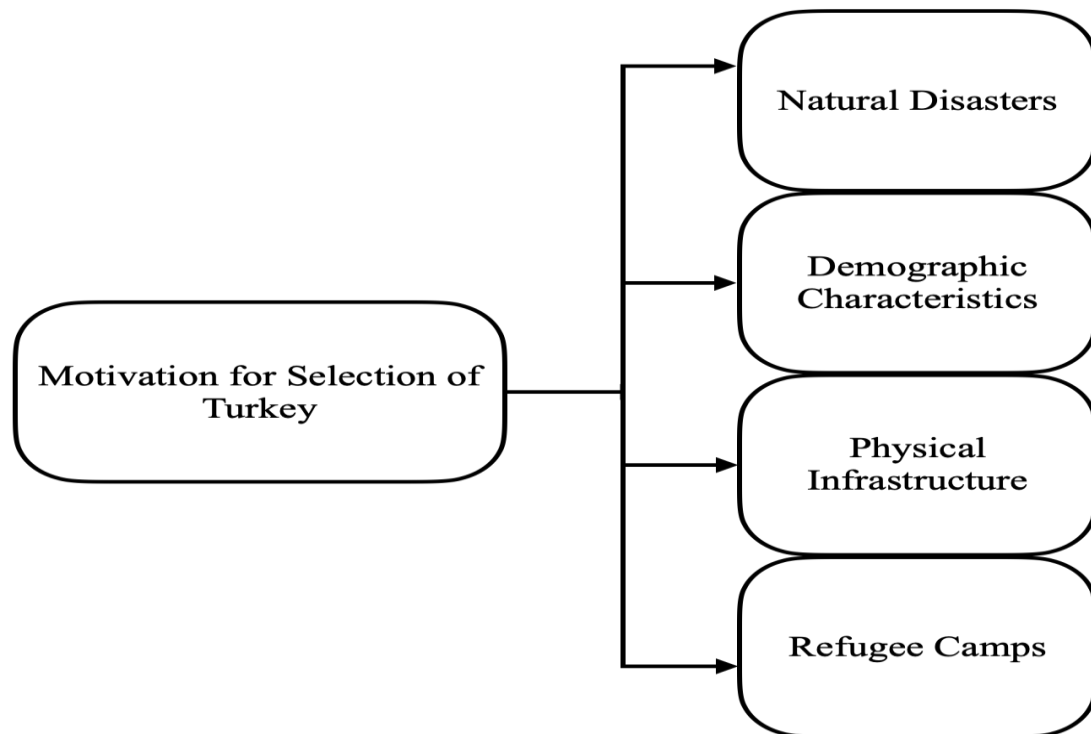


Figure 8: Reasons for Selection of Turkey For Localization

4.2.1 Natural Disaster Occurrence

Anatolia (Minor Asia) has been affected by numerous natural calamities throughout history. However, earthquakes occur on a regular basis because Turkey is an earthquake-prone country (Oral et al., 2015). Based on Turkey's geological characteristics, the country should plan to avoid the terrible impacts of major earthquakes. Particularly probable big earthquakes forecast in Istanbul (Ozdemir & Yılmaz, 2011). The most recent significant earthquake in Turkey has a wide-ranging negative impact on the populace. According to data from the United Nations Office for the Coordination of Humanitarian Affairs, the Maraş Earthquake has displaced 3 million people from their existing residency (Türkiye: 2023 Earthquakes Situation Report No. 11, 2023).

Because of the big earthquake, there is a big demand for portable shelter supply since the available capacity of Turkish firms couldn't meet the demand for portable shelters— Interviewee 6

4.2.2 Demographic Characteristics

Husmuttern AB focuses towards social sustainability. In Turkey, promoting workforce diversity is crucial because female labor force participation in Turkey is lower than in the EU and OECD countries (Dayoglu & Kirdar, 2010). Furthermore, there is a gender disparity in employment (Ilkcaracan, 2012). Another critical aspect of work is the inclusion of people with disabilities in the labor force. Disability, particularly in Turkey, is a barrier to women and men entering the labor force (Oncel & Karaoglan, (2020): Oncel, (2021)). In addition, Turkey hosts different nationalities because

immigration happens for a variety of causes, including political, economic, and natural calamities (Maqul et al., 2020).

The purchasing power and economic strength of the Turkish people vary by area. Particularly in the impoverished eastern districts, whose purchasing power is lower than in the western parts (Korkmaz, 2019). Furthermore, a high rate of inflation has an undesirable effect on house prices (Korkmaz, 2019).

4.2.3 Physical Infrastructure

Physical infrastructure in Turkey may assist an overseas company that seeks to localize here (Business Sweden report 2021; Enterprise Surveys, The World Bank).

Infrastructure investments influenced Swedish firms' investments in Turkey positively—Interviewee 6

Infrastructure investment in Turkey has increased in recent years (Saygılı et al., 2021). One of the primary motivations for greater investment is to attract foreign investors to the Turkish domestic market (Hadjit & Moxon-Browne, 2007). Furthermore, good transportation infrastructure promotes long-term economic growth. To improve transportation efforts in Turkey, the general directorate of Highways legislated by Turkish authorities to create new highways connecting major metropolitan areas with maritime regions (Elburz & Cubukcu, 2021).

As an example of these regulations, numerous new opportunities arise to facilitate the localization of foreign investments, such as minimizing transportation lead times, which leads to a positive contribution in connected prices and expenditures. According to Akgüngör et al. (2011), investments in transportation infrastructure boost Turkish companies.

In terms of energy, transportation, and communications, Turkey's infrastructure capability might be known as self-sufficient—Interviewee 6

4.2.4 Refugee Camps in Turkey

Due to the huge amount of displaced individuals, geopolitical issues around the world, particularly in Middle-East countries, necessitate the establishment of refugee camps in Turkey. According to UNHCR data, there are approximately around 3.9 million refugees and asylum seekers in Turkey (UNHCR, n.d.).

The majority of the refugee camps in Turkey were tent camps in Turkey's southeast (Karsu et al., 2019). According to Jahre et al. (2018), one of the primary concerns is a lack of tents for long-term settlement for refugees. As well as issues with shared areas and privacy (Cantekin, 2018). Tents, on the other hand, would not give ideal living circumstances in the long run, as there have been reported cases of refugees suffering from chest diseases as a result of tent housing (Kurtulus et al., 2018).

Furthermore, families, pregnant women, and elderly people face challenges in accessing advanced medical services in refugee camps (Tayfur et al., 2019). Furthermore, the healthcare facilities established in refugee camps would not be self-sufficient which creates the need for external support of medical assistance (Karsu et al., 2019). In terms of education, refugees face difficulties in obtaining school education due to poor educational facilities in the camps (Celik et al., 2021).

In summary, the above paragraphs highlight the issues in the refugee camps from different angles.

4.3 Enablers of Localization in Turkey

According to the findings and data gathering, there were numerous business enablers that made it advantageous for a company to establish itself in Turkey. Out of various enablers, the Swedish brand image, state incentives, and supplier accessibility were prioritized as relevant study subjects that enabled the Focal firm's creation in Turkey. In summary, figure 9 (below) demonstrates localization enablers such as state incentives, Swedish brand image, and accessibility to local suppliers in Turkey.

