

Report On
Architectural Supply Chain Revolution for Market Leadership

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An internship report submitted to the BIGD in partial fulfillment of the requirements for
the degree of
MASTERS IN PROCUREMENT AND SUPPLY MANAGEMENT

BIGD
Brac University
June, 2024

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Declaration

It is hereby declared that

1. The internship report submitted is my/our own original work while completing degree at Brac University.
2. The report does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The report does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I/We have acknowledged all main sources of help.

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Letter of Transmittal

Dr. Md Rashed Bhuyan
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Subject: Submission of practicum report titled “Architectural Supply Chain Revolution for Market Leadership”.

Dear Sir / Madam,

This is to inform you that I have shared my profound experience which I receive by working as a procurement manager for my esteemed organization. In my report I have tried to elaborate my research on the supply chain revolution since years and its strong impact on architecture market.

I have attempted my best to finish the report with the essential data and recommended proposition in a significant compact and comprehensive manner as possible.

I trust that the report will meet the desires.

Sincerely yours,



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Non-Disclosure Agreement

This agreement is made and entered into by the undersigned FATEMA TUZ ZAMAN at BRAC University and ARCHVISTA, a Dhaka based architectural firm. As I am currently working at the organization, I have access to the Organization's information. I agree that I will keep all the information strictly confidential and will not share it with anyone outside of the organization.

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Acknowledgement

We would like to extend our sincere gratitude to everyone who contributed to the completion of this report on the "Architectural Supply Chain Revolution for Market Leadership."

Firstly, we wish to thank our advisor, Dr. Md Rashed Bhuyan, whose insightful guidance and valuable feedback were instrumental throughout the research and writing process. Your expertise and encouragement were crucial in shaping the direction and depth of this report.

We are also deeply grateful to our colleagues and team members, whose collaboration and support were vital. Your contributions, whether through research assistance, data analysis, or discussions, greatly enriched this study.

Special thanks to BIGD for providing the necessary resources and facilities to conduct this research. Your support in accessing relevant literature and data was essential to our work.

We would also like to acknowledge the industry experts and professionals who shared their knowledge and experiences, providing practical insights that enhanced the quality of our findings. Your willingness to contribute your time and expertise is greatly appreciated.

Finally, we are indebted to our families and friends for their unwavering support and understanding during the completion of this project. Your encouragement and patience were invaluable.

Thank you all for your contributions and support.

EXECUTIVE SUMMARY

In the contemporary architectural practice, the significance of an efficient supply chain cannot be overstated. The necessity of a streamlined material supply base, sustainable sourcing methods, value engineering, and efficient management of crucial deliverables have become evident from the combined roles of supply chain manager and architect in order to assure project success. Architectural education has a strong emphasis on choosing the best design solutions, but it frequently ignores the difficulties associated with the procurement process. This disparity has motivated me to seek graduate work in supply chain management in order to obtain more in-depth knowledge and proficiency.

Supply chains are now more dynamic and logical than ever. Thanks to the introduction of globalization, which is essential for gaining a competitive advantage. The development of supply chains has boosted project success rates and cost effectiveness, which has helped the architecture industry become the market leader.

The objective of this paper is to present a thorough examination of the significance of supply chain evolution in attaining market leadership in the architectural sector. It examines the crucial facets of supply chain management, such as the incorporation of sustainability, technological developments and the strategic ramifications.

Keywords: sustainable, value engineering, globalization, competitive advantage, leadership.

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List of Acronyms

ERP	Enterprise Resource Planning
BIM	Building Information Modeling
IoT	Internet Of Things
AI	Artificial Intelligence
BIM	Building Information Modeling
SDG	Sustainable Development Goals
VR	Virtual Reality
AR	Augmented Reality
IPD	Integrated Project Delivery
TDS	Technical Data Sheet
VOC	Volatile Organic Compound
BIFMA	Business+ Institutional Furniture Manufacturers Association
HSE	Health And Safety Executive
ISO	International Standard Organization
OHSE	Occupational Health and Safety Organization
H.S CODE	Harmonized System Codes
IBAS++	Integrated Budget and Accounting System

e-GP	Electronic Government Procurement
SAP	Supplier Relationship Management

Chapter 1

ARCHITECTURAL SUPPLY CHAIN

Introduction

The topic generates from my own workplace experience and challenges faced during past six years. Being an Architect and supply chain professional, the urge to relate the both prominent fields felt an irrevocable duty to the social business welfare.

Architects are the social leaders and uninterrupted supply chain is a must in Architecture. The phrase "A chain is only as strong as its weakest link" is a common proverb used widely in various contexts, including supply chain management, to highlight that the effectiveness of a system is limited by its most vulnerable part.

Strength of the chain is very important to cope with the contemporary construction era. End-to-end visibility, close loop supply chain [1] are strongest feature of the contemporary architectural supply chain.

This whole practicum contains total four chapters starting with the architectural supply chain, its revolution during years. Digitalization also playing significant role to improvise the architecture practice and ups and downs in the market. Inevitable part of sustainability has also been discussed briefly at the end of this chapter and in detail in chapter three in detail.

Chapter two enlighten us regarding the globalization and market dynamics explaining the factors which are driving the change, significant risk factors of supply chain disruptions. Market trends over competitive strategies are also explained in this chapter as add one.

The next one more focused about the real-life challenges and solutions achieved working with my current organization, ARCHVISTA, a Dhaka based Architectural and Interior firm.

Being the Procurement Manager here, got the opportunity to work with different sectors. From NGO's to IBRD's, Local corporate offices to Government offices, we (ARCHVISTA) got the opportunity to work with their workplace designs. Each of these projects had individual supply chain potential and challenges and we had to act accordingly.

Based on the client demand forecast and faces/forecasted challenges has been described in brief in this chapter.

Lastly, the practicum consists of the conclusive statement on the previously discussed scenario and the market revolution. Way of defeat the challenges and grow as market leader has been suggested through focusing the basic of sustainable global supply chain dynamics.

1.1 Overview of Traditional vs. Contemporary Supply Chains

Buildings and structures that are created utilizing well-established, historical architectural processes and techniques that are unique to a given culture, region, or era are referred to as traditional architecture. This style of architecture reflects the social and cultural legacy of a region by emphasizing functionality, regional materials, and conventional building techniques.

[2]

The supply chain for traditional architecture is made up of a number of interrelated procedures and parties that work together to guarantee the provision of the supplies and labor needed to create structures the old-fashioned way. This supply chain's emphasis on regional materials, artisanal skill, and environmental methods sets it apart from contemporary building.

Traditional Supply chain:

Traditional architectural supply chains are frequently distinguished by fragmented workflows, a lack of technological integration, and inefficiencies brought on by a lack of cooperation

between different stakeholders. Due to their heavy reliance on human labor and local sourcing, these supply chains frequently experience delays and higher costs. In contrast, contemporary supply chains emphasize flexibility, openness, and cooperation by utilizing cutting-edge technologies and global sourcing. [3]

To improve communication and expedite processes throughout the supply chain, this chain incorporates digital solutions like enterprise resource planning (ERP) and building information modeling (BIM).

Limitations in the Traditional Model:

Several significant challenges affect the traditional architectural supply chain-



FIGURE 01: Limitations of the Traditional Model

Contemporary supply chain:

The modern supply chain, sometimes referred to as the digital or contemporary supply chain, uses cutting-edge techniques and technologies to improve sustainability, responsiveness, and

efficiency. Real-time data, enhanced connection, and an emphasis on client centricity define this paradigm. [4]

Digital technology has ushered in a new era of innovation and transformation in supply chain management. Nowadays, companies use a broad spectrum of technology to increase visibility, simplify processes, and meet the constantly evolving needs of their customers. This section explores the range of digital technologies that are revolutionizing supply chain management and looks at how much of an impact they have on the modern supply chain environment.

