ALFRED NOBEL UNIVERSITY

DEPARTMENT OF GLOBAL ECONOMICS

Bachelor's Thesis

Title of the Thesis

The development and ways of implementation of international investment project 'Shipping container homes' in Singapore

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Group: MEB-17a

Specialty: 292 International economic relations

Supervisor: Dr. Oksana Koshulko,

Ph.D. in Economic Sciences,

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Last name, initials, scientific degree

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ALFRED NOBEL UNIVERSITY
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The Bachelor's Thesis Assignment

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Abstract

Saidu H.M. The development and ways of implementation of international investment project 'Shipping container homes' in Singapore

This thesis examines the current state, trends of the Singapore economy and development of international investment projects in Singapore. Singapore assumes a major part in changing the destiny of post colonial nations in the Asian region, by proclaiming the distinctive success of financial development, industrial competitiveness combined with political stability and transparency. Despite the fact that Singapore was compelled by geological constraints and a vast regular resource base, Singapore had the option to establish the frameworks of economic prosperity and diversity through viable use of its entrepot status. Singapore fills in as a regional headquarters for in excess of 3000 foreign companies and has top notch financial and administration sectors and above all exceptionally efficient physical framework. The nation constantly positions itself highly among 'most attracting nations for worldwide business' and has accomplished a per capita GDP level practically identical to levels of developed western countries. An international investment project to establish the construction of "shipping container homes" in Singapore was developed and the calculations of the need for investment resources are given, as well as the calculations of the main indicators that made it possible to evaluate the investment attractiveness of the proposed project.

Keywords: economic growth, foreign investment, gross domestic product, globalization, international investment project

Анотація

Саіду Х.М. Розробка та шляхи реалізації міжнародного інвестиційного проекту «Доставка контейнерних будинків» у Сінгапурі

Дана дипломна робота досліджує сучасний стан, тенденції розвитку економіки Сінгапуру, а також розвиток міжнародних інвестиційних проектів у цій країні. Сінгапур взяв на себе основну роль у зміні долі постколоніальних держав в Азійському регіоні, забезпечивши цілковитий успіх фінансового розвитку, промислової конкурентоспроможності, у поєднанні з політичною стабільністю та прозорістю. Незважаючи на те, що Сінгапур обмежений геологічно та ресурсно, він створив основи економічного процвітання та різноманіття шляхом життєздатного використання свого статусу антрепота. Сінгапур є регіональною штаб-квартирою для понад 3000 іноземних компаній і має першокласні фінансові та адміністративні сектори, і перш за все надзвичайно ефективну інфраструктуру. Нація постійно позиціонує однією з «найбільш привабливих країн для світового бізнесу» і досягла рівня ВВП на душу населення, практично ідентичного рівню західних розвинутих держав. У даній дипломній роботі було розроблено міжнародний інвестиційний проект щодо будівництва «контейнерних будинків» у Сінгапурі, а також були наведені розрахунки потреби в інвестиційних ресурсах, на додаток до розрахунків основних показників, що дали змогу оцінити інвестиційну привабливість запропонованого проекту.

Ключові слова: економічне зростання, іноземні інвестиції, валовий внутрішній продукт, глобалізація, міжнародний інвестиційний проект

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INTRODUCTION

Singapore has emerged as one of the world's most thriving countries. It's a financial center and serves as a model for developing countries. Despite its size and lack of natural resources, Singapore's 5.6 million people enjoy one of the highest average incomes in the world, ahead of countries like Germany, France and Japan. The vision of the Ministry of Trade and Industry of Singapore is to make Singapore "a leading global city, supported by a dynamic economy with world-class and innovative enterprises".

The Economic Development Board (EDB) observes that, with globalization and hastening technological advances, knowledge will become a strategic asset. Therefore, to reap the opportunities, countries must realign themselves as a knowledge-driven economy. Investments are really important as they are a major driver of the economy in the world. They are also the basis for executing technological and scientific progress, improving the competitiveness and quality of products, balanced development of all its industries, developing the social sphere and restructuring the economy. Without investments, investing in other assets and implementing environmental actions to ensure the competitiveness of goods, services etc would not be possible.

In this paper, I will be analysing the investment climate in Singapore; This consists of the general information of the country which includes the socio-economic trends and the macro economy of Singapore, the theoretical aspects on international investments projects and the research gap. I will also talk about the effect of globalization in Singapore and how it has helped in the growth of the economy of Singapore, international trade activities and international relations challenges. In the final chapter, I will be having a look at the ways to develop an investment project in Singapore (shipping container homes), cost of implementing the project, assessing its risks and making calculations to determine the attractiveness of the project.

CHAPTER 1

1.1. Socio-Economic Trends And The Macro Economy Of Singapore

Several economies around the world have grown spectacularly bigger in the last few years and the Asian continent especially has become more developed and richer than any other continent in the world (Ali et al., 2018). This growth and development have been facilitated by several factors including extraordinary labour and capital investment unlike gains in efficiency. However, this growth has not occurred similarly across Asia as some countries (big players) have experienced far more growth than others (Koo and Deyo, 2018). Eastern countries of Asia have experienced the greatest levels of economic growth compared to other parts. For Singapore especially, there has been a very huge pathway of success with regards to economic growth as it has experienced a great level of industry competitiveness, along with a high level of transparency and political stability in the country, which are all necessary ingredients/determinants for economic growth (Quah, 2018). The fact that Singapore is a central/regional headquarter for over 3,000 international brands around the world buttresses the strength of Singapore's economy and also serves as evidence of Singapore's economic growth over the years (Quah, 2018). Furthermore, Singapore's per capita gross domestic product has boosted to a level that can be compared with international greats and Singapore ranks at the top level with regards to the most attractive countries for international business and foreign investment. This chapter carries out an economic analysis of Singapore, using available literature to identify the research gap that exists.

Singapore is the smallest country that exists in South East Asia, from its establishment, the economy of Singapore relied entirely on the state being an entrepôt which countries around it would use due to the fact that the country is strategically located in the continent (Abshire, 2011). This is buttressed by the fact that Singapore lacks an abundance of natural resources or other commodities that it can transport or export, so the country resorted to helping nearby countries process and ship their

goods; the most significant resource of Singapore has therefore been its deep harbour (Sin et al., 2016). As the years passed by, Singapore then generally became more active in the building, construction and repair/maintenance of sea vessels, milling of coral and rubber, smelting of tin amongst others. In addition, Singapore has also become a core location for the transfer and dissemination of goods manufactured in Europe.

With regards to density of population, Singapore stands as the third most densely populated country in the world as it has a population of 8,291.9 per square kilometre with only Monaco (26,160.3 square kilometres) and China (7,082.1) being more densely populated (Statista, 2019). The total population of individuals living in Singapore as of 2020 is 5.704 million, however, a critical statistical breakdown of the country's population was made for just 3.6 million of this population (those who are citizens of Singapore and also those who are permanent residents). One issue affecting Singapore with regards to the productivity orbits population is its severe ageing problem. For the human poverty index (HPI-1), of 103 developing countries around the world Singapore ranks 6th overall, and fir HDI (Human Development Index), Singapore ranks 25th, as it has a value of 0.907, in order to assess how good this value is, it can be compared with that of Hong Kong, China which ranks first and has a value of 0.916.

The type of economy operating in Singapore is a free market economy, this type of economy has been very effective as Singapore is obviously very successful. Several other factors that have contributed to Singapore's success is the fact that the business environment of the country is open, is free of corruption is very transparent, poses commodities with prices that do not fluctuate, and its gross domestic product is one of the highest for both developing and developed countries across the world (Ng et al, 2010).

The government of Singapore encourages both savings and also investment through a scheme called the CPF (Central Provident Fund), large portions of the country's budget are also extensively spent on technology and education, in order for its inhabitants to possess the relevant qualification, skills, knowledge and technicality to contribute positively to the economy (Koh et al., 2018). Singapore also possesses

TLCs (Temasek-linked companies) which are directly linked to the Government's arm of investment). These Temasek linked companies are entities that operate commercially especially in the manufacturing industry and therefore contribute close to two-thirds of the country's gross domestic product (GOH, 2014). The investment in technology particularly is one way of Singapore putting in efforts to position itself as an Asian technology and financial powerhouse, as it envisions a future dominated by globalisation.

These investments have generally been worthwhile as they resulted in a great level of growth since investment (an average 8 percent in growth from 1960 to 1999) (Macrotrends, 2021). The strength of Singapore's economy is also buttressed by the fact that it has withstood a real economic, financial and global crisis and is doing very well. Take, for instance, there was a regional financial crisis in 2009, however, this did little or nothing to alter its gross domestic product or capita which increased from 21,796 dollars to 23, 852 dollars in 2000, an incredible 9.04 percent (Macrotrends, 2021). Even in 2003, where the country was one of the countries where the Severe Acute Respiratory Syndrome) SARS outbreak was rampant, the overall GDP and per capita improved by 4.54 percent. Analysing more recent trends reveals that Singapore's GDP per capita increased by 2.12 percent from 2015 to 2016, 2017 saw an even increased percentage increase (7.19 percent), 2018 followed suit as the gross domestic product per capita grew by 8.66 percent from 2017. However, 2019 witnesses a slight reduction in GDP per capita (1.44 percent) (Macrotrends, 2021).