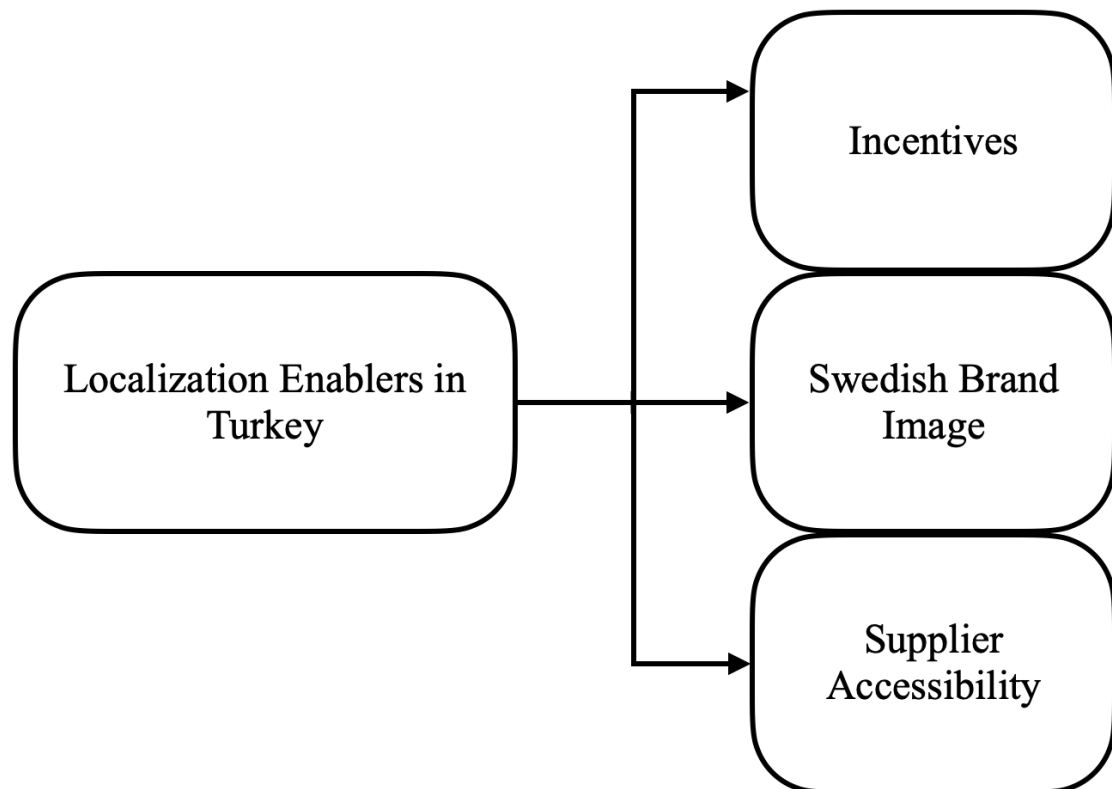


Figure 9: Enablers of Localization in Turkey for the Focal firm

4.3.1 Incentives

This chapter presented research data on Turkish state incentives.

Incentives based on project completion would be advantageous for conducting business in Turkey – Interviewee 6

In Turkey, there are six incentive regions, having incentive rates increasing from region 1 to region 6 (Republic of Türkiye Investment Office, 2023). Additionally, Southeast Turkey (Adıyaman, Ağrı, Ardahan, Batman, Bingöl, Bitlis, Diyarbakır, Hakkari, Iğdır, Kars, Mardin, Mus, Siirt, Sanlıurfa, Sırtak, Van) is referred to as region 6, which means least developed areas of Turkey and is prone to receiving additional state incentives (Republic of Türkiye Investment Office, 2023). Table 4 outlines the incentives and features for Region 6.

Table 4: Region 6 Incentives (Republic of Türkiye Investment Office, 2023)

Region 6 Investment Incentives	
Eligibility Criteria	Incentives
<p>Minimum Fixed Investment Amount of TRY 1,500,000</p> <p>Investment Should be Made in the Region 6 Cities</p>	<p>Land Allocation</p> <p>Interest Rate Support</p> <p>Corporate Tax Reduction of 55% of Investment Expenditures</p> <p>Social Security Premium Support (Employer’s Share) for 12 years</p> <p>Social Security Premium Support (Employee’s Share) for 10 years</p> <p>VAT(0.18) Exemption of Machinery</p> <p>VAT(0.18) Exemption of Construction</p>

If a foreign company had an investment minimum of 1.500.000 lira in region 6, the Turkish Employment Agency provides monetary support for workforce employment; however, in order to receive the agency's support, a certain percentage of the trainees must be employed by the foreign firm (Republic of Türkiye Investment Office, 2023). Trainees, on the other hand, must be unemployed people who have registered with a Turkish Employment Agency (Republic of Türkiye Investment Office, 2023).

There are additional incentives for emergency assistance. The Disaster and Emergency Management Presidency may import all types of prefabricated, container, and similar temporary shelter materials within the scope of national and international projects aimed at repairing the damages and negative effects caused by the earthquake on 6/2/2023, with the approval of the Ministry of Commerce (Official Gazette of the Republic of Turkey 13.4.2023).

Energy support can be provided as an incentive for participating in the company as a partial rebate for project-based investments (Republic of Türkiye Investment Office, n.d.). Furthermore, infrastructure support allows foreign investments for energy infrastructure development requirements (Republic of Turkey Investment Office, n.d.).

4.3.2 Swedish Brand Image

Table 5: Advantages of Swedish Brand Image

Benefits of Swedish Brand Image		
Provides Easier Accessibility to Local Suppliers	Creates Trustworthiness Between Local Supplier and the Focal Firm	Maintaining Long Term Relationship
Husmuttern does not have a brand image in Turkey because it is a new start-up, but if suppliers learn that it is a Swedish brand, they will approach it more positively— Sixth interviewee	Swedish companies have established reliability with Turkish companies - Interviewee 6	Swedish companies have very good brand recognition; all suppliers prefer to work with Swedish companies because they provide high quality, maintain solid relationships, and make payments on time — Interviewee 6

The advantages of Swedish brand image in Turkey are highlighted in Table 5 (see above). According to interviewee 6, Swedish businesses have a strong image among local suppliers. Swedish companies are well-known for providing high-quality materials. Local Turkish suppliers have high regard for Swedish enterprises since they faithfully adhere to contracts, making doing business with them simple and predictable. One of the most important reasons that Swedish companies stand out from the competition is because payments are made on time, which improves connections between suppliers and companies.

According to the interviewee 6, many Swedish companies have made important contributions in Turkey by solving challenges and issues, building confidence in Turkish companies. Although Swedish companies' services are costly, they are efficient, which leads to long-term savings in expenses.

4.3.3 Accessibility to Suppliers

The focal company might benefit from easier access to Turkish construction material suppliers. These advantages included enhanced construction material quality and availability, network opportunities with local suppliers, and greater innovation skills to foster competitiveness in the Turkish market. As a consequence, table 6 (see below) highlights the data findings regarding supplier accessibility in Turkey.

Table 6: Advantages of accessing suppliers in Turkey

Benefits of Accessibility to Suppliers for the Focal Firm		
Increased Availability and Quality for the Construction Materials Building Networks	Building Networks	Innovation Capabilities
<p>The Turkish business environment fosters competitiveness among Turkish suppliers, resulting in sufficient quality and quantity of products; hence, suppliers can be deemed easily accessible in Turkey— Interviewee 6</p> <p>The Turkish construction industry contributes significantly to the Turkish economy, generating a large number of small businesses (Tavakoli & Tulumen, 1990; Albayrak & Albayrak, 2014; Polat & Donmez, 2010).</p> <p>Eastern European enterprises may find it easier to establish networks with local suppliers in Turkey than Western European firms. Digitized systems and English-speaking supplier staff act as accelerators for network construction— Interviewee 6</p>	<p>Eastern European enterprises may find it easier to establish networks with local suppliers in Turkey than Western European firms. Digitized systems and English-speaking supplier staff act as accelerators for network construction— Interviewee 6</p>	<p>If the market demands it, suppliers will adjust to meet the most recent demands.— Interviewee 6</p> <p>There are examples of Swedish companies investing in R&D operations in Turkey, creating innovation settings spanning from the electric automobile industry to the communication technologies sector— Interviewee 6</p> <p>Previous cases in Turkey of local suppliers and foreign companies improving their innovation capability in the automobile sector (Ozatagan, 2011; Atalay et al., 2013)</p>

According to Erbil et al. (2010), the Turkish construction material market accounts for a significant portion of the world's self-sufficiency in construction materials such as steel, bricks, glass, and PVC.