Salient features of the Contemporary supply chain:

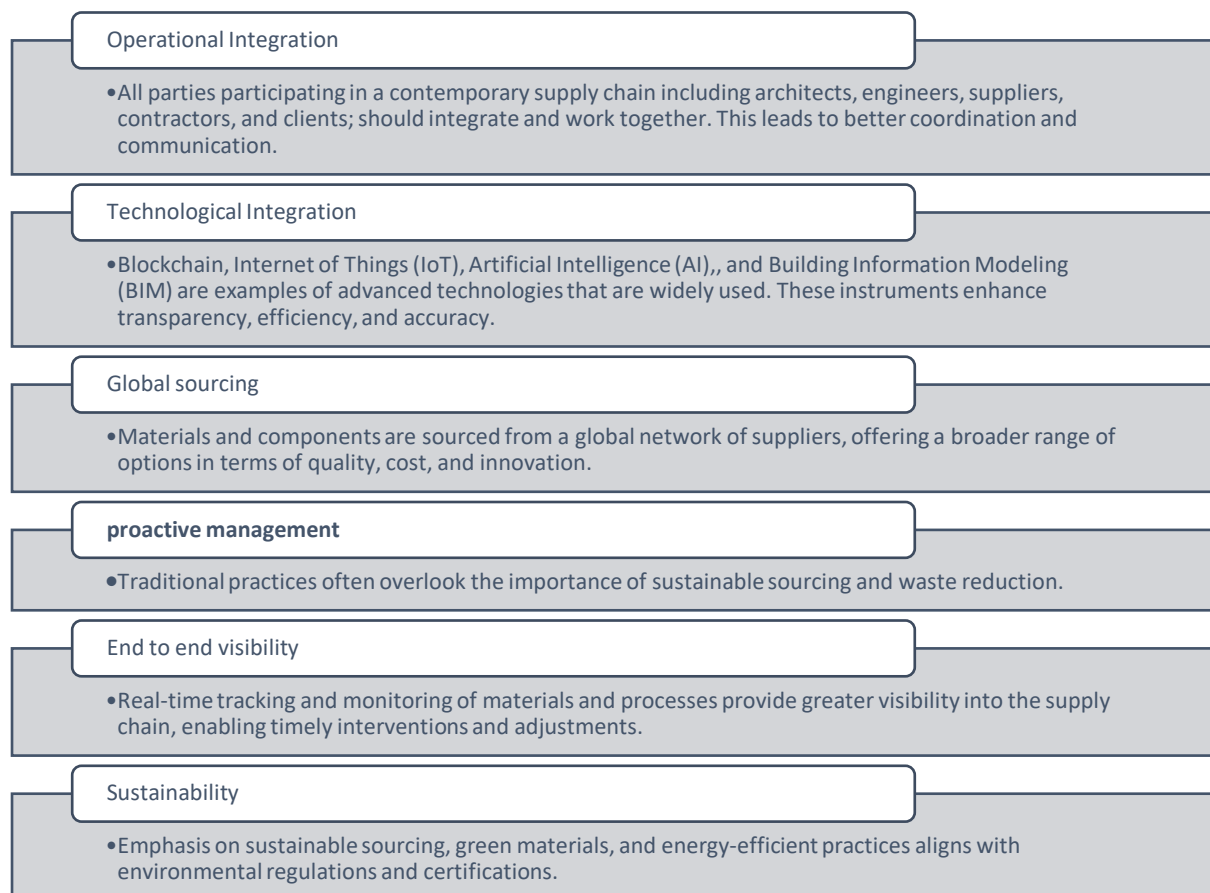


FIGURE 02: Features of the **CONTEMPORARY** supply chain

The architectural sector has seen a substantial revolution with the adoption of contemporary supply chains, replacing conventional ones. Contemporary supply chains offer improved efficiency, cost-effectiveness, and innovation by utilizing cutting-edge technologies, embracing globalization, and implementing sustainable practices. The architecture industry's changing demands and gaining a competitive advantage depend on this revolution in supply chain management.

1.2 Impact of Digital Transformation on Supply Chain Processes

Impact of Digital Transformation on Supply Chain Processes Digital transformation in the architecture supply chain involves integrating advanced technologies such as the Internet of Things (IoT), artificial intelligence (AI), and blockchain. [5]

These technologies enhance supply chain visibility, improve decision-making through data analytics, and ensure traceability and transparency.

Supply chains are being modernized in large part because of IoT sensors and devices. These sensors allow for real-time condition and location monitoring of supplies, machinery, and shipments. They benefit of IoT can be find below-

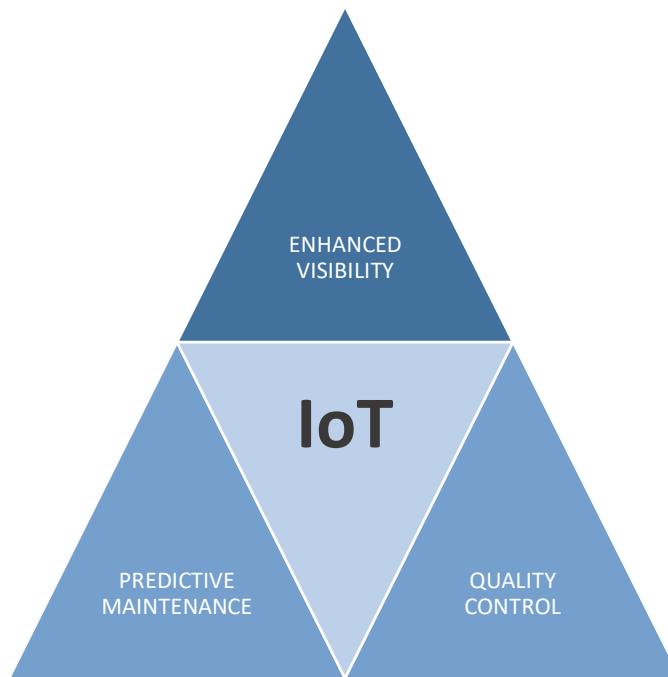


FIGURE 03: Benefit of IoT.

At first, it might seem irrelevant discussing the IoT in this report. However, the market is way more global. In my current organization, we work with a Singapore-based consultant. They are designing HUAWEI corporate head office in Dhaka. Being the General Contractor, we are preparing the digital sample approval sheet for their kind perusal and in order to save time and faster approval process.

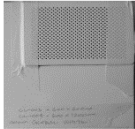
VZA SPACEZERO ARCHITECTS		HUAWEI		delladash	
MATERIAL SUBMITTAL FORM					
Submittal No: VZA-ID-CL-00A(Lay In system)					
Project Title:	HUAWEI Bangladesh HQ Office Relocation Work				
Client:	HUAWEI				
Consultant:	Delta Desk Pvt.Ltd.				
Contractor:	VZA				
Discipline:	☐ Structural ☐ Architectural ☐ Roofing ☐ Wood work ☒ Finishing ☐ HVAC ☐ Fire Fighting ☐ Electrical ☐ Fire Alarm ☐ Plumbing				
Reference:	BOQ / Drawing	Revision:	01	Date:	27 June 2024
MATERIAL DESCRIPTION					
Material:					
Product Name:	Perforated Metal Ceiling Lay In system				
Code No:	CL-001 / Dimensions: 600x600x12mm				
Location of use:	Medium Meeting Rooms & Manager Offices				
Manufacturer / Country of Origin:	INDIA				
Make/Brand:	KNAUF CEILING SOLUTIONS				
Reference image					
BOQ Reference:	46				

FIGURE 04: Digital Material approval sheet.