Singapore GDP- Historical Data

Year	GDP	Per Capita	Growth
2019	$372.06B	$65,233	0.73%
2018	$373.22B	$66,189	3.44%
2017	$341.86B	$60,914	4.34%
2016	$318.65B	$56,828	3.24%
2015	$308.00B	$55,647	2.99%
2014	$314.85B	$57,563	3.94%
2013	$307.58B	$56,967	4.84%
2012	$295.09B	$55,546	4.46%
2011	$279.35B	$53,890	6.34%
2010	$239.81B	$47,237	14.53%
2009	$194.15B	$38,927	0.12%
2008	$193.61B	$40,007	1.87%
2007	$180.94B	$39,433	9.02%
2006	$148.63B	$33,769	9.01%
2005	$127.81B	$29,961	7.36%

Table 1.1. History Of Singapore's GDP

Source: Macrotrends (2021)

Considering individual sector performance, manufacturing has been one of the most performing sectors. In the most recent years, the contribution of manufacturing to the Gross domestic product in Singapore has continuously increased. In 2016, there wasn't a 0.39 percent increase from 2016, 2017 experienced an enormous increase (12.65 percent) from the previous year, even more impressing, 2018 experienced an even greater growth (22.86 percent) increase from the previous year), however, there was a minute decline in 2019 from 2018 (4.82 percent) (Macrotrends, 2021).

Singapore Manufacturing Output- Historical Data		
Year	**Billions of US $**	**% of GDP**
2019	$73.68B	19.80%
2018	$77.41B	20.74%
2017	$63.01B	18.43%
2016	$55.93B	17.55%
2015	$55.72B	18.09%
2014	$56.67B	18.00%
2013	$54.25B	17.64%
2012	$56.41B	19.12%
2011	$54.70B	19.58%
2010	$49.82B	20.77%
2009	$39.36B	20.27%
2008	$39.86B	20.59%
2007	$43.11B	23.82%
2006	$39.50B	26.58%
2005	$34.61B	27.08%

Table 1.2. History of Singapore's Manufacturing Output (Macrotrends, 2021)

Source: Macrotrends (2021)

Apart from manufacturing, other sectors that have performed very well are its engineering fake transportation, manufacturing of biomedical and electronics sectors. Over the last 20 years, specific events have also helped to boost the economy of Singapore. Take, for instance, there have been several instances where freight rates for global shipping have surged where high oil prices have caused higher levels of oil exploration and even natural disasters such as Hurricane Katrina which affected oil rigs in Mexico, rippled over and caused a surge in orders for the marine engineering industry of Singapore. The services sector, electronics and construction industries have also not been left out of these developments as they have experienced reasonable growth and also contributed positively to the gross domestic product over the years. The services sector has peculiarly been powered by financial services and its wholesale and retail trade. The financial services sector of Singapore has been supported by developments with regards to the expansion of capital market activities and asset management in the country, and these expansion activities themselves were facilitated by a growth in the amount of investment made by international bodies on Asian equities, a higher level of volatility in the FX market and increased domestic stock market turnover. (CHOW, 2019). The wholesale and retail trade services sector on the other hand has been boosted by high levels of regional trade and also improved in consumption domestically.

1.2. Theoretical Aspects On International Investment Projects

Companies that operate multinationals are working to obtain profit just like other companies, a difference between them and these other companies however is that they can enlarge their scope globally and invest in other countries apart from where their head office is located. In addition, when the fiscal policies and other financial

policies that are located in an investor's domestic country are not favourable, then the investors would likely search for international development projects to invest in (Aguilera-Caracuel et al., 2017). We would first of all be assessing the product life cycle theory. According to the product life cycle theory, there are several forms of international investment projects and these projects are greatly determined by the stage of development of the country or its stage of production. The theory provided that there are four stages of production or development; the first stage is innovation, the second stage is growth, the third stage is maturity and the fourth stage is decline (Yoo, 2010). As previously explained, the unique location of Singapore and the unique services that it provides is a major attraction of interest. The implications of this theory to this study is that, it explained that if a country can develop (for example with regards to technology), it would facilitate the development of international investment projects, also this theory helps us understand that the low level of technology in most of these developing countries is a major deterrent for development of international investment projects in the countries. Despite the fact that technological development can bolster international development projects, it can also be somewhat detrimental with regards to the country's employment levels, as (Haile et al, 2017) explained that this is a major problem in developing countries.

1.3. Research Gap

There have been several studies in the past that tried to analyse the development of international investment projects in different countries around the world, however, these different studies were specific to the particular country they assessed and cannot be applied to Singapore as they would fail to go accurately describe the nature of the projects in Singapore due to the difference in the evening and other modulating factors. Despite the huge volume of available literature in this field, no particular researcher has to examine this concept in Singapore to be specific. The economy of the world has greatly evolved and there have been drastic economic changes, these drastic economic

changes have caused several financial and economic crises, a transition in globalisation trends and many others, and policies responses have also been executed to respond to these economic problems. Furthermore, analysts have strongly promoted and advocated the need for new research that is current and sensitive to the present time as they would holistically reflect on, review and address the relevant issues. This research is therefore a current and innovative approach to international investment projects and economic growth. The need for this study is also demonstrated as empirical frameworks and conceptual fundamentals that would further contribute to the existing literature in this field will be provided by this study. Furthermore, the economic capacity of Singapore as a nation is gradually expanding and there are several studies that are employing first to determine what are the influencing factors/major causes of this economic growth. Therefore, this research provides not only an additional but also an improvement on the existing literature and would drive to fill the numerous research gaps outlined above.

CHAPTER 2.
SINGAPORE'S INTERNATIONAL RELATION

2.1 Singapore and Globalization

This subhead explores the challenges associated with globalisation, and argues for a fresh policy approach to better manage the process. The note begins by noting the benefits of globalisation for small open economies such as Singapore. It then takes stock of the present tensions arising from the uneven spatial agreement effects of globalisation and therefore the potential dislocations exposed by new technology.

Drawing from Singapore's expertise, the note discusses sensible policy measures that can be taken to mitigate the aspect effects of globalisation and achieve inclusive growth globalisation, broadly defined as the cross-border mobility of goods and services, people, capital and information, has long been a key enabler of economic growth for many countries. It permits countries to provide and consume at a more optimal level through increased specialisation, improved capital allocation and greater competition. Producers will relish economies of scale and cut back prices through the enlargement of markets. Consumers benefit from lower prices, and access to a wider style of merchandise and services. International trade likewise assists with encouraging healthy rivalry, thus prodding innovative advancement and usefulness development. In the post-WWII period, arising economies have been significant recipients of financial transparency. Whereas the advantages from the primary wave of globalization (that is 1870-1913) increased to owners of capital within the industrial world, the gains from the newest wave of globalization are a lot equally distributed, resulting in a drastic reduction in world poverty level .

In Asia, the erstwhile freshly industrialised economies of Korea, Chinese Taipei, Hong Kong SAR and Singapore and more recently, China and Malaysia, have benefited from the substantial dividends from chasing an export-oriented development

strategy. By opening up their economies and participating in global value chains, they were able to industrialise and grow rapidly for long periods, and in the process transform themselves into middle or high income countries. Being a small open economy, Singapore provides a good if somewhat unique illustration of this change. An absence of natural resources and autochthonous entrepreneurship at the outset of the industrialisation drive in the 1960s meant that the country had to depend on foreign direct investment (FDI) from multinationals in labour-intensive manufacturing industries to secure the requisite markets, technical know-how and management expertise. Openness to trade and investment has allowed Singapore to continuously raise its productive and technological capabilities over the years as it evolved into a high value-added producing node within the regional production networks that sprang up throughout the 1990s and 2000s. As a result, Singapore's industrial structure and export product combine have modified significantly, and multinationals have not only increased their presence but also diversified their operations towards R&D, logistics and distribution, fund management and technical support. Singapore also stands out for its heavy dependence on the free flow of capital, which is significant for performing its role as the entrepôt and money centre for the Southeast Asian region.

Throughout its history, Singapore has remained tightly integrated with the global trading and financial systems: for instance, trade openness (as measured by the quantitative relation of exports and imports to GDP) has been systematically high, staying well above 200% of GDP and reaching a peak of 440% before the Global Financial Crisis (GFC). Singapore's money openness, measured by the quantitative relation of external liabilities and assets to GDP, expanded rapidly from an average of 560% in the 1990s to 1,600% in the 2000s as it evolved into an international financial centre, amid increasing global financial integration, IMF (2017a). The country's strong outward orientation has arguably been significant in increasing its real per capita income (in constant 2010 dollars) from USD 3,905 in 1965 to USD 52,600 in 2016. For small and open economies, continued engagement with world markets is not a choice but an economic imperative. With very little within the approach of resource endowments and therefore the absence of a natural economic boondocks, little

economies must rely on global markets, free trade and unfettered capital flows to sustain their livelihood. In addition, a willingness to embrace and adopt new technologies is key to helping these economies capture opportunities. In Singapore, technological adoption is even more urgent in view of the country's ageing population and integrative shifts within the labour force over the consequent decades – the working-age population is set to peak in 2018, and the resident labour force growth will slow to 0.7% p.a. over the next decade, from 1.6% p.a. on average between 2011 and 2016. For Singapore to sustain sound development and expectations for everyday comforts to keep rising, it should continue to use innovation to drive efficiency development. International trade theory posits that economic openness and the ensuing higher growth would lead to a generalised rise in incomes, whereas reducing income inequality across and within countries. However, actual nation encounters have been blended, with the additions and losses from globalization being unevenly fanned out at the global and national levels. As of late, these results have led to worries about the negative effects and distributional outcomes of globalization. Specifically, the benign view of globalisation has been challenged by the post-GFC surge in advocate and inward-looking sentiments, particularly in the United States and Europe. With relation to the gains from foreign trade, these have increased mainly to regions with a high concentration of export-oriented industries while the wage gap between skilled and unskilled workers have widened alongside the introduction of new technologies. A recent World Bank study found that within-country inequality has remained at elevated levels – the population-weighted average Gini index rose steadily between 1988 and 1998, from 0.34 to 0.40, declining only slightly to 0.39 in 2013 (World Bank 2016). A few market analysts reckon that innovation – all alone, or together with globalization – is the fundamental driver of rising disparity. One possible rationalisation of this view is that novel digital technologies generate massive revenues from a low employment base, thereby eliminating middle-class (manufacturing) jobs and enriching a small group of "superstar" firms and individuals. At a similar time, "job routinisation" is happening as technology replaces tasks that are codifiable across a wide spectrum of occupations. The routinisation hypothesis provides an extra clarification for why

financial gain difference only began to rise in the 1980s: the appearance of computerisation in the 1970s brought about a qualitative amendment to machine capabilities – machines were now capable of storing, retrieving and responding in simple ways to information, thus replacing workers in routine tasks.