According to Copping et al. (2022), in the context of supplying materials for disaster-relief shelters, centrality plays an important role in Turkey, emphasizing the proximity and closeness of regions in purchasing selections. As a result, gaining access to local actors results in constitutions of great social, political, and economic relevance in Turkey, which directly influences regional progress and provides good contributions to the regional population (Ersoy, 2016). According to interviewee 6, because the focal firm promotes regional development, connecting and creating networks with local suppliers from areas near the factory-in-a-box location will be relatively easy because communication will take place through digital tools and bilingual workers.

There are numerous examples of inventions that have occurred in Turkey in the past. Particularly in the automobile industry, diverse innovative capacities were demonstrated by foreign companies and local suppliers in order to sustain design changes and technological competence (Ozatagan, 2011). To put it another way, innovation is a critical activity for Turkish automotive suppliers (Atalay et al., 2013).

4.4 Challenges for Local Sourcing of Construction Materials

This chapter emphasized the difficulties associated with local sourcing. According to the data, four separate challenges were identified. These issues included the availability of construction materials for the focal enterprise, the procurement of high-quality construction materials, environmentally friendly construction materials, and a special economic challenge that Turkey confronts, which is high inflation rates.

4.4.1 Challenges in Wood Material Availability in Turkey

This chapter discusses data on construction material availability difficulties that affect the focal firm. Based on the information, it was discovered that the wooden materials used by the firm for the production of portable shelters would be inapplicable in Turkey due to the lack of a forestry industry that provides strategic process materials that were important elements in the focal firm's portable shelter production.

Cement may be found in any part of Turkey; however, wood items are in short supply and primarily unavailable — Interviewee 6

Because Turkey's wood sector is not as developed as that of Northern European countries, it may be preferable to import — Interviewee 5

The construction industry is one of Turkey's most important. Cement, bricks, and steel are the most often used building materials in Turkey. Turkey is the largest cement producer in Europe and the fourth largest in the world, with a production capacity of over 80 million tons (Ekincioglu et al., 2013). According to interviewee 6, Turkey generates enough building raw materials to maintain itself without relying heavily on other countries.

Prior to the usage of concrete and masonry for building structures in Turkey, wood was the most commonly utilized material for house construction. Wooden constructions, according to Dogangun et al. (2006), are less prone to earthquakes. During earthquakes

in Kocaeli and Duzce, wooden constructions lasted better than cement ones, as evidenced by the fact that they were built with wood rather than cement.

According to Karakaya et al. (2017), Turkey produces 19 million m³ of wood from public forests, 4.8 million m³ from private forests, and 5.2 million m³ from other nations to meet the overall demand of 29 million m³ per year. Many challenges arise in the procurement of wood supplies, such as a scarcity of wood resources, as well as quality and cost issues.

To meet the demand for wood products in Turkey, the majority of the wood is taken from the local forest, with the rest being imported from other countries because the state does not want to deplete the forest resources (Karakaya et al., 2017). Because demand is high and supply is limited, prices will be higher when compared to Europe and other nations (Dogan & Akyildiz, 2017). The cost of wood and the availability of wood raw materials have become the most significant barriers for Turkish wood businesses, and as a result, certain types of wood industries have been closed down (Karakaya et al., 2017).

According to Karakaya et al. (2017), during the production phase of wooden materials, some Turkish companies encountered difficulties in paying high prices for energy for production, and 18% of the companies experienced power outages, resulting in decreased productivity and increased financial costs. During the market period, the majority of the enterprises encountered financial difficulties, since they did not get payment for the things they sold. While some of them struggled to compete with plastic and cardboard manufacturers.

4.4.1.1 Empirical Data Regarding Steel and Concrete Based Material Selection as Alternative Solution

According to the data collected in chapter 4.4.1 (see above), wood construction materials indicated the possibility of alternative construction materials and the necessity for a change in the bill of materials. As a result, findings concerning the availability of wood and the feasibility of implementation were examined in validation sessions with interviewee 1 (CEO of the focal firm) and interviewee 2 (Case project manager). Based on the meetings, the use of concrete and steel-based materials for alternative materials for alteration in the manufacturing of temporary houses was discussed. As a result, the findings that follow concerning steel and concrete-based materials are presented.

In Turkey, concrete, green concrete and steel based construction materials could be implemented instead of wood— Interviewee 2

Concrete is a cement-based building material that is generally inexpensive (Imbabi, 2012). Concrete buildings were more severely damaged than wooden structures in the Malaysia earthquake (C.Alih & Vafaei, 2019). As a result, the earthquake resistance properties of wood and concrete materials would differ. Quality controls on concrete should be prioritized in Turkey (Firat et al., 2013). Hot climates in Turkey causing temperature rise in concrete construction materials (Schindler & Mccullough, 2002). From the standpoint of ergonomics, the placement of concrete materials causes worker injuries (Hess et al., 2004). According to the interviewee 2, ergonomics stated as important criteria since manual labor force would be used in factory-in-a-box. Concrete material manufacture produces greenhouse gas emissions (Habert et al., 2020). Wood products, on the other hand, have a far lower environmental impact (Marsono & Tighnavard Balasbaneh, 2015). As a result, the statements above defined the concrete

building materials' properties in terms of material availability, cost, quality, environmental sustainability, earthquake resistance, and climate compatibility, all of which were highlighted as important factors for portable shelter production during the validation rounds.

Steel, on the other hand, was mentioned as an alternate construction material. Turkey is one of the world's largest steel manufacturers, implying that steel as a construction resource is plentiful (Ahmadi, 2020). Steel has a high thermal conductivity, thus if it is utilized to build home walls, the internal atmosphere will be unbearable for people (Zafra et al., 2020). Musculoskeletal injuries are widespread among construction workers, and heavy lifting of steel construction materials for portable houses might result in injuries (Schneider, 2010). Portable steel shelters are less costly than timber structures owing to the durability that they offer (Chini & Gupta, 1997). Steel-framed buildings are more environmentally friendly than wooden houses since they can be easily recycled and help to minimize deforestation (Sakumoto et al., 1998). Steel frame buildings are commonly employed in earthquake-prone areas due to their great earthquake resistance (Sahin Guchan, 2007).

In conclusion, comparisons between steel and concrete construction materials were stated above regarding certain criterias.

4.4.2 Finding Materials with Good Quality

This chapter contains empirical data on the quality of building materials.

In recent years, quality assurance processes in Turkey have become more effective, and producers are implementing quality control systems, consequently the material's quality in Turkey has become better — Interviewee 5

The primary issues in Turkish building companies are low quality, productivity, and managerial standards (Polat et al., 2011). Foreign enterprises that guarantee quality may depend on Turkish suppliers who fulfill ISO 9000 demands (Türk, 2006). Many Turkish companies have recently obtained ISO 9000 certification, which plays a significant part in increasing quality, customer satisfaction, and production processes. Additionally, it acts as an advertisement to connect businesses from different nations with Turkish companies (Beskese & Cebeci, 2001).

In Turkey, suppliers may prioritize price; but, in order to promote quality, a Swedish corporation may specify quality norms, requiring local suppliers to comply.— Interviewee 5

As Swedish firms ensure that good quality raw materials are given to manufacturing facilities, Turkish firms are encouraged to build excellent quality production processes that result in the generation of good quality raw materials and the improvement of profit by selling the goods to Swedish firms.

