Customs Broker Integration Framework

By

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Preface

When I started this course, I never thought I would get married, change new jobs and move places. Everyone in the course experienced a lot of changes in their personal and professional life during this time. Even though COVID took away the pleasure of seeing the whole class physically, everyone supported each other by celebrating every newborn, marriage, etc. Attending the classes was one was the joy moments I will always cherish in my life. Thanks to all who contributed to this work. I am very grateful to my parents, who encouraged me to apply for the course. I would like to thank all my professors and colleagues who had the patience and trust in me to finish this work. I am thankful to my supervisors, Professor Dr. Joris Hulstijn and Professor Dr. Ziv Baida, since they had patience and care to give me feedback on each step and asked critical questions, which provoked more technical discussions. I would like to thank my manager, Iris Amptmeijer, who is a visionary and supportive during the thesis, helped me with the conceptual idea for this topic and guided me on the outcome. When I started this course, I started dating a girl; she knew what my challenges were and was supportive from that day till the end and eventually even married me. Thanks Varshni, for having the patience and trust in me.

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Executive Summary

In our world, everything is connected, and global trade plays an important role. Supply chain and logistics are the core of the operating model of manufacturing companies as they help them navigate the international business and return the revenues desired. The central part of the worldwide supply chain involves various indirect actors such as customs authorities, customs brokers, freight forwarders, and carriers. Even though the term digitalisation is hyped across the global trade spectrum, the rate of adaptation is only around 76% in international trade (Deloitte, 2017). Digitalisation is mainly applied in global trade management software. However, it is often forgotten that even if companies say they are digitalised, various in-direct actors who play a role in the end-to-end supply chain activities also need to participate in the digitalisation exercise. One such supply chain activity is the customs operation. The transaction cost in international trade is higher for the conventional than digital customs clearance mode due to various actors participating. The trade leaders of multinational companies work towards achieving an equilibrium in minimizing the cost of the trade and adhering to compliance to become the strategic partner for the business. This thesis brings forward such a case where the misfit of the GTM software and the business demand on the customs broker integration. As significant companies operate globally, they need a global strategy to determine the customs broker integration approach and a localised adaptation policy to draw a workable framework. The strategy and localised policy elements are divided into functional and technical parts. The functional part addresses the aspects of the policy, operations elements and technical part of the IT. To help create a framework, this thesis uses design science methodology and performs a case study of a global trading company and analyses what issues they face with indirect actors (Customs Broker) on integration to a GTM. The framework is tested by using it on the implementation project and review panel. We conclude with the recommendations and steps to be taken by the organization on such customs broker integration.

Keywords: Customs broker integration framework, Customs operation system integrations, System integrations

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Chapter 1: Introduction

For multinational companies, international trade is vital in gaining a competitive advantage. The statement "Data is the new oil" remains valid for multinational companies in the 21st century. Different process steps and movements generate data in today's interconnected world, enabling global trade to occur quickly. Inbound and outbound operations logistics add primary value, while technology development offers secondary support value. Digitalisation is defined as the *use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business* (Gartner, 2023b). Digitalization is a major trend worldwide, with different aspects of life being digitalised daily. The impact of digitalisation is often compared to the industrial revolution (The Third Industrial Revolution, 2012). With the rise of Industry 4.0(Rüßmann et al., 2015), more companies are integrating various internal & external functions to create a highly connected and optimised environment.

Global Trade Management Software (GTMS) is a critical element of digitalisation, managing and automating global trade activities(Gartner, 2023). GTMS serves as a warning system for trade compliance in the value chain process (including the supply chain process) and aids in customs operations. Up to 76% of companies in the industrial products sector have invested in GTMS to control customs operations better and address cross-border trade challenges (Deloitte, 2017). However, many companies struggle to get the expected value from their GTMS implementation. This is primarily due to difficulties interpreting and communicating requirements across various actors, such as government agencies and systems, and a lack of automation.

Most companies still follow manual or semi-automated processes for supply chain management, especially in customs clearance activities. These manual and semi-automated processes involve multiple actors in a single customs clearance activity, as represented by the supply chain logistics transportation management hierarchy theory (Veenstra, A.W. 2019), which includes various direct and indirect roles. This study will focus on one indirect actor, customs brokers, and explore how efficiently we can system integrate them into a firm's information technology architecture via interfaces.

1.1 Problem Statement

In recent times, many global companies have invested in GTM software to automate various parts of global trade (compliance screening, customs declaration creation, product classification, etc.). Despite the best efforts by the companies, manual intervention is always needed as most companies face problems with data availability and quality; as a result, they struggle with digitalization (Ernst & Young LLP, 2006);(Thomas Reuters & KPMG, 2016.);(Deloitte, 2017)). Normally, GTM software is either designed to address the legal or the business requirements for the process, and the perfect amalgamation of both is hard to find. According to Joshi (2011), for GTM software to function perfectly and achieve full automation, the following pillars must be addressed:

A) Trade

B) Movement of goods

C) Data storage

D) Compliance with regulation

E) Ability to process financial documents and business intelligence

F) Data analysis

In interviews conducted by Maurer et al.(2012), end users often complained about using the system for their jobs without considering how their duties align with others in the organisation (Maurer et al., 2012). The misfit between system functionality and identified business needs may not necessarily be actual but perceived. Some organisational stakeholders may want to change the system to fit the process or vice versa, even though such changes may not be necessary to achieve the required performance. In other cases, organisations may recognise the misfit as an actual one but still decide to live with it (i.e. a workaround) if the risk level created by it is acceptable. According to Sia & Soh (2017), misfits can be categorized as imposed and voluntary. The customs domain begin country-specific, meaning every country has different rules and regulation on the way the customs operation is organized, and the organization performing business in that country has an obligation to play by the rules of the land; hence, misfit occurs due to the customs operation due to such practices are assumed to be under the imposed category.

However, recent trends suggest that such approaches, i.e. workarounds, are no longer viable in the current context of international trade, vastly different from the one or two decades ago when deregulation was on the rise and, as a result, the number of commercial partners increased and so is their technical demands. Customs practitioners must take note of the misfit (if there is one) and view it as an opportunity for companies, particularly those that operate globally, to increase productivity and tackle future challenges.

The mere presence and identification of a misfit from the business needs of the system functionality can be a catalyst for breaking an inertial pattern, offering an opportunity to address the current misfit and tackle future ones. According to Maurer et al. (2012), if handled well, misfits between system functions and business needs can benefit the organisation under high

environmental turbulence. Moreover, fundamental changes made in response to misfits can create digital options that provide organisations with a broader range of possible actions to undertake in the future, as pointed out by (Sambamurthy et al., 2003).

Historically, misfits - such as when the GTMS (or ERP) system imposes an inefficient way of working or lacks required functionality - have been resolved by customising the GTMS or adapting the organisation's processes to fit the GTMS requirements (Hong & Kim, 2002). Studies, mostly on MNEs, suggest that adapting organisational processes is preferable to customisation of the IT, which can be risky, expensive, and hard to maintain (Zach and Erik Munkvold, 2011). In addition, a commonly cited reason for using "off-the-shelf" solutions is that they contain best practices (Goodhue & Gattiker, 2005), which a company should follow.

However, based on the works of Holsapple et al. (2009) and Ekman & Erixon (2009), the credit given to best practices promoted by GTMS vendors is questionable, given the negative feedback reported by compliance practitioners over time. The reason is that the requirements change often from one country to another, and the development of the solutions of all countries doesn't give vendors any economic incentive. The term "best practices" is a value judgement influenced by a vendor's description of how a specific business process should be optimally performed based on working with previous customers. Such practices are not general business running standards, and the topic of compliance is country-specific.

This thesis will suggest how global companies may frame the functional and technical (system specifications) parts needed to efficiently integrate a customs broker into GTM software. This will cover the system and business process misfits by proposing a design artefact that follows the requirements and creating a framework for customs broker integration. This framework would be a keystone for an organisation and help it re-evaluate the existing systems and suppliers. It will

also help the business decision-makers set a digitalisation strategy for the organisation and help optimise the trade.

1.2. Research Questions

Based on the problem statement coined above, the thesis is driven by the following main research question:

What stepwise approach would help the multinational organisation efficiently integrate customs brokers? And provide an integration model for the global industrial rollout of customs broker integration.

The following sub-questions are framed to guide our literature review and research question.

A) Why is there a need for a customs broker in the organisation?

B) Why do we need to system integrate customs brokers into the GTM system?

C) What solutions are available in the market to integrate a customs broker into the GTM System?

    a. How do you select software suppliers and customs brokers?

    b. What are the factors that influence selection?

D) What are the characteristics of such system integration?

    a. What is a framework for the system integration of customs brokers?

    b. What are the properties needed to design a framework?

All these findings are expected to form the requirements that the design artefact shall meet. The structure of the thesis is explained in the form of BPMN notation.
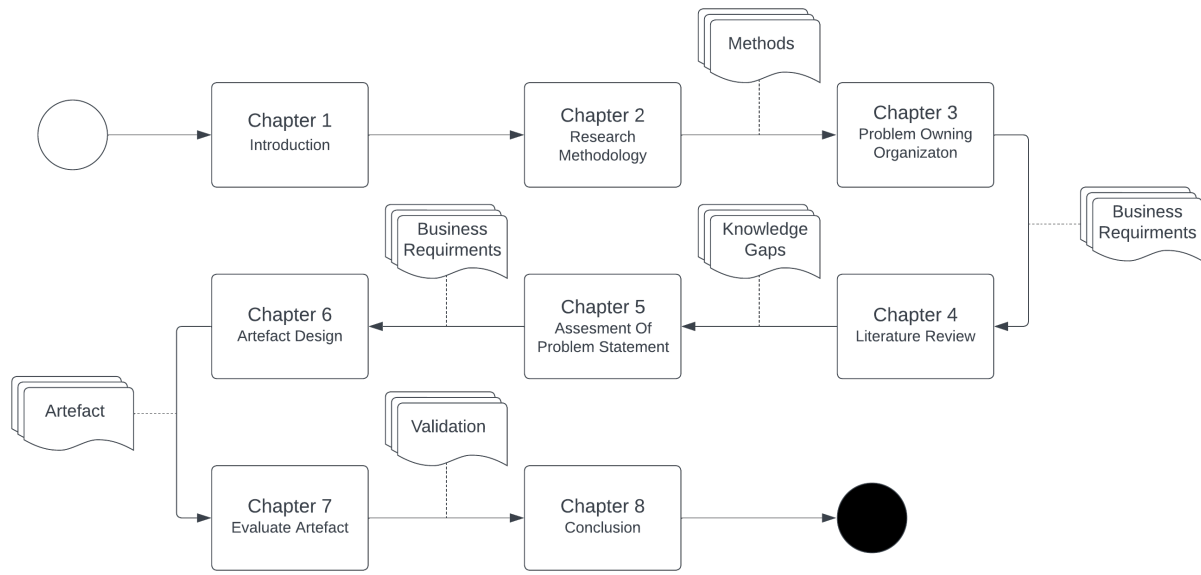
Figure 1 BPMN Notation for Thesis Structure.

1.3 Search Process and References

The literature review for this thesis is mainly conducted in the online electronic databases (EBSCO, RSM e-library, Google Scholars) with the primary search key to include Customs Broker, ERP integration, Cross System Integration, EDI Standards, Supplier Selection, Global Trade Management Software, Supply Chain. Most of the articles referred to in the thesis are peer-reviewed. Apart from the articles, white papers produced by consulting firms are also considered.

1.4 Scope of the Thesis

Since the idea touches on a large and complex field of systems integration, it is suggested during the initial feedback with the professors and mentor to descope some aspects of the overall integration framework. The elements of the framework, which is the current scope of the thesis, are decided upon the factors deemed fundamental and critical to the design of an artefact that needs to be submitted as part of this thesis. This is primarily done to ensure that the thesis can be finished within the stipulated time and that the rest of the work on the topic can be executed in the extended timeline from the thesis timeline.

In the below framework, the following elements are in the scope of this thesis

- Global strategy

- System integration standards

- Supplier onboarding questionnaire

- Minimal data set KPI standards.
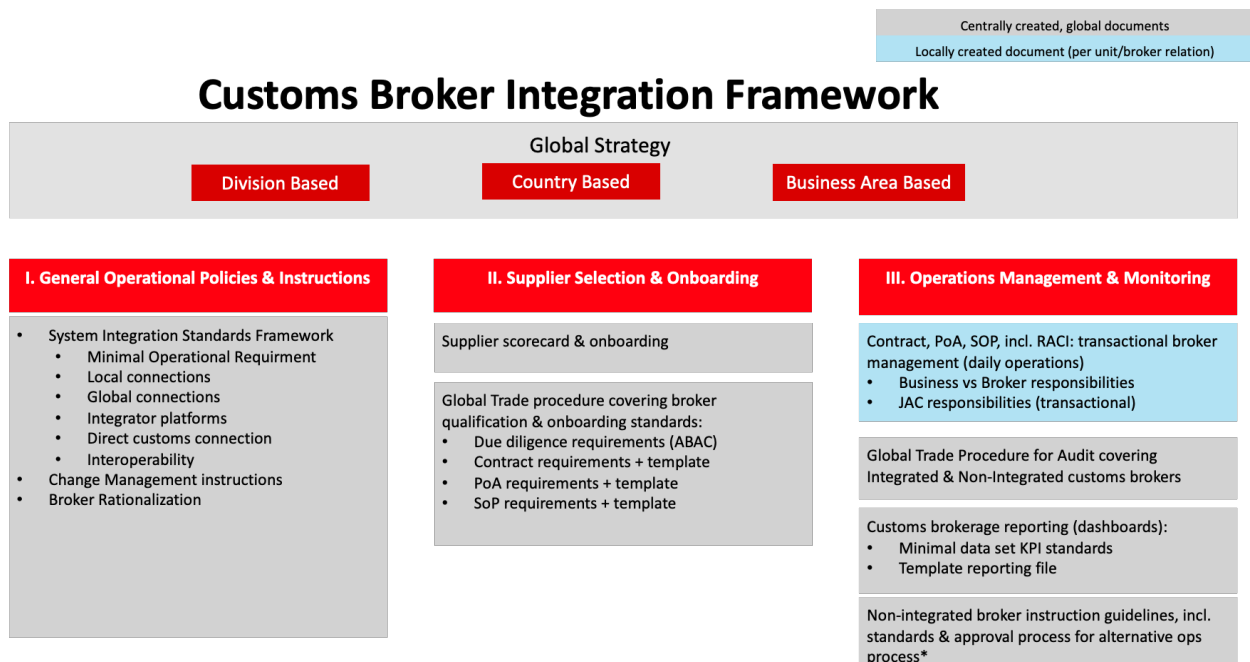
Figure 2 Scope Of Thesis

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1.5 Summary

The initial steps to formulate the answer to this question are to understand the literature behind cross-system integration (since we are talking about two-systems integration), supplier selection (customs broker selection) and standardisation in the EDI domain (communication between 2 systems), ERP integration, customs, value chain modelling and competence management, which we see in chapter 4 of the literature review. Chapter 4 gives an overview of the literature used for this thesis in the areas of cross-system integration. Chapter 3 explains the business process of global trade in the case study company and its need to create a competitive advantage and showcases the most common problems in customs broker integration. Identifying the specific functional and technical requirements of the customs broker integration and categorising customs-related issues faced by the organization form the basis for the design in the next Chapter 5, using the design science methodology and explaining the research work conducted. Chapter 5 deals with creating the artefact, namely a broker interface framework. Chapter 7 discusses the evaluation process of the artefact along with the results. The thesis finishes with a conclusion, practical recommendations for business and suggestions for further research in Chapter 7.

Chapter 2: Research Methodology

The definition of research methodology encompasses the philosophy behind the research process, including the underlying assumptions and values that guide research, as well as the standards or criteria used to analyse data and draw conclusions (Basili et al., 1986). In essence, research methodology involves the application of scientific methods to solve research problems or answer research questions.

March & Smith (1995) distinguishes two paradigms of research in IS behavioural science and design science. This thesis employs the design science research methodology (Hevner et al., 2004) because it aims to create a new artefact - the Customs Broker Integration Framework- for designing an information systems blueprint. The main reason is design science seeks to find novel solutions to previously unsolved problems or improve upon existing solutions (March & Smith, 1995).

The Business Process Model and Notation (BPMN) describes processes, including the process of writing this thesis, to standardise their semantics and communicate them to a broad audience. The picture below showcases the research framework used for the thesis. It depicts the process by which the environment and knowledge base bring value added to the research, and by the requirements, it will produce the design artefact.
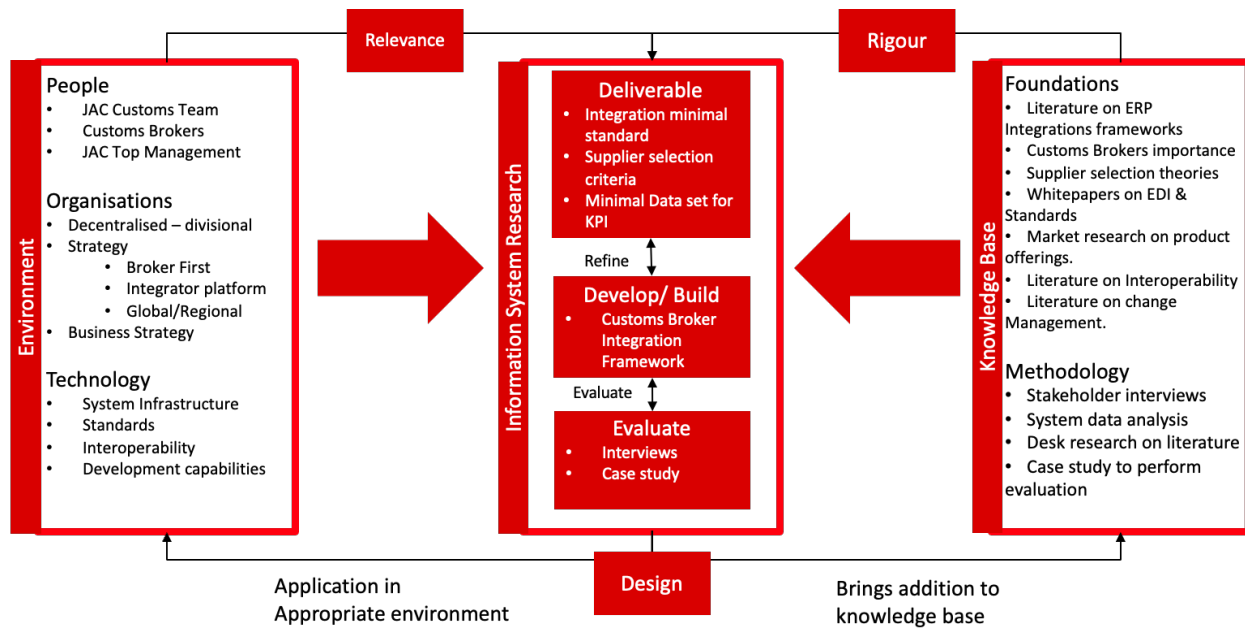
Figure 3 Design Science Artefact

Hevner et al., (2004) mention that design research should make a distinct contribution to design artefacts, design knowledge, and/or design evaluation methodologies. Propose a framework for research activities in design science specific to the field of Information Systems (IS) and a set of seven principles or guidelines to achieve this objective. The subsequent section outlines how these principles are implemented in the current research.