In terms of losses, the structural shifts brought about by globalisation (and technological change) have brought about significant separations and change costs that have not dispersed over the long haul. Globalisation has not been an unmitigated good, i.e. it has not generally made mutually beneficial results for all. Indeed, the efficiency gains from globalisation tend to grow progressively smaller as trade barriers come down, while the redistributive cost increases. As countries become increasingly open to international trade, the impact on affected communities and households, through job retrenchments or lower wages, has been sizable. Simultaneously, low or flawed inter-regional mobility has impeded changes and in specific occurrences, the adverse consequences either neglect to disseminate or are even amplified over the long run. Singapore's experience with globalisation was probably more benign in the earlier periods, although like other countries, it has not been fully insulated from the impact of technological developments. In the early years of industrialisation (i.e. the 1960s–1970s), robust job creation, complemented by large investments in social and physical infrastructure, brought about a substantial rise in income for most of the population. Accordingly, the Gini index fell from 0.50 in 1966 to 0.42 in 1978.

However, as the economy moved up the production value chain (i.e. in the 1980s– 1990s), the corresponding increase in wages benefited higher-skilled workers more than low-skilled ones. As a result, inequality increased over the period, with the Gini index hovering at 0.46–0.47. In the 2000s, Singapore continued to leverage the possibilities of external-oriented growth, restructuring its economy towards capital and skill-intensive sectors in order to remain fully engaged in global production networks. These government-facilitated efforts sustained growth, created new jobs and made possible the fiscal resources needed for redistributing the gains from trade.

Accordingly, real household income from work continued to rise across all income groups while at the same time, expanded redistributive programmes and wage

subsidies helped to soften the increase in inequality. In recent years, median wage growth for low-skilled workers has accelerated to a compound annual rate of 7.2% since 2013, (IMF, 2017). The Gini index, after accounting for transfers and taxes, declined correspondingly to 0.40 in 2016, the lowest in over a decade, (Department of Statistics Singapore, Key Household Income Trends, 2016). Shanmugaratnam (2015), opined that, indeed, Singapore maintains a relatively high level of intergenerational income mobility, with 14.3% of children born to parents in the bottom income quintile reaching the top income quintile. Looking ahead, the impact of technological change will likely intensify and compound the other side effects of globalisation. Forces of progress (and disruption), globalisation, and technological advancement go hand-in-hand, and are often mutually reinforcing. If predictions of the next wave of globalisation are accurate, the world may possibly be on the cusp of a new phase – one involving data and propelled by rapid advances in information processing and transmission. The implications could be far-reaching, especially for advanced economies, as this wave of disruption will also affect jobs that have so far been shielded from the effects of globalisation and automation. Whilst the impact of previous waves of globalisation has been confined largely to manufacturing jobs, advances in artificial intelligence, robotics, and data processing and transmission capabilities are likely to affect jobs at both ends of the skills spectrum. At the lower end, as robots gain the dexterity to do more complex tasks, more manufacturing jobs will be automated. At the higher end, advances in computing power will allow machines to process and analyse large amounts of data while “virtual presence” technology will vastly improve human interaction and communication over the internet. Taken together, these developments may result in a significant disruption of professional, white-collar, service sector jobs, which could accentuate the current backlash against globalisation and technological change.

2.2. Singapore and The Policy of Globalization

Regardless of the difficulties confronting globalization, a retreat from open approaches isn't the solution. The suitable reaction is to deal with the cycle so that the gains from trade are more uniformly and equitably shared, and the costs alleviated.

In particular, governments need to offer greater support to adversely affected constituencies, as well as the more vulnerable members of the society, through directed and very much executed policies. The Singapore government has increased their efforts to advance equality of chance and comprehensive development as more constructive responses to globalisation and rapid technological advancement. The measures taken have focused on three main thrusts:

(i) supporting firm's innovation and productivity drive;

(ii) investing in workers' skills development; and

(iii) strengthening inclusivity through fiscal transfers and redistributive policies.

Globalisation has acquired somewhat of a bad reputation in recent times. This is unfortunate as they remain the principal drivers of sustained growth in the global economy. Worries over the adverse consequences of free trade and innovation are not new and have arisen in different structures all through economic history. However nations overall have kept on engaging with the global economy, and new, innovative ideas have flourished. From a policy perspective, pro- and antiglobalisation are not sensible positions to take, as there is no single orthodoxy that can effectively tackle the deep-seated societal issues that have become conflated with the ill effects of economic progress. A fresh narrative and policy approach is needed. Policymakers need to regain the ground lost to the sceptics, who often exaggerate the downsides of openness to trade and ideas, and choose to play down the benefits. At the same time, governments need to be ready to be strategically interventionist, to work with and deal with the market influences behind globalisation and technology, as these do not lift all boats in the first instance.

There will be increasing contradictions and distributional consequences that governments need to be alert to. We therefore need to prepare as many of our workers as we can to be carried along with the waves of progress and provide for

those who might be left behind. In such a manner, the primary best strategy reaction is quite often never to smother advancement nor openings for trade, however to perceive that the preconditions for participating in their benefits are getting more grave for specific fragments of organizations and households. For Singapore's situation, globalization has permitted the island to conquer its regular limitations of limited land, labour and market size to achieve rapid economic growth since independence. In the previous years, foreign direct investment sped up the accumulation of capital and know-how, and powered the rapid development of Singapore’s manufacturing capabilities. More recently, the advent of information technology enabled services to become more exportable and for Singapore to focus on increasingly specialised parts of global value chains. Looking forward, a more prominent trade of thoughts and higher versatility of human resources will be fundamental in Singapore's transformation into a knowledge and skill based economy.

Singapore’s engagement with world markets is therefore deeply etched into our economic and political history. In the same way as other nations, Singapore needs to intensify efforts so that what has plainly demonstrated to be welfare-enhancing for the country overall doesn't turn into a destabilizing power that separates various sections of society. Singapore's methodology towards globalization and innovation inclusivity is secured on intensive endeavours to set up their workers for change through the SkillsFuture and different projects, as well as measures to advance the availability of new technologies. They would need to concede to more and more intelligent speculations for the future, joining preparing as a fundamental tool with different types of targeted income support and redistribution.

2.3 Singapore Economic Growth Towards Economic Transformation

Singapore has gone through rapid transformation during the last forty-five years. From an entrepot dominating towards business and administrations in the mid-1960s into an economy which presently specializes in high worth assembling exercises, and territorial financial center for business services in East Asia (Richardson, 1994). The

nation is likewise a rapidly growing financial focus served by the vast majority of the global business and merchant banks. Singapore is a highly competitive economy and according to Swiss International Institute for The Board Development somewhere in the range of 1995 and 2001 , the country ranked second in national competitiveness. By 2000, the production of hard disk drives (HDD) in the country reached $10 billion and accounted for nearly 70% of the world's total production of hard-disk drives. This is a highly standardised and easily transportable product. MNEs have invested in the HDD manufacturing in Singapore as the gateway for Asian and global markets (World Bank, 2009; Rodan, 2004). The study intends to examine critically the role of state, international economic situations and the Cold War tension in the region and how these factors have played a crucial role in achieving rapid growth rates, which I find has been neglected so far. I will also analyse the economic changes in Singapore since 1965.

The intention of this paper is to critically evaluate various factors which have contributed towards achieving high growth rates and prosperity, which has been ignored by the mainstream economists. A weak domestic bourgeoisie invited foreign capital to assist its industrialisation and modernisation process. The government has shown its total commitment towards the policies of active 'export promotion', and openness towards foreign businesses (World Bank, 2009; Shin, 2005; Siddiqui, 1998). There is existing literature about the role of MNEs (multinational enterprises) in the transformation of Singapore's economy.

However, I feel they are insufficient. Some studies have criticised the role of multinational enterprises (MNEs) as counter productive (e.g. UNCTAD, 1996; Dicken, 1998; Eden and Potter, 1993; Mirza, 1986; Vernon, 1977), while others either have overlooked or saw it as a positive contribution (Clifford et al, 1999; Gilpin, 1987; Kirkpatrick, 1986). During the 1980s and 1990s the East Asian economies were increasingly debated among the international financial institutions and academics. The failures in economic strategies in other developing countries were also discussed, especially Latin America, Africa and South Asia, which had followed, what was known as the 'Import Substitution Strategy' (Shin, 2002; Krugman, 1994; Siddiqui,

1998; Bhagwati, 1987; Hirschman, 1968). The setbacks during the 1980s in economic growth led to the change in strategies and gave way to the 'Neo-classical' i.e. pro-market policies, which heavily relies on 'market-forces' and 'international financial institutions' for investment and resources (Siddiqui,2010). For them, resource allocation is the key to higher growth rates for these countries. It was claimed that East Asian economic growth success was mainly due to export-oriented strategies. The proponent of free-market (also known as mainstream economist) argues that export-led policies kept private incentives and entrepreneurship in line with those of the global businesses (Girdner and Siddiqui, 2008). As a consequence, higher levels of competition will ensure efficient resource allocations and higher productivity (World Bank, 1993; Bhagwati, 1987; Krueger, 1980). The proponents of free-market policies are based on the presumed universal efficiency of the free market, which is expected to ensure economic growth in any country (Krueger, 1980). On the other hand, the critics said that the state played a crucial role in the early years of East Asian development and that 'getting the prices wrong' instead of 'getting the prices right' was responsible for achieving dramatic growth rates. These critics found evidence of clear state intervention in these economies and could not be separated from the interventionist role of the state. For instance, South Korea's successful establishment of selective intervention in heavy industries led to enormous structural changes during the 1980s in its industrial structure and exports (Chang, 1994; Wade, 1990; Amsden, 1989).