According to interviewee 5, Turkish construction enterprises are currently increasing the quality of their processes and product. Furthermore, if the suppliers have ISO certificates, the product quality improves.

The suppliers in Turkey value the price over quality as there is major cost competition among the suppliers in the market— Interviewee 5 and Interviewee 6

They are more focused on making profit rather than focusing on quality in the Turkish construction industry.

4.4.3 Finding Environmental Friendly Construction Materials

Sourcing ecologically friendly products is a significant goal that is consistent with the firm's viewpoint. Meanwhile, the building materials business, which is directly influenced by climate change threats, presents chances to improve market competition (Ekincioglu et al., 2013). Turkey is a major player in the building material industry, which results in significant environmental output; thus, using ecological attributes in construction generates both environmental and economic benefits (Esin, 2007). Furthermore, according to Kosanoglu and Kus (2021), environmental problems in the building industry are becoming more important over time.

When comparing environmental sustainability in the context of construction materials, it is not incorrect to say that Sweden is in a better position than Turkey—Interviewee 6

Sweden has a long tradition of corporate social responsibility (Ki-Hoon et al., 2015). On the other side, Turkish construction enterprises have recently undertaken environmental sustainability initiatives such as gaining ISO 14001 certification (Turk, 2009). As well as numerous environmental legislations (Aksoy & Gonel, 2015). There is a demand in Turkey for a more environmentally sustainable construction environment (Ilter & Ilter, 2011). According to Aktas and Ozorhon (2015), the Turkish construction industry leads to cost increases, and the Turkish construction industry lacks a specific level of experience in terms of sustainable buildings.

Sustainability issue in Turkey creates extra costs for firms. Although sustainability efforts started in recent years but it is not in desired level — Interviewee 5

Since traditional methods have been confirmed in the Turkish construction sector for decades. As a success factor in the market, rapid building provides a competitive advantage for Turkish construction enterprises (Arslan & Kivrak, 2008). According to an Atmaca (2018) study, portable shelters should have longer durability to promote environmental sustainability, and governments should be careful of building material choices.

4.4.4 High Inflation Rates in Purchasing

Turkish economic speculation may provide difficulties for international enterprises when purchasing materials. Throughout the decades, Turkey has had high inflation rates (Kibritcioglu, 2004; Domac & Bahmani-Oskooee, 2003). The economy suffers from a variety of negative repercussions, including lower investment due to unpredictability difficulties (Neyapti, 2000). The construction business also has reflections.

High inflation is a hurdle since the Turkish Lira's depreciation generates difficulties in the local market—Interviewee 5

Turkey's high inflation rate causes unpredictability and forecasting issues, which most Swedish enterprises dislike—Interviewee 6

High inflation rates have a direct impact on customer purchasing power, thus enterprises with a B2C strategy will suffer the most—Interviewee 6

Inflation rates have a direct impact on construction material pricing (Durdyev, 2012). Since then, rising inflation rates have had a negative impact on Turkish enterprises' financial statements (Arsoy & Gucenme, 2009). Furthermore, as well as construction

worker wages (Musarat et al., 2020). On the other hand, a rapid adjustment of worker pay in relation to inflation and PPP (Purchasing Power Parity) would be required.

4.5 Comparison Analysis

Following the facts presented in the case study to the project manager and the CEO's focal firm, there was a need for change to the base scenario in Turkey. Implementation of the Pugh matrix was an efficient way to figure out the most suitable decision for portable shelter production in order to decide which alternative option would be most suited for use by the focal firm addressing issues in local sourcing.

To begin, the Pugh matrix is built with multiple scenarios, weighted ratings, and criteria. The case study findings were used to determine the respective elements of the Pugh Matrix. Furthermore, each potential scenario is graded based on the writers' subjective opinions and insights. The most practicable alternative strategy to address problems in local sourcing was chosen as the scenario with the highest score.

Furthermore, following the selection of a feasible material for portable shelter production based on empirical findings regarding incentives, Swedish brand image, and supplier accessibility, localization enablers to overcome potential issues in local sourcing would be discussed by comparison with the theoretical background and findings.

4.5.1 Implementation of Pugh Matrix

The stages of Pugh Matrix implementation were presented in this chapter. According to Ström et al. (2016), evaluation is accomplished subjectively through comparing alternatives using data. The matrix was used to reveal the possible solution after the stages were determined. The solution for local sourcing challenges was presented through the use of alternative materials for the manufacturing of portable shelters in order to address research question 1.

4.5.1.1 Solution Identification

Table 7 (see below) demonstrated 4 different solutions to be used in Pugh Matrix.

Table 7: Identification of Solutions

Solutions
1)Wooden Base Material Usage(Base Case)
2)Concrete Base Material Usage(Solution 1)
3)Green Concrete Material Usage(Solution 2)
4)Steel Base Material Usage(Solution 3)

The focal firm's base case for producing portable shelters is wood. As a result, the base case is the use of timber construction materials. During the validation round, the case project manager (interviewee 2) recommended concrete, steel, and green concrete as

alternatives to wood. As a result, there were four distinct choices indicated in the matrix.

4.5.1.2 Criteria Identification

Table 8 (see below) constituted to highlight different criteria for the Pugh's matrix.

Table 8: Criteria Identification

Criteria
1) Material Availability
2) Quality
3) Environmental Sustainability
4) Cost
5) Ergonomics
6) Climate Suitability
7) Resistance to Earthquakes

Material availability was determined as the primary requirement for the focal firm based on the problems associated with the Turkish construction material industry. Furthermore, quality difficulties with construction materials had a considerable impact on the decision-makers in the focal firm. Third, environmental sustainability was an important factor in ranking the choices. Since the manual labor force was used at the production cell in the factory-in-a-box, ergonomics were determined as a criterion, as lifting high material weights would have negative impacts on the workforce's health. Because corresponding construction supplies had varying prices in the economic scenario with high inflation rates, cost parameters were vital in the choosing of construction materials. Because natural disasters occur at a significant frequency in Turkey, earthquake resistance is regarded as a requirement. Finally, because refugee camps were located in warmer regions of Turkey, climate suitability was included as a requirement.

4.5.1.3 Impact Level of Criteria

Table 9 (see below) Criteria impact levels were listed which were used in the implementation phase of the Pugh Matrix.

Table 9: Impact Levels of Criteria

Criteria Impact Levels(Ranked from Lowest(1) to Highest(5) Value)
1)Material Availability → 5
2)Quality → 3
3)Environmental Sustainability → 1
4)Cost→ 3
5)Ergonomics→ 3
6)Climate Suitability→ 3
7)Resistance to Earthquakes→ 3

Impact levels were allocated to each criterion after multiple criteria were developed. The most important aspect discussed with the CEO of the focal firm and the case project manager was material availability. As a result, material availability had the highest impact value, which was 5. Although material quality was important in the construction of portable shelters, locating available resources was more important in Turkey. As a result, the quality criteria effect level value was set at 3.

From the standpoint of environmental sustainability, as described in the findings in the case study chapter (section 4), sourcing environmentally friendly materials had the lowest effect level of 1 due to the difficulty in obtaining green construction materials in Turkey.

The cost has a significant impact on the choice of options, hence the impact has been expressed as 3. Ergonomics also had a 3 impact level value since manual labor was used in the factory-in-a-box. Because the sites of refugee camps in Turkey created consideration for weather effects, climate suitability had an impact value of 3.

The resistance to earthquakes was a criterion with a 3 impact value. Because Turkey is a disaster-affected country. As a result, earthquake resilience is critical in Turkey.

4.5.1.4 Ranking Each Solution Comparing with Base Solution

Each solution in this chapter is compared against a base solution in terms of the criterion. For comparing the different solution options, there were five possible rating values. Table 10 (see below), which presents these five various ranking values, demonstrates their application.