A) **Design as an Artefact:** Customs Broker Integration Framework – which answers the question of why the JAC need it and whether it fulfils the requirements that are being proposed.

B) **Problem Relevance:** In Chapter 1, we discussed the problem statement, where it was stated that case 1 was taken as the basis and issues faced by the local customs organisation and top management. The outcome of the framework will aid in fulfilling the issues that need to be assessed. Apart from this case study, a series of interviews were conducted with the internal and external stakeholders to understand if the problem statement is valid. The

interviews were informal, with the author setting the call to discuss the questions. The

stakeholders who participated in the interviews were the Business Area Trade Manager (2

Persons) from the four divisions, the Country Customs Manager (3 persons), and Customs

Broker (2 persons). To further aid the problem statement, the data analysis is performed on

the data from the GTM and ERP software.

C) **Design Evaluation:** In chapter six, we will evaluate if the framework is able to complete

the requirements effectively and overcome the shortfalls of the as-is situation. The

following picture showcases the evaluation process.
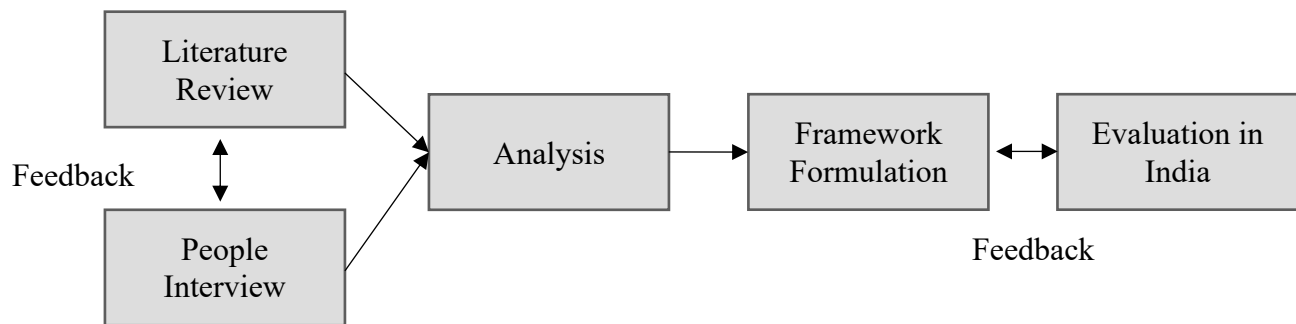
Figure 4 Evaluation Method

D) **Design Contribution:** As mentioned in Chapter Three, the knowledge base on the supplier

selection of the customs broker and integrator platform is very scarce. The current literature

surrounds the big cloud of the logistic providers in the supply chain. The outcome of this

thesis is an addition to the knowledge for further research.

E) **Research Rigour:** The way the research is conducted is called rigour. This research draws

the fundamentals based on the framework of ERP implementation. The evaluation of the

framework will be conducted through interviews. As part of the research, the empirical

data of the number of brokers and the frequency of the issue occurring are collected.

F) **Design as a Search Process:** Design science research aimed at providing the guidelines or principles for supplier selection and system architects on the problem statement of how to select a customs broker and how it can be integrated with an existing system.

G) **Communication of Research:** The outcomes of the research should be easily understood by both top management and IS. Since it is critical for any framework mentioned in chapter two, commitment from the top management and the clear system requirement for IS are crucial for its success.

2.1 Summary

This chapter guides us that the design theory is the methodology that is suitable for the research project. The design theory supports the project as it guides in finding and formulating the artefact, which is our case customs broker integration framework. The guiding principle to construct the artefact and the research framework of (Hevner et al., 2004) is used for the research. The relevance of the problem statement is justified by the case study analysis, which was conducted in Chapter 3. Chapter 5 discusses how the elements of the framework set into the places to form the artefact.

Chapter 3: Problem Owning Organisation – Case Studies

JAC is a multinational engineering company with factories and sales offices in over 100 countries. It has four Business Areas (Electrification-EL, Industrial Automation-PA, Motion-MO, and

Robotics-RA), each with several Divisions. JAC serves customers in various industries with a wide range of products, systems, and software solutions. It has a robust B2B profile and engages in cross-border transactions with external business partners and internal stakeholders. JAC's operating model has shifted from a matrix to a business-led model, with higher autonomy and accountability given to the Divisions. This re-organisation allows for better alignment with business strategies, faster and more agile working, and increased business ownership for processes, continuous improvement, and issue resolution. However, this also means each Business Area and Division must develop and maintain essential capabilities and skill sets within their organisations. Cross-border transactions involve business conducted with external partners and internal stakeholders, such as supplying units, feeder factories, central warehouses, and distribution centres across the globe. Feeder factories are often responsible for producing specific products. Within JAC, individual divisions typically focus on product sales, large projects, or service delivery and may offer a combination of these offerings based on market needs. The transportation and trade requirements can vary significantly among the different types of business, and cross-references are made to highlight these differences.
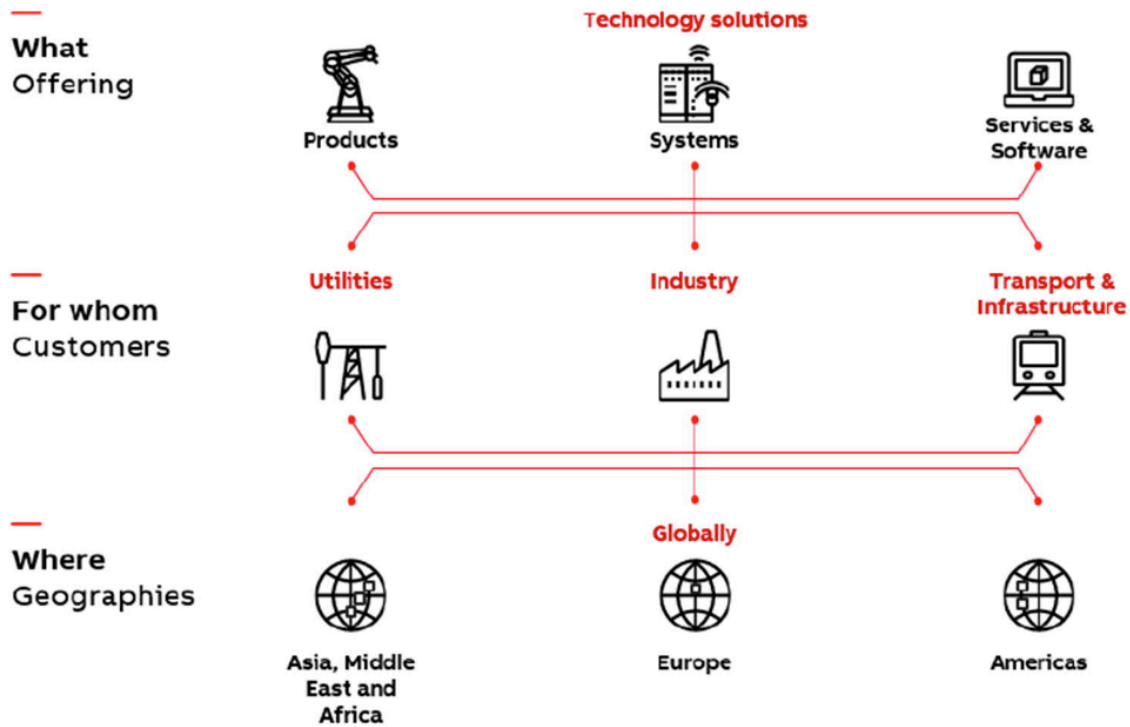
Figure 5 JAC Business Areas

JAC's operating model has significantly transformed from the original matrix model to a business-led one. The organisation has eliminated global functional departments, except for core divisions like ERP IT, IT shared services, and communications and has integrated functional roles within individual sub-organisations. This decentralisation has shifted more autonomy and accountability to the divisions, creating opportunities for better aligning functional activities with the business strategies throughout the value chain.

This re-organisation has allowed for faster and more agile working and promotes a stronger sense of business ownership for processes, continuous improvement, and issue resolution. However, it also means that each business area and division must develop and maintain essential organisational capabilities and skill sets, as specialised central departments no longer provide certain operational and governance activities. This is true in the case of the customs operations as the individual

divisions within the business area started to map activities that are core to them and outsourced the rest. Moreover, unfortunately, some of the divisions left the customs operation part as a non-core activity. They started to employ an external third party to perform these duties on their behalf. This is perfectly fine according to the new organisation, but this is segregated further down to the country level. Therefore, businesses must continuously learn and self-develop to ensure their capabilities align with market demands and customer requirements in the short-, mid-, and long-term.

3.1 Trade Organisation

The trade organisation of the JAC is complex & matrix as the organisation became decentralised; the past centre of excellence for customs and trade is distributed across the various divisions. Due to this type of organisation, the leads of the separate divisions are responsible for how the customs operation is managed. Some divisions keep the skilled workers, while others outsource the task. The current organisation is not uniform, and a division in one country can be a customs operator. In contrast, the same division in another country will need more dedicated resources and would follow a different approach. This further adds the complexity of determining a single strategy from a centralised team who is head of transportation since there are various flavours of the approach followed; hence, the central team realised that there is a need for multiple strategies to cater to the needs of the different flavours (in GTM this is a different business process). This is easier said than done, as various strategies mean multiple solutions must be implemented/ executed to aid that strategy. To understand how many various flavours are referred to below, an initial analysis was conducted to understand which countries have dedicated teams for the customs operation and which don't. Within the country, which divisions are utilising these teams was collected to know

distribution better. Based on the analysis result, it was evident that out of the 92 countries the

company operating, following results were seen.

Countries operating in	Dedicated customs operation team	Use GTM for customs operation	Use GTM for import	Use GTM for export	Use customs broker directly
92	19	19	19	14	82

Table 1 JAC Operating Countries with GTM

Business Areas	# of country	Active use GTM import	Active use GTM export
Electric	5	5	1
Motors	7	7	7
Robotics	4	4	4
Process Automation	3	3	2

Table 2 GTM Active Countries of JAC

This table shows how diversified the business process is in the JAC; this was not the case before

the re-organisation, which was part of the group directive. In the past, centralisation in the country

was a clear priority. When the major flow of goods is noticed, the central team is introduced to

help with the customs operation and provides a breeding ground to inculcate the necessary skills.

In the current scenario, the central teams are dying breed, and there are certain places they adapted

to the restructuring as part of the re-organisation. The author collected data on business

transactions and had several interviews with the team to analyse the business process, transaction

volumes and system. The analysis showed that a single strategy and solution would not cater to

the organisation's needs. Based on the interview with the four business process owners and the

GTM data (Q1 2021- Q1 2022), the following business process was identified in the organisation.

We will see in detail about the analysis and interview in Chapter 5.

A) Decentralised team with customs operation head and automated self-filing –

In certain countries where JAC operates, the business process and IT solutions catering to it are highly developed. They have the self-filing capability to communicate the declarations directly to customs authorities, control the cost, and use freight forwarders for transportation alone.

B) Decentralised team with customs operation lead and digitalised customs broker integration –

In certain countries, the customs operation has automation in the customs operation, and the developed IT solutions are customised to cater to the individual needs of that country. This is primarily due to the fact that these countries are the trial grounds for the implantation of the IT solution.

C) Outsourced team with customs supervision and non-digitalised customs broker integration –

In certain countries, the customs operations are not automated at all, and the tasks in the book are manually performed by 3rd party firm that prepares the customs declarations. These firms are not customs brokers; they are part of data entry services. The further development of the IT solution to automate was not done yet as the cost of using the 3rd party firm is less compared to investing in an IT solution.

D) Broker first model – In certain countries, the customs operations are outsourced to customs brokers as these countries did not have the knowledge and budget to develop, operate and maintain such a team. As a result, the information is e-mailed to the customs broker to perform the clearance.

To showcase the responsibility and risk better between the models mentioned above, diagram 6 is created, which combines models D and C as they have the same roles and responsibilities and represented as Outsourced. Hence, the following diagram has three main models: A) Self-filing,

B) Semi filing and C) Outsourced. In the diagram, the grey scheme represents that JAC is the process owner and red is 3rd party.
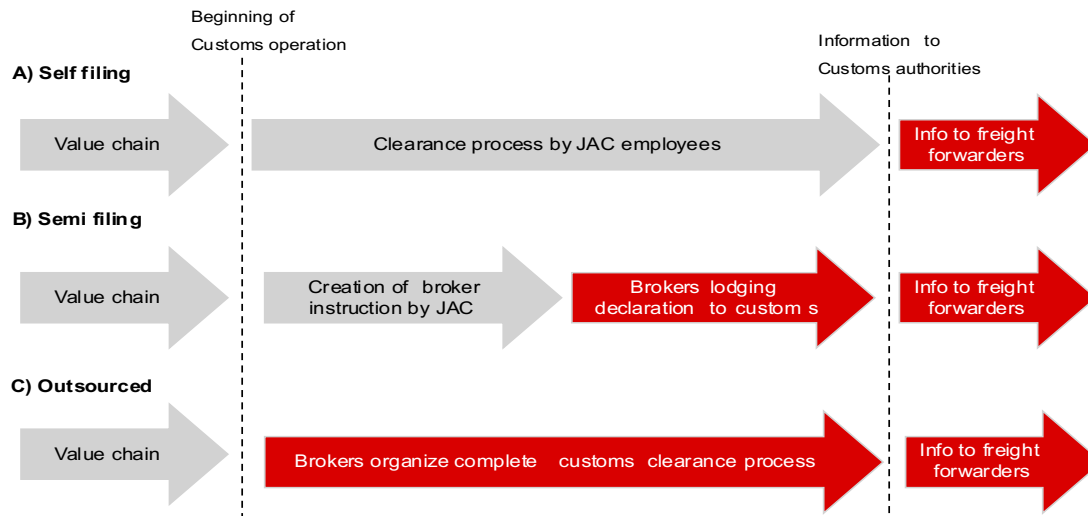
Figure 6 Roles & Responsibility of JAC & 3rd Party

One of the biggest pain points of the various flavours is the visibility of the data and metrics to track whether the operation is profitable since the data is either not captured or not distributed to perform analysis or data dashboards; this is the main issue faced by the leads of the department of trade and logistics of the individual business areas (BA). The variation in the process, by which solution, and who executes these processes makes it difficult to collect and analyse data. This is one of the focus areas of the thesis as it aims to ensure that despite different operation models, the need for common KPI (Key performance indicators) must be collected to sustain a business in the long run. For the thesis, we will investigate the operation of one such team with the least automation and one with high automation. We will leave the self-filing flavour as its straightforward integration with the customs authorities, thus effectively eliminating the customs brokers.

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3.2 IT Landscape & Data

The IT landscape of JAC is complex and huge, as the company has a habit of buying, spinning off and selling divisions. As a result, the IT landscape is very diverse; there are multiple ERP systems (32), multiple global trade management (GTM) systems (5) and multiple Transport management systems (10). The main GTM system we are focusing on here is the product from SAP called SAP GTS, as this system is connected to most of the ERPs. This is mainly due to the fact that the majority of the ERP system is SAP ECC, and this provides native integration with the GTM system. Data quality in the ERP systems can be assessed from basic to less. It is based on the case study elaborated below. The master data needed for the customs are overlooked as the different business areas have different business models. The Electric and Motor business areas have the majority of the product business, which means selling the finished product, which won't be configured to customer needs, whereas the Robotics and Process Automation business is majorly project-based; hence, their products are configured, which leads to the creation of the new product master data. Most configured products are sold and miss part of master data like description, net weight, HS code, and export control number. The documents in the value chain process are generated with a generic ID so the system can process them.
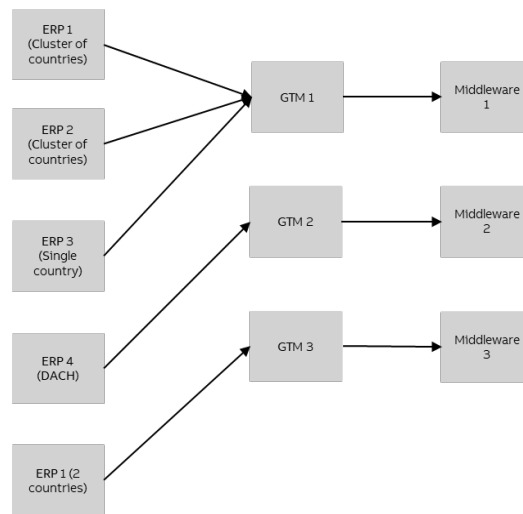
Figure 7 IT Landscape

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Here, the GTM 1 and GTM 2 are the same product but with different instances and software versions; the system's capabilities also vary as the GTM 2 is developed with the customs module and has the self-filing capability, as explained above. The GTM 1 is not fully utilised to its potential as the implementation was done as an industrial rollout and specific requirement, and the change management was not properly executed during implementation. The data quality in the ERP is comparable across the different ERPs, and the bottom line is that the quality is not high enough to perform full automation.

3.3 Business Process

As mentioned above, the business process in the different business areas is developed to cater to the business needs of divisions within business areas in each country (logistic coordinators, country customs lead, business area trade managers, sales leads). The systems are customised to cater to these individual business processes to some extent on the GTM, but rest of the processes are kept offline and in certain cases, they are made completely manual. As a result, the data is stored on multiple platforms in multiple formats. As a result, the business area trade managers are unable to understand the whole picture of the cost involved in the trade and the operational performance. Since we want to describe these business processes to aid the thesis, we will investigate the business process similar to one ERP system for a particular country alone (ERP can contain multiple countries mentioned above). In addition, we will briefly discuss the business process occurring in the value chain before customs clearance. The business process is explained in the following case studies.