Since independence, Singapore's economy has had an experience which was not common among other former colonies such as: sustained economic growth; reliance on foreign corporations; low inflation; high saving rates etc. Singapore's GNP increased to more than thirteen fold between 1960 and 1999 and also the country witnessed a sharp decline in both the number of people in poverty and in infant mortality (Feenstra et al 2005). The annual real GDP growth rates averaged around 8% between 1965 and 1997, except during the 1980s it fell to 6.7% mainly due to global recession. In 2008-2009 the average growth rates again declined sharply due to the global financial crisis and uncertainty in export demands. There have been low

levels of inflation i.e. around 2% annually during the nearly five decades, except in the 1970s when it rose to 5.8% annually, mainly due to the oil crisis and inflationary trends in the Western economies. A stable macroeconomic environment with low inflation has created a positive environment for a long-term business perspective in the planning investment decisions and provided a good return on their investments.

2.4 Contemporary Singapore and Singapore Economic Growth

Singapore is a global financial and economic hub that sits astride the meeting point of the strategically vital Malacca Strait and the South China Sea. Despite its small size, the island city-state of 6.2 million people is a heavyweight in regional and international affairs. A close strategic partner of the United States in Southeast Asia, Singapore also maintains a close relationship with China. In recent years, it has pursued a balanced foreign policy, seeking to avoid getting caught up in the geopolitical competition between the two countries. But the U.S.-China trade war bruised Singapore's economic prospects in 2019, and the 2020 coronavirus pandemic has posed a challenge to the country's healthcare system and economy.

According to (Krnjajic, 2002), Singapore was a British colony and entrepôt for more than a century. Following World War II, as the British empire unraveled, Singapore gained considerable autonomy in the 1950s and in 1963 joined the Federation of Malaysia. The marriage was short-lived, however. Amid growing tensions between Malay nationalists and the predominantly ethnic Chinese supporters of Singapore's People's Action Party (PAP), Malaysia expelled Singapore in 1965, which then became an independent parliamentary republic.

The country's founder and first prime minister, Lee Kuan Yew, ruled for more than thirty years, until 1990, after which he became a senior minister and ultimately minister mentor to the Singaporean government until his resignation in 2011. Lee's influence over Singapore's national identity and approach to public policy cannot be overstated. Under Lee, Singapore became one of Asia's four so-called tiger

economies, along with Hong Kong, South Korea, and Taiwan. However, unlike these other rapidly growing Asian tigers—and Japan—Singapore, while retaining state control of core economic development, did not employ protectionist policies to help nurture its domestic industrial giants. Rather, Lee's Singapore pursued an economic development model that prioritized courting foreign direct investment, particularly from U.S. multinational corporations, such as Texas Instruments and Fairchild Semiconductor, looking for low-wage labor.

Singapore's per capita gross domestic product (GDP) is among the highest in the world. The PAP, which Lee founded, continues to rule Singapore today, having never lost an election. Lee's son, Lee Hsien Loong, is the country's third and current prime minister. Lee Kuan Yew was famous for his political philosophy, which viewed the national government as a paternalistic and technocratic manager of all aspects of social and economic life. He saw individual liberties as secondary to communal prosperity and social discipline as a necessary condition for that prosperity. Over the years, Lee's political opponents and other dissenters often found themselves in prison. While many experts credit his model with enabling Singapore's incredible economic growth, Lee's approach also earned him a reputation as a soft authoritarian. Singapore today is considerably freer than it was during Lee's rule. Having witnessed the legacy of ethnic violence in In Malaysia in the early 1960s, Lee understood the need for racial harmony in multi-ethnic Singapore. Accordingly, the government has, over the years, engineered a range of policies to promote social stability, including racial quotas in housing and racial representativeness requirements for election candidates.

However, Singapore's record on human rights has drawn criticism from non-governmental organizations. The country's use of capital and corporal punishment and its strict regulation of speech has drawn particular scrutiny. The 2019 World Press Freedom Index ranks Singapore 151st out of 180 countries, citing the government's liberal use of defamation suits against journalists. Public acts of protest are strongly proscribed. In recent years, social media has given the opposition a

greater voice and improved their competitiveness in national elections, which poses obvious challenges for the country's entrenched leadership. The PAP-led government has attempted to crack down on the use of social media. In 2019, it passed the Protection From Online Falsehoods and Manipulation Act, which requires media companies to correct or remove statements that the government deems false. Companies that violate the law can be fined a maximum of S$1 million ($718,000) and individuals face imprisonment for up to ten years. The opposition Workers' Party has criticized the law for being anti-democratic.

Singapore's next general election must take place before April 2021, though the date has yet to be announced. In the last general election in 2015, the PAP won an overwhelming majority of seats, and the Workers' Party—the most viable opposition party and the only one to enter parliament—won the rest. Issues that will likely dominate the upcoming election include growing inequality, an increase in the goods and service tax, and a rising cost of living.

2.4.1. Singapore's Economic Dependence

Singapore's economy relies intensely upon exchange, and the nation has since a long time ago upheld worldwide endeavors to diminish exchange boundaries. At 326% in 2018, Singapore had the fourth-most noteworthy exchange-to-GDP proportion globally, which makes it especially defenseless against globalization and streamlined commerce in the West. Singapore's domestic market is generally small, however Singapore ranks as the world's top transshipment point. Its main exports are electronics, oil and mineral items, pharmaceutical products and mechanical gear. Singapore was among the Pacific Four gatherings of nations, alongside Brunei, New Zealand and Chile which dispatched the dealings in 2008 that at last prompted the twelve-member Trans-Pacific Partnership (TPP) talks. After the United States pulled out from the TPP in 2017, Singapore consented to an agreement with the eleven

remaining nations. Singapore has a few other international alliances, including one with The United States and one with China. Bysenk and Locksoh (2011).

While U.S.- Singapore ties stay close, exchange policies under President Donald J. Trump has drawn a reproach from the highly exchange-subordinate country. In 2018, Singaporean Prime Minister Lee reprimanded the Trump administration for one-sided levies on China, Singapore's top exchange associates. "An exchange battle between the two biggest economies on the planet will have a major, adverse consequence on Singapore," Lee wrote in the Washington Post. As the U.S.- China exchange war intensified in 2019, Singapore's minister of trade Chan Chun Sing said, the absence of trust between the United States and China was "the most threatening direction for the world economy." The trade war's effect on the worldwide economy, including decreased shipping, has effectively bruised Singapore: in 2019, the country's GDP progressed by just 0.7 percent, its slowest yearly pace in 10 years.

2.4.2 Singapore International Trade Activities

As a small nation that has deep connections with both China and the United States, Singapore has needed to walk a cautious line between these contending powers. Singapore is a close strategic ally for the United States in Asia, and the two nations have specifically advanced military ties. The U.S. and Singaporean militaries lead customary activities together, and the U.S. Naval force utilizes Singaporean maritime offices to help its activities in Southeast Asia. In spite of the fact that it's anything but a U.S. deal partner, in 2020, Singapore became the sole Southeast Asian state to handle F-35 fighter jets, the most exceptional U.S.- made warrior airplane. The two nations additionally have close economic ties. The United States is Singapore's biggest investor internationally, and Singapore's investments in the United States represents an expected 250,000 jobs.

Singapore has furthermore looked for warm ties with China, however their relationship has been strenuous on occasions. Lately, China has found ways to split apart Singapore and its long-lasting partner Taiwan, which China thinks is a breakaway region. Strains spiked in 2016 when China held on to a few Singaporean military vehicles that were getting back from maneuvers with Taiwan. In 2017, Singaporean Prime Minister Lee was not welcome to China's debut Belt and Road Forum as relations stayed cool. In any case, China is Singapore's greatest exchange partner, and in 2017, Singapore was the second-biggest investor in China. In 2019, the two nations consented to various agreements to team up on exchange and security, and they consented to cooperate on Belt and Road Initiative ventures in other nations.

All the more as of late, Singapore has extensively avoided remarking on great forces matters. For example, in a bid to improve its relationship with China, senior Singaporean authorities have not condemned China's militarization of islands in the South China Sea; Singapore isn't an inquirer state in the fall-out there. The degree to which Singapore should voice its inclinations on the South China Sea and other territorial issues additionally stays an active discussion. The Singaporean government has likewise refrained from publicly remarking on Beijing's constraint of Uighurs and different Muslims in the Xinjiang area.

Beyond the United States and China, Singapore keeps up close political and financial ties with its Southeast Asian neighbors as a member of the Association of Southeast Asian Nations (ASEAN). As a former British colony, it is likewise a member of the Commonwealth and partakes in the Five Power Defense Arrangements, wherein it facilitates military issues with Australia, Malaysia, New Zealand, and The United Kingdom.