Table 10: Rank values in comparison to base value

Much worse value than the base value represented as -2
Worse value than the base value represented as -1
Same value as the base value represented as 0
Better value than the base value represented as 1
Much better value than the base value represented as 2

This ranking algorithm rates each solution for comparison with the base value.

Table 10 (see above) listed seven criteria. Consequently, seven comparisons between the alternative solutions and the base solution were made in total. Subjective comparisons between the various scenarios are displayed in tables 11, 12, and 13 (see below).

Table 11: Ranking values of wood material(base) vs steel based material

	Ranking Criteria							
Solutions	Material Availability	Quality	Environmental Sustainability	Cost	Ergonomics	Climate Suitability	Resistance to Earthquakes	Total Value
Wood Based Material Usage(Base Scenario)	0	0	0	0	0	0	0	0
Steel Based Material Usage	2	2	1	2	-1	1	1	8

Table 12: Ranking values of wood material(base) vs concrete based material

	Ranking Criteria							
Solutions	Material Availability	Quality	Environmental Sustainability	Cost	Ergonomics	Climate Suitability	Resistance to Earthquakes	Total Value
Wood Based Material Usage(Base Scenario)	0	0	0	0	0	0	0	0
Concrete Based Material Usage	2	0	-2	2	-1	1	-2	2

Table 13: Ranking values of wood material(base) vs green concrete based material

	Ranking Criteria							
Solutions	Material Availability	Quality	Environmental Sustainability	Cost	Ergonomics	Climate Suitability	Resistance to Earthquakes	Total Value
Wood Based Material Usag (Base Scenario)	0	0	0	0	0	0	0	0
Green Concrete Based Material Usage	-2	2	2	-2	-2	1	-2	-3

Concrete-based components would be of greater value than the current base given Turkey's strong cement output rate. It was simpler to find steel-based materials in Turkey than it was compared to the baseline scenario. Last but not least, due to the difficulties encountered in Turkey's market for environmentally friendly construction materials, green concrete products received the lowest ranking in the comparison.

The writers used a correlation of the material accessible in Turkey to determine the quality level of potential solutions. According to the research from the academic journal, the use of green concrete materials is therefore declared as having the best value. The use of steel as a base material is likewise given the highest value relative to the base scenario.

Green concrete materials would score highest among alternatives from the standpoint of environmental sustainability. Since steel-based materials are more durable than wood-based materials, which is stated based on academic journals as empirical data, steel base materials have a better ranking as the base solution. Concrete material has the worst value when compared to alternative solutions.

The positive link between ranking based on cost criteria and the ease of obtaining construction materials on the market. In other words, the rankings were determined by the supply and demand ratio. Therefore, the costs of concrete would be more favorable than the raw materials made of wood based on the cement industry's market dominance in Turkey. Those for steel-based construction would rate significantly higher than those made of wood. On the other hand, the use of green concrete materials is claimed to have considerably lower value than the current base since environmental resources would be most expensive to get in Turkey.

The factory-in-a-box creates movable shelters by using manual labor. So, when it comes to ergonomics, the weight of the building materials should be taken into account. Workers must therefore lift the building supplies to the production cells. Compared to the basis materials of concrete and steel, wooden materials were the lightest. Thus,

compared to the base case scenario, steel had a little worse value than the existing foundation, while concrete and green concrete had the poorest ranking.

The suitability of construction materials for warmer climates is taken into consideration based on the refugee housing demands in Turkey. The authors conclude that each alternative scenario has a higher value than the base scenario.

The resistance of construction materials to earthquakes is still regarded as a crucial requirement because they frequently happen in Turkey. As a result, steel-based construction materials were more valuable than wood-based ones. Concrete and green concrete, on the other hand, scored worse than the current base solution.

4.5.1.5 Implementation Phase to Determine Most Feasible Solution

For the purposes of calculating the scores of alternative solutions, the impact level of the criterion is multiplied by the ranking comparison of the alternatives in the implementation base. Additionally, the most practical alternative approach for the focal company to manufacture portable shelters was chosen, with the alternative having the largest sum. Thus, tables 14, 15, and 16 (see below) provide the sum of ranks and the best alternative approach.

Table 14: Implementation of Pugh matrix(wood based material vs steel based material)

Solutions	Ranking Criteria							Total
	Material Availability	Quality	Environmental Sustainability	Cost	Ergonomics	Climate Suitability	Resistance to Earthquakes	
Wood Based Material Usage (Base) Scenario	0	0	0	0	0	0	0	0
Steel Based Material Usage	10	6	1	6	-3	3	3	26

Table 15: Implementation of Pugh matrix (wood based material vs concrete based material)

	Ranking Criteria							
Solutions	Material Availability	Quality	Environmental Sustainability	Cost	Ergonomics	Climate Suitability	Resistance to Earthquakes	Total
Wood Based Material Usage (Base Scenario)	0	0	0	0	0	0	0	0
Concrete Based Material Usage	10	0	-2	6	-3	3	-6	8

Table 16: Implementation of Pugh matrix (wood based material vs green concrete based material)

	Ranking Criteria							
Solutions	Material Availability	Quality	Environmental Sustainability	Cost	Ergonomics	Climate Suitability	Resistance to Earthquakes	Total
Wood Based Material Usage (Base) Scenario	0	0	0	0	0	0	0	0
Green Concrete Based Material Usage	-10	6	2	-6	-6	3	-6	-17

The steel base material solution, which had a total sum value of 26, was highlighted as the most feasible option. On the other side, a comparison and ranking revealed that green concrete had the lowest sum value. Cost, availability, weight, and earthquake resistance would be the main barriers to the use of green concrete in Turkey. Turkish environmental practices were not as developed as those in Sweden, therefore regional suppliers were unable to provide significant quantities of green building materials. Additionally, the cost-competitiveness of Turkish rival suppliers limits the availability of green building materials. Green concrete would not be practical for the focal firm to use in Turkey due to the market for construction materials and local suppliers in the

short term, but as green building practices in Turkey improved and the supply of materials increased, green construction materials could be used to produce portable shelters. However, assessing the viability of the green construction alternative for the focal firm in Turkey is a future implication.

5. Discussions

Answers to RQs 1 and 2 have been addressed in this chapter. Firstly, in chapter 4.5 (see above) steel, wood, and concrete materials were evaluated as alternative materials for construction. In conclusion, it is anticipated that steel materials were feasible when considering the challenges that will be confronted in the selection of alternative components that can be utilized in the construction of portable houses. In the following part, the advantages of localization enablers for the focal firm in order to produce shelters using steel materials are stated. As a result, figure 10 has been created to represent the relationship between localization enablers and the focal firm.