Demand forecasting, inventory control, and logistics are just a few of the supply chain management functions that AI algorithms optimize. Among AI's major contributions are stated below-

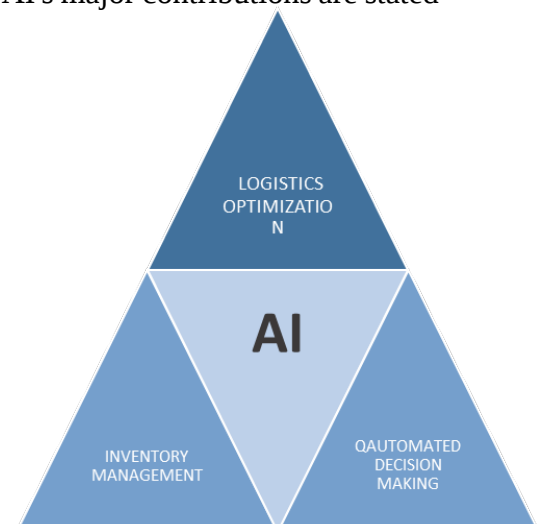


FIGURE 05: AI Major contribution sectors

Although AI being new contributor in this sector improvisation, still we are facing advantages instant sourcing of similar material digitally using google similar material suggestions. (see Figure 06 for reference) Software's are taking over pen and paper graph of inventory management and this resulted a supply chain boom in this sector during last few years.

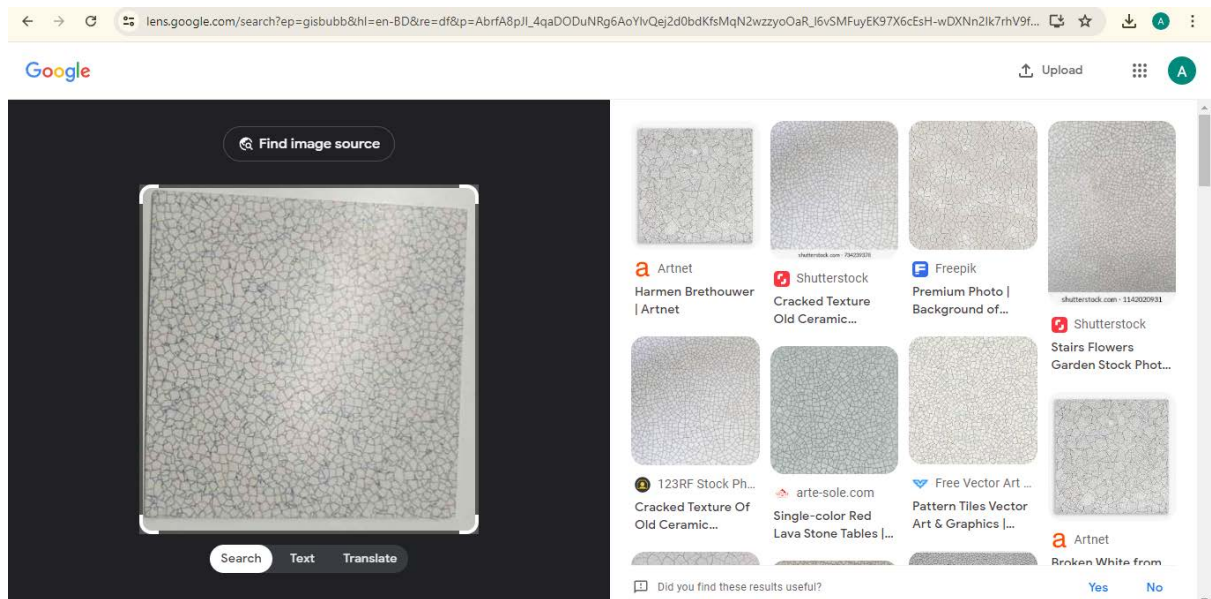


FIGURE 06: Google image search improvising global material sourcing.

Transparency and traceability are guaranteed throughout the supply chain via blockchain technology. Its advantages are especially important for upholding confidence and confirming the legitimacy of documents and transactions. Important elements consist of Traceability, Transparency & Smart Contracts.

A major step toward more dependable, transparent, and efficient supply chain procedures is the incorporation of IoT, AI, and blockchain technology into the architecture supply chain. These developments lay the groundwork for innovation and sustainability in the sector while also improving operational effectiveness and cost-effectiveness along with needful demand forecast.

1.3 Importance of Sustainable Materials and Practices

Sustainable building materials and methods have many applications in architecture and construction, encompassing social, economic, and environmental aspects. Green building

techniques and sustainable sourcing not only lessen their negative effects on the environment, but they also help communities and companies in the long run.

One aspect of social responsibility is ethical sourcing, which guarantees that resources are sourced in a way that upholds labor rights and promotes fair trade, thereby enhancing living standards and working conditions.

Aside from this, green construction techniques frequently improve community wellness by lowering exposure to dangerous pollutants and improving interior air quality, which benefits occupant health and wellbeing.

The economic benefits include Long-term Cost Savings & Increased Property Value by initiating Energy-efficient designs and sustainable materials usage which can easily lower the operating cost through reduced energy and water consumption.

Buildings constructed with sustainable practices often have higher market value and can attract environmentally conscious buyers or tenants.

The following are the primary justifications for thoroughly and promptly including sustainability concerns into property valuation: The survival of Earth's ecosystems depends critically on more sustainable behavioral patterns; there is a sizable unmet market for sustainable real estate investment products and consulting services; sustainable buildings outperform their conventional counterparts in all pertinent dimensions (i.e., ecologically, socially, and financially). [6]

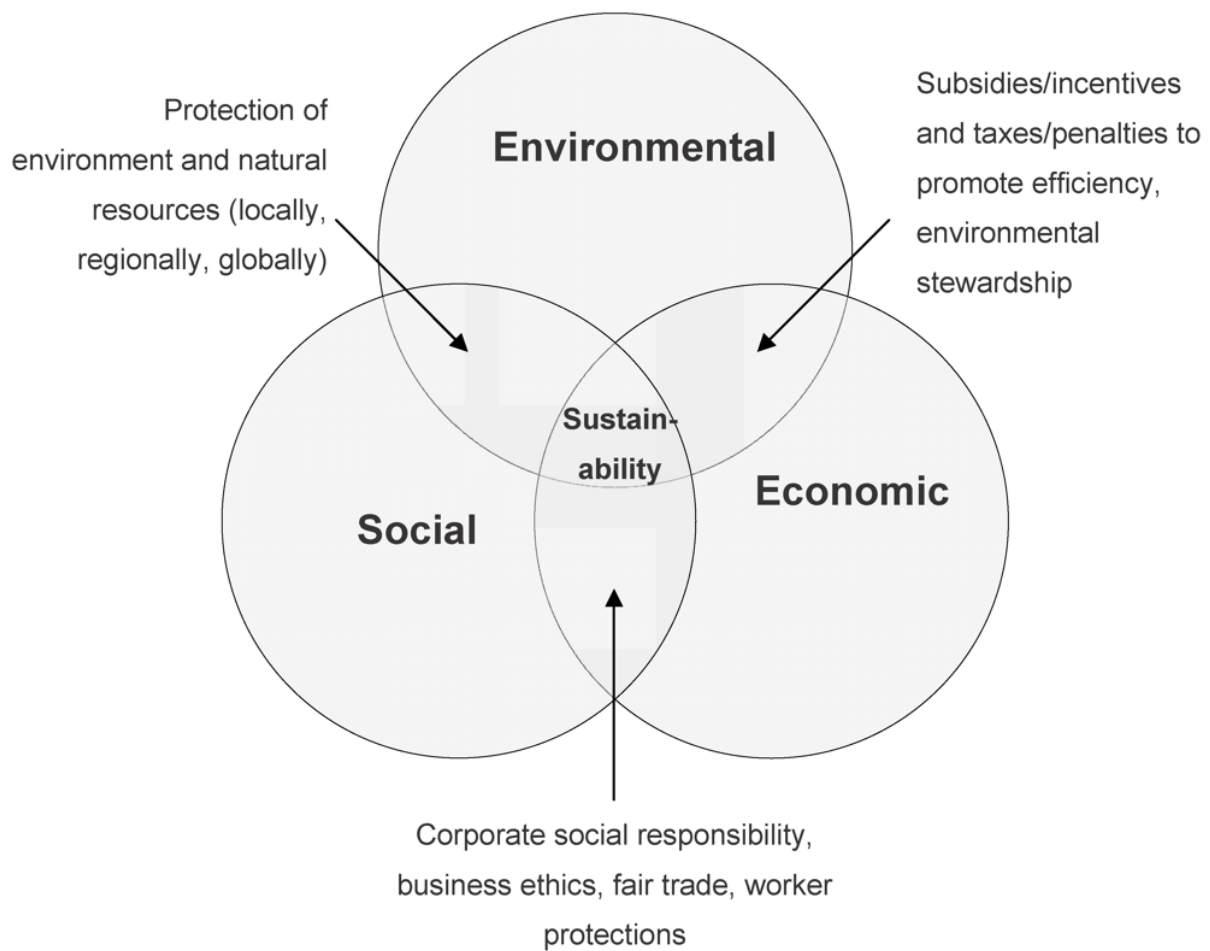


FIGURE 07: Benefits of sustainable practices.