Cases	Description	Method of custom filing	Relevant for thesis
Decentralized team with the least automation	Teams operate with complete manual process – India as example	Via Customs Broker	Yes
Decentralized team with the most automation	Teams operate with most automation -Poland as example	Via Customs Broker	Yes
Broker first model	Teams operate with no interface connection with broker- US as example	Via Customs Broker	Yes
Decentralized team with self-filing	Teams operate with self-filing capability- Germany as example	Via self-filing system	No

Table 3 Case Study In Scope

3.3.1 Case 1 Operation with the least automation:

The case originates in India, and the customs operation team, after the re-organisation of the firm, are distributed to the different business areas. As a result, JAC has a lead for customs (who is double-heading transportation) from each division who oversees all the customs operations of their division. The team performing the customs declaration are contracted third-party employees (Declarants) and mainly perform data entry jobs in the customs system. The JAC employees responsible for the transportation of the goods, both import and export, create the initial request for the declarants that a shipment is inbound or outbound and instruct the declarants to create a customs declaration. The Declarants go to the ERP system and push the relevant purchase order (in case of import) or sales invoice (in case of export) to the GTM software to create a customs declaration. Once the document is pushed to the GTM software, the declaration is created in the GTM, and Declarants check if the data fields are complete and correct. If the ERP does not populate the data fields, the Declarant manually enters them into the GTM system and completes them. Some of the common fields that Declarant fill are analysed using data log in the GTM software and found as

A) Material description

B) HS code

C) Material net weight

D) Packaging weight

E) Country of origin

F) Additional documents for customs (Indian customs ask for the local registration number, customs registration number, and association of invoice).

Once the declaration is completed, the Declarant executes the communication to generate a unique number in the GTM system. Then, the document is downloaded as a CSV file and sent to the respective customs broker of the transportation lane. Since each business area has the ability to decide which brokers to use, there are multiple brokers (10) to choose from. The Customs Broker receives the e-mail with the CSV and processes the information in the government portal (ICEGATE), and if there are some errors, they contact JAC for more details. Once the Customs Authorities accept the declaration, the Customs Broker extracts the data in a CSV file and returns it to the Declarants. In case the import declarants upload this CSV file to the ERP to create goods issue and create payable invoice so that duties which were paid are also visible in the ERP. In the case of the export, the CSV file is uploaded to a separate Excel sheet where the export tracking number is stored. This is showcased in the following BPMN flow chart.
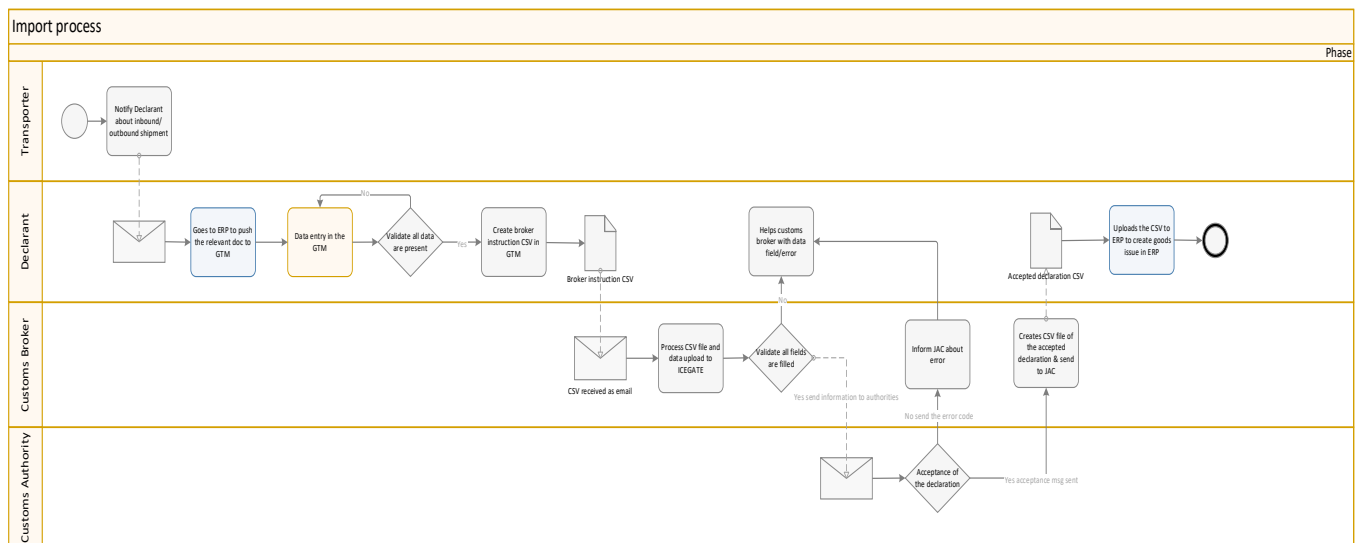
Figure 8 Case 1 Operation with the least automation

3.3.2 Case 2 Operation with automation:

The case originates in Poland, as the organisation is distributed among different business areas. However, the key point is that a single customs head oversees the overall operation. The country has both import and export transactions, and under the single customs lead, the number of brokers is rationalised to one. The export and import of relevant documents from the ERP are automatically transferred to GTM software based on a logic that GTM software provides natively. The Declarants are JAC employees who fill in the missing data, if any; they also make some of the codes generic as they have given the prearranged instructions to the customs broker to fill them. The fields that are given for the Broker to fill in are

A) Customs valuation

Once the declaration is complete with the data fields, JAC Declarant sends the information to the Broker via the EDI from the GTM software. The Broker sends a return communication that the message is received and further enriches the data in the declaration with the HS code and customs valuation. Once the information is filled in, the Broker sends the information to the customs authority and receives the acceptance. The return message of the customs registration number is communicated via EDI back to the GTM. The GTM closes the declaration as completed if it receives this message.
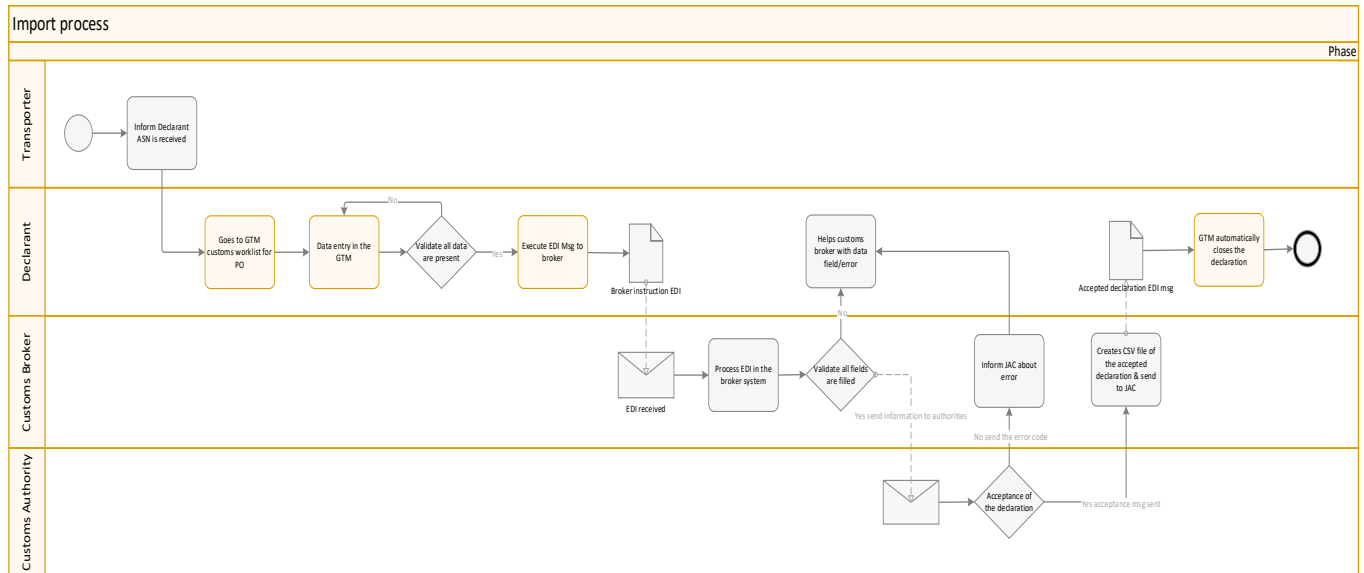
Figure 9 Case 2 Operation with Automation

3.3.3 Case 3 Operation with Broker First model:

The case originates in the USA, where one of the divisions follows this process. This division was newly acquired in 2017, and the business processes innate to the acquired organisation are kept as it is. It is primarily due to the re-organisation, which was mentioned before, that took place in 2018. As a result, the change management needed to pull the organisation into the JAC organisation was given second priority. The current organisation acknowledged this is still the case, and the traction to integrate the division into the JAC systems is proposed and shaping up during the writing of the thesis. The division currently relies solely on the Customs Broker for customs clearance. The division is lean and doesn't have the internal capacity and resources to perform customs operations independently. The process starts with the transporter of JAC sending the Advance Shipper Notification (ASN) along with the relevant documents to the Customs Broker via e-mail, who then manually enters the data into the broker system and communicates it with the US Customs Authority. Any notification apart from the acceptance is sent to the transporter to act on by the Customs Broker. This model handover all the tasks to the Customs Broker, and HS code

details, which are entered for the product, are also outsourced to 3rd party firm that classifies on

JAC's behalf.
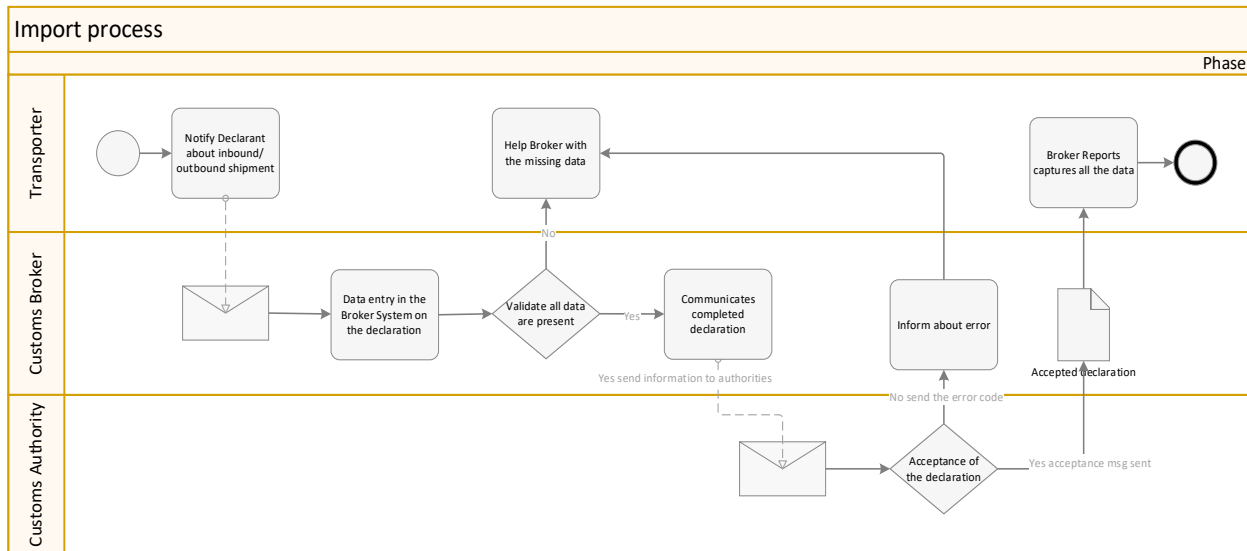
Figure 10 Case 3 Operation with Broker First model

3.4 Summary

Since these cases won't be unique to JAC, we refer to the theoretical contributions of others, which

lays the foundation for this thesis research literature. Chapter 4 gives the literature review, which

helps in understanding if there are correlations in the literature for the common attributes found in

the cases mentioned above. This chapter mainly explains the different business process which is

prevalent in the organization and explains the need for a customs broker in the organization as it

is lean and possess less customs knowledge; also, it showcases the integration of the broker to the

GTM software as the model and the advantages of them (reduction of manual work and. Workings

behind the case study helped us select the cases that are suitable for further investigation. Some of

the common attributes of the cases are

 A) Data visibility

 B) Broker connectivity

 C) Change management

From the different case studies, we can tabulate the stakeholders who play the key role in the process they are mentioned below.

Stakeholder	Internal/External	Role
Customs Broker	External	They complete the task of customs clearance
Integrator or Platform Provider	External	They are the liaison between the firm and the customs broker for integration and data transfer
Customs Manager	Internal	They manage teams for customs clearance internally /externally
Trade Managers	Internal	They set the strategy of the business area and help in the alignment with regional business
GTM software team	Internal	They help in developing the solutions with the current GTM software

Table 4 Stakeholder Identification

Chapter 4: Literature Review

In this chapter, we will discuss the background theory that lays the foundation for the scientific context and the need for further exploration in this research. Based on the Chapter 3 cases, the common attributes and how to remediate them was discussed with the internal stakeholder of the firm. This meeting took place before 2021 with the business area trade managers and the transportation leaders. The outcome of the meeting was that JAC needs a structural framework and policies regarding the customs operation on the business area level, and the elements of the policy and framework were discussed during that call. This further aided the thesis as the business leaders acknowledged the need for optimization and policy alignment (even though the divisions may or may not follow the whole policy, certain part of the policy was agreed to be mandatory as it is key for implementation). Based on this outcome, to create a framework we proposed the following questions in Chapter 1 as the research questions.

A) Why is there a need for a customs broker in the organisation?

B) Why do we need to system integrate customs brokers into the GTM system?

C) What are the characteristics of such system integration?

    a. What is a system integration framework?

    b. What are the properties needed to design a framework?

D) What solutions are available in the market to integrate a customs broker into GTM System?

    a. How do you select software suppliers and customs brokers?

    b. What are the factors that influence selection?

Questions A and B are answered in the previous chapter 3 in the details of the case study. This chapter is divided into the following to give a narrative of how the research questions can be answered.

4.1 What is a framework , and why do we need a framework?

The definition of the framework varies based on the field in which it is applied. Collins dictionary defines framework works in the general context as "A framework is a particular set of rules, ideas, or beliefs which you use in order to deal with problems or to decide what to do." When it comes to programming, it is defined as "a framework is a skeleton or blueprint of code that provides the structure for your application." In the business context, "a framework is a system of rules that are used to govern a process or decisions.". Even though the text varies, we can infer from the above definition that a framework needs to portray the following characteristics.

- It sets a guideline.

- It showcases factors which have an impact on the goal.

- It showcases boundaries.

In our thesis, we want to understand how we can integrate a GTM (Global Trade Management) system into the third-party system (customs broker system). Based on the work experience of the author (implementation of GTM software and as functional business lead for trade and customs applications), the process of integrating the system follows the methodology where the following questions are considered as prerequisites.

A) Understanding what type of systems (sender and receiver).

B) Are there native connections between these systems?

C) Are there any standards which we can use for the communication between the systems?

D) Can the solution be reused for other connections of similar nature?

E) Data elements that need to be sent between the systems?

F) What is the security protocol followed by the two firms?

G) What is the data retention policy of the firms?
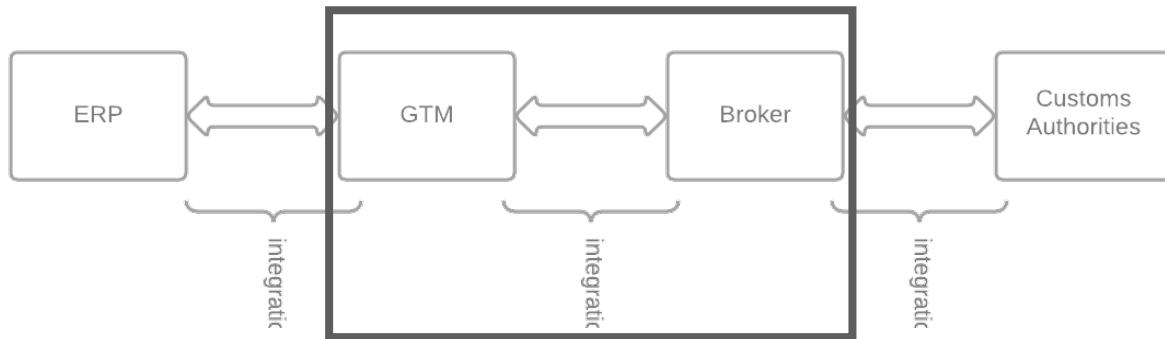
Figure 11 Integration in scope