2.4.3. Singapore International Relations Challenges

Singapore continues to wrestle with quite a lot of difficulties, including the outbreak of a new coronavirus and the impacts of environmental change.

A. Coronavirus pandemic.

Singapore's reaction to the 2020 Covid pandemic was at first hailed for its achievement in controlling the outbreak. According to (Blau, 1964), The nation saw its first case in January, and until early April, its number of cases and deaths was moderately low. However, in mid-April, the number of cases rose to more than three thousand with some specialists warning of a new outbreak, however just ten deaths were accounted for, (Stevens, H. & Haines, M. B. 2020). A greater part of the recently detailed cases were among migrant workers, a considerable lot of whom live in packed dorms and have not been able to practice social distancing. Testing has been far and wide, with information from March 20 indicating it had directed 6,800 tests for each one million individuals, contrasted with the United States 300 tests for every million. Arrivals by momentary guests were immediately blocked, and returning occupants have been required to remain in government-provided lodgings for fourteen days. Contact following has been broad, with specialists utilizing a cell phone application to track whether Covid patients have been in close contact with uninfected individuals. The government has ordered online classes, working from home, and take-out-only eatery service until May 4. It has additionally declared three economic upgrade packages, adding up to $41.7 billion, to mollify the financial effect of these actions. (Hinde, 1979)

B. Terrorism and piracy.

According to Goh, E. (2005), Singapore's principal security dangers include transnational terrorism and sea robbery in the encompassing Malacca Strait. At least three Singaporean residents have headed out to the Middle East to join the self-proclaimed Islamic State, and the nation is careful about unfamiliar fighters returning

to commit demonstrations of terrorism in Singapore and spread their philosophy all through Southeast Asia.

The Malacca Strait is one of the busiest shipping courses globally, with in excess of 120,000 ships passing through yearly, connecting major economies like China and Japan. The Republic of Singapore Navy (RSN) conducts customary anti-piracy patrol close to Singapore's territorial waters and elsewhere in Southeast Asia, including the Malacca Strait, where robbery and piracy have grown as of late. The RSN has also assured to help against piracy and robbery in the Gulf of Aden. Singapore has likewise upheld the U.S. led alliance against the Islamic State, providing refueling airplanes, imagery analysis and clinical staff.

C. Climate change.

According to (Hogan & Roberts, 2004; Swann, 1987), Global climate change is a significant danger to Singapore, and the nation has been a main defender of coordinated worldwide activity to lessen fossil fuel byproducts, including the 2015 Paris Agreement. Almost 33% of Singapore is only five meters above mean sea levels, leaving the low-lying island exceptionally powerless against seaside flooding. Accordingly, the public authority has assigned millions of dollars to battle rising sea levels. Plans include building low-lying recovered land regions to diminish flood hazard and growing the nation's repository and underground drainage system to get the water supply. Climate change additionally undermines the city-state's water resources, food security, biodiversity, and general wellbeing.

D. High-stakes summitry.

In spite of the fact that Singapore doesn't enshrine neutrality as a guideline of its international strategy, its accepted fairness has left it a popular venture for high-stakes summits. In 2015, the city-state facilitated the first-ever meeting of a Chinese leader and a Taiwanese president. In June 2018, Singapore facilitated the first-ever U.S.- North Korea summit meeting. Singapore likewise hosts the Shangri-La Dialog,

a significant Asian security gathering attended yearly by local defence chiefs and the U.S. secretary of defence.

CHAPTER 3

WAYS OF REALIZATION AND DEVELOPMENT OF THE INTERNATIONAL INVESTMENT PROJECT “CONSTRUCTION IN SINGAPORE”

3.1 Preamble

This chapter deals with the ways of realization and development of the international investment project “construction in Singapore”. Its purpose is to ensure

that the project is managed as expected and also within the budget. There are several advantages to conducting a project analysis and the advantages are;

- It helps to determine the viability of the project: Many projects don't serve its intended purposes. Some projects work out fine without any problems while some fail to work out. Without project analysis, there is no way the feasibility of a project is determined. This tells us how beneficial the project would be.
- Helps in Budgeting: Executing projects costs money and it is therefore important for the investor to work within the budget. Project analysis helps the project run within the required budget and helps to recognize any instabilities and deals with them.
- Boosts Project Planning: With project analysis, any issues that may impede the execution of the projects are pointed out and dealt with immediately. The planning and organizing of the project can now carry on smoothly once the issues are handled.
- Finds and reduces risks: There is no project without risks and the risks could vary from poor implementation to poor design and all that. Project analysis helps with finding and limiting the risks and making sure they are prevented from causing damages.

Therefore, in this chapter, I will be analyzing the ways to develop an investment project (shipping container homes), the cost of implementing the project, assessing its risks and making some calculations to determine the attractiveness of the project.

3.2 Overview Of Housing In Singapore

Housing is one of the most important life segments in the universe, providing shelter, health, and water, as well as a place to sleep. The Sustainable Development Goals' eleventh goal is to make urban societies more comprehensive, sheltered, versatile, and sustainable. According to UN Habitat (2015), the primary goal was to

ensure that all people had access to adequate, secure, and affordable housing. Every country's economic development is influenced by the lodging industry, which accounts for 10 to 20% of total monetary movement and is the most settled asset of family units (European Commission, 2005).

People continue to thrive solely on the expectation of better and improved housing, despite the fact that housing is not the only human need. Human needs are complex, and people continue to thrive solely on the expectation of better and improved housing. However, in modern times, one of the housing requirements is viability, temperance, and new upcoming designs that are in line with trends and in harmony with nature.(Mbazor, 2018). Appropriate, moderate lodging is critical to individuals' well-being and stability, as well as the smooth operation of economies, according to (Mbazor, 2018; Poleg, 2020; Wong & Yang, 2020). Cities all over the world, in both developing and developed economies, are attempting to address this issue.

The Universal Declaration of Human Rights (1948) considers the right to decent housing to be a critical component of the right to a better way of life. One of the fundamental needs in the global field, according to Morakinyo (2021), is security. The hope is that families will adopt healthier eating habits, provide their children with a better education, and be better equipped to deal with various life issues as a result of their reduced lodging use. While lodging is a solid decent, Poleg (2020) claims that families' ability to get to it in a sufficient and equitable manner is not. The situation has been discovered to have a large number of financial benefits that accrue to the inhabitants, business network, and administration without sacrificing other necessities.

Because of a lack of affordable housing, the world is in the grip of a housing crisis. This could mean that one out of every three urban dwellers, or approximately 1.6 billion people, will be affected by the global affordable lodging gap (O'Neill & Ouyang, 2020). Ward (2019) estimates that approximately 900 million people worldwide live in ghettos, with little access to safe drinking water, sanitation, or adequate housing. Over the next 25 years, over 2 billion people will add to the growing

demand for housing, water supply, sanitation, and other urban base administrations, according to UN-Habitat (2005).

In the 1950s and 1960s, Singapore's urban landscape was in disrepair. The Housing and Development Board (HDB) identified “huts made of attap, old wooden boxes, rusty corrugated iron sheets, and other salvage material... congested squatter settlements with no sanitation, water, or any of the elementary health facilities” in its first annual report in 1960. Almost a quarter-million people lived in dilapidated slums, six to a bed, with many more in squatter colonies on the city's outskirts. As the population grew rapidly, so did overcrowding. The dwellings in the city center were frequently too small to accommodate large families, resulting in crowded living conditions, poor ventilation, and inadequate sanitation.

The British colonial government had taken a laissez-faire approach to housing and urban planning in general, ignoring the housing needs of thousands of Chinese and Indian migrant workers who had flocked to Singapore in search of work in Malaya's thriving rubber and tin industries. The increasingly squalid living conditions and acute housing shortage compelled British authorities to establish the Singapore Improvement Trust (SIT) in 1927, a statutory board tasked with tackling town planning, slum clearance, and later providing low-cost housing, first for those made homeless as a result of Improvement Schemes, and then for lower-income classes. However, SIT's initial housing attempts were thwarted because the majority of its limited resources were spent on road and land development plans, as well as demolishing unsanitary buildings (Ruonavaara, 2018).

Conditions deteriorated with the outbreak of World War II, and SIT was unable to meet the needs of the city in the postwar period. In 1947, the population was nearly 940,000, with more than 70% residing in the city center. SIT completed only 20,907 houses between 1947 and 1959, enough to house 100,000 people out of a population of 1.5 million. Major changes had already begun by the time the need for more extensive urban planning and housing provision became apparent. Singapore received full internal self-government in 1959, one year after the first statutory Master Plan was

approved in 1958. The declaration of independence in 1965 forced the government to reconsider its entire approach to planning, building, and housing not just a city, but a country.

The People's Action Party (PAP) government replaced the colonial-era SIT with the Housing and Development Board (HDB) on 1 February 1960, tasked it with an ambitious and large-scale public housing program for the masses. HDB had inherited a difficult situation: the population was growing at a rate of 4.3 percent per year, requiring at least 15,000 new homes to be built each year to house new citizens and replace dilapidated structures. The housing shortage had worsened as a result of SIT's ineffective efforts. Singapore was able to develop a robust housing plan that addressed housing shortages thanks to deliberate government housing policies.(Glaeser & Gyourko, 2018). Despite being a land-scarce city-state with a population of nearly 6 million residents, Singapore has a high homeownership rate of 91% Fesselmeyer, (2018), its median house price to median household income ratio in 2018 was just 4.6, compared to Hong Kong (20.9), Sydney (11.7), Los Angeles (9.2), and London (8.3). Since affordable and inclusive housing is framed as socio political priorities, the government devised mechanisms to most effectively achieve these goals.