To address the urgent issues of resource depletion, climate change, and environmental degradation, the building sector must adopt sustainable materials and procedures. By adopting energy-efficient designs, conserving water, reducing waste, and using sustainable sourcing, the construction industry can drastically lower its carbon footprint and create a built environment that is healthier and more resilient. These methods are essential to the future of building and design since they not only support ecological sustainability but also have positive social and economic effects.

Green supply chains are essential to sustainable building techniques, and the design and construction sectors need to embrace them if they are to meet the SDG targets. Through ethical

and conscientious engagement in these practices, the industry may substantially mitigate its ecological footprint, foster social accountability, and advance the wider objectives of sustainable development. Building a resilient and sustainable built environment requires the combination of sustainable sourcing, eco-friendly manufacturing, green logistics, sustainable packaging, and end-of-life management. [7]



FIGURE 08: SDG by WORLD GREEN BUILDING COUNCIL.

1.4 Value Engineering

Value engineering (VE) is a systematic and structured approach used to improve the value of a product or process by assessing its functions. [8] Value engineering in the context of the architectural supply chain is assessing materials, procedures, and designs to maximize cost-efficiency without sacrificing performance or quality. The goal is to give maximum value to the client while assuring sustainability and functionality.

Key principles of value engineering in architectural supply chain include- [9]

- a) Identify Key Functions: Determine the primary and secondary functions of materials, components, and systems used in construction.
- b) Assess how well these functions are being performed and identify areas for improvement.
- c) Compare the cost of different materials, methods, and technologies to find the most cost-effective solutions.
- d) Consider not just initial costs but also long-term expenses related to maintenance, operation, and disposal. (lifecycle costs)
- e) Explore alternative materials, designs, and construction methods that could provide better value.
- f) Encourage creative and innovative approaches to problem-solving within the supply chain.
- g) Evaluate the environmental implications of materials and processes, aiming to minimize the carbon footprint and resource consumption.
- h) Integrate sustainable practices and materials that contribute to green building standards and certifications.

- i) Ensure that any cost-saving measures do not compromise the quality and performance of the final product.
- j) Adhere to industry standards, codes, and regulations while implementing VE.

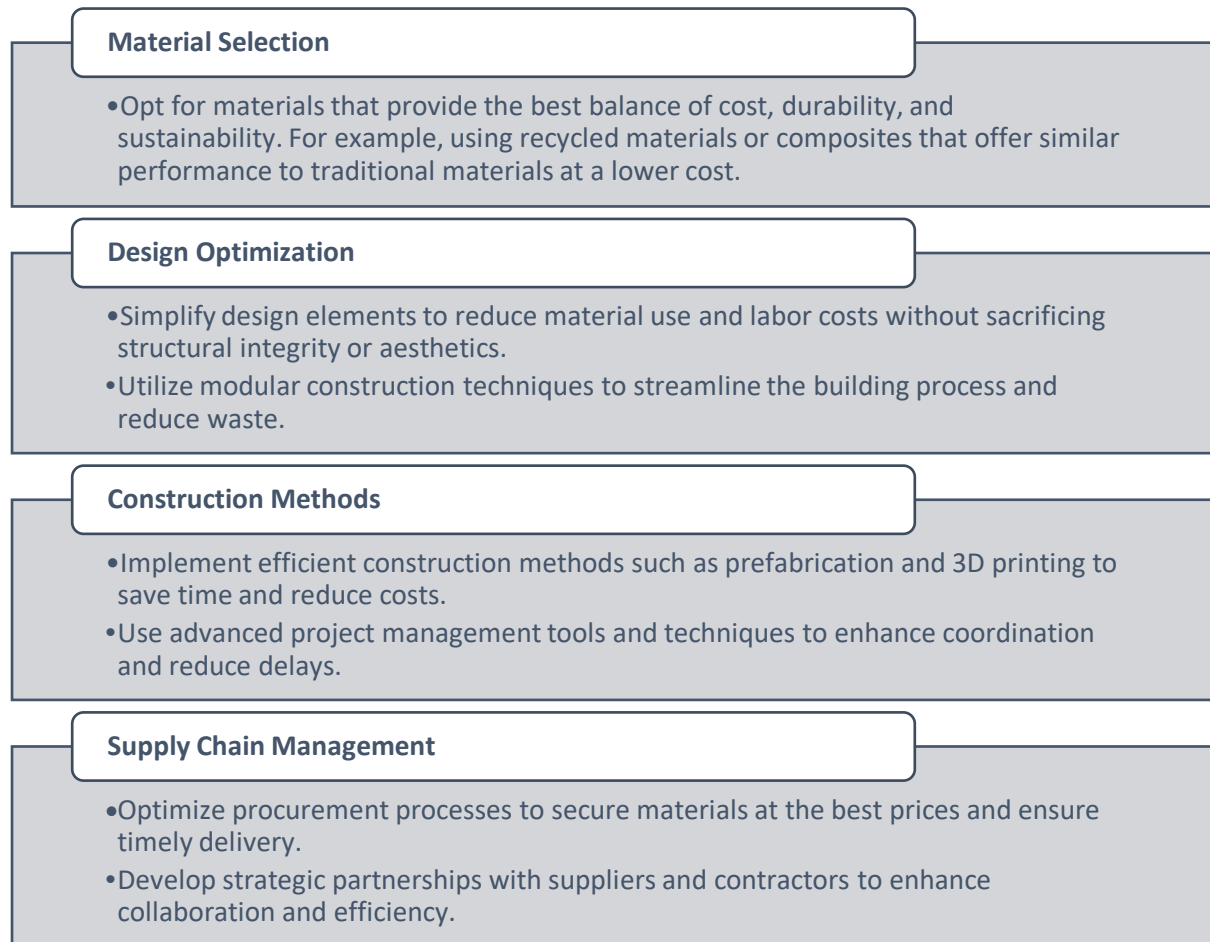


FIGURE 09: Value Engineering Method in Architectural Supply Chain

ARCHVISTA have its own way to work on it. It has a full-time team to work on every cost affecting aspects in every possible way maintaining the quality for a sustainable construction.

Optimum cost, performance and quality requirements for buildings, their components and/or materials are the main objectives in almost every construction project. In fact, there are growing and changing demands from building owners on the nature of the buildings they need based on the above three indicators.