Framework will provide the structural method to guide the process of finding the answers to the above questions. Our thesis provides the backbone for the firm to understand the constraints of the systems, business processes and policies. The core aim of the thesis is to design and develop a framework that defines the guidelines, factors, and boundaries for customs broker integration into the GTM system, which is showcased in Figure 8 in the black block. Since there is no particular literature on the GTM software, we turn towards the next best source, which is ERP systems. The ERP system acts as the source of the data for GTM, as the GTM software normally functions as the tertiary system that performs specific functions (in our case, customs operation). Even though the functions might be different, we are safe to assume that the fundamental elements of the ERP and GTM will be similar, such as access management, recording transactions, data stored in tables, integration with third-party solutions, etc. We turn towards the ERP integration framework literature as it defines the technical and functional parameters that are needed for successful ERP implementation and integration with other third-party software. Below, we can find the two models

of the ERP integration framework, which were coined in the literature. The main motivation to use

them for the thesis is that functional elements of these integration frameworks resonate with our

goal for the framework.
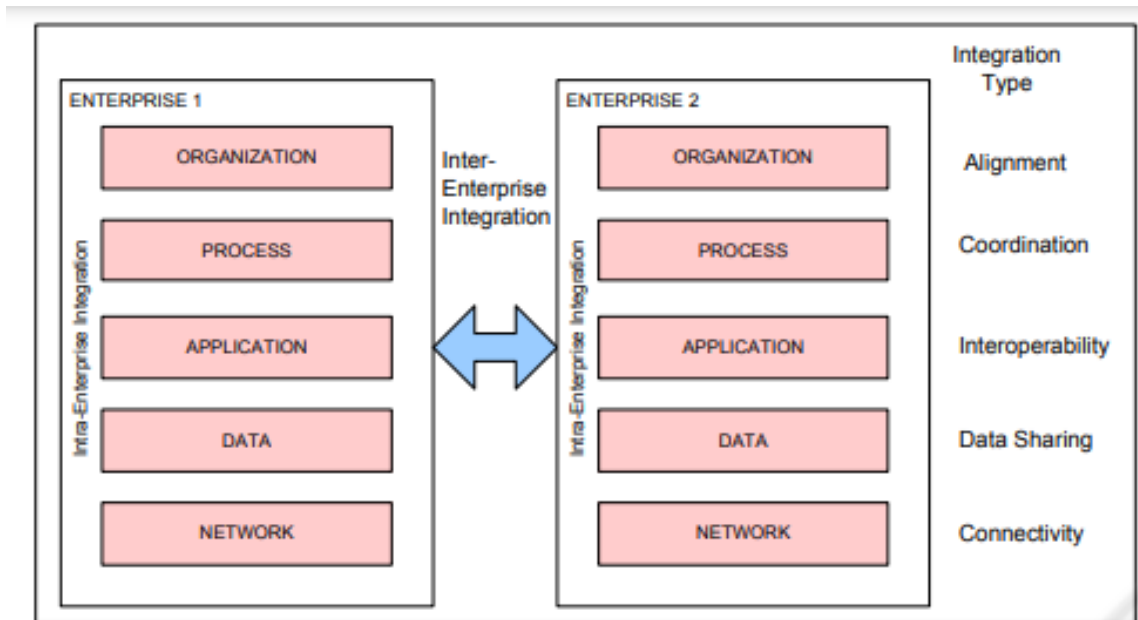
Figure 12 ERP Integration Framework (Giachetti et al., 2004)
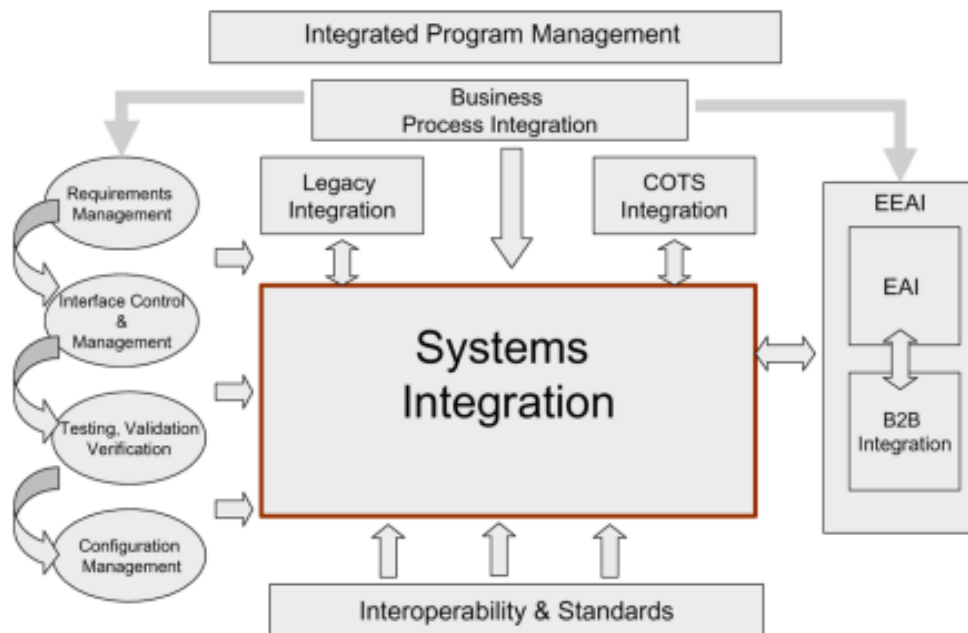
Figure 13 ERP Integration Framework (Jain et al., 2010)

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4.1.1 Characteristics of ERP Integration Framework

From the work of Giachetti et al., (2004) and Jain et al., (2010) on the integration frameworks for an ERP integration, we can deduce the following characteristics.

A) Reconfigurable

B) Scalable

C) Standard syntax and interoperability

D) Compatible with legacy integrations

E) Change management

Let us discuss if these properties will address our question, "What properties are essential to designing a framework?".

1. Reconfigurable:

   The framework cannot be written in stone as the current system architecture and the business develop rapidly(HBR.2017), and technologies like Artificial intelligence, data pipeline and blockchain technology are some of the key interests in the field. Moreover, the works on the data pipeline and the ITADE by (Klievink et al., 2012)showcase that the customs domain is in the transition phase for the next big development. It is also visible on the customs authorities' side as the Revised Kyoto Protocol (WCO, 2006) aims to make customs operations digital. Several governments already took initial steps like the US 21CCF program(*U.S. Customs and Border Protection*,), the EU single window system for customs (*EUR-Lex - 52020PC0673 - EN - EUR-Lex*, .)etc.

2. Scalable:

The framework needs to be scalable as the business it caters to grows, and the demand can fluctuate randomly. As a result of the growth, many third parties can be incorporated into the business process, and the framework should be adaptable to multiple countries.

3. Standard syntax and interoperability:

Standardisation of the solution approach for a particular requirement helps in the scalability of the solution and error handling and provides the solution's interoperability to multiple parties. The importance of the standards in communication and networking is clearly emphasised in the papers on the data pipeline & ITCAD (Klievink et al., 2012). The ITCAD also mentions the pitfalls of the current standards in the context of how they will mature in future generations. Also, the use of commercial off-the-shelf solutions must be explored as they provide faster implantation, improved quality, low cost of ownership and serviceability. According to R. Jain (Jain et al., 2010), interoperability is the ability to play well with others with current and future systems. Ouksel and Sketh(M Ouksel & Sheth, 1999) mention that interoperability is mainly categorised into four types: semantic (Data level), structural & organisational, and syntactic and system. Some of the models of interoperability used are listed as follows:

i)   Levels of Conceptual Interoperability Model,

ii)   Levels of Information System Interoperability,

iii)   NATO Reference Model for Interoperability,

iv)   Organisational Interoperability Maturity Model,

v)   System of System Interoperability,

vi)   ECMA/NIST Model and Defence Information Infrastructure Common Operating

Environment.

In our case, the customs broker integration would fall under semantic interoperability and

uses a level of conceptual model due to the fact that the semantic is the data fields transfer

and the ability of the systems to interpret what that data means. The EU has adopted this

model for the domain of customs

4. Compatible with legacy integrations:

The integration framework needs to consider the legacy systems already part of the

company. Since these systems are functional and perform necessary tasks which are critical

for the business. But these systems can be very primitive and pose a complex integration;

then the question needs to be asked: what are these systems' issues? What will be the cost

and risk associated? And when can they be decommissioned?

5. Change Management:

This is one of the key aspects of the framework as the time to implement solutions, change

management needed for the people to understand the tasks oriented with the solution and

effective communication are key factors in determining if the solution can be successfully

implemented in that organisation. In the case of JAC, the change management was

overlooked because of that the adaption rate of the GTM solution was very low.

The above-mentioned points are necessary for an effective framework, but it is also critical to

know about the factors why such an integration framework fails. This is done to ensure that our

framework can learn from past mistakes. Since there is no study on the factors for the failure of

GTM software, we refer to the comparable architecture of ERP. The ERP and GTM software is

based on a similar fundamental principle to record transactions, act as record-keeping ledgers,

store and compare the data from internal databases, and connect with external and internal functions to complete the task. Based on this assumption, I am making an inference to compare the literature on ERP to that of GTM software. Based on the above notion, the article by Bingi (Bingi et al., 2006) on the critical issues that affect an ERP implementation is studied, and the following points are inferred.

i. Top management commitment:

This is identified as a critical factor; if the top management's commitment towards the technology is less, then the implementation of the software is affected highly in a negative manner. Top management needs to ask why we need this system, the business benefits of it, whether it adds competitive advantage, the change management it requires and if it is a global or local change. It was advised that the top management get involved and closely monitor the development of the system rather than handing over the responsibility to the IT department. Since the implantation of technology is not about the software but about the people who will use it, Bingi et al., (2006) emphasize the criticality of change management.

ii. Reengineering:

Solutions coming out of the shelf in the software are tried and tested solutions since the vendors already analyze what the demand is in the market and develop solutions for it. What most companies do on the implementation of the new software is to modify the system rather than thinking critically if the business process can be changed? It's always better to utilize an out-of-box solution rather than customizing the solution to fit the business need.

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iii.   Integration of multiple systems:

Companies have multiple systems to perform tasks not designed for the ERP system. In a multinational company, the various elements of the value chain(Porter 1998) are performed by different systems (Bingi et al., 2006) since a single ERP system won't be able to adapt to the needs of the various value chain elements. As a result, an MNC has more than one main system to perform critical tasks. It further makes the integration framework complex as we must integrate all different systems to enable smooth communication between them. According to Bingi et al., (2006), a company having multiple systems is not an issue. However, the integration development between them normally has issues if the systems are heterogeneous (from different vendors), meaning they don't share the common data mapping and connectivity protocols since every software vendor tries to create a closed ecosystem to monetize.

iv.   ERP Consultants & Vendor:

Consultants play a vital role in successful implementation as they are the ones who effectively and efficiently translate the business requirements to the changes that need to be done in the ERP System. The consultant role demands functional, technical and interpersonal skills, according to Bingi (2006). Often, managing them and effectively delivering the project is also a major challenge for successful implementation. Moreover, the selection of the correct ERP software also plays a main role in the implementation. The top management has to critically evaluate if the solution is strategically aligned with the business, has a track record with customers, and can cater to the company's needs (complex process, size, landscape).

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v.   Implementation Time and Cost:

The software comes in a modular form; some modules must be implemented simultaneously to provide value. Most companies follow the phased approach when it comes to implementing systems, as it gives enough time to learn and solve problems that might be unique to the company. The implementation plan of the system is normally determined by the size of the company, the criticality of the solution, locations where it needs to be implemented and finally, how complex the solution will be. It was observed that the longer the implementation plan has adverse effects on the success of the implementation and the cost associated with it (Bingi et al., 2006). The GTM software industry is estimated to grow to 2.29 billion by 2029 (Trade Management Software Market Size, 2022).

vi.   Selection of Right Employees:

The selection of internal employees for the project is crucial for successful implementation. These employees not only act as the perfect vessel to communicate the business process but also have a clear view of the best business process. They have the right exposure to the day-to-day operation pain with the current business process and address it during the implementation. If done right, they create a positive feedback loop in software implementation.

vii.   Training of Employees:

The successful implementation also depends on the usage of the system; if the end user who is going to spend 40 hours per week does not get proper training on the software that is implemented, then the adoption rate will be less. This falls under change management, and it's mentioned in the previous question how important it is.

4.2 How do we select a supplier?

As we read in works by Bingi et al., (2006) and Jain et al., (2010), it was evident that supplier

selection and standardisation will play a critical role in system integration. To aid better narration,

let us discuss various stakeholders who were identified in the case study below.

Stakeholder	Internal/External	Role	Power to make decisions on integration	Interest on integration
Customs Broker	External	They complete the task of customs clearance	Low	High
Integrator or Platform Provider	External	They are the liaison between the firm and the customs broker for integration and data transfer		
Customs Manager	Internal	They manage teams for customs clearance internally /externally	High	High
Trade Managers	Internal	They set the strategy of the business area and help in the alignment with regional business	High	High
GTM software team	Internal	They help in developing the solutions with the current GTM software	Low	High

Table 5 Stakeholder Mapping

For our thesis, we mainly have two external actors who can act as a supplier. The two actors are.

   A) Customs Broker (for Broker first & minimum automation)

   B) Integrator or platform provider (for minimum automation & self-filing)

   Let us discuss them in detail below

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4.2.1 Customs Broker:

Customs Brokers are the intermediaries who aid in the customs clearance process for the MNC. The role of the customs broker is crucial in countries where the MNC has not developed a significant knowledge base for customs clearance operations. The customs brokers are licensed in the customs domain by the local customs body of the country, and their skill is highly useful for the MNC that is operating globally. The role of the Customs Broker is well defined in the WCO Customs Broker Guidelines(*Customs Brokers Guidelines WCO Customs Brokers Guidelines*, 2018), and most of the countries that are part of the WCO have implemented the Revised Kyoto Protocol, which makes use of the Customs Broker voluntary for the imports/exporters. (*WCO Study Report on Customs Brokers World Customs Organization*, 2016) WCO mentions that as of October 2015, the number of countries that are imposing mandatory use of the customs broker is nine and fourteen are insisting on the use of the customs broker when the value of the goods/ specified categories of the goods is to be cleared by them. A detailed report on which country has a trade barrier like this can be taken from the US government's 2022 National Trade Estimate Report. The main reasons for using a customs broker are.

a) Companies use customs brokers for countries that have small transaction volumes as it brings down the fixed cost (Medin, 2021)(Anderson & Van Wincoop, 2004)

b) Due to trade barriers set by the country's Local Government. (Ginsburg et al., n.d.)

c) Due to a lack of in-house knowledge & resources in the customs domain.

4.2.2 Integrator Platform:

The EDI (Electronic Data Interchange) is the system of system exchange of business documents. The history of EDI started back in 1970, and there are several standards which are followed based on the industry. For customs clearance, the globally accepted standard is set by the UN/EDIFACT (the US has ANSI X12, which is comparable). The EDIFACT defines the message content and the information needed to be passed for the customs under the header of CUSDEC and CUSEXP for sending the information to the Customs Authorities and reply message from the Customs Authorities as CUSRES. Digitalisation in the Customs Broker is increasing rapidly in the aftermath of the COVID-19 pandemic and due to the country's Customs Authorities making it mandatory to communicate electronically (ICEGATE). This showcases the trend in the economy as most new actors hope to digitalise their operations. Deloitte (Deloitte, 2021) & IBM (IBM, 2020)mention that EDI developments and adoptions will continue in the coming years as the world slowly moves towards the API (Applications Programming Interface). IBM forecasts that a combination of the API and EDI will be used around the globe in the years to come. Standardisation of the EDI is a big question as, for now, there are 16 Standards and 14 protocols. (Klievink et al., 2012) The paper mentioned that a standardisation approach led by GS1 could lead to the future of customs processing using the data pipeline. After years, the standardisation of customs is still at the same level as before, and the issue with interoperability exists (Enkhuizen_van, 2018)

In the current EDI integrator market, there are two types of vendors.

1. Generalist – Companies like IBM Sterling, MS Biztalk 360, Boomi, Cleo, Mulesoft, and SPS offer EDI integrator platforms for various functions.

2. Specialist – Companies like Descartes, Wisetech, Seeburger, and Tibco offer a specific solution for customs clearance and a customs broker.

4.3 How to select a supplier?

There is considerable academic work on supplier selection for systems and the logistic network (as the customs broker is part of the logistic network). Key considerations on the topic are mainly taken from the following works of authors Gustin et al., (1997) and Sahay & Gupta, (2003) for the supplier selection criteria for software/software as service, Mukherjee, (2014) for the supplier selection criteria which have been used in the past, present and to certain future and finally the topic of customs broker selection from Francis J. Quinn, (1989) and Hintsa et al., (2005). Based on the literature above, the common criteria for selecting supply chain partners and systems are inferred in Table 6.

Commonly Cites Supplier Selection- System Criteria	Commonly Cites Supplier Selection Criteria
Flexibility	Cost
Ease of use	Quality
Vendor viability/ reliability	Delivery
Efficiency	Service
Vendor support	Supplier profile
Integration with an existing application	Reliability
Interoperability	Responsiveness
Ease of installation	Logistical performance
Cost	Commercial plans & structures
	Quality of relationship with vendor
	Risk factors
	Technology and capacity
	Mutual trust & ease of communication
	Collaboration
	R&D
	Alignment on strategy

Table 6 Supplier selection criteria for system and suppliers (Gustin et al., 1997) (Mukherjee, 2014) (Francis J. Quinn, 1989)

Gustin et al. (1997) mention that supplier selection criteria for the software were based on the survey, which was done among the logistic leaders of around 295 companies. The study categorises various selection criteria into three main factors.

A) Product/Service Attributes –

   1) Flexibility of the software - The solution must be flexible with the offering, and customers can pick the functions which suit their needs rather than buying it as a bundle.

   2) Ease of use (The user interface is simple)- The solution which is offered is easy to use, and it should not have an adaptation barrier and outdated user interface, as these factors have an impact on change management (discussed earlier in this chapter)

   3) Interoperability – The solution must be interoperable and must be able to connect to legacy systems with similar efficiency and functions as new-generation software.

   4) Efficiency – The new solution should improve the efficiency of the process and promote easier and faster working. The adaption rate will be low if additional steps are incorporated.

   5) Ease of installation - The solution should be easy to install and distribute within the enterprise. The high installation cost of the software has a negative impact on the selection.

B) Vendor Attributes

   1) Vendor support - Quality of the service & support is important; a supplier with high customer satisfaction in the support and service levels positively impacts the selection.

2) Vendor vitality/reliability -The supplier must have a reputation in the market, must be financially stable and possess high domain knowledge. If the vendor has industry-specific solutions, they are highly desirable as they have a unique offering which caters to the company's needs.

C) Economic Attributes.

1) Cost – According to the survey, one of the primary criteria for selecting the supplier, which is from time to time, emphasised in the various articles. If the supplier's cost is high compared to the market range, then the supplier cost negatively impacts the supplier's selection.

Furthermore, the works of Sahay & Gupta (2003) lay importance on the criteria such as the vendor vision and strength, which addresses properties like the partnership program of the vendor for the co-development of new solutions, R&D, and trend follow of the vendor, philosophy of the vendor. Based on the abovementioned works, we can infer the software selection criteria mentioned in Table 6. Mukherjee's (2014) analysis of various works till 2012 further affirms the above selection criteria mentioned for a supplier selection. Furthermore, he mentions that more emphasis is given by the various authors on criteria such as cost, quality, delivery and services. Even though the studies on supplier selection are limited in customs broker, considering that customer broker is part of the overall supply chain, we can assume that studies which are done on the supply chain supplier selection are applicable to it. Francis J. Quinn (1989) mentions that supplier selection of Customs Brokers primarily falls under the cost and the knowledge elements rather than the trade barrier set by the governments (except a handful). The selection of the customs broker needs to incorporate technology and R&D since, in the rapidly changing environment, the ability to adapt

to new technology and the ability to innovate new ideas are clear signs that the supplier has not only the capability with the legislation but with IT too.

4.4 Summary

Based on the above literature, we can infer an effective and robust formulation of the framework. The following elements are needed

A) Strategy & Organization & Change Management- to align with the top management on what type of implementation and customs operation approach needs to be set for the organization/ division or country.