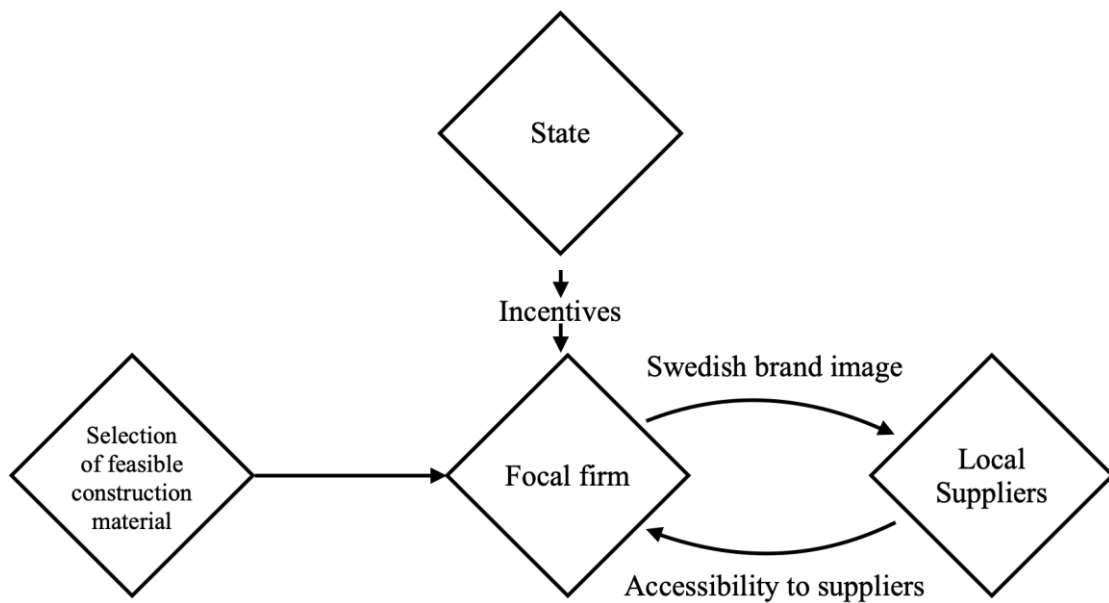


Figure 10: Feasibility study of factory-in-a-box localization for the focal firm.

5.1 Why steel is the most feasible for material selection ?

Comparing concrete and wood, steel appeared as the most feasible material. Steel was chosen as a construction material for portable shelter production due to its availability, quality, environmental sustainability, affordability, ergonomics, climate adaptability, and earthquake resistance capabilities.

5.1.1 Material Availability and Quality

The process would not be a challenge in Turkey to obtain sufficient steel construction materials locally. The main cause is because Turkey is home to a vast diversity of steel producers in various areas. In order to meet the demand for portable shelters during the stages of a disaster, huge production volumes of steel, as confirmed by Adli (2020), create benefits to economies of scale allowing high rates of production. Additionally, the wide range of factories may reduce related costs for storage and delivery. Since

shorter delivery lead times would result in lower overall costs. Interviewee 5 claimed that quality certifications in Turkish construction material production are constantly improving from a quality standpoint. Therefore, it can be determined that steel-based building materials are of suitable quality for the manufacture of portable shelters. However, the producer will decide where to find high-quality steel.

5.1.2. Environmental Sustainability and Cost

Concrete when compared to steel, is not an environmentally friendly material. The main reason is that producing concrete generates significant volumes of greenhouse gas emissions (Habert et al., 2020). Although green concrete could be utilized in building, its long-term viability is compromised by its costly price. Green concrete and concrete are therefore not the best materials for the focal company.

Steel is a material that promotes environmental sustainability. According to Sakumato et al. (1998), recycling steel can help minimize deforestation. Reduced deforestation results in fewer emissions, which eventually promotes environmental sustainability since forestation reduces the harmful effects of carbon emissions. Additionally, as interviewee 5 stated that Swedish businesses highly value environmental sustainability practices. Demanding environmental consideration is an important objective in the context of the focal firm. In order to sum up, steel contributes to accomplishing the goal and promotes the sustainability objectives.

According to interviewees 5 and 6, Turkey's wood supply is insufficient to meet demand from the construction industry. Additionally, Karakaya et al. (2017) validated their findings by investigating the amount of wood produced in Turkey and drawing the conclusion that the amount is inadequate. Additionally, a study by Chini & Gupta (2017) found that steel has superior cost competitiveness than wood due to its durability characteristics. In terms of the amount of production and the ratio between supply and demand, wood would therefore be regarded as significantly more expensive than concrete and steel-based products.

5.1.3 Ergonomics and Climate Suitability

Moving wood from the warehouse to the production cell, wood is generally more advantageous for the employees than steel and concrete. The ergonomic disadvantage of steel building material, however, might be disregarded after taking other material selection criteria into account.

Wood is more practical than construction materials based on steel and concrete, therefore it can be utilized more frequently in colder areas. However, wood might not be as practical as steel and concrete-based materials in warmer climates, like Turkey. Steel has a high thermal conductivity, according to Zafra et al. (2020). However, the use of appropriate isolation components makes the manufacturing of portable shelters appropriate for steel-based construction materials..

5.1.4 Resistance to Earthquakes

Turkey, which is in an earthquake zone, earthquake resistance is one of the most important criteria for portable shelter usage. According to the study of C.Alih & Vafaei (2019), wood construction materials withstood better than concrete based materials in the Malaysian earthquake. On the other hand, steel based materials are widely used in earthquake areas due to their high earthquake resistance (Guchan, 2007). Accordingly, both wood and steel based construction materials are more resistant than concrete based materials. On the other hand, steel based portable shelters might be more beneficial with respect to modularity.

One of the most crucial requirements for the use of portable shelters in Turkey, which is in an earthquake zone, is earthquake resistance. According to the study of C.Alih & Vafaei (2019), wood construction materials performed better in the Malaysian earthquake compared to structures made of concrete. However, due to their high level of earthquake resistance, materials made of steel are frequently used in earthquake-prone regions (Guchan, 2007). As a result, construction materials made of steel or wood are more resistant than those made of concrete. On the other hand, steel-based portable shelters might be more advantageous than those made of wood because their modularity features would be beneficial during the stage of disaster assistance.

5.2 Benefits of Localization Enablers for the Focal Firm

The role of localization enablers can act as a catalyst to set up factory-in-a-box when steel is used as an effective material for the construction of modular shelters. Firstly, incentives offer numerous advantages to promote the business of the focal firm in Turkey, including energy, infrastructural, financial and fiscal, land allocation, social security premium support. Local Turkish firms view Swedish-based corporations positively due to their high levels of dependability and efficiency. As a result, the focal company might have access to multiple tiers of suppliers to find steel base construction materials. Emphasizing the country brand of origin is helpful for gaining access to a wide range of suppliers in Turkey after receiving state incentives.

5.2.1 Incentives

This chapter compares theoretical background with empirical data on incentives to show how localization for the focal firm is influenced by incentives. The authors' interpretation of the data is based on their discussion of region 6 incentives. Table 17 shows illustrations of the benefits of incentives for the focal firm in order to set up a factory-in-a-box solution.

Table 17: Illustrations of the benefits of incentives for the focal firm.

Benefits of Incentives				
Energy Support	Infrastructure Support	Monetary and Fiscal Support	Land Allocation Support	Social Security Premium Support
An incentive that benefits the focal company's energy supply in order to power the factory-in-a-box that makes portable shelters.	The financial incentive that meets the focal company's infrastructure demands while acquiring electricity and natural gas for the factory-in-a-box.	<p>Institutions that provide financial help to the focal company by waiving factory-in-a-box startup costs.</p> <p>The capital support incentive, which compensates factory-in-a-box investment spending, can be advantageous to focal businesses.</p> <p>The factory-in-a-box can receive tax exemptions on development and building costs due to a VAT (Value Added Tax) incentive.</p>	The incentive that is useful for deciding where to set up the factory-in-a-box	Factory-in-a-box benefits for employment from Social Security premium payments in regions 6 areas.

Findings of the incentives when compared to the theoretical framework for addressing the research question 2. Investment incentives, according to Simay Karaalp (2014), are advantageous for less developed regions with low income and employment levels. The empirical data suggests that incentives have a catalyzing effect on international companies' investments in Turkey. Table 17 (see above) was created as a result to illustrate incentives and the advantages they offer.

As a project-based incentive, energy assistance offers electrical support for the construction of factories-in-a-box. Energy sourcing would be more convenient if the state provided electricity and natural gas. Infrastructure must be constructed around the factory-in-a-box to produce portable shelters in order to serve as a source of energy. Solutions for the infrastructure requirements for natural gas and electricity would be offered by leveraging the infrastructure incentive.