Various concepts and ideas have been developed to help Clients meet these needs, including value engineering, total quality management, management by objectives, and quality function deployment. [10]

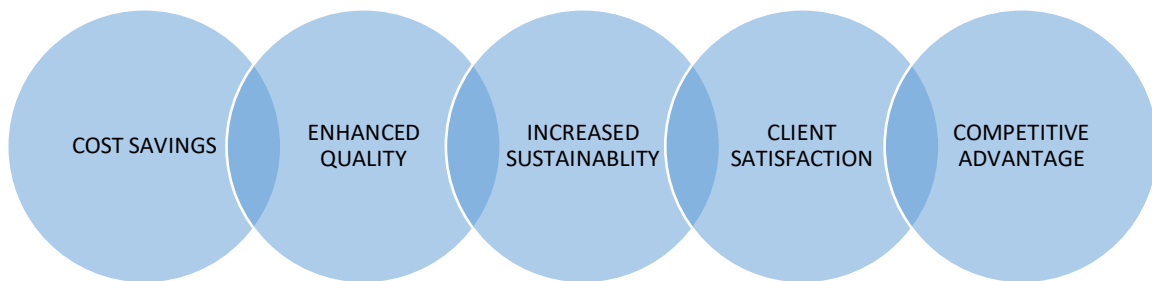


FIGURE 10: Benefits of Value Engineering in the Architectural Supply Chain

Chapter 2

GLOBALIZATION AND MARKET DYNAMICS

2.1 How Global Sourcing and Collaboration Have Reshaped Supply Chains in Architecture

Businesses have been forced to reconsider the design and functioning of their physical locations due to the development of the supply chain industry. [11] The demand for streamlined operations, effective logistics, and enhanced client experiences is what is driving this change. According to a Deloitte analysis, [12] companies are progressively integrating supply chain factors into their architectural blueprints to optimize smart technology and material use. As a result, aspects including space planning, energy efficient building and less construction waste can be achieved.

Globally novel approaches are being used to address the problems resulting from the supply chain industry's influence on architectural design. Architects and supply chain specialists must now work together to design structures that smoothly connect with logistics.

This collaboration may result into a stronger web of development among the countries and environment favoring the respective communities from near sourcing to offshore sourcing at best.

In Bangladesh, the international companies such as HSBC UNILEVER, RECKITT BENKISER, ORACLE, JLL, VELWIRE are placing market footprints. They are setting up their Bangladesh office for smooth operation. While working for them we need to maintain their global design guideline and source globally for the standards materials.

Global sourcing may also lead the international stakeholders into the local market increasing the possibility of advancement of technology and new era of architectural solidarity.

Integrity between the architectural stakeholders act as a lead entity in the social and environmental development. The competitive advantage is only achieved when there is no boundaries affecting the sustainable sourcing and internal collaboration.

2.2 Factors Driving the change

Global sourcing and collaboration have significantly reshaped supply chains in the architecture industry. Here are some key ways in which these trends have impacted architectural practices and the broader supply chain:

- Access to a Broader Range of Materials and Products
 - a) Diverse Material Options: Architects now have access to a wide variety of materials from around the world, enabling them to specify unique and innovative products that might not be available locally. This has enhanced the aesthetic and functional possibilities in building design.
 - b) Cost Efficiency: Sourcing materials from different regions can lead to cost savings, especially when certain materials are cheaper or more readily available in specific countries.
- Improved Technology and Design Tools
 - a) Building Information Modeling (BIM): Global collaboration is facilitated by advanced design tools like BIM, which allow architects, engineers, and contractors to work together seamlessly, regardless of their geographic locations.
 - b) Virtual Reality (VR) and Augmented Reality (AR): These technologies enable real-time collaboration and visualization, improving the accuracy and efficiency of design processes.

- Enhanced Project Management

- a) Global Project Teams: Teams can be assembled with experts from around the world, bringing diverse skills and perspectives to projects. This can enhance innovation and improve problem-solving.
- b) 24/7 Work Cycles: With teams in different time zones, work on projects can continue around the clock, speeding up timelines and improving efficiency.

- Sustainability and Ethical Considerations

- a) Sustainable Sourcing: Global sourcing allows architects to choose materials and products that meet stringent sustainability criteria, which might not be available locally.
- b) Ethical Standards: Collaborating globally necessitates a focus on ethical sourcing and labor practices, ensuring that materials are sourced responsibly and that all workers are treated fairly.

- Risk Management and Resilience

- a) Diversified Supply Chains: By sourcing materials from multiple regions, firms can mitigate risks associated with supply chain disruptions, such as natural disasters or political instability.
- b) Flexible Supply Networks: Global collaboration fosters more resilient supply chains that can adapt to changes in demand and supply conditions more effectively.

- Regulatory and Compliance Challenges

- a) Navigating Regulations: Different countries have varying building codes, standards, and regulations. Architects must navigate these complexities to ensure compliance across all regions involved in a project.
- b) Intellectual Property Protection: When collaborating internationally, protecting intellectual property becomes crucial, requiring robust legal frameworks and agreements.

- Cultural and Communication Dynamics
 - a) Cultural Sensitivity: Understanding and respecting cultural differences is essential in global collaborations. This can influence design choices and project management approaches.
 - b) Effective Communication: Clear communication is vital to overcome language barriers and ensure all stakeholders are aligned in their objectives and expectations.

2.3 Increased Risk of Supply Chain Disruption

Although there are many advantages to global sourcing and collaboration for the architectural sector, there is also a higher risk of supply chain interruptions. Natural catastrophes, pandemics, and political and economic instability are important variables that might affect how quickly and affordably projects are completed. The architecture sector can strengthen its resistance to these disruptions by implementing thorough risk management plans, broadening its supplier base, utilizing technology, and cultivating enduring partnerships with suppliers. [13]

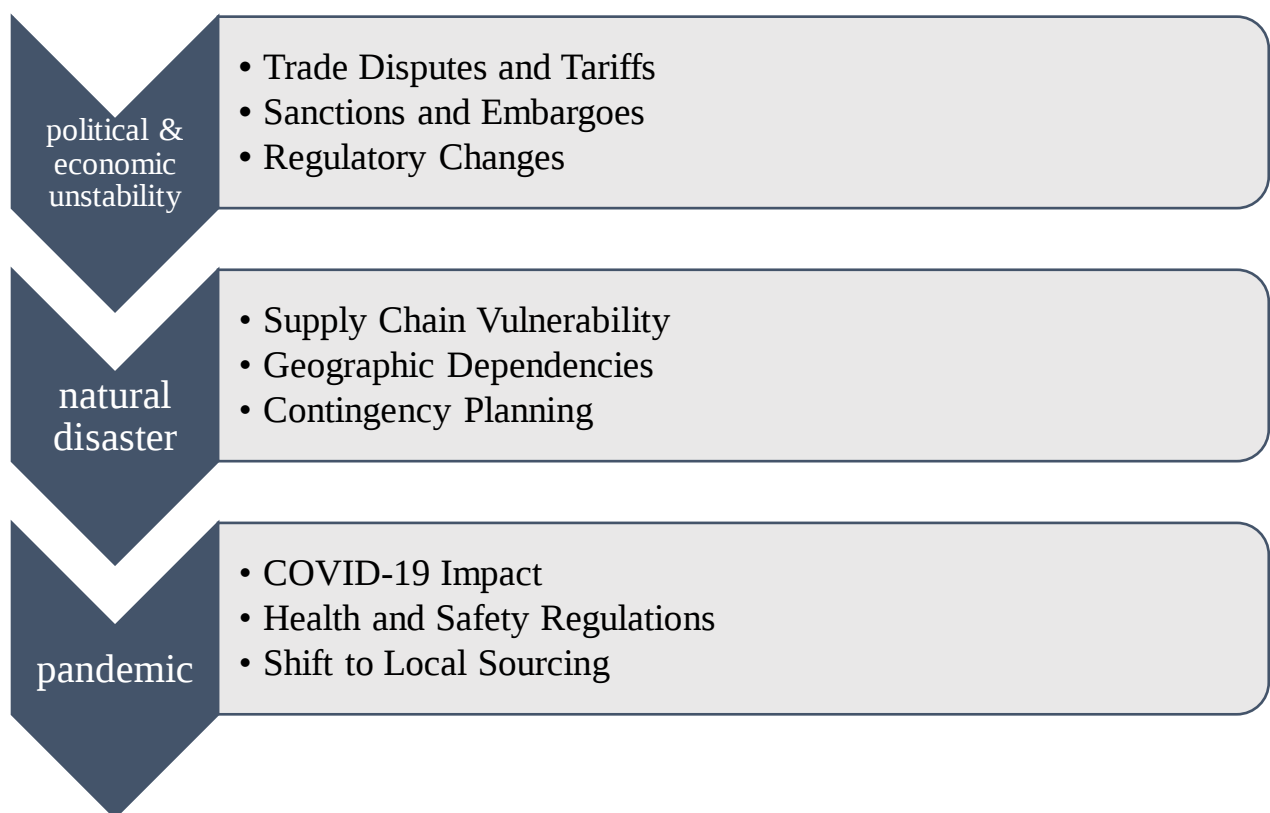


FIGURE 11: Main risks of supply chain disruptions

In order to mitigate this increased risk of supply chain disruptions we might opt for diversification of the supplier having multiple sources of both local and global ones. We also need to have the scenario planning and needful protocol maintaining for the risk management and contingency planning.