3.3 Shipping Container For House Construction

Global trade relies on shipping containers for a global transportation network, resulting in a large number of empty containers at destination ports, (Agatsiva, 2019). While returning them to their home country may not be cost effective, leaving them in their new home may require a significant amount of space. As a result, there are a lot of empty containers out there just waiting to be reused or recycled. Because of recent technological advancements, the reuse of shipping containers for home building purposes may merit further investigation in addition to its other applications.

Every year, promising cases of converting containers into a youth center, classroom, emergency shelter, office, house, or hotel emerge around the world. In a way, this would be a kind of offset, resulting in greener and healthier coastlines without adding to the landfill problem. The question is how to transform those containers for homebuilding purposes in a sustainable way that makes our society greener and healthier (Mwisila, 2018).

Some people may be unaware that shipping containers can be used as building materials. Reusing shipping containers for house construction reduces the need for cutting-edge materials used in traditional construction. It is well known that containers are manufactured in the same standard dimensions with some built-in properties, making them an outstanding modular structural component. The recent use of prefabricated shipping containers may serve as a replacement for traditional timber-framed construction. According to the study (Wetzstein, 2019), this has resulted in a significant reduction in embodied energy when compared to conventional houses. Reusing shipping containers is the ultimate in sustainability, as it uses far fewer materials and embodied energy than any other type of building construction. As a result, architects and builders have already begun to take advantage of reusing containers for home building purposes in order to save money. However, it is critical to investigate its constructability, strength, and long-term viability.

There are also some limitations to using shipping containers to construct structures. The thermal performance of a building may vary depending on the local climate of the area in which it is constructed. There are obvious opportunities to reduce embodied energy by reusing containers as building materials.(Balogun, 2018). Therefore, it is needed to determine the amount of energy consumption and environmental impacts reduced in container home construction. However, it is also significant to know how the container home is habitable compared to a conventional home. It is common thought between critics that because shipping containers were not intended for residency purposes, the operational amount of energy needed to make them habitable would restrict the aspiration of a normal home. According to the study

(Wong & Yang, 2020), container walls are relatively thin, uninsulated, and acoustically undesigned, so comfortability may be an issue to consider. This, however, is not always the case. The study (Mwisila, 2018) concludes that this form of construction is not inferior to a conventional building after measuring the internal air temperatures of two identically dimensioned structures, one of conventional construction and the other a modular shipping container unit. While this may be true in hot-humid tropical regions, it may necessitate additional research in cold and temperate climates such as Singapore.

Serving its life span for freight transport, cargo containers that are used for building constructions are called ISBU, which stands for Intermodal Steel Building Unit. Due to sudden change in construction materials and procedures and methods, regulatory officials are yet to recognize shipping containers for home building all around the world. As previously stated, the difficulty of using shipping containers as ISBU is that they are not manufactured in accordance with any building code, and some urban developers were opposed to the development of ISBU construction due to its conflict with current building code rules and regulations (Dara et al., 2019). ISBU is expected to be very noisy as a living environment, and insulating the interior of metal structures necessitates sound softening elements, which may be an additional expense that must be considered. However, with the help of the latest insulation methods, the performance of the building envelope improves further. Most ISBU are primed with an industrial strength anticorrosive coat to avoid surface corrosion or rusting regarding that they are supposed to be carried by ships which is a very humid environment to be in. According to the study (Balogun, 2018), shipping containers' structural behavior is defined as being intrinsically stiff enough to be stacked up to nine rows high without compromising structural integrity.

Another important factor in the reuse of shipping containers in construction is their uniformity and modularity, according to Mwisila (2018), which saves time for large developers. The primary benefit of reusing these shipping containers is that it identifies the possibility of efficient and sustainable building construction. The world

is moving toward environmental protocols in all industries, including building construction, which consumes a lot of energy and emits a lot of greenhouse gases into the atmosphere. As a result, reusing shipping containers would provide a new perspective into a greener and more sustainable environment for all of us.

Cargo containers are made of weathering steel. Weathering steel contains alloying elements that influence the corrosion process of the material. Weathering steel produces an amorphous inner layer that protects the steel's integrity from externally harmful agents. In Figure 3.1, the placement of the layer as well as its composition is being displayed. The continuity of the layer also adds to the protection of the steel.

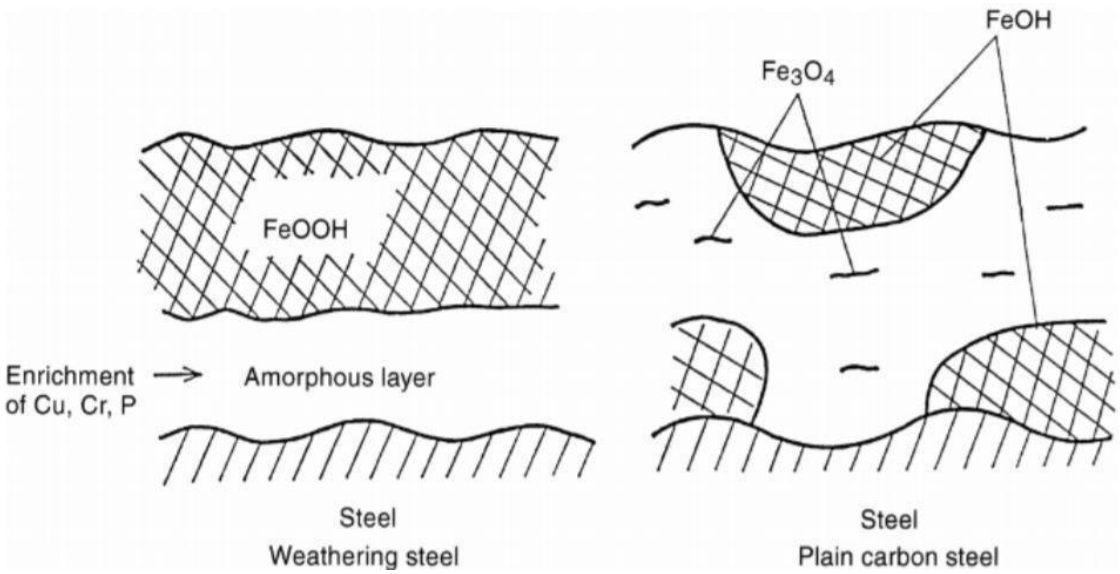

Figure 3.1. Schematic illustration of the corrosion product layers identified on steels exposed to rural and marine atmosphere for periods up to five years

Source: Moore, Yildirim & Baur (2015)

Furthermore, due to their exposure to natural elements, weathering steel is an ideal material for cargo containers. Cargo containers spend the majority of their lives outdoors on cargo ships, trains, and trucks, with little moisture protection. For a variety

of reasons, cargo containers are an appealing building material. For starters, their strength and durability provide structural support as well as a long life span. Their weathering steel construction protects against corrosion while also providing strength. In addition, as a part of the movement toward sustainable construction practices, the recycling of unused cargo containers for construction material makes use of an otherwise unused product. Furthermore, the modular construction of cargo containers simplifies the design process. Cargo containers, like bricks, are built to specific specifications.

As can be seen in the illustration, the interlocking mechanism is used to lock the containers together in the practical stacking of freight containers. (See Figure 3.2) This mechanism stabilizes the stacked containers in case of multi-level container buildings. Moreover, the corner casting of the containers are designed to be connected for the four sides they sit on which could be a foundation advantage at the same time.

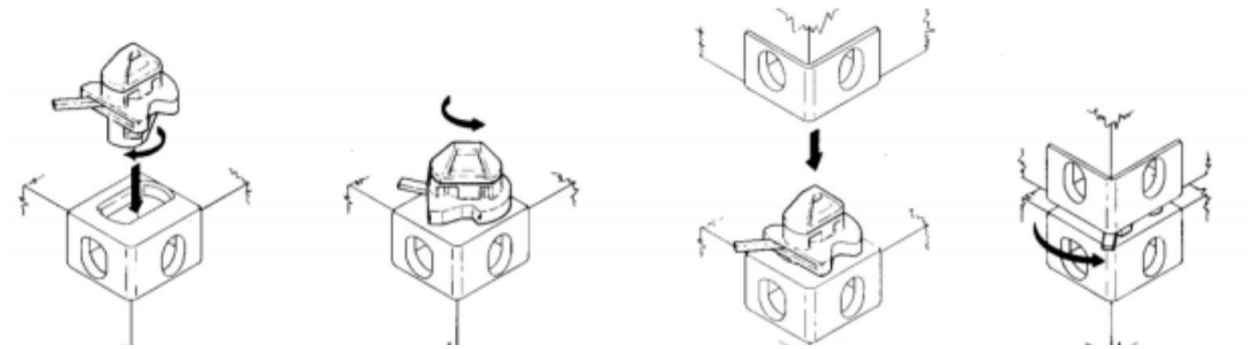

Figure 3.2. Illustration of corner locking mechanism

Source: Moore, Yildirim, & Baur (2015).

ISO shipping containers could be deemed as a perfect construction material due to their high availability. The cost of shipping containers in their origin is more than buying a new one so many of them are left empty in ports all around the world. According to Drewry Maritime Research (drewry.co.uk, 2013), the global container

fleet consisted of approximately 32.9 TEU (Twenty-foot Equivalent Unit). That figure would estimate 32.9 million standard 20 foot containers, meaning that there is no shortage of cargo containers in the market today.