B) Process & Policy – Which type of customs operation process is to be followed, and what are the policy elements for the type of integration which needs to be in place on the global and local levels of the organization.

C) Data & Network – which showcases the options for data transmission and the data elements that need to be transmitted and received. Also, where there is no possibility of integration, what are the elements which need to be tracked.

D) Supplier selection – how to leverage the supplier selection process to decide upon the business partners like customs brokers and the software integrators for the communication.

E) Standards & Interoperability – These are the standards on the data transfer which need to be followed so that the cross-platform communication could work without issues.

Apart from the above elements, in order to validate the problem statement that we made earlier, the following questions are based on the theory of misfit (Hustad et al., 2016) (Hong & Kim, 2002). The interview questions are framed in a manner to address what are the issues which are faced by the various stakeholders and what are their requirements if they have any past experience in the implementation of such complex systems. These questions are asked in order

for us to understand if the issues which were brought up were just assumptions or, in reality, they exist. We will see this in detail in the coming chapter.

Chapter 5: Assessment of the Problem Statement

A thorough examination of the research context is necessary to evaluate the significance of the issue at hand. In line with Hevner et al. (2004), it is crucial to recognize that the research artefact cannot be considered separate from the individuals, organizations, and social dimensions it employs. Rather, it is intertwined and on equal footing with them in addressing business

requirements. Considering the characteristics of the problem outlined earlier (see problem statement), we focus on the following key topics.

5.1 Interviews with Internal & External stakeholders: A series of interviews (7) in a semi-structured informal manner are conducted with the organization and external stakeholders to understand the issues faced by the JAC (Internal) and Customs Brokers (External). This helps us to identify the business needs.

5.2 Assessment of the current solution: System data analysis to validate whether the issues identified via the interviews are perceived or actual. Also, finding the system limitations.

5.3 Systems & technology market review: To better understand market offerings on the various systems and technologies.

The outcomes of the interviews, analysis and market review are showcased below.

5.1 Interviews with Internal & External Stakeholders.

In our thesis, the stakeholders (from Table 4) are identified to be interviewed to assess whether the problem statement is relevant. The interviews were informal, with the author setting the call to discuss the questions. The stakeholders who participated in the interviews were the Business Area Trade Manager (2 Persons) from the four divisions, the Country Customs Manager (3 persons), and the Customs Broker (2 persons). The questions which were asked are as follows.

Stakeholder	Relevance	Questions	Answer
Trade Manager (internal) (2 Persons)	This question is framed to better understand the issues and determine if they are perceived or actual reality. It further gives insight	What are the major issues you face as a trade manager when it comes to customs? (Problem relevancy)	• Currently, there is less visibility of customs-related costs (customs duty, cost due to delay, compliance cost, etc.) since it

	into the vision of the leaders of the department		will help me set the strategy for customs operations as a trade manager. • We hear from the customs managers in various regions that the current GTM system is not usable, and a lot of manual work needs to be done. • We don't know how many customs brokers are used in the firm since there is no central information available.
Trade Manager (internal) (4 Persons)	Requirement gathering for design artefact	What will be your basic requirements for customs brokers?	Customs brokers who do the work for us need to have the following basic requirements. • Reputed and stable • Must pass the supplier qualification* • Must have the ability to help in clearance in various countries. • Use digital methods to integrate. • Reports on the performances and costs associated
Customs Manager (CM -internal) (3)	Misfit theory	What are the major issues you face as a customs manager	• We have to manually update a lot of data in the GTM software to

		when it comes to customs?	enrich a declaration (CM1)
			• We don't have our customs brokers integrated into the GTM software (CM1)
			• We don't have any confirmation on the customs exit and customs compliance milestones.
			• We don't have the ability to calculate importing costs or other costs in our ERP.
			• It takes a minimum of 3 months to integrate a broker into our GTM system, and this is long.
			• The Brokers integrated have high transaction costs for electronic communication (CM2)
			• The globally integrated customs broker is not used any more due to high transaction costs and poor performance (CM2)
			• We don't ask for the technical capabilities of the customs broker in

			detail during supplier selection (CM1)
Customs Manager	Misfit theory	Do you think we can perform self-filing in your country if we get all the data to GTM software	• Self-filing in our country is not a cost-effective solution as we don't think this is our core function. (CM1) • We don't have a solution for self-filing in our country, as the GTM software does not support it. (CM3) • No, we rely on the service provided by the customs broker; we don't have the manpower (CM2)
Customs Broker (External) Trade Managers (4)	Misfit theory	What are the issues you face with electronic communication via integration	• We don't know how many customs brokers are used in the firm since there is no central information available. (TM1) • We often perform the work of adding the data manually as the information is not sufficient. (CB2) • We don't have the resources available to make the integration as they are already occupied. (CB2)

| Customs Broker (external) | Requirement for design artifact | Have you come across any standard integration approach to connect with the client's system | We don't have a standard approach from our side since clients demand requirements – CB1 We have an approach for global connections, but for the regional implementation, we don't have an approach as the demand changes according to regional legislations (CB1, CB2) We have not connected to the integrator platform before, and our IT capabilities are lean (CB2, CB3) |

Table 7 Interviews with Internal & External Stakeholders

5.2 Assessment of the current solution:

Complete system analysis by collecting the data from the GTM system from mid-2021 till mid-2022 on the various transactions which are created in the software and communicated in the software. These collected data answer the following questions.

5.2.1 Which are the countries which use electronic broker communication via GTM software?

5.2.2. How many transactions are performed via electronic broker communication, and how many are not?

5.2.3 How many brokers are electronically connected in a specific country?

5.2.4 What are the data elements which JAC employees manually add? Do we have this data in ERP?

5.2.5   What is the standard procedure for integrating a customs broker into the GTM

software?

5.2.6   What are the supplier selection criteria present to select a customs broker?

Metadata from the GTM software is extracted on the transactions from multiple countries for a

time frame of 3 months by building the query in the software, based on which the following

elements are observed. The questions from 5.2.1 to 5.2.4 are addressed by this system analysis.

i)   Number of transactions created for export/ import. (This showcases the volume of

trade happening in a country.)

ii)   Number of transactions created as customs declarations in GTM software (This

showcases the utilization rate of the GTM Software in that country)

iii)   Number of brokers to which electronic message is sent via GTM software. (It

showcases the integrations and method of GTM utilization.)

iv)   Number of brokers to which are not connected via electronic message. (It showcases

the integrations and method of GTM utilization).

No ERP connected to GTM	Number of countries performing customs via GTM	Number of countries use broker connection
23	19	6

Table 8 ERP & GTM Customs IT Landscape

Country	Number of total transactions Export created in ERP	Total number of GTM customs Declarations created against transactions in ERP *	Number of GTM declarations communicated electronically to the customs broker
IN	1546	847	0
PL	2130	1756	1756

FI	14000	13870	13217

Table 9 Export Statistics of Countries Using GTM (This showcases the utilization rate of the GTM Software in that country)

Country	Number of total transactions Import	Total number of GTM Declaration	Number of GTM declarations communicated electronically to the customs broker
IN	5653	5306	0
PL	1467	1185	1127
FI	2149	1920	1474

Table 10 Import Statistics of Countries Using GTM (This showcases the utilization rate of the GTM Software in that country)

Customs Broker (in IN)	Export Transaction Connected	Export Transaction Not Connected	Import Transaction Connected	Import Transaction Not Connected
CB1		389		4222
CB2		14		341
CB3				25
CB4		443		78
CB5				613
CB6		1		
CB7				27

Grand Total		847[1]		5306[21]

Table 11 India Customs Broker Footprint

Customs Broker (in PL)	Export Transaction Connected	Export Transaction Not Connected	Import Transaction Connected	Import Transaction Not Connected
CBPL1			39	
CBPL2	10		61	
CBPL3	38		80	
CBPL4	395		342	
CBPL5	958		551	
Grand Total	1703[3]		1126*	

Table 12 Poland Customs Broker Footprint

The changelog from GTM software is taken to identify what fields the users add in the declaration manually. The export and import processes are recorded in the session to understand the steps better. The process involves a lot of manual steps to be executed by the declarant to process a declaration in GTM software. The process flow is depicted in the following diagrams.

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[1] *omitted other customs brokers who represent minor volumes
* Declaration can have multiple lines and multiple HS codes

[3] *omitted other customs brokers who represent minor volumes

Process of Export

Following are the steps which are done by Indian Custom operation

interviews

1 Planner sends the invoice number to the Customs team	
2 Customs Team goes to the ERP to transfer the invoice to GTM.	
3 Export declaration is generated in GTM	
4 Customs Team fill all the data needed for the Declaration to be completed	
5 Once the declaration data are entered the declaration is saved and ERR (export registration number)	
7 Customs broker send the information back no later than 2 days with the MRN and the proof of export	
6 Customs Team send the information of the declaration and ERR number to the customs broker via email.	

Figure 14 Process of Export in India

Process of Import

Following are the steps which are done by Indian Custom operation

interviews

1 Planner/ Shipper sends the ASN to the Customs team	
2 Customs Team goes to the ERP to transfer the PO to GTM.	
3 Import declaration is generated in GTM	
4 Customs Team fill all the data needed for the Declaration to be completed	
5 Once the declaration data are entered the declaration is saved and CRR (Consignment registration number)	
9	
8	
7 Customs Broker send the information back no later than 2 days with the MRN	
6	

Figure 15 Process of Import in India

Issues and Data added in the Declaration	India		Poland		
Missing Data elements from ERP to GTM	Export	Import	Export	Import	Data present in ERP
1) Weights of the product	Y	Y	Y	Y	Dummy values
2) Material Number/ Dummy material number	Y	Y	Y	Y	Yes
3) Packaging number	Y	Y	Y	Y	No
4) Packaging type	Y	Y	Y	Y	No
5) invoice value (FOC)	Y	Y	N	N	Yes

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6) Material Descriptions	Y	Y	N	N	Yes
7)Business partners- ultimate consignee	Y	Y	Y	Y	No
8)Mode of transport at the border	Y	Y	N	N	No
9)Country of Origin	Y	Y	Y	Y	No
10)HS Code transfer from the ERP to the GTM	Y	Y	N	N	No
Data issues within GTM & missing functionality	Export	Import	Export	Import	GTM Functionality
1)Data from a broker via EDI (missing duty paid)	Y	Y	N	N	Yes (a few)
2)Adding default documents to the shipments	Y	Y	N	N	No
3)Customs currency change and conversion	Y	Y	Y	Y	No
4)GTM export to import copy	Y	Y	Y	Y	No
5)Reporting for customs and compliance	Y	Y	N	N	Yes
6)Updates to GTM master data (classification content, SPL, currency rates)	Y	Y	N	N	Yes
7)Not all brokers are connected	Y	Y	N	N	Yes
8) Responsible Employee addition	Y	Y	N	N	Yes
9)ability to add the customs inspections the issues to the declaration	Y	Y	N	N	Yes

Table 13 List of Issues and Data Addition in ERP & GTM

5.2.5 What is the procedure for integrating a customs broker into the GTM software?

Based on the conversation with the internal GTM IT Service team Manager, it was found out there are no standard procedures which are developed to integrate a customs broker with GTM software. Based on the early GTM implementation design, it was found that the current GTM software did not have any solution for the customs broker integration. As a result, the organization created a customized solution for such integration with a global customs broker. Based on the conversation with an external implementation partner (one of the Big 4), it was found that the solution developed for the organization was bespoke development. Currently, the team have a standard XML format, which was developed during the initial implementation, which they use as the standard communication towards the brokers. This format is modified to further aid the regional requirements when additional fields need to be added. In order to connect with external brokers, the middleware Biztalk is used, which acts as the server to exchange messages outside of the firm.

5.2.6 What are the supplier selection criteria present to select a customs broker?

The firm recently implemented supplier onboarding software, which collects critical information on the supplier via self-answerable questionnaires. The firm has an internal policy on supplier onboarding to check if the suppliers are qualified on the internal policies of anti-bribery and anti-corruption, financial solvency, and trade compliance. If the supplier is qualified on the above three policies, they will be onboarded to the organization. Apart from the qualification from the above three policies, there are policies on the specific domain the supplier acts on, such as the information technology domain, TTL (trade transport and logistics) domain, services and procurement domain. These policies help identify the risk and better understand the suppliers' offering. For the onboarding of the customs broker as a supplier, asked questions on the product offering on the customs brokerage side, on the knowledge side, accreditation and reporting capability. It was found during the analysis that the questionnaire doesn't address any technical questions on the customs broker system integration. The customs brokers are onboarded based on their performance and capability, and less importance is given to the technical capabilities of the broker.

The current scorecard system for the supplier can be divided into the following.

A) Broker capabilities - 50 % of the score, under which the Reporting and system capability comes to 5% of the score.

B) Operations, quality assurance & quality control – 50 % Score.

5.3 Current Market Offering:

 The market size of GTM software is growing, and it is expected to reach 1,938.93 million by 2028. The market growth rate is forecasted to be 10% for the year 2021-2028. The GTM market is often approached tactically by the companies to satisfy the need alone, and the software is purchased in modules as it provides the flexibility to the companies to try and test the solution and

mix and match with various functionalities. This approach is useful for companies, but often, the issue is that integration is not tight with the company's ERP systems. In the thesis of Monti (2017), he has catalogued the various GTM software (customs and compliance) which are available in the market in a detailed manner. It is also mentioned that even though the software vendors promote their solution as a platform solution, it is not as they are reluctant to offer integration capabilities with other vendors. Thus, creating silos ecosystems. The interoperability is most often not offered by the vendors, and it is the client companies that create bespoke solutions to integrate various systems they own. Often, a middleware solution is used as a bridge between different systems, enabling them to communicate with each other and share data.

Middleware can be categorized into several types, including application server middleware, message-oriented middleware, database middleware, transaction-processing middleware, and integration middleware. These different types of middleware serve different purposes and are used in different contexts, such as in e-commerce, financial services, healthcare, and other industries.

The middleware market is driven by the increasing need for seamless integration between different applications and systems, as well as the growing demand for cloud-based middleware solutions. Some of the key players in the middleware market include IBM, Oracle, Red Hat, Microsoft, and SAP. As businesses continue to adopt digital transformation strategies and invest in cloud computing, the middleware market is expected to experience significant growth in the coming years. In our context for the thesis, we will be looking into the solutions which are most commonly used across the various industry for the customs domain and has great compatibility with JAC´s GTM software. The solutions offered by SAP, Microsoft, Wisetech, and Seeburger are considered for the thesis. (Gartner, 2023)

A) SAP[4] - Cloud Platform Integration (CPI) & Process Orchestrator – nicknamed PI/PO, are the middleware given by SAP. The solution provided by the platform is generic, and there are connectors which are developed to connect well with the products of SAP. For the non-SAP software to integrate, solutions are not provided by SAP, and they need to be developed by the clients. JAC uses the GTM software, which is created by SAP.

B) Microsoft- Azure Cloud Integrator & BizTalk – The Azure cloud integrator is similar to the SAP Cloud Platform integration (PI), and it is generic and mainly used for cloud-based applications. The later BizTalk [5]is an on-premise solution which is widely used, but it also provides a generic solution for integration with third-party software. JAC uses Biztalk as the middleware for the customs broker integration purpose; this solution was developed during the implementation of the GTM software in JAC.

C) Wisetech – CargoWise [6] - This software includes pre-built integrations with customs authorities worldwide, enabling customs brokers to submit electronic declarations quickly and easily. It was mentioned that customs brokers often use this system for filing the declaration to the customs authorities. This software is specific for the customs and supply chain network domain; apart from providing the customs declaration filing solutions, it also provides the opportunity to connect with the customs brokers who are already integrated centrally as part of MOU. Currently, the software has around 40 top logistic providers integrated.

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[4] https://www.sap.com/products/technology-platform/process-orchestration.html
[5] https://learn.microsoft.com/en-us/biztalk/core/introducing-biztalk-server
[6] https://www.cargowise.com

D) Seeburger- Business Integration Suite[7] - This is an integration suite which is having multiple functionalities: file transfer, API integration, B2B/EDI communications, IoT/Industry 4.0, E-Invoicing and ERP/SAP connectivity. It also has the mapping repository ready to use for the customs declaration. Seeburger has experience in the field of customs declaration as they co-developed the solution with SAP for the GTS native connectivity with customs authorities (of some countries).

5.4 Summary

Based on the above interview and data analysis on the business process and the system offerings, the problem statement is relevant. Furthermore, it also showcases that the current market solutions and the adaptation of the solution in the companies are not likely to address the problem statement due to the factors such as the silos nature of the software, less number of native solutions for interoperability, Customs requirements are regional. Companies always need to coexist with both global and regional solutions, which in turn might create complex data integrations.

To address the problem mentioned above paragraph, there needs to be a common standard for interoperability for customs domain (needs to be enforced by the governments) and, in our case, an integration framework which enables the correct selection of suppliers with both IT and knowledge capabilities. Even though there are standards which are set by the UNEDIFACT, the necessity to follow them was enforced in the companies since the customs were always at the discretion of the regional country. The new solutions of the blockchain are promising, but they also need a lot of time to adapt, and the countries' governments agree on it. Based on the business

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[7] https://www.seeburger.com/de/plattform/business-integration-suite/

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requirements which are gathered in this chapter, the next chapter will discuss the creation of the artefact, which is the customs broker integration framework.

Chapter 6: Artefact Design

6.1. Introduction:

This chapter describes the artefact Customs Broker Integration Framework. Based on the requirements gathered in Chapter 4 and the understanding of issues faced in the firm in Chapter 2, this Chapter will make the utilization of the requirements to draw the integration framework. Also, this chapter will discuss the list of technologies and standards which are relevant to the integration framework.

6.2. Customs Broker Integration Framework

The Customs Broker Integration Framework is devised to enable the successful integration of the customs broker into a firm's customs operation both on the functional and system level. The Framework helps global firms in operating and managing their customs brokers' footprint by effectively bringing analytical capabilities and implementing and monitoring the effectiveness of customs compliance. In the thesis of Vivian (Monti, 2017), it was effectively demonstrated the importance of customs compliance and why, the need for the central tower approach to breaking the silos in this domain and the importance of the interrelated business ecosystem. Furthermore,

from the thesis of Iris (Amptmeijer, 2020), it was clear that the customs as the operation is not concerned with only one department. It is a collective operation by different departments in the value chain. By effectively combining these factors into developing the integration framework, we can address the needs of global firms.