Investment on the technology can also provide a big relief ensuring the supply chain visibility and predictive analytics

Furthermore, collaborative partnerships along with regular vendor base rationalization can help to mitigate the increased risk from core.

2.4 Analysis of Market Trends

Modular construction is a rapidly growing trend in the architecture and construction industry, driven by its efficiency, cost-effectiveness, and sustainability benefits. Its rise is mostly due to technological advancements, growing demand for urban dwelling, and the necessity for quick construction solutions. Even with these obstacles being present, the sector is making progress in breaking past them with innovations in technology, education, and regulations. Modular construction is expected to have a big impact on how buildings are designed and built in the future as the market develops.

Secondly, the emphasis on sustainability in architecture is a reflection of a larger social movement towards resource efficiency and environmental responsibility. The use of environmentally friendly materials, energy-efficient systems, compliance with more stringent environmental laws, and incorporation of cutting-edge construction technology are all included in this trend. Architects and builders are responding to the market's continued emphasis on sustainability by creating designs and methods that not only satisfy legal requirements but also win over investors and customers who care about the environment. This emphasis on

sustainability is influencing architecture's future, spurring creativity, and encouraging the creation of a built world that is more sustainable.

Thirdly, Prefabrication techniques are reshaping the architecture and construction industry by offering significant cost and time savings, enhanced quality and precision, and sustainable building practices. The adaptability of prefabrication applications, industry backing, and technological improvements are propelling its use across a range of building types. Even though there are still difficulties, prefabrication is becoming more and more popular in today's building industry as people realize its advantages. Prefabrication is expected to be essential in producing high-quality, ecological, and efficient structures as the market develops.

2.5 Competitive strategies

Using technology, using lean building practices, and promoting cooperation with international partners are ways that architecture companies can improve their marketability. The supply chain's transparency, project management, and design accuracy are all enhanced by the use of digital tools like BIM, AI, and IoT. [14] Procurement, logistics, and inventory management are all optimized by data analytics. The goals of lean construction are to increase productivity and reduce waste without sacrificing quality. Superior project outcomes are achieved through the promotion of collaboration, innovation, and shared accountability through strategic alliances and Integrated Project Delivery techniques. By comprehending and putting these tactics into practice, architecture companies may take advantage of globalization opportunities, manage the intricacies of global supply chains, and promote innovation and quality in their projects.

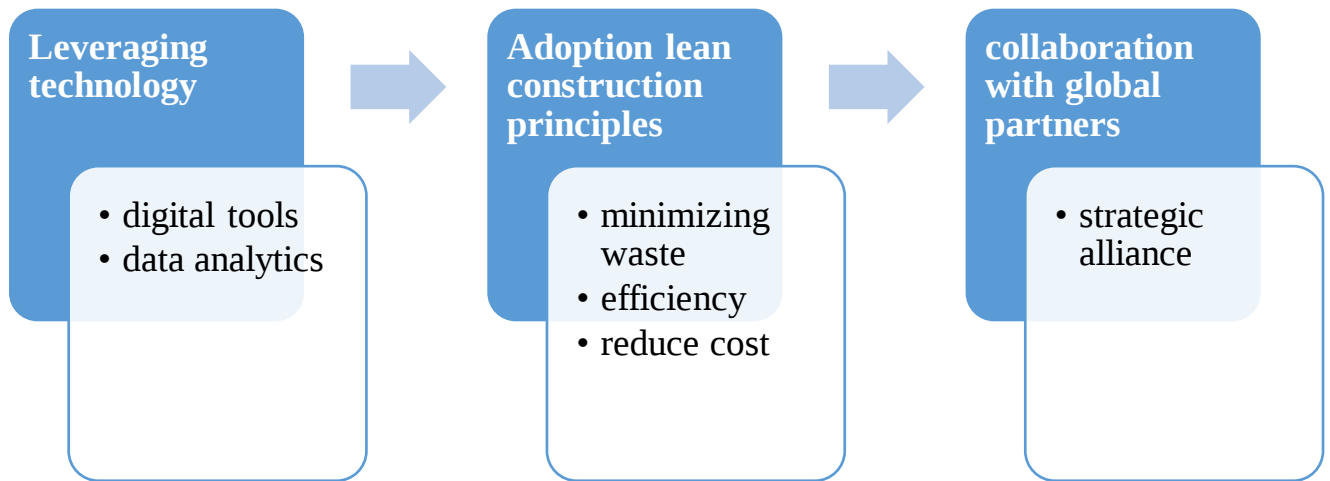


FIGURE 12: Key plan of Competitive Strategies

Besides this, Adopting Integrated Project Delivery (IPD) approaches can significantly enhance project outcomes by promoting collaboration, shared responsibility, and early involvement of key stakeholders. Through collaborative contracts, shared risk and reward structures, and the utilization of advanced technology like BIM, IPD fosters an environment where all parties work together towards common goals. This approach not only improves efficiency and reduces costs but also enhances the overall quality of the project. By embracing IPD, architectural firms and their partners can navigate the complexities of contemporary construction projects more effectively, delivering superior results for clients and end-users.

Chapter 3

This chapter is going to reflect my utmost experience during these years as the supply chain professional. The way my current organization has evolved their internal supply chain evolving with the global market dynamics.

The tendering method/ procuring method has also been evolved through years. Starting with E-GP to all the online bidding portal like SAP, ARIBA etc, the participating vendors should have extravagant knowledge of global sourcing, value engineering and ensuring sustainable approach.

These tendering processes offer end to end visibility to the both bidder and the client regarding the process and the project itself. The operational integration has to be reflected in the project schedule as mandatory submittals in this segment.

Technological integration also plays vital role here. As discussed in the Chapter one (1.2), the impact using the IoT, AI increase the chances of getting the competitive advantage of global sourcing was faster and do the needful value engineering to stand out of the crowd.

Proactive team consist of strict quality control and energy efficient project planning surely be the final choice in the industry. Team identifying the key challenge in the contemporary supply chain in Architecture and promptly solving them with both technical and operational integration generates a new era of market leadership.

Few unavoidable challenge and my workplace example has been derived below for the better understanding of the above stated statement; showing how ARCHVISTA have dealt with the challenges and overcome successfully to ensure strong footprint in the commercial Office interior Industry over the years.

Potential challenges and solution

On this phase we will be discussed about the potential challenges and their probable solution to avoid the risks that might generated and need to be cautious about while implementing the strategies mentioned in chapter two.

During 2020 Covid pandemic has evolved the architecture market practice drastically. The central hub for construction has been evolved from China and near to equally distributed globally among Malaysia, Singapore, Denmark etc. countries.

3.1 Longer lead time

Challenge:

Procuring materials from international suppliers can result in extended shipping times, which may lead to project delays. Lead time may also increase due to distance quality supervision for the same.

Solution:

This can be avoided by Implementing advanced planning and scheduling techniques, including just-in-time (JIT) inventory systems to synchronize material deliveries with project timelines. Use digital tools like BIM to forecast and plan for potential delays, and establish buffer stocks of critical materials.

Example:

If the project duration is 4 weeks, it is quite difficult to import glass door and partition from overseas. This is because the standard lead time for those is usually 4-6 weeks.

Same happens with the lighting technologies. ARCHVISTA had to import light for its various projects as they work mainly for MnC's, IBRD's and NGO's. Mostly their local offices have

to be designed being aligned with its overseas headquarters and this tends to create a brand or specification boundaries for those esteemed projects.