3.4 Idea Of International Investment Project In Singapore

The purpose of my project is to establish a construction firm in Singapore that specializes in “container houses". The “tiny” house movement is an architectural and social movement that advocates living and working simply in small homes. The tiny houses are usually prefabricated homes made with shipping containers. They provide an alternative to the usual brick homes and are most times cheaper and faster to sell. The target market for this project are the middle class citizens who want to own a “place” but can’t afford “brick” homes, people who need mobile offices and also for tourists (and the locals) who wouldn’t want to spend a lot of money in a regular luxury hotel. We offer shipping container houses for rentals too. The tiny homes offer an opportunity to experience luxury and comfort at a cheap price. That is, instead of buying an average home (2-3 bedroom) which costs about $180,000 or paying for a night at the hotel for $800, the tiny homes offer the same kind of luxury and help tighten the expenses of its target market. These container homes can also be used as mini bars, restaurants and shops.

One of the benefits that this firm offers is that we have a thorough understanding of space. Dumberry (2018) is able to maximize the simple areas that a container provides by understanding the space. The 2.4x12m container space is divided into four sections: the living room, kitchen, bathroom, and bedroom. Allowing a lot of sunlight into the space and being very specific about the dimensions of the construction pieces that we choose, providing enough access for people to walk around the tiny home without really interfering with the space are some tricks used in making these homes

look spacious even though they appear small from the outside. These tiny houses are mobile and can be moved around the city.

The starting price of a shipping container home is $23,200 and the price goes up depending on the specifications that people want (i.e type of fitting, corner moulds etc). The firm has a total of $2 million to invest in these shipping container homes and we expect to be in the market for the first five years, producing and selling 80 shipping container homes per year.

3.5 Cost Of Implementing Project

In this project, we seek to find the absolute cheapest we can get this project done for. Materials needed to implement this project are;

a. Used shipping container: A used shipping container will cost $2,500. A new container can be used but it will cost higher than the used one.
b. Windows and doors: This includes the cutoff wheels for cutting the window out and any miscellaneous steel needed to place the windows together, including the window. The preferred door for this project is the sliding door. This will cost $3,200.
c. Insulation: Insulation panels will be needed for this project. These panels are 4ft by 8ft in size. Spray foams will also be used. The total cost for this is $1,000.
d. Metal framing: Our firm will be using twenty gauge steel frame studs. This ensures the wall is kept off the floor and the entire system is supported by a frame. This will cost $700.
e. Electrical: This includes the RV plug, 50 amp RV extension cord that plugs in, breaker box, GFI circuits, wiring and outlet boxes. This cost $1500.

f. Plumbing: Plumbing materials for this project will cost $1,800. This includes stainless steel dropping sink, faucets, water closet, shower valves etc.
g. Drywall: This will be needed in the project to create ceilings and walls. Design features including arches and eaves will be created from this. Total cost for this is $720
h. Flooring: The vinyl flooring will be used in this project. It is a really cost-effective, quick install product. This costs $750
i. Cooling system: Our firm chose a mini-split system for this project. It is a high-end energy efficient system with a creative design that circulates the airflow around the shipping container homes. This will cost $900.
j. Cabinetry: Cabinets will be installed in the kitchen and the bathroom. The total costs of the cabinets is $2,100
k. Countertops: Countertops will be on top of the cabinets. Our firm opted for butcher block countertops because it is the most cost effective use of countertops that we can install on site. This costs $700

Total cost of investment per shipping container home- $15,870

Total investment to be made in 1st year- $1,269,600

Total return: $1,856,000

Total investment to be made at the end of 5th year- $6,348,000

Total return- $9,280,000

Expected net profit- $586,400/year

3.6 Investment Risks And Its Assessment

All around the world, over 17 million structurally sound shipping containers are available for reusing after completing their freight applications (Chan, 2019). The first

reported shipping container house (in two stories) was built in the USA in 2006, which proved to be in compliance with the strict guidelines of the UBC-uniform building code. Another example is the Travelodge hotel building constructed at Uxbridge, London. Total of 120 bedrooms by modification of 86 shipping containers onsite (inhabitat.com, 2014). According to the contractor, this modular construction was 40–60 percent faster and produced 30 percent less onsite waste than conventional building. It also does not necessitate a complicated construction method, which helps to significantly reduce costs. In another project, a Dutch developer transforms 1000 shipping containers into student housing in Amsterdam (Glaeser & Gyourko, 2018). It was stacked up to five levels high, bolted together, and divided into twelve separate buildings. Four shipping containers were retrofitted into a children's activity center in South Melbourne, Australia, in a separate development. The forms and aesthetics were created by a sustainable perspective with the goal of creating a low-cost, zero-waste construction (inhabitat.com, 2014). (Kim, 2020). It is well known that shipping containers are flexible in the construction system due to their modular features and rigidity. However, it is still up to the constructability method used and country's standard practices to comply with local rules and regulations. As a prefabricated modular structure, building of container homes has a considerable degree of constructability potential. Although there is adjustment in construction procedure, the amount of container homes is still relatively low globally compared to what is expected due to lack of skilled labor to handle new materials and methods (Pham & Yeo, 2019). This study also identifies another barrier in the development of container home construction, which is the effect of their appearance on owner choice due to their metal wrapping, which mostly reminds them of a mode of freight and does not conjure up images of comfort in their minds. On the other hand, salvaging shipping containers can significantly increase carbon footprint emissions. It is also necessary to consider some features that control heat loss and gain, as well as insulation, in order to provide a comfortable living environment. According to the study (Yuan et al., 2020), the disadvantage of a shipping container is its temperature, which is extremely high in the

summer and extremely low in the winter around the container's exterior envelope. The entity of such design should be in accordance with the climatic conditions of the site.

The investment risk is the possibility that an investment will produce a different result than expected. Even if a profit is expected, some or all of the investment funds may be lost. It is critical to understand that every investment entails some level of risk. A statement of the factors that are likely to occur in the course of the entire project should be obtained at the point of identifying the risk. The following are frequently mentioned tools/methods used to identify risk factors: checklists, the Delphic technique, brainstorming, internal auditing in a company, and so on.

The identification and verification of risk should begin from the simplest technique which is using both the quantitative variables as well as the qualitative variables. Published data on shipping containers used for non-shipping applications is rare, and published data required for structural modeling and analysis of shipping containers is even more difficult to obtain. Many of the references available do not contest the structural strength and response of shipping containers under abnormal loading scenarios or modifications. There are several books, such as (Pham & Yeo, 2019), that present interesting building projects utilizing shipping containers. However, because the structural strength of the container is unknown when modified, additional strengthening elements are usually added to it.

Although architects and designers value aesthetics, shipping containers cannot be viewed as building blocks if efficiency and economics are driving the project. The projects described in (Fesselmeyer, 2018) and other architecturally driven container building books are unimportant in terms of the structural aspects that we require, and they typically do not take structural considerations into account. Balogun, (2018); Wong & Yang, (2020) performed some blast load structural tests on actual ISO containers. The information available is relevant and necessary for structurally defining and evaluating the performance of shipping containers. However, we do not take into account blast loading scenarios. These documents are likely the only publicly available information involving full-scale shipping container modifications and

testing. The following examples show how different codes around the world incorporate their design and consideration.

LP	The main of risks	Owner of risk	Reason/cause	Effect	Probability	Impact	Level of risk	Risk response strategy
Designing risk								
1	Lack of acceptance by investor of design proposals	Investor	Delays in approval	Increase in costs due to the suspension of work of the design team	5-40%	50-500thous.	Low	Market observation, alternative designing solution
2	Delays and difficulties in obtaining permits	Investor	Delay of designing work, unknown scope of design	Disturbed designing process	5-40%	500thous-2m	Medium	Early diagnosis of the situation in local authorities offices, organizing of meetings preceding designing process
3	Conflict among designing team members	Designer office	Insufficient flow of information among team members	Disturbed designing process	0-5%	50-500thous.	Low	Response of a team leader to all form of conflicts- mediation in the team
4	Too optimistic assessment of employee workload	Designer office	Approval of unrealistic deadlines for individual work	Delay of designing work	5-40%	50-500thous.	Low	Proposing for employees to work overtime or ordering of part of work to another designing team
5	Incorrect information from investor/lack of clear guidance	Investor	Design may be issued with duplicate error or detected error can generate timing constraints	Verification of errors will increase costs and time due to the development of the next revision of design	40-70%	2-5million	High	Application to investor for extension of time to complete a design due to additional circumstances

6	Staff do not have sufficient knowledge about the subject of design	Designer office	Errors in design	Verification of errors will increase time due to the repeated checks of designing work	5-40%	2-5million	Mediu m	Designing team leader strengthens control over work, providing for employees consultation with an expert
Time risk								
7	Acceptance of unrealistic deadlines in contract	Designer office	Faulty contractual provisions	Deterioration of design quality of failure to meet the deadline	40-70%	2-5million	High	Employment of new employees or ordering part of work to another party during a contract
Budget risk								
8	Underestimation of design budget	Investor	Budget may not be sufficient to carry out designing tasks	Deteriorating of design quality	40-70%	2-5million	High	Limiting scope of design to necessary minimum

Table 3.2: Risk listing with pattern of risk

3.7 Main Indicators Of Its Attractiveness

It is necessary to calculate and compare the net income with the initial cost of the project. Hence, the Cash flow forecast (1st year) = Beginning cash + Projected Inflows - Projected Outflows = Ending Cash

	Cash Flow	Net Cash Flow
Year 0	-$1,269,600	$-1,269,600

Year 1	$586,400	-$683,200
Year 2	$586,400	-$96,800
Year 3	$586,400	$489,600
Year 4	$586,400	$1,076,000
Year 5	$586,400	$1,662,400

Payback Period

This is the number of months or years it takes for for an investment that has been made to return

PP = Amount to be invested / Estimated annual net cash flow

PP = 2.165 years

Return on Investment (ROI)

This is a performance measure used to gauge the profitability or effectiveness of an investment or project. Relative to the investment cost, ROI tries to measure the amount on a particular investment directly

ROI = Net Profit / Cost of Investment x 100%

ROI = $1,856,000 / $1,269,600 x 100% = 146.18%

Profitability Index

Profitability Ratio: Profitability ratios calculate and assess the ability of an organization to earn income (profit) compared to sales, balance sheet assets,

operating costs, and shareholders' equity over a particular period of time. The benefits to investors include how well the company used its resources or assets.

a. Return on capital employed: This is used to measure a company's profitability and capital efficiency
b. Return on shareholders’ funds: This indicates how much capital is returned to the investors as a percentage of the money they have invested or held in the business.
c. Gross profit margin: This is a measure of profitability which represents the percentage of total sales that surpasses the cost of goods sold (COGS).
d. Net Profit Margin: This is the amount of income left after all costs have been deducted from revenues.