Based on the literature review, to create an integration framework, we need the following pillars . They are listed here for ease of reference.

A) Strategy (Proposed)

B) Organisation

C) Process

D) Data

E) Application

F) Network
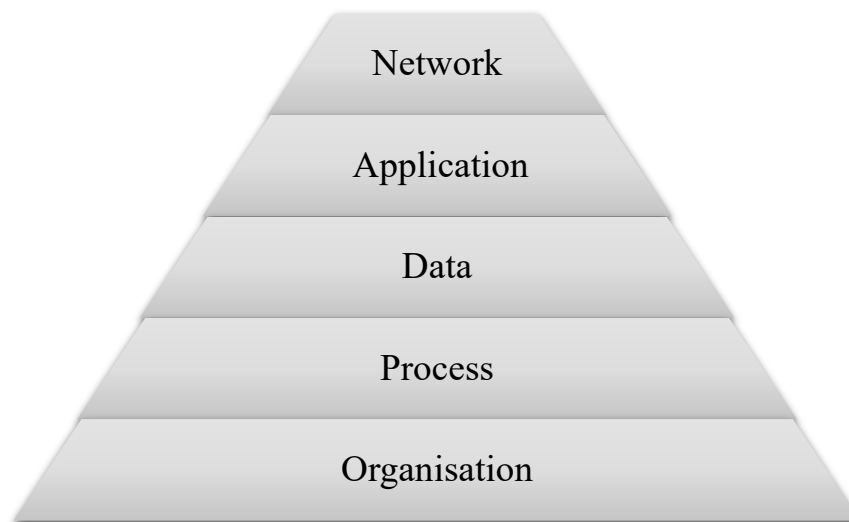
Figure 16 Pillars of Framework

However, the issue with the standard system integration framework is that strategy and change management are often left behind; in the operating model white paper (Deloitte, 2020), it was iterated how important these factors are for a successful operation. The author thinks that combining both models is necessary to create a robust framework with flexibility, functionality, and versatility. Hence, the following model is proposed.
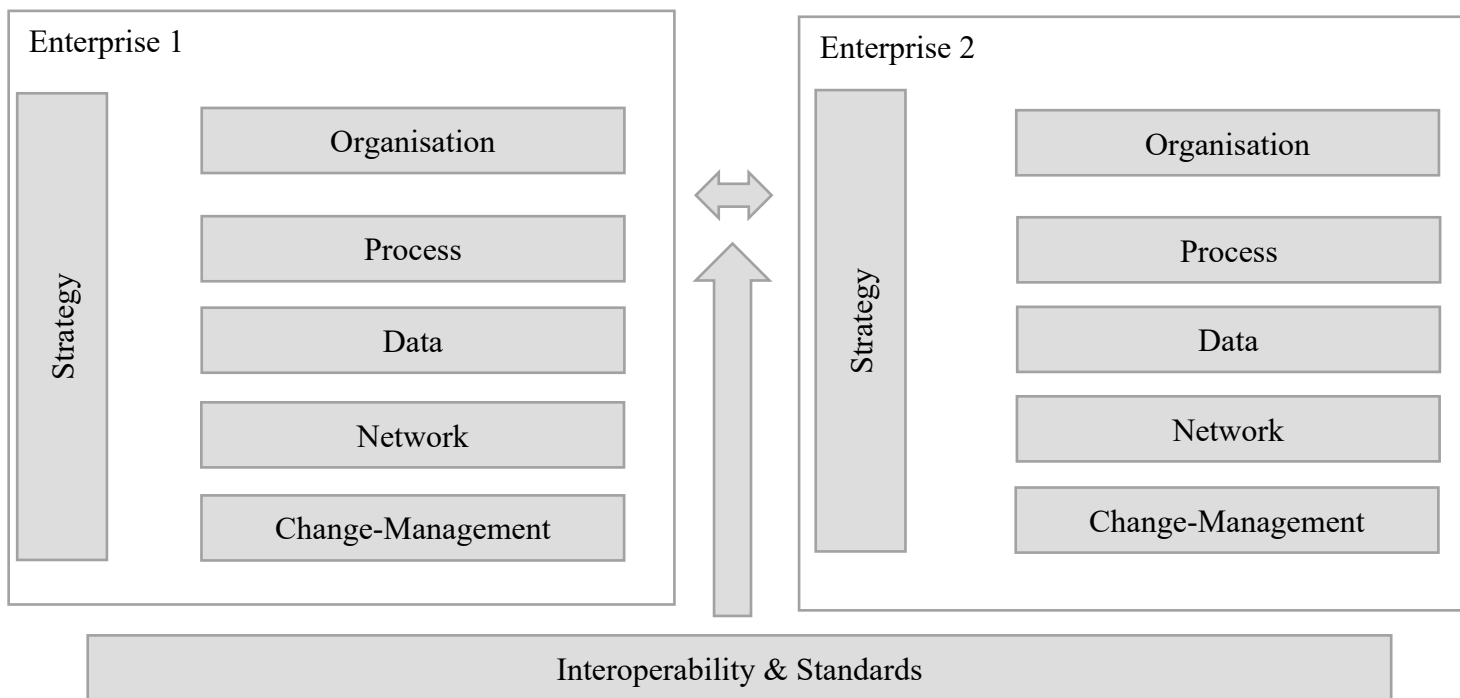
Figure 17 Framework for Customs System Integration
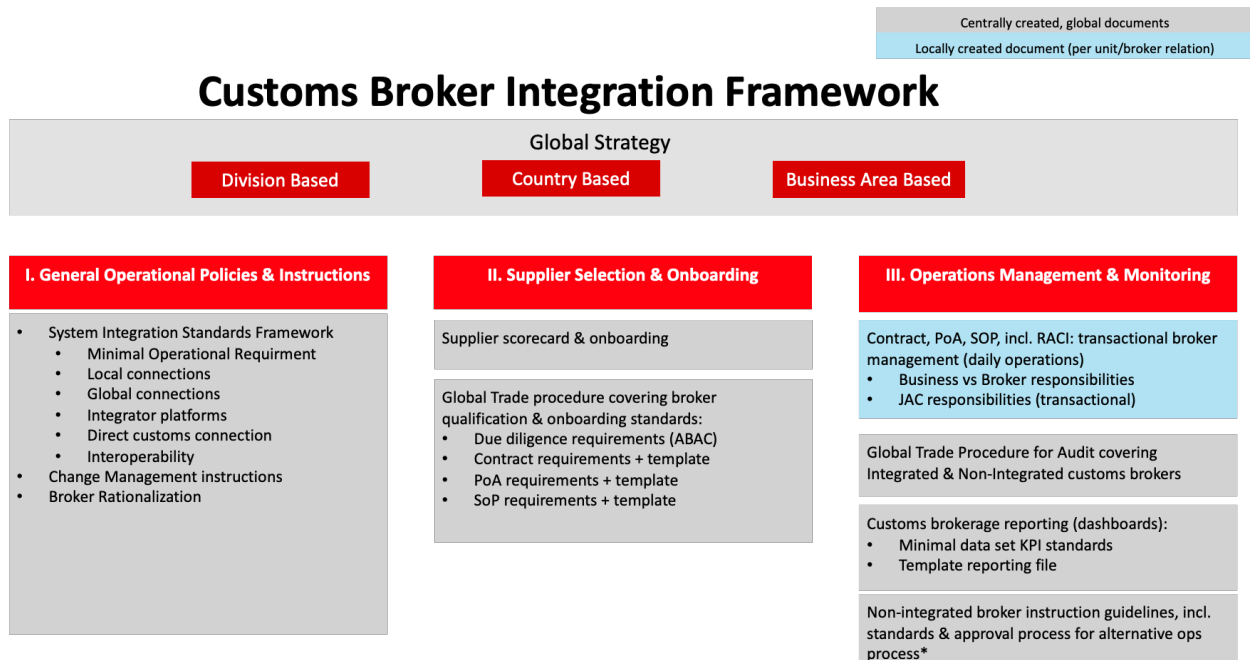
Figure 18 Customs Broker Integration Framework

The author proposes a model shown above that iterates the functional and technological elements that can address the various pillars derived from Chapter 3 of the literature. The above structure highlights both the functional and technical requirements, which are captured in Chapter 4. They are tabulated in detail below to showcase which are covered in the thesis and which are addressed outside. The requirements are categorized into three main subdivisions

i)   General Operational Policies & Instructions,

ii)   Supplier Selection & onboarding,

iii)   Operations Management & Monitoring,

The strategy has an overarching influence on the three subdivisions, and the requirements change based on the strategy.

6.2.1 Strategy

The strategy plays a main role in the customs broker integration as the firm currently has various

variations of how the customs brokers are used and where they are used, and there is no uniformity

established in the context of Chapter 2. Here, the trading strategy needs to be adopted by the firm

on any one of the levels, which can benefit the division or business area.

- Division Level Strategy

- Business Area Level Strategy

- Country Level Strategy

These strategies are to be developed by keeping in mind the trade and non-trade barriers one might

face, such as the data in the ERP, regional resource capacity and limitations, and governmental

limitations. The RCA (Root Cause Analysis) of why this is identified as the first primary solution

which needs to be addressed is as follows.
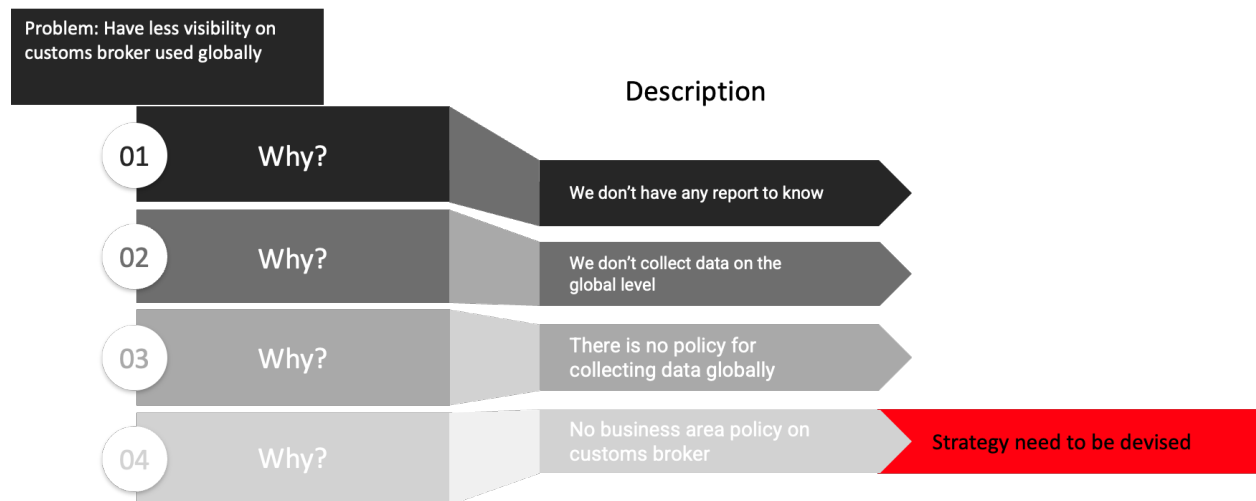
Figure 19 Root Cause Analysis

The better way to harmonize the strategy is to make it country-level since the customs regulation

change from one country to another, and having a standard policy on the global level needs to be

as generalised as possible and further policies need to be developed around the general strategy to help achieve the strategic goals.
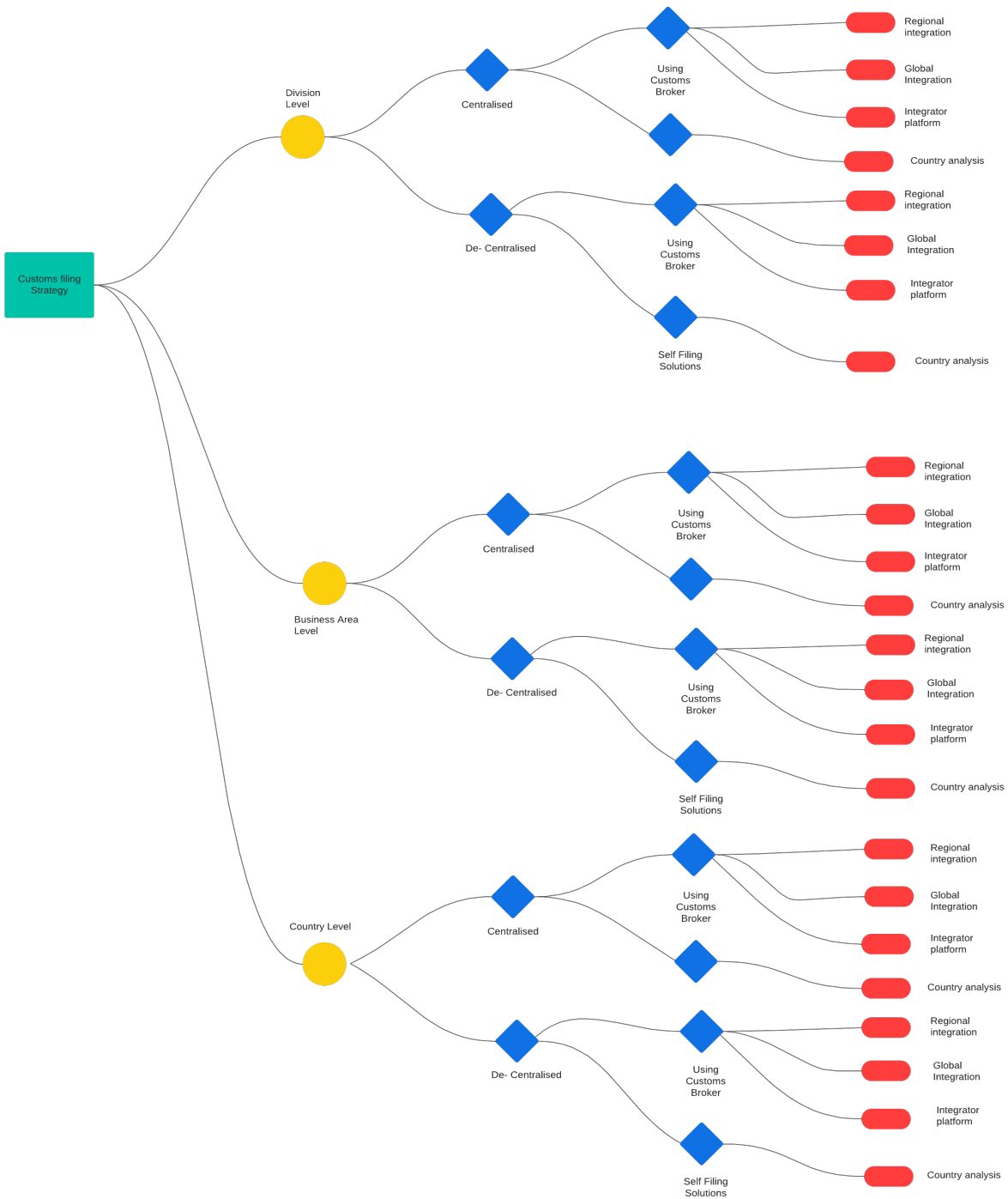
Figure 20 Customs Filing Strategy

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Ultimately, the business areas have the option to choose from a combination of strategies which better suit the business goal. At the time of researching for the thesis, no particular strategy was decided by the organization, and the local management was free to choose one of their likings. To choose the correct strategy, we breakdown the strategy elements into three main elements

   A) Ownership – who decides on which level the strategy is to be set and what.

   B) Operation – how the organization needs to be set for the particular strategy.

   C) Process – how the business process needs to be executed.

Strategy breakdown for Customs Broker Integration
The strategy is breakdown in to following pillars
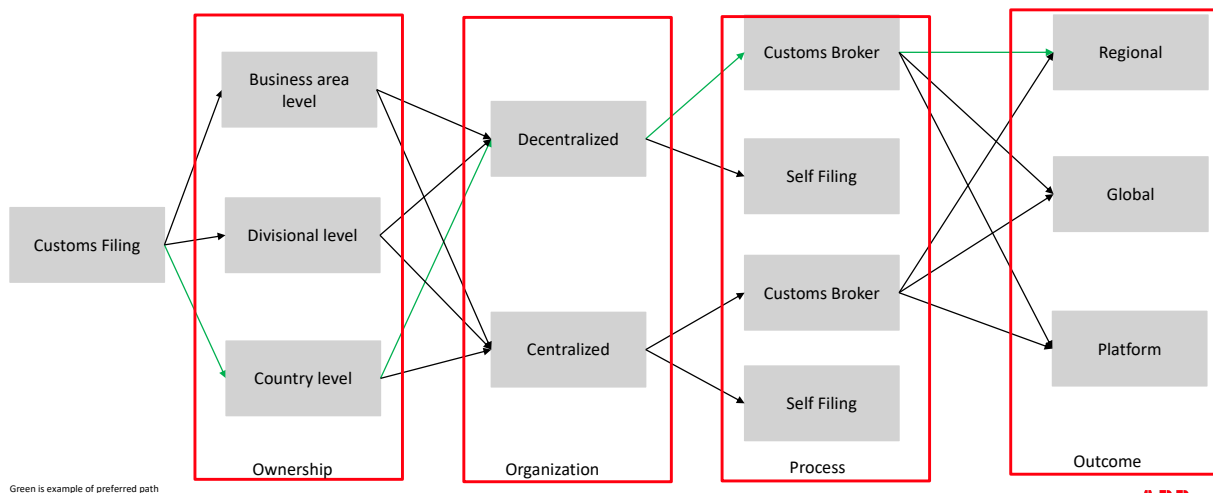
Figure 21 Strategy breakdown

It was proposed to the business leaders of the organization to have further conversations on the strategy to decide which is the most suitable. In order for them to better decide the potential trade-off in the strategy of using the different nodes, they are discussed below. The pros and cons of the strategy are motivated based on the informal conversation with the Global Trade Centre of Excellence team (comprising of the trade application manager, operational manager, and program manager).