In such cases we often need to work with international consultants suggesting more global brands not only for partition but also light, carpet etc. These all items uphold longer lead times and not suitable for any project which timeframe is amid 4-6 weeks.

Projects with longer lead time items tends to be completed by 90 days (minimum), whereas we can execute the same project by locally available materials within 43-45 days easily.

However, this choice strongly depends on the projects type and client requirements for the same.

3.2 Regulatory Difference

Challenge:

Variations in building codes, standards, and regulations across countries can complicate compliance and project execution.

Solution:

These can be avoided by employing a dedicated compliance team to navigate international regulations and standards. Collaborate with local experts to ensure adherence to regional laws. Standardize processes where possible and maintain detailed documentation to streamline regulatory approvals.

Example:

Even after we overcome the longer lead time challenge and try to import again from the international suppliers, sometimes it often seeing that there are some regulatory differences in the manufacturing standards, installation processes etc. Another example can be arisen here in the ceiling manufacturing sector KNAUF is a renowned name. The ceiling they produce for the Singapore market and the product they manufacture for the south Asian market has huge difference in making and technology respecting the individual user experience.

Recently we have also imported solid surface from Zhuhai, China as we had time in hand and got some beautiful option over there. But the problem occurred with the H.S code being different for China and Bangladesh. Though we had been declared as per Bangladesh tariff schedule, but the customs regenerated the H.S code as per the material data sheet, which lead to a longer custom clearing procedure.

While installing glass door partition and frame of brand-named JEB, we were facing difficulties installing the access control. After few email and virtual meetings we understood that, the method we have followed in install it was not compatible for the doors. Then we need to dismantle and reinstall again for the proper usage.

These often happens with so many items. Thus, products have been decoded with Asian standard, European standards etc.

3.3 Communication Barriers

Challenge:

Differences in language, culture, and time zones can hinder effective communication and collaboration.

Solution:

The solution for these challenges is to utilize digital communication platforms that support real-time collaboration and document sharing. Foster a culture of open communication and provide cross-cultural training for team members. Schedule regular virtual meetings to ensure alignment and address any issues promptly

Example:

Lately we have worked with a fluid workplace for ADA Technology limited back in 2018. This project was way more fluid compared to the available technology in Bangladesh back then. There was a huge stretch ceiling inclusive of light inside. We have sourced and imported the stretch light but couldn't install it here. The item has been custom made by a local Chinese artisan who doesn't know English. So, it was very difficult to communicate with him virtually. To mitigate this challenge, we bought him here and we were talking via google translator to communicate regarding our challenges. Then he used sign language and instruct our local foremans to do the needful and install the light beautifully.



FIGURE 13: ADA Technology office stretch ceiling

3.4 Intellectual Property Right Protection

Challenges:

Sharing designs and proprietary information with international partners can pose risks to IP security.

Solution:

This can be done Implementing robust IP protection measures, including non-disclosure agreements (NDAs) and secure data-sharing platforms. Educate employees and partners about the importance of IP protection and monitor compliance regularly.

Example:

One of the most crucial parts for these sectors. Usually, we need to sign the NDA with not only the client but also the supplier with biggest market hold.

While using the global branded item, we have the privilege to explore their company and material datasheet both as consultant and contractor. The datasheets are the intellectual properties and should not be mistreated as it may leads towards market duplication and fall in standards.

Similarly, while working with HSBC bank, we had the privilege of being trained with HSBC global in terms of space design and their global workplace language. During those so many contents and standards has been stared which are solely the research of team HSBC and we have to maintain the secrecy while working with the stakeholders.

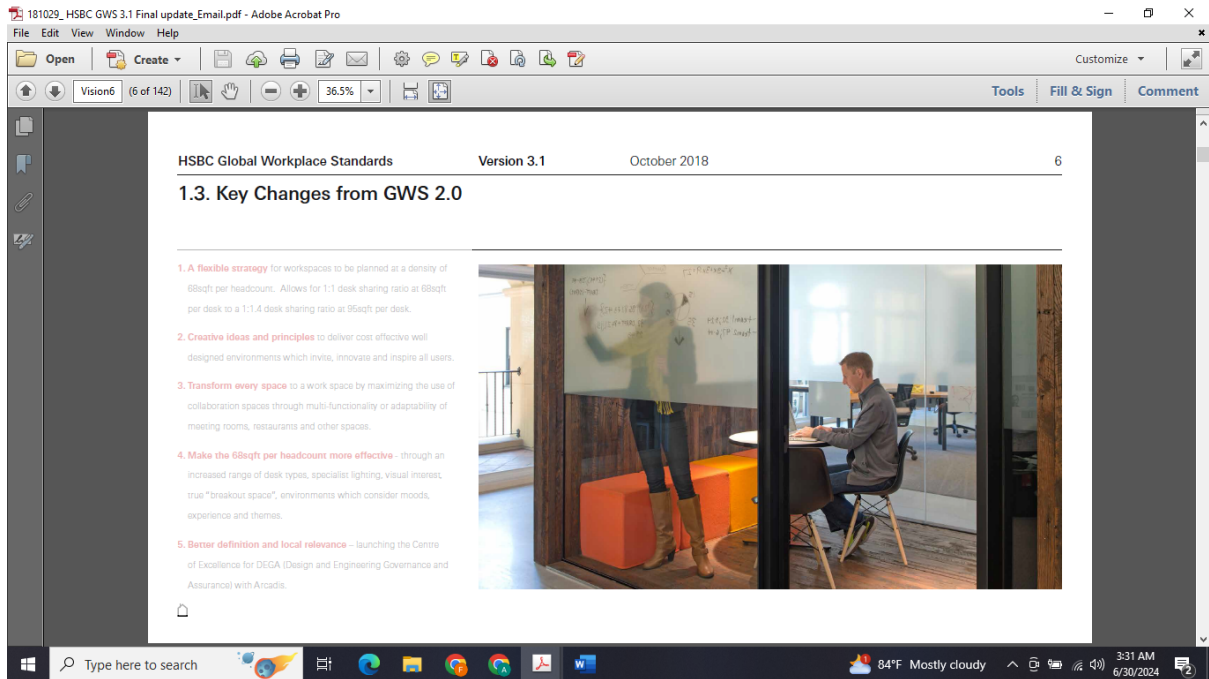


FIGURE 14: HSBC Global Design Guideline.

3.5 Quality Control and Cost Management

Challenges:

Ensuring consistent quality across global suppliers can be challenging. Fluctuations in exchange rates and international shipping costs can affect project budgets. Which is another vital challenge here.

Solutions:

However, it can be achieved by Developing stringent quality assurance protocols and conduct regular audits of suppliers. Utilize digital tools for real-time quality monitoring and feedback. Establish clear specifications and standards for all materials and components.

Hedge against currency risks using financial instruments. Negotiate long-term contracts with fixed pricing to mitigate cost variations. Optimize logistics and supply chain routes to reduce shipping expenses.

Example:

Supervising the factory work was way more difficult that it is now. In one of our earlier projects, there was issue with the swing system of the doors while ordering with the global brand DEKO and all the doors came with opposite site swing. These leads us to reorder the doors again and import accordingly.

We have now initiated to approve the product shop drawing first in order to avoid these stuffs. On a regular note we encourage our team to visit the manufacturing factory of the furniture's, partition, acoustic etc. These also help our team to innovate new options and decided on site regarding the needful customization as per design choice.

3.6 Sustainable and Ethical Sourcing

Challenges:

Ensuring that international suppliers adhere to sustainable and ethical practices can be difficult.

Solution:

In that case need to develop a sustainable sourcing policy and conduct thorough vetting of suppliers. Implement third-party audits and certifications (e.g., FSC for wood products) to verify compliance. Engagements with suppliers to improve their sustainability practices and foster long-term partnerships based on shared values is also required.

Example:

ARCHVISTA right now have the honor to successfully completed four LEED certified commercial interiors. While working for these projects we had to do a lot of product background research based on the TDS.