This is a method used to evaluate a proposed project’s cost and expenses by dividing the estimated capital inflow by the investment.

PI = ECF / NPV

PI = 4008000 / 1269600

PI = 3.15

If PI > 1 then it means the project will be profitable and should carry on

3.8 Sustainability Of The Business Model

The majority of current literature on the reuse of shipping containers focuses on its various aspects and design aspects. Almost no published paper has addressed the life cycle assessment of this construction and its potential for sustainability, indicating a significant research gap in this area. Reusing shipping containers for house design and construction is a smart way to improve sustainability across the country in comparison to traditional construction methods. A container home can be erected utilizing 75% recycled materials by weight as mentioned by the study (El Messeidy, 2018) Building container homes is environmentally friendly due to the ways in which

the solid structure is transformed into a repurposed entity. Because of recent advancements in some features such as wallboard or paneling with insulation, well-insulated flooring or ceiling options, ceramic coating and polyurethane foam insulation, low VOC paints, primers, adhesives, and sealants, it is now forging into an eco-friendly construction (De Vinnière, 2020). These environmentally friendly features make the container building even more energy-efficient and sustainable in ways that no one has seen before.

Shipping containers are also well-made and resistant to fire, rust, and mold. It also saves on the labor and fuel costs associated with transporting them back to their country of origin. Container steel is not a decomposing material that can be turned into compost in a landfill, and recycling requires melting shipping containers in a basic oxygen furnace (BOF) or an electric arc furnace (EAF), which consumes a significant amount of energy and emits greenhouse gases. For instance, a 3.63 ft shipping container needs 8000 kWh of electrical energy to make them into steel blocks which is a huge amount of energy and subsequently money. While the process of reusing that entire 3.63 ft shipping container into a home building takes only 400 kWh of energy, only 5% of the energy required to melt it back to steel blocks. It is also proved that each ton of steel makes emissions almost 2t of CO2 and 40 kg of other gaseous emission into the atmosphere (Veleva, 2021; Yuan et al., 2020). Having assessed carbon footprints and other environmental impacts of a container building over its life span is a complex exercise. It requires evaluation of all its products, processes and services over whole life cycle stages. Construction and maintenance phases consist of products, processes and services of assembled building elements. Operational phase has heating and cooling demands, which has an enormous environmental impact. Final disposal has hazardous land filling an incineration that may also have considerable impact to the environment. The definition of sustainable building relies on green building to both reduce its environmental impacts and also create a healthy environment for occupants. So, the main emphasis is to choose materials that are free from harmful chemicals as well as excessive environmental impacts. Prefabricated

container homes may provide a number of unique opportunities to meet all of the above-mentioned goals. An architectural firm (Lendager Architects) claimed that by evaluating their project, which was built in Denmark using shipping containers, they reduced carbon emissions. The house was constructed from two shipping containers, with the floor, walls, roof, and facade made of various recycled and upcycled (i.e. reused with minimal modification for another purpose) materials. When the house was evaluated using the LCA approach, the CO2 emissions were reduced by 86 percent when compared to a comparable conventional.

3.8.1 ISO & CSC standards

The International Organization for Standardization (ISO) and the International Convention for Safe Containers (CSC) offers documents which dictate shipping containers' specifications, structural strengths, serviceability, and applications. Almost all globally used shipping container conforms to current standards of shipping container manufacturer data, and ISO container standards of 668 (ISO 668, 1995), 830 (ISO 830, 1999), 6346 (ISO 6346, 1995), 1496-1 (ISO 1496-1, 1990), 1161 (ISO 1161, 1990), 2308 (ISO 2308, 1972), and 3874 (ISO 3874, 1997). These container standards encompass every specification for shipping containers including structural limits. The structural limitations of an ISO shipping container are discussed in ISO 1496-1 (ISO 1496-1, 1990). ISO 1496-1 describes a series of structural tests all ISO containers must pass in order to be in operation, and the required tests are the only source of information regarding the container's structural strength characteristics. Figure 3.3 presents examples of the structural load test from ISO 1496-1 (ISO 1496-1,1990). This standard carried different tests to evaluate the container strength and their response was determined subsequently. For example, in the second test they simultaneously applied 942 kN on the top corner castings and 135 kN in the bottom corner casting and

measured the deflection corresponding to that to validate the structural integrity of the ISO container.

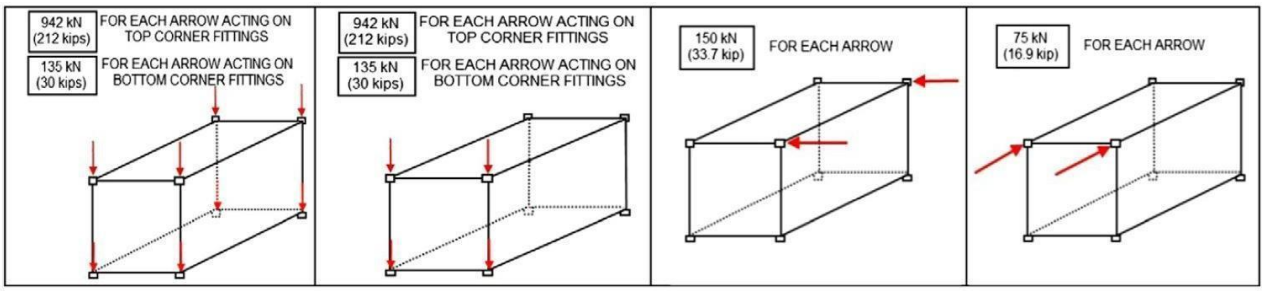

Figure 3.3. Example of structural tests by ISO 1496-1 (ISO 1496-1, 1990)

3.8.2 Marketability and Benefits to End Users

Literature on the benefits of containers to end users is El Messeidy, (2018) study investigates the attainability of using shipping compartments to address the lodging accumulation in South Africa. Two experiments for the attainability examination were structured. The primary case considers a measured single-story private home and the second experiment considers a multi-story, medium-thickness private building, fit for lodging various families. The investigation's findings show that a single-story arrangement with compartments is insufficient, as it is more expensive per square meter than a traditional home. In any case, a multi-story holder arrangement is feasible because it is less expensive (than comparable conventional arrangements), quicker to build, allows for higher thickness development of settlements, and is more environmentally friendly.

Battaglia & Lee, (2020) study focused on container architecture reusing shipping holders in making innovative engineering spaces. This sort of Architecture plans to make some compositional spaces that has diverse capacities and human exercises, not just on the size of an individual building yet additionally on a bigger scale that can help in making a snappy or now and then impermanent answer for a building or a gathering of structures that are basically steady and safe, condition agreeable, with high abilities of accomplishing tasteful qualities that can be used by individuals.

3.8.3 Affordability of Shipping Container Housing

According to a feasibility study conducted by Veleva on the affordability of using shipping containers for housing development purposes, (2021), there is a new construction trend that has been universally accepted in which shipping containers have been fabricated into commercial spaces, offices, ablution blocks, family homes, and institutional structures. Some of the advantages of shipping containers include architectural efficiency, time savings, low risks such as fire, and other environmental advantages.

Perrucci & Baroud, (2020) study on design of a cost-effective, modular, and energy-efficient home sought to address the growing problem of a lack of affordable, energy efficient, and environmentally- sustainable housing in partnership with Harvest Energy Solutions in Jackson, Michigan. This is achieved through the design of a prototype of modular single-family home that is affordable and energy-efficient. The methods used in the study were firstly architectural design of a single module of a home, simulation of energy performance for a baseline vs. traditional model, and finally constructing a cost model. It seeks to create awareness among architects, engineers and developers about the growing need for sustainability and the energy savings that can be achieved alongside affordability.

CONCLUSION

This paper critically examines ways to develop an investment project, particularly the shipping of containers for homes in the area of its cost, the risks involved and also some calculations to determine the attractiveness of the project. The concept of container housing is central to discussions about increasing densities and providing well-located low cost housing. According to literature reviews, container buildings have a huge potential to be one of the major architectural types that can offer durable, practical, less expensive and more comfortable living space in a shorter construction period, especially in temperate and cold climate regions. However, in the hot-humid tropics, its implementation is still limited due to several uncertainties regarding its specific construction technique and the lack of a building code to guide and standardize the architectural type and its physical features, which are not only compatible with the hot and humid conditions. However, the limitations that limit its potential to become one of the preferred architectural alternatives in the tropics may be outweighed by its advantages in terms of modularity, transportability and durability provided that appropriate installation and modifications are made to the container building to ensure its comfortable indoor environment, particularly for those in desperate need.

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