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Strategy Element	Pros	Cons
Centralised	Effective control over the business process and uniformity in the SOP. Centralized team to orchestrate the trade activities and the single point of contact for customs activities. Ability to retain and pass the knowledge on the process within the organization.	Geographically, it is not feasible, and local laws are different; hence, experts from each customs regime must be there. The ability to cater to different time zones is also a challenge. The current organization's business model does not support it.
Decentralized	Effective control of the process at a regional or divisional level or at the country level. The process is unique, and it fits the requirements of the stakeholders who perform the task. The current organization's business model supports it.	There is no uniformity globally, and the SOP varies a lot. A lot of stakeholder persuasion is needed to align on strategy, and guidelines must be devised.
Divisional Level	This is a hybrid of the divisional centralization principle. It gives the divisions power to set the strategy for themselves on a global or on a country basis. The current business model of the company supports this.	The issue is that the strategy might have potential clashes since customs is a regional subject. Currently, the customs are locally monitored on a country basis.
Business Area Level	This is a hybrid of the divisional centralisation principle. It gives the business area the power to set the strategy for themselves globally. This creates uniformity on the business area level on the process followed by it. It also helps the business area trade managers oversee the guidelines and the operation of different divisions globally.	The issue is that the strategy might have potential clashes since customs is a regional subject. Currently, the customs are locally monitored on a country basis.
Country Level	This is the current approach in some countries where the centralized team takes over the ownership of the customs process. This approach gives uniformity at the county level if implemented well. It gives the flexibility to the local customs managers to manage and create a uniform process for a country	The current trade-off is that global managers won't be able to get an overall picture of the customs operation as the approaches are different. Also, in a country where there are no single customs managers, divisions can decide on their own on the approach they need.
Self-filing	Ability to directly connect to the customs authorities and eliminate the customs broker as the middleman. The complete control over	Has limitations at the country level as it cannot be used as a global strategy,

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	the process and the business areas and the ability to work along with the government for faster clearance. And getting the preferred status of the trade partner.	and the data elements to be transferred and the completeness of the are crucial for it. It also requires a lot of manpower to achieve it.
Customs Broker – Regional	To connect to the local customs brokers who don't have a global presence. This approach gives the ability to the partners who are well placed in the country of operation and have a good reputation in the regional customs operations. This is a country-level strategy which gives the local organization the most freedom to choose. The Customs brokers are to be selected based on the criteria given in the supplier selection chapter; in addition, the volume of the transactions also plays a role.	Local brokers might or might not have the ability to connect to the systems as they are very regional. The uniformity from one broker to another can vary in the same country if the guidelines are not placed on the country level on the broker integration policy.
Customs Broker- Global	To connect to a customs broker who has a global presence and can cater to the needs of the local country customs process. This approach is best for companies that can have contracts on a global scale with customs brokers and determine the universal rates for customs clearance. It also provides the opportunity for global trade managers to effectively negotiate the cost and optimise the service levels needed for the operation. It also helps in the integration efforts since a single broker system will be connected instead of multiple, and superset data can be transmitted for incoming and outgoing messages. Global managers will have complete oversight of the customs cost and the issues and have a uniform process.	The drawback of this approach is that the competitiveness of the customs broker's rates will be lost as many regional providers quote less for the similar service provided.
Customs Broker- Integrator Platform	To connect to an integration platform which can serve as the gateway for various customs brokers. The cost of the implementation is one time, and the subsequent rollout to the various customs brokers can be an additional cost which can be borne by the customs brokers. The solution provides a single SOP and data structure which can be used for multiple countries. It effectively reduces the cost of onboarding the customs broker and the time needed for it.	The integrator platform primarily works well for the uniform business process in a country; if there are deviations from the standards installed, then the cost of development comes to the business divisions and areas. Creating the superset of the data needs to be done for each country, and it is a

		long process to complete it. Stakeholder management is a factor which can have adverse effects on such integrations if the broker boycotts the system and approach.

Table 14 Pros & Cons of Strategy based on author research

The functional and technical requirements are gathered based on the pillars discussed in Chapter 3 and the interviews with the internal sources. For space, GOP is used for General Operating Policy, SSO for Supplier Selection and onboarding, and OMM for Operation Management and monitoring

Pillar	Requirements	Category	Description	Part of thesis
GOP	Minimal Operational Requirements	Both	Minimal requirements for the integration of customs broker into the three layers and the minimal data set which needed to be communicated back by the customs brokers. It has both functional and technical parts, with a functional part like the operation manual and communication methods and a technical part like the system integration approach, standards, message types, and error handling.	Yes- The technical part. functional parts in the works
GOP	Change Management instruction	Functional	Set of instructions which needs to be explained on what steps need to be taken before and executed after the system integration. It is used to gain the trust of the regional champions to effectively make the adoption of the solution.	No -functional parts in the work
GOP	Broker Rationalization	Functional	Rationalisation guidelines are the criteria which are helpful in consolidating the number of brokers which are being used on the regional and global scale so that the firm will have more collective power to negotiate prices.	No -functional parts in the work
SSO	Supplier scorecard	Functional	Scorecards are a set of qualification requirements which are ranked based on the performance, reliability and information technology	Yes – IT part
SSO	Qualification Standards	Functional	Qualification standards are set by the different departments of the firm, like Legal, procurement, trade compliance	No -functional parts in the work
OMM	Responsibility	Functional	It explains the various policies and contracts which need to be in place at the regional level, and since the regional law differs, it is given the responsibility of the regional organization to take ownership of it.	No -functional parts in the work
OMM	Audit	Functional	The procedure for auditing customs broker (system & non-system integrated) provides guidance on performing an audit and what are the key elements which need to be audited.	No -functional parts in the work
OMM	KPI	Both	The minimal data ich needs to be sent by the brokers back to the Firm, which can be used for creating the dashboard needed for visibility.	Yes – minimal data set
OMM	Non-integrated broker guidelines	Functional	Guidelines pertaining to operating with the non-system integrated brokers and the process related to communication, record keeping and other operational upkeep.	No - functional parts in the work

Table 15 List of Requirements

6.2.2 General Operational Policies & Instruction:

Operational policies and instructions are critical in helping organizations achieve their strategic goals. These policies and instructions guide employees and stakeholders on how to perform their roles and responsibilities effectively and efficiently. By aligning operational policies and instructions with strategic goals, organizations can ensure that everyone is working towards the same objectives and that resources are being used effectively.

The policies we identified for the customs broker integration framework are as follows.

    i)   Minimal operational requirement

        a. Common minimum standard

        b. For regional connections

        c. For global integrations

        d. For using integrator platforms

    ii)   Change management instructions.

    iii)   Broker Rationalization guidelines

The common minimum standard is the definition of the functional and technical aspects of the integration, which need to be adhered to set the fundamentals of different integration business decisions. In effect, the minimum standard is the guardrails in place which define what can be done and what can't be when it comes to broker integration. As part of the thesis, we are concentrating on the minimal operational requirements, which entail the technical considerations for the four types of integration mentioned above; these are tabulated below.

Type of Integration	Requirement	Description
Common minimal standards	Minimal data types sent from the Firm	This is the minimal data types [8] of the declaration, which needs to be sent to brokers for customs clearance – The Minimal data set is derived from the past implementation of the customs broker solution of the company and is compared with the Standard CUSDEC. The outcome of the dataset will be discussed with the different customs brokers and the internal customs managers to validate if the data elements are necessary. Since the CUSDEC is a huge library of data elements, customs authorities need only some necessary elements from it. These data elements are cross-referenced with the minimal KPI data elements proposed.
Common minimal standards	Minimal data set sent by Customs Broker	Data set which is sent by Customs Broker on the different events. i) Acknowledgement ii) Receiving approval from customs authority – MRN iii) Proof of exit for export iv) Import duties to be paid. v) Date of acceptance by customs – Import
Common minimal standards	Interoperability & Standards	Currently, the firm uses a custom-made XML structure. Further investigations need to be done to BiZtalk if the WCO XML Data [9] model / ASYCUDA XML [10] structure can be implemented.
Common minimal standards	Reporting	A common data set will be used for the broker reports for performance and customs compliance.
Common minimal standards	Document sharing	A secure FTP location needs to be used for the files to be shared, and it's the responsibility of the customs broker to set it up for the firm
Common minimal standards	Record keeping	Documents processed in the GTM need to be archived for the next five years, and the confirmation messages and the customs-approved customs declarations need to be stored in the data repository of the firm
Regional connection	Additional fields needed for customs declaration	This is a specific data set which is needed for customs clearance in a particular country alone, and it needs to be prepared with the help of the local customs manager.

Global Connection	Scalability	The solution needs to be scalable for multiple countries and must be flexible to accommodate the regional request
Integrator Platforms	Flexible approach for integration	The platform must be flexible to be connected with the various third-party systems, and the integration solutions for the widely used software must be developed by the vendor.
Integrator Platforms	Versatility in offering	The platform must be versatile, having the ability to connect via API, connectors, and communication protocol.
Integrator Platform	Scalability	The solution must be scalable (i.e. it should support integrations with various broker systems for different countries). As firm wants the platform cater to various new demands of integration from different brokers in the same country or other countries too. The detailed criteria for the scalability are not defined during the time frame of the thesis.
Integrator Platform	Monitoring & Error handling	The solution must have the monitoring capability for the communications and the error-handling communication protocol
Integrator Platform	Reliability and availability	The platform should ensure minimal downtime and maintain performance under varying loads or in the event of failures, often through redundancy and load balancing.
Integrator Platform	Vendor support & community	The platform should be backed by strong vendor support and an active community of users, ensuring access to resources, documentation, and best practices.

Table 16 Minimum Operational Requirements for System Integration

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[8] *Minimal data set attached in the appendix*

[9] https://github.com/hmrc/customs-declarations-information/blob/main/public/api/conf/1.0/schemas/wco/declaration/WCO_DEC_2_DMS.xsd
https://www.wcoomd.org/-/media/wco/public/global/pdf/topics/facilitation/instruments-and-tools/tools/data-model/wco_xml_guidelines_2012.pdf?la=en
[10] https://customs.gov.bd/files/XML_Structure.pdf

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6.2.3 System Architecture:

System architecture is the design and organization of interconnected components, systems, and processes that work together to achieve a specific objective or set of objectives. It provides a structured approach to combining various software applications, hardware components, and data sources, enabling efficient data exchange and streamlined business processes. In the customs broker integration, various types of integration were mentioned above, and we will discuss them in detail. The integration also includes existing applications such as DMS (document management system), which acts as a document archive system
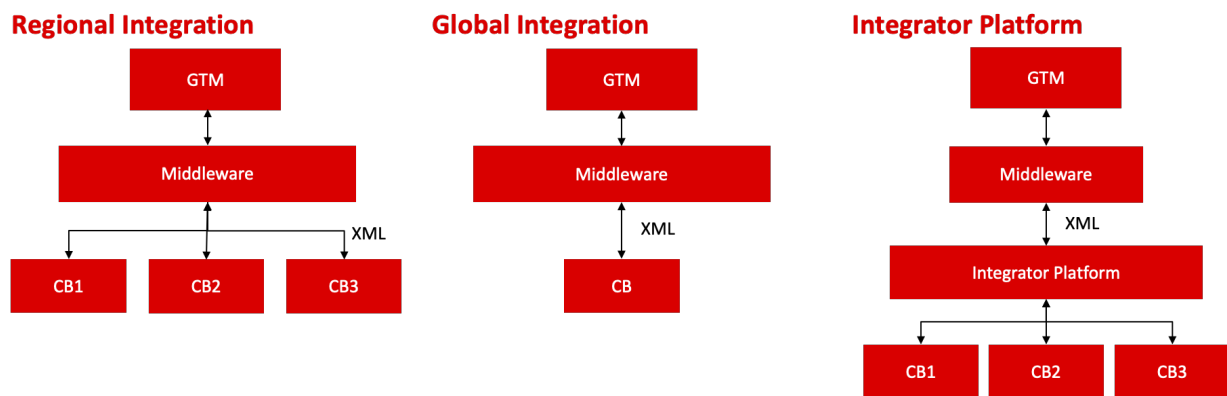
Figure 22 System Architecture

6.2.4 System Architecture:- Regional Integration

The regional integrations are done with the broker who is catering to the specific country alone. In the ideal world, the firm should avoid such integrations since firms will be dedicating time to integrating a single broker, and it will take a lot of time to achieve breakeven on the ROI (Return on investment). But there are cases where the necessity outweighs the return on investment. Based on Fig 21, we can understand that the key point in the architecture is to keep the XML message structure as standard as possible. It is purposed to use the XML superset data model, which contains provisions for the additional data elements to be configured. The country-specific XML structures are to be followed in the case where the superset XML model cannot be adapted/modified. The

aim is to make the minimal dataset part of the XML superset structure and the additional elements to be added to the country specifics to be configured on the regional level. The middleware acts as the aggregator and collects and executes the transmission task; when the return messages are sent back from the brokers, it helps to populate the GTM. The figure below explains the schematics of the business process in the case of the regional system integrated customs broker. The standard format of communication will be used (XML), and the regional content variations will be done if required.
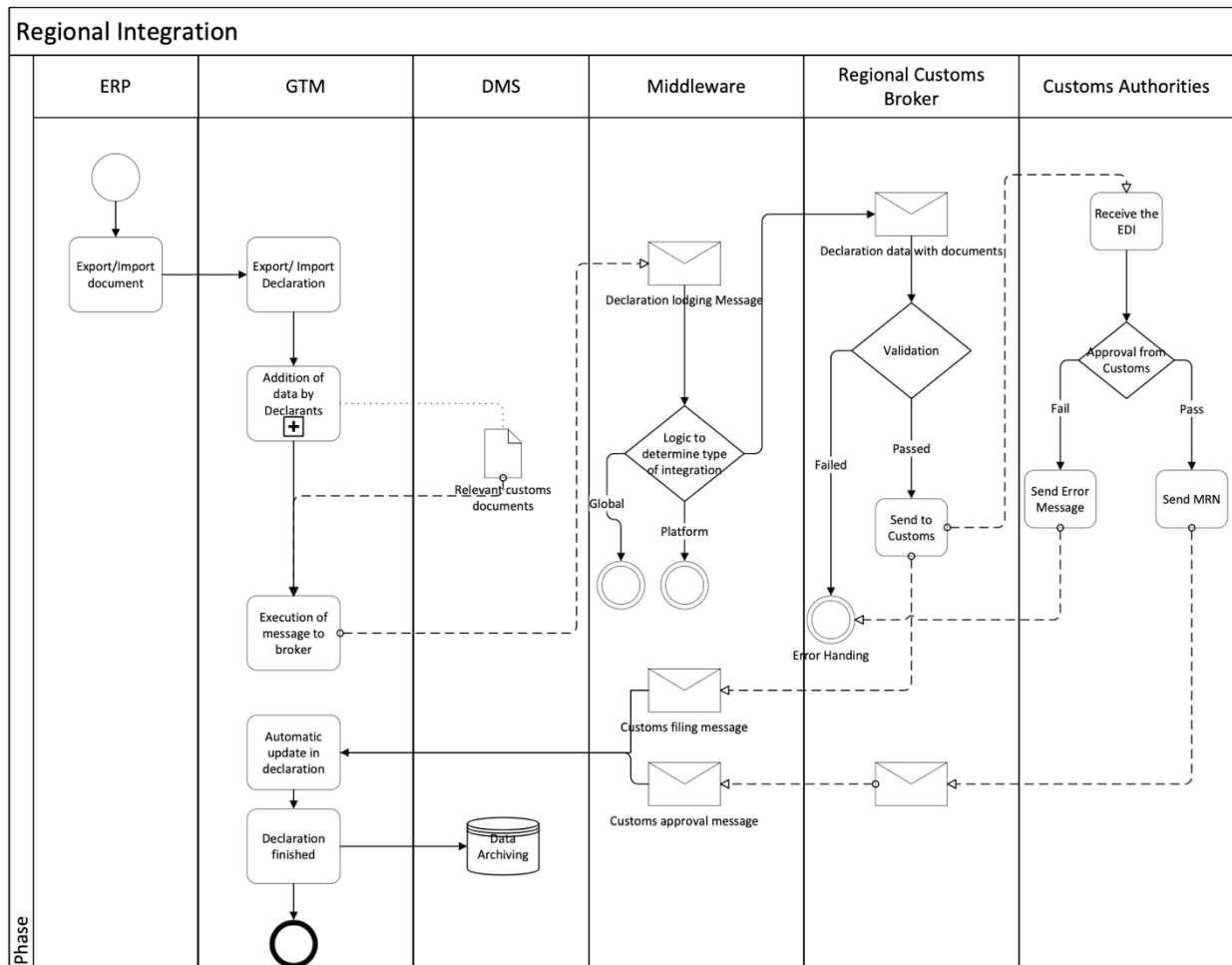
Figure 23 Regional Integration

The middleware will be able to understand if the communication is for the regional customs broker or for the other integration types, and it will forward the information accordingly. The main

rationale for keeping the logic in the middleware is that it is easier to modify the system there compared to the GTM. The document archiving is done with the help of the Document Management System (DMS), which can in the future, help in the traceability and audit.