According to Akan & Arslan (2008), local development was supported through incentives for the East Anatolia region. Therefore, region 6 incentives for Turkey offer the widest selection of incentives. Therefore, the region 6 area and associated incentives for the target firm were discussed. The administration cited land distribution as an incentive for investments in Turkey's Region 6. Rapid production would be necessary, particularly for the immediate response to the earthquake, in order to deliver effective relief to the crisis area. Therefore, a land allocation incentive would establish the best location for a factory-in-a-box to be built, setting the best lead time for material supply for manufacturing and resulting in quick delivery times for portable shelters. On the other hand, as temporary shelters will be used in refugee camps in Turkey, proximity to the location of the camps is essential. Therefore, a shorter travel distance would result in lower transportation expenses for the logistics cost optimization. As a result, it is crucial for the focal firm to build the factory-in-a-box in area 6 so that it may take full advantage of the incentives and is located close to the refugee camps. However, the focal company and relevant decision-makers have the last decision.

The focal firm will receive financial help from monetary and fiscal support. Which agrees with David's (1983) claim that foreign enterprises benefit from fiscal incentives when making investment decisions. Capital expenditure would be required to establish a factory-in-a-box in Turkey. Tax incentives provide cost reductions because region 6 in Turkey is eligible for VAT and corporation tax exemptions. The focal firm would spend less money if it took advantage of tax benefits, which is important for the long run. The budget adjustment of the focal firm will benefit from monetary support from the state in the form of a rebate of expenses. Particularly, the high volatility of the Turkish economy, which is mostly the result of high inflation, creates risks and planning difficulties with regard to financial access. Therefore, the development of a factory-in-a-box and the procurement of related equipment are made easier by the state's financial support.

Social security premiums enable the focal firm to create jobs in area 6 and facilitate the factory-in-a-box's easier employment of manual workers. Foreign investment boosts Turkey's employment levels after the crisis, according to Erdogan & Ataklı (2014). The focal firm's employment program will increase the population's access to stable employment opportunities and economic power for both Turkish nationals and refugees. Enterprise zones, which seek foreign investment in less developed areas to increase employment levels and are most advantageous for small enterprises that may be seen as the focal firm, were the subject of a study by Dabney (2011). Furthermore, according to Fisher & Peters (2002), enterprise zones thrive demonstrably as employment levels improve in the specified areas. On the other hand, women's employment is essential for regional growth in area 6 and should be an aim for the focal firm in terms of sustainability. Additionally, Kurdve & De Goey (2017) claimed that employing factory-in-a-box workers could enhance humanitarian development. Social security premiums increased the number of women employed in Turkey, as reported by Uysal (2013). Social security premiums are advantageous for the focal firm for the employment of the local population at the factory-in-a-box under the supervision of the

relevant theory and empirical facts. As a result, Turkey's social sustainability would improve.

Additionally, there are a number of incentives for earthquake-affected areas that are supported by actual data. By creating temporary shelters and distributing them to the afflicted populations in the areas, the focal company takes advantage of the many incentives. Therefore, disaster-affected areas stand as investment opportunities for short-term housing needs, with the exception of region 6 areas. However, area 6 offers the greatest number of incentives, thus for a small business, incentives would be essential for establishing the factory-in-a-box.

Finally, the aforementioned comparisons show how the data and theory about incentives are in line with each other and serve as an analysis for the localization of the focal firm in Turkey.

5.2.2 Swedish Brand Image

Incentives will be a critical component of the focal firm's localization activities. However, it's crucial to have access to suppliers if you want to find the process materials you need at a price you can afford to build a business network with nearby suppliers. The nation of origin of the focal firm acts as an enabler and facilitator to achieve these goals.

A claim made by Yasin et al. (2007) claims that a brand's place of origin has an effect on consumers' perceptions, either positively or adversely. According to interviewee number 6, Swedish brand image has a favorable impact on the Turkish business climate, as Swedish steele is commonly referred by domestically. As an interpretation, the Swedish origin of the main company fosters a supportive environment for local entrepreneurs. There are numerous instances of Swedish companies operating successfully in Turkey. In the Turkish business climate, these companies compete for a long time. The data additionally demonstrates that Swedish businesses have a tradition of sustainability. The local enterprise in this study benefits from long-standing networks with local actors within Turkey, according to the interpretation. Additionally, the main firm's social sustainability aims align with the nation's brand image. Since brand image and country of origin image both affect each other's reputations, a fit between a firm's image and its country of origin would be beneficial for both images (Lopez et al., 2011). As a result, in order to start producing the portable shelter, the focal firm would establish easier networks with local suppliers and other actors. The focal firm would therefore complete the initial stage of internationalization. The image of a brand's country of origin is essential for the early stage of internationalization (Lopez et al., 2011).

The business culture and practices of the focal firm will be crucial for long-term success following the development of the factory-in-a-box in Turkey. For foreign businesses to establish a name in international markets, financial promises, supplier training, and innovative capabilities are essential (Parente-Laverde & Rojas-DeFrancisco, 2022). Turkish local firms find Swedish companies to be very trustworthy, and this is supported by the interviews. Therefore, given that the focal firm is situated in Sweden, it would have solid financial guarantees. The focal firm also places a high importance on organizational development and education for its employees and organization. Long-term business applications and practices can help the focal company support the growth of regional suppliers and create positive connections to avoid material delivery

delays while also utilizing the cost competitiveness that the Turkish construction market offers. Last but not least, Swedish companies' innovation capabilities enhance their standing in Turkey for reaching out to local actors. The interviews that made up this study's findings, such as those about R&D and investments in innovation, underlined the Swedish companies' capacity for innovation. Consequently, the reputation of the focal firm benefits. The focal firm's innovation capabilities can, in the long run, sustain the creation of new competitive advantages for successful competitiveness. Both the focal firm and the Swedish enterprises may transfer these qualities from their country of origin.

In other words, localization in Turkey will be positively impacted by the focal firm's nation of origin. Once established, the focal firm's capacity for reliability, innovation, and training upholds competitiveness and the development of regional business networks with regional players. Access to suppliers is essential and critical, especially for the construction of temporary shelters, to maintain localized production without causing disruptions in the supply chain.

5.2.3 Accessibility to Suppliers

Swedish brands are known for producing goods with high levels of dependability, quality, and reliability, which has been confirmed by interviewee six and opens up access to local suppliers in Turkey. The primary company wants to localize in Turkey, thus having a positive perception of the nation as a whole increases the likelihood that it will work with local suppliers in the near future.

Turkish providers are accustomed to the regional customs of the nation. Thus, if customers required that suppliers adapt new technology, suppliers would do so in order to maintain their respective competitiveness in the market, according to interviewee 6's conclusion. Innovation capacities grew with the cooperation of foreign companies and local suppliers, according to Raines et al. (2010) and Petersen et al. (2003). Additionally, strategic supplier selection used in long-term business partnerships with local suppliers enhances material availability, product quality, and innovation capabilities (Pazirandeh, 2011). As a result, in the long run, thoughtfully selected suppliers and the development of network capabilities with the focal company give the Turkish market a competitive edge if new competitors enter the market. Which is supported by interviewee number 6, who asserts that Swedish companies are long-standingly dependable for the local Turkish enterprise, enabling long-term business partnerships. Results on innovation capacity so matched the theoretical framework for long-term corporate collaborations.