These project design along with minimal waste and reuse makes. For an example currently we are bidding for a restoration interior project which has MILIKEN carpet as existing. We just came to know this company have old and used carpet restoration and replacement policy. Also we try to source with few brands who produce carpet from plastic waste (collected from sea shore) promoting sustainability.

In the case of acoustic we use “no paint” material, so that we can have VOC free environment. The practice is also same for the paint used in these projects.

Considering the 3R of sustainability we use such material for acoustic and floor covering which can be re-used and re-cycled thoroughly. [15]



FIGURE 15: 3R of sustainability

Furniture's as office desks, chairs etc has been choose in a manner that have sustainability compliance certification such as BIFMA Compliance, SCS Indoor Advantage™ etc. For example, Steelcase, Rockworth etc.



FIGURE 16: sustainability standards.

Regarding carpet used, we always opt for VOC free carpet along with the certification of the “CRI+”. This is also called Green level plus certification. [16]

3.7 Implementation of The Strategies for Solution

Challenges:

By addressing the above-mentioned challenges with targeted solutions in this chapter and implementing strategic improvements, architectural firms can effectively manage global supply chains and leverage the benefits of global sourcing and collaboration to enhance project outcomes.

Solution:

The strategies usually will rely on the project circumstances and current market dynamics to be adapted and worked properly.

Example:

The project has longer lead times and the project with urgent handover schedule is not possible to be handed over in the same manner, implementing the same strategy. The project language itself will select the strategy we need to plan for and need to be executed accordingly.

Budget constraints need to be considered equally with importance in the case of global sourcing. The sourcing will only be beneficial if there is active value engineering prior the procurement process begins. Locally available items need to be avoided during import selection in order to reduce related carbon footprint of the project.

Here, let me refer to two separate office construction cost for better understanding. The Head office for UNILEVER Bangladesh Head office was 5500 BDT/sqft, whereas the same was 3500BDT/sqft for the Office of IBAS++ program head office of Ministry of Finance Bangladesh. Thus, the supply structure and strategical implementation was solely different from each other. For the UNILEVER project we had the opportunity to use world class materials directly procured from the global suppliers. And then we had to be minimalistic while using the same for the Finance Ministry project.

Sometimes we often need to work on a running office for restoration purpose. During that tenure noise level of the work needs to be maintained properly and overall HSE team need to be in charge to maintain the indoor space environment on priority basis.

We have already trained our inhouse HSE team with ISO:4001 certified OHSE training to maintain those.

Advanced Technologies	Process Improvements	Collaboration And Training	Sustainable Practices
○ Adopt BIM and IoT: Use Building Information Modeling (BIM) for integrated project planning and Internet of Things (IoT) for real-time tracking of materials and components. ○ Leverage AI and Data Analytics: Employ artificial intelligence and data analytics for predictive maintenance, demand forecasting, and risk management.	• Standardization: Standardize procurement and construction processes to ensure consistency and efficiency ○ Lean Principles: Apply lean construction principles to minimize waste and optimize resource utilization.	○ Cross-functional Teams: Create cross-functional teams that include members from procurement, compliance, quality control, and project management. ○ Training Programs: Develop training programs for employees on global sourcing, regulatory compliance, and cultural sensitivity.	○ Green Procurement: Prioritize sourcing materials from suppliers with strong sustainability credentials. ○ Lifecycle Analysis: Conduct lifecycle analysis of materials and components to ensure their environmental impact is minimized.

FIGURE 16: Implementation strategies for solution.

Chapter 4

CONCLUSION AND RECOMMENDATION

4.1 Conclusion

Improvements in supply chain management are driving a dramatic revolution in the architectural sector. Achieving market leadership requires a transition from conventional to contemporary supply chains, which are distinguished by digital integration, sustainability, and international cooperation. Digital transformation, which includes blockchain, IoT, and AI, improves visibility, efficiency, and transparency—all of which are critical for contemporary architectural processes.

Sustainability is now necessary rather than optional. In line with the worldwide Sustainable Development Goals (SDGs), the incorporation of sustainable materials and methods not only solves environmental issues but also has positive social and economic effects. This is further supported by value engineering, which maximizes value for clients by optimizing cost-efficiency without sacrificing performance or quality.

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Supply chains have changed as a result of globalization, which has made a variety of resources more accessible and encouraged cross-border cooperation. But it also brings hazards, such

supply chain interruptions, which call for effective risk management techniques. Prefabrication, modular building, and sustainability are altering the architectural environment and encouraging creativity and efficiency.

Marketability and project outcomes are improved by competitive tactics that emphasize technology, lean construction, and integrated project delivery (IPD). These tactics make sure that architectural businesses can push innovation, uphold strict quality standards, and negotiate the intricacies of contemporary supply networks.

To sum up, supply chain management must advance if the architectural sector is to become the leader in the market. The industry can overcome obstacles, reduce risks, and seize opportunities by embracing digital transformation, sustainability, and international cooperation as well as by implementing competitive strategies. This will pave the path for a robust and creative future.

4.2 Recommendation

Based on the comprehensive analysis and findings presented in this study, the following recommendations are proposed to enhance the efficiency, sustainability, and competitive advantage of the architectural supply chain:

Adoption of Advanced Technologies

- **Integration of IoT, AI, and Blockchain:** Architectural firms should invest in and adopt IoT sensors, AI-driven analytics, and blockchain technology to enhance supply chain visibility, improve decision-making, and ensure traceability and transparency.
- **Utilization of BIM and AR/VR:** The use of Building Information Modeling (BIM) along with Augmented Reality (AR) and Virtual Reality (VR) should be expanded to facilitate seamless collaboration among stakeholders and improve project accuracy.

Sustainable Sourcing and Practices

- **Embrace Green Supply Chains:** Firms should prioritize sustainable materials and green building practices to reduce environmental impact and align with global sustainability goals. This includes ethical sourcing, reducing waste, and implementing energy-efficient designs.
- **Compliance with Environmental Standards:** Adopting international standards for sustainability, such as those set by the World Green Building Council, to enhance market credibility and attract environmentally conscious clients.

Value Engineering

- **Systematic Value Engineering:** Implement a structured approach to value engineering to optimize materials and processes for cost-efficiency without compromising on quality. Focus on lifecycle costs and explore alternative sustainable materials and methods.
- **Encourage Innovation:** Foster a culture of innovation within the supply chain to continuously improve and adapt to emerging trends and technologies.

Risk Management and Resilience

- **Diversified Supplier Base:** Develop a diversified supplier network to mitigate risks associated with supply chain disruptions. This includes having multiple sources for critical materials and components.
- **Scenario Planning:** Implement robust risk management strategies and contingency plans to address potential disruptions such as natural disasters, pandemics, or geopolitical issues.

Global Collaboration and Sourcing

- **Leverage Global Sourcing:** Take advantage of global sourcing opportunities to access a broader range of materials and technologies. Ensure that collaborations are strategically managed to enhance efficiency and innovation.
- **Enhance Cultural Sensitivity:** Promote cultural understanding and effective communication within global teams to improve collaboration and project outcomes.

Lean Construction Practices

- **Adopt Lean Construction:** Implement lean construction techniques to enhance productivity and reduce waste. Focus on continuous improvement and the elimination of non-value-adding activities.
- **Integrated Project Delivery (IPD):** Promote the use of IPD approaches to foster collaboration, shared responsibility, and early stakeholder involvement, leading to better project outcomes.

Education and Training

- **Continuous Professional Development:** Encourage continuous professional development and training for supply chain managers and architects on the latest technologies, sustainable practices, and risk management techniques.
- **Industry-Academic Partnerships:** Establish partnerships with academic institutions to bridge the gap between architectural education and practical supply chain management.

By implementing these recommendations, architectural firms can significantly enhance their supply chain efficiency, sustainability, and overall market leadership. Continuous adaptation

and innovation are crucial to navigating the dynamic landscape of the architectural supply chain.

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