However, in addition to Turkey's advantages in terms of supplier accessibility, the localization of the focal firm also benefits from these advantages. These benefits include price reductions based on transportation expenses, insurance costs for process material transportation failures, and indirect costs resulting from environmental concerns. Dynamic, static, and hidden costs are the three main types of costs mentioned by Holweg et al. (2006). According to interviewee number 6, increased supplier accessibility results in increased material availability. Therefore, there would be fewer material stock outs, which would result in lower dynamic costs. Since customs and insurance expenses would be optimized and decreased, static costs would be lower. Furthermore, local sourcing made possible by supplier accessibility allows for the neglect of hidden expenses brought on by currency changes, notably in Turkey where

inflation rates are high. Local sourcing is therefore a feasible sourcing approach when a company wants to neglect supply risks, transportation disruptions, capacity restrictions and improve the speed to tariff processes and market growth, production flexibility, efficiency in cost parameters, and performance in terms of delivery (Wei et al. , 2012; Tunisini et al., 2011; Patti, 2006).

Additionally, from the standpoint of humanitarian supply chains, the main firm's ability to access suppliers can be quite important. Local communities would boost supply quantity and significantly decrease lead times and transportation costs as a result of efficient and practical communication (Sheppard, 2013). Since sourcing necessary materials of high quality would be relatively easier in Turkey during the initial phase of the disaster response, supplier accessibility was mentioned as an enabler in Turkey by interviewee 6. This is because communication is comparably easier in Turkey for the foreign companies. Therefore, the focal firm would succeed in producing portable shelters rapidly when required. Additionally, since the factory-in-a-box's portable ability provides an increased degree of mobility, lead times and transportation times are able to be decreased (Jackson & Zaman, 2007; Bengtsson et al., 2006). In order to reduce time and expense on transportation, a factory-in-a-box can be relocated close to the area impacted by a disaster and materials can be purchased from the closest suppliers in neighboring areas. As a result, the delivery of humanitarian aid can be improved in terms of timing, and the relief effort will move rapidly .

In conclusion, the focal firm benefits significantly from having access to suppliers both during normal operations and during crises.

6. Conclusion

First research question in this study was designed to seek answers to highlight local sourcing issues and viable solutions to the corresponding challenges. Material availability, locating good quality materials and the availability of environmentally friendly building materials were identified as common obstacles for the focal firm in creating portable shelters based on the data and conclusions. Furthermore, high inflation rates in Turkey are highlighted as a country-specific obstacle for local sourcing. The pugh matrix approach was used to evaluate the most practical answer to local sourcing issues and the authors in Turkey decided to use steel foundation construction material for the fabrication of temporary shelters.

Second research question was designed to address what factors may enable the focal firm to be located in a disaster-affected country. As a result, Turkey was chosen as a case study for the study. According to the findings of the study, natural catastrophe occurrence, demographic features of various countries, physical infrastructure capabilities, and situations in refugee camps are all grounds for Turkey's selection as the focal firm to locate. Furthermore, based on the findings, enablers in localization are identified as state incentives, Swedish brand image, and access to suppliers in Turkey. State incentives for energy assistance, land distribution, tax breaks, social security premiums, and infrastructure support are explored, with monetary, financial and employment benefits highlighted. Country image and its relationship with brand image were explored, and based on a comparison analysis of empirical and theoretical data, the positive role of country image was initially asserted for the focal firm's localization in Turkey. However, the necessity of the firm's business processes and financials were also emphasized for long-term success in localization. Finally, supplier accessibility is discussed, as well as the benefits for the focal firm in both regular business and disaster relief.

Results of this research are valuable for businesses that produce portable shelters using a factory-in-a-box method. The findings and suggestions provide a roadmap for emphasizing the factory-in-a-box settings and localization demands. Companies that operate in earthquake-prone and disaster-prone foreign nations for production may need feasibility studies examining the local construction materials accessible therein. Additionally, the researched localization enablers could be applied to a variety of different countries. This is primarily because developing nations like Turkey, which require foreign investments in order to boost the local economy as well as meet the urgent demand for post-disaster aid, foster the initiatives of foreign corporations to invest. In conclusion, it is beneficial for foreign enterprises to understand the relationship between localization enablers and their effect on the production of portable shelters. To sum up, potential issues and challenges that producers of modular houses might encounter depending on local conditions are examined.

This research has a small sample size of interviews concerning alternative building materials that can be considered as a limitation. The data pool was small, and the matrix produced more subjective results due to Turkey's lack of an interview culture and difficulties connecting with individuals. Better data quality was also hindered by the small number of interviewers. As a result, not all of the findings and suggestions in the

report might be accurate. The results that were claimed by this study caused additional debate because the uncertainties in today's business world have not yet been sufficiently addressed. In terms of providing a significant contribution to the solutions of issues that will occur in reality, the research could be slightly brief. Hence, a company that seeks to produce portable houses in Turkey could make wrong decisions if only the results of this study are considered as reference.

This research contributed to the theory of factory-in-a-box, localization research, local sourcing, localization enablers, and the Pugh matrix's implications for movable shelter creation. The feasibility study contributed to the theory of the factory-in-a-box. The study of localization enablers in Turkey contributed to the theory of localization concept. This study contributed to the theory of local sourcing in portable shelter production in Turkey. Furthermore, the Pugh Matrix utilization area was implemented for the product development, which was a portable shelter. As a result, Pugh Matrix implementation contributed to the product development theory from the standpoint of portable shelter production.

The key contrast between practice and theory in the study was that localization conditions were not totally ideal for the foreign firm in foreign nations that were distinct from the origin country, necessitating adaptation. Because of material market obstacles, organizations must become agile and pragmatic in their business procedures in order to localize effectively. As a result, flexibility in the design of portable shelters as well as business operations became a critical aspect that would boost the feasibility of localization from the standpoint of the focal firm.

The use of portable shelters for humanitarian development in Turkey was determined in this study. The reasons for choosing Turkey are defined by the requirements of the people. As a result, several applications of portable shelters outside of the humanitarian context were excluded from the scope of the study. Future research could focus on portable shelter production using green construction materials and recycled materials; however, environmental sustainability development in Turkey's construction industry currently limits the feasibility of green building practices for the focal firm producing portable shelters.

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Appendix

Interview Guide

General Information regarding the focal company

- 1) How did the concept for Husmuttern AB start ?
- 2) What standards did Sweden use to find suppliers? Should Turkish suppliers be searched following in the same way?

Questions regarding localization enablers in Turkey

- 1) Can Swedish brand recognition encourage the focal firm to localize in Turkey?
- 2) Are the local suppliers of building materials available through the Swedish brand?
- 3) Does the Swedish name inspire confidence in Turkish suppliers and partners?
- 4) What does the Turkish population think of Swedish companies?
- 5) Do you believe that Turkey's rural and less developed locations have sufficient physical infrastructure (including energy, communication, and transportation) to support the construction of a mobile production facility ?
- 6) There are incentives instruments that offer fiscal support that helps a foreign company financially. Do you believe that these financial incentives would have a significant effect on company when producing portable shelters ?
- 7) Is building and maintaining networks with suppliers in Turkey simple? What opportunities might these networks offer ?
- 8) Do you believe that, for a Swedish-based company, establishing confidence among Turkish business actors would be difficult? If so, how can a foreign company from Sweden attract the local Turkish stakeholders and actors' trust ?
- 9) Does the reputation of the Swedish brand influence local suppliers' faith in obtaining materials in the right amount and at the appropriate time?

Questions regarding local sourcing challenges for construction materials

- 1) Are construction process materials easily accessible in every region of Turkey? If not, which locality in the region has a center of gravity for the supply of these building supplies?
- 2) Do you believe that Turkey has a self-sufficient market for building materials to make temporary shelters ?
- 3) Do businesses that are founded in Turkey notice any discrepancies in the quality of the materials that are offered there, and if so, what do they think regarding that?
- 4) Do you believe that large suppliers in Turkey offer higher-quality products than those from smaller companies?
- 5) Do manufacturers of building materials in Turkey use sustainable production procedures?
- 6) Turkey's high inflation rates act as obstacles to international investment that pursues a B2C strategy. Can you describe the potential obstacles the focal firm would encounter when sourcing locally to produce movable homes?

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