6.2.5 System Architecture: - Integrator Platform Integration
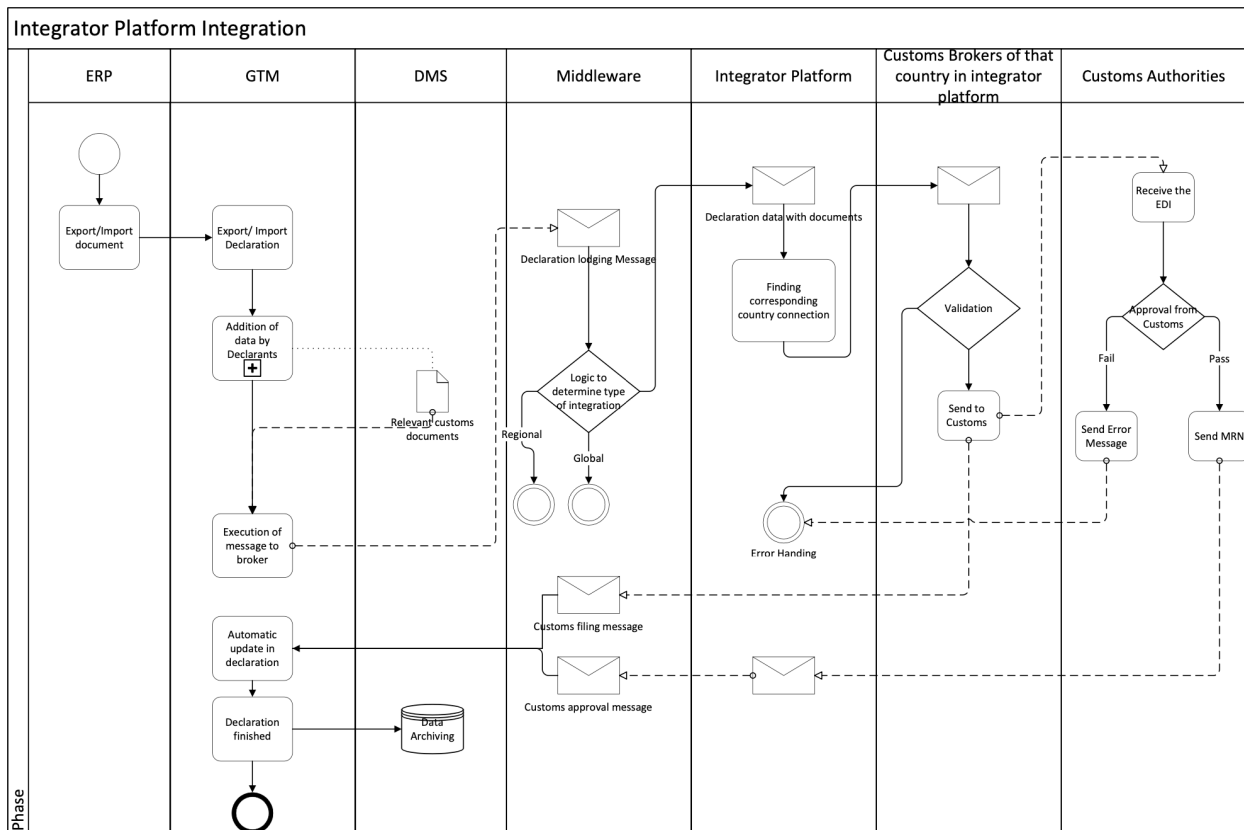
Figure 24 Integrator Platform Integration

The above model is for the Integrator Platform, which is the platform where the customs brokers of one or more countries will be integrated into. Once the declaration data is transmitted from the middleware to the integration platform, the data will be relayed to the respective customs brokers who are already working with the tool. The integrator platform will ensure that interoperability exists between the three systems (Middleware, Platform, and Broker system). The platform will take care of the addition of new brokers and this effectively reduces the development time for the firm, but this service cost has to be paid by the firm. The biggest pain point here is convincing the

brokers to integrate into the platform and selecting a suitable platform. Till now, only two brokers have shown interest in the integration platform; the rest are yet to be asked.

6.2.6 System Architecture: - Global Integration
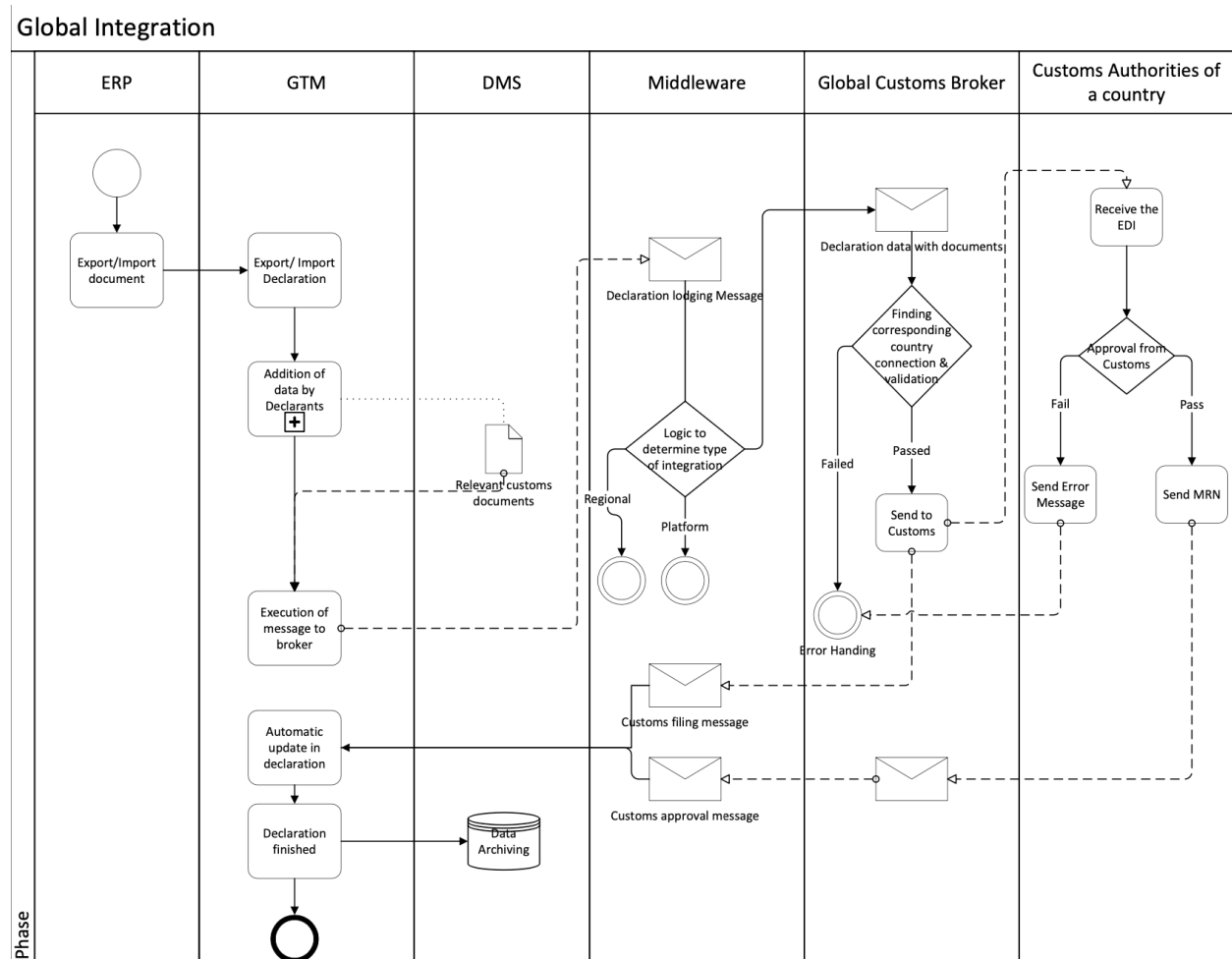
Figure 25 Global Integration

For the global integration mentioned in the above figure, the system integration is done with one broker who has a global presence (i.e. More than five countries) and the ability to perform customs clearance activities in multiple countries. Here, the messages with the declaration data will be sent to the customs broker system, and the broker will be able to use that to lodge the customs clearance in the respective country. This model is most favourable as it aids broker rationalisation and also creates synergy between them.

6.2.7 Supplier Selection & Onboarding

Supplier selection is a crucial aspect of the customs broker selection process & software, as it can have a significant impact on the efficiency, reliability, and compliance of import and export operations. A reliable and experienced customs broker can help businesses navigate complex customs regulations, minimise delays, and avoid potential penalties. The main rationale behind the proposed criteria is to design a flexible framework by selecting a customs broker (Software is not the core business) and a systems vendor (Software is the core business). The following criteria are proposed based on the Chapter 5 supplier selection literature. The criteria are reviewed with the panel of the internal team (consisting of the operational expert and program manager)

Proposed criteria for selection of supplier	Rationale
Cost	Cost is one of the primary criteria for the selection of the supplier, which is from time to time emphasised in the various articles. If the cost of the supplier is high compared to the market range, then the cost has a negative impact on the selection of the supplier.
Quality of service & support	Quality of the service & support play an important role; a supplier with high customer satisfaction on the support and service level has a positive impact on the selection
Delivery	Project delivery capacity and the ability to drive the project for the big organisation informs about the expertise suppliers have in the domain, which adds to the positive impact
Ease of Use	The solution which is offered is easy to use, and it should not have an adaptation barrier and outdated user interface, as these factors have an impact on change management (discussed above)
Efficiency	Suppliers' solutions should promote efficiency. If they are counterproductive, the adaption rate will be low.
Ease of installation	The solution should be easy to install and distribute within the enterprise. The high installation cost of the software has a negative impact on the selection.
Integration with an existing application	The solution must be interoperable and must be able to connect to legacy systems with similar efficiency and functions as new-generation software.
Responsiveness & Collaboration	The supplier's responsiveness to the issues and the collaboration to develop new solutions for customers are key.

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Technology & capacity	The technology platform which solution based must be future-proof or compatible with future upgrades. Also, it must be scalable to fit the organisation of any dimensions
Flexibility	The solution must be flexible with the offering, and customers can pick the functions which suit their needs rather than buying it as a bundle
Supplier reliability	The supplier must have a reputation in the market must be financially stable, and possess high domain knowledge
Alignment on strategy	The solution and the functionality which is offered must align with the core strategy of the enterprise

Table 17 *Purpose Supplier Selection Criteria (Gustin et al., 1997) (Mukherjee, 2014) (Francis J. Quinn, 1989)*

Since the firm has an extensive questionnaire for supplier selection, which is mentioned in Chapter 4, we will be adding a set of questions with respect to the system integration and reporting perspective to make the selection process more optimized. The set of questions to be added will be part of the broker's capabilities but more specific to the integration and reporting. See the annexe for full questions. The questions will be sent via a proprietary platform, which is used for supplier onboarding; they are made in a manner of yes or no for easier shortlisting of the suppliers.

ID	Questions	Supplier Answer	Rationale	Already existing in the Supplier Questionnaire
1	Does your organization have the ability to digitally clear goods with customs authorities (Import, Export, Transit) in country X?	Yes/No	This gives the ability to assess if they operate customs clearance digitally in a country	Yes
2	Do your organizations have dedicated customs clearance systems?	Yes/No	This gives a notion about the broker's customs system	No
3	Does your organization have the ability to digitally, via the following methods (Q4), share that	Yes/No	The ability of the Customs Broker to send information back on the clearance is asked	Yes

	clearance data with JAC?			
4	If "Yes", what kind of method would be available?	Dropdown box	The dropdown box is for the supplier to select, and it should include the following A) Via XML B) Via EDI C) Via SFTP D) Via Integration platform E) Via Email	No
5	Does your organization have a dedicated IT support team to work on integration projects?	Yes/No	This gives the indicator for the technology and capacity.	No
6	Does your organization have experience with such system integrations	Yes /No	The experience with system integrations is crucial as the firm cannot educate the broker on the process and engineering	No
7	Is your organization able to send monthly digital reports on customs clearance in the format specified? (see annex)	Yes /No	Even if the digital integrations are in place, the report on the monthly performance and the operations need to be sent to validate the broker's performance	No
8	Does your organization provide 24/7 IT support?	Yes/No	This is important for business continuity since if there is an error in the data transfer or an outage of connections, this needs to be fixed	No

Table 18 Questions to be added to the Supplier Selection Questionnaire

6.2.8 Integration Criteria for Existing Brokers

For the integration of the customs broker into the GTM system, the following criteria are proposed based on the past implementation of the customs broker solution and further discussion with the GTM technical team. Based on the three models, the criteria change.

    A) Regional Integration

        1) Number of the countries served: If the Broker is present only in one country or less than 5, then only the regional integration process is used.

        2) The volume of trade – if the particular custom broker takes care of the huge volume of trade in the country, it has a positive impact on the project to be initiated.

        3) Return on investment (ROI)- if the integration brings in value addition apart from the custom compliance, it will have a positive impact on the project.

        4) Integration development- Use of the XML template by JAC and the integrator platform is preferred. The cost of the integration is to be borne by the customs broker.

    B) Global Integration

        1) Number of countries served: For the broker who caters to more than 1 country but more than 5, then the global integration is used.

        2) The volume of trade – if the particular custom broker takes care of the huge volume of trade in the country, it has a positive impact on the project to be initiated

        3) Return on investment (ROI)- if the integration brings in value addition apart from the custom compliance, it will have a positive impact on the project.

4) Integration development - Use of the XML template by JAC and integrator platform is preferred. Cost of the integration to be borne by the customs broker.

This decision tree is explained in the following diagram, and it's made based on the inputs from the team the GTM technical and the customs manager of the case study country.
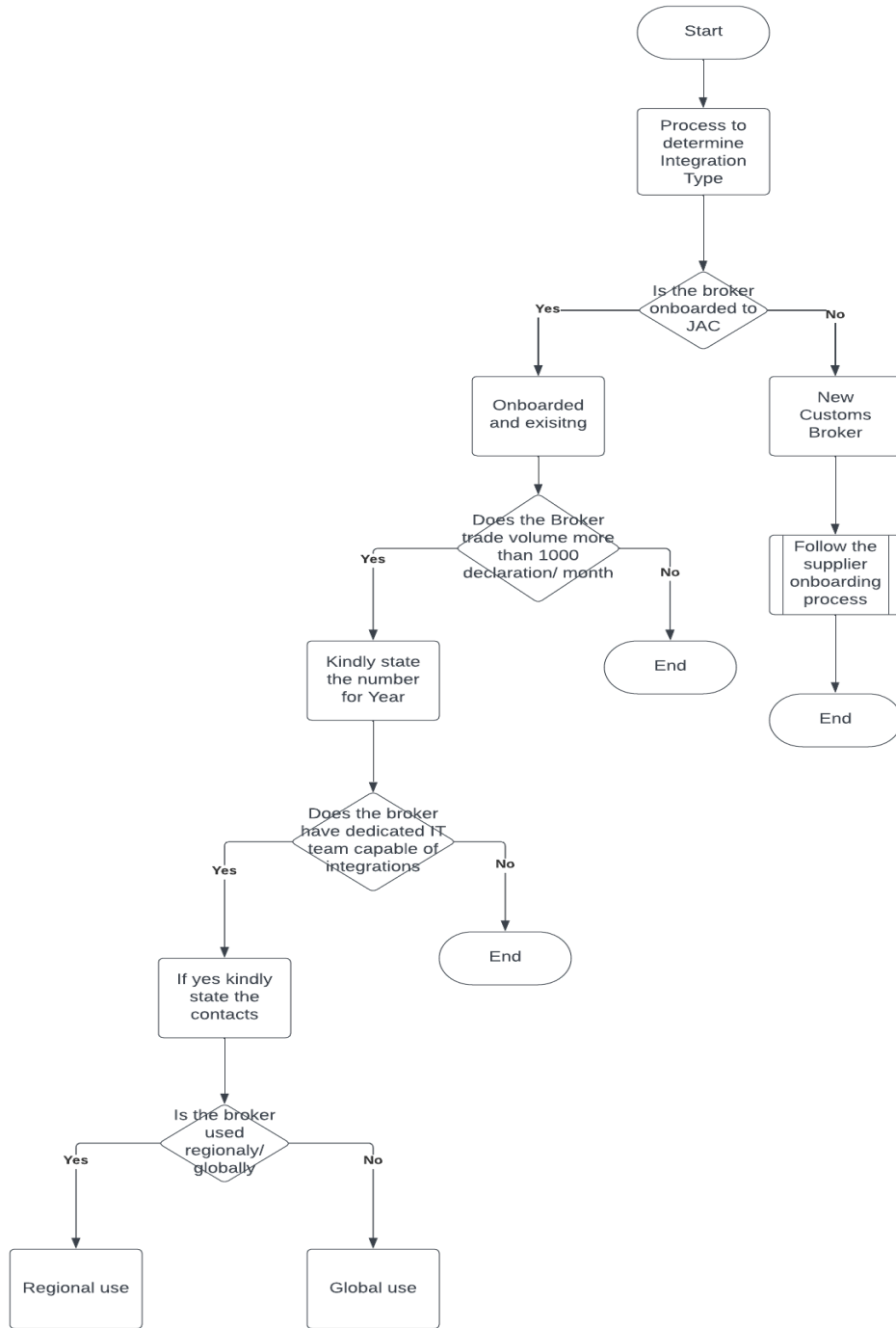
Figure 25 Integration Decision Tree

6.3. Minimal Data set for the KPI Reporting.

One of the big pain points pointed out by the trade managers and the customs managers is the inability to track any metrics related to the customs broker's performance, customs duties, and customs compliance. This is mainly due to two reasons: historically, the brokers were never asked for such metrics as the concept of customs compliance and the cost optimizations were relatively new (i.e. the trade compliance team took ownership of these topics, which were before not concentrated by the logistics department) in the organizations. Also, since each division has the ability to choose its own broker, it did not have guidance (nor it have written policies pertaining to the topic) to ask brokers for such details. In the case study country (India), the customs brokers are asked by the government to submit digital reports on their performance monthly and licenses (CBITC, 2022). To alleviate the pain, the following minimal data set needs to be sent by the brokers who will perform the firm's customs clearance activities. The data elements of the KPI are based on the collaboration of the customs broker and a firm (Johnson Controls AG) (Krishnamurthy, 2017) and it is retrofitted here based on the discussion with the case study customs manager and participating brokers. Additions are made to the basic data set with the export control identification. It noted that adding this criterion on the customs brokers will impose additional cost elements on the transactions, but the point which was emphasised by the trade management team is to make sure that customs compliance is observed. The minimal data set of the KPI is suggested to be imposed on the new brokers who will be integrated into the landscape both via electronic (EDI) and manual (paper & Email) base so that JAC can have visibility of the global operation. The firm has leverage over the brokers as the volumes of its imports and export globally is larger, and it's a lucrative business opportunity for the brokers.

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ID	Export Relevant Data sets	Rationale	Import Relevant data set
1	Customs Clearance Date	Data of customs clearance approval from customs	Customs Clearance Date
2	Export Date	Date of lodging customs declaration	Import Date
3	Export declaration nr.	Unique identification number for declaration	Import declaration nr.
4	HTS Code	HTS /Export code of the product	HTS Code
5	Product Description	Product description in declaration	Product Description
6	HTS Quantity	Quantity in the HTS UOM	HTS Quantity
7	Entry Type	EX – Export, IM – Import	Entry Type
8	Entry Line Number	Declaration entry, if the declaration has multiple products in increment count	Entry Line Number
9	Mode of Transportation	Mode of Transport at the Border	Mode of Transportation
10	Statistical Value	The statistical value of the good	Statistical Value
11	Currency	Currency of the value	Currency
12	Consignee	Ship to / Ship from party information	Consignor
13	Ship to Country	Country ISO code	Ship from country
14	Exporter of record	The firm which is exporting/importing	Importer of record
15	Export Country	Country where customs declaration is lodged	Import Country
16	EORI NO of Exporter	Identification number of row 14 Firm	EORI NO of the importer
17	Broker ID	Broker unique ID	Broker ID
18	Export customs office	Customs Office of clearance	Import customs office
19	Point of exit	Point of entry/exit where the shipment	Point of entry
20	Invoice Number	Invoice number	Invoice Number
21	Invoice value	Invoice value	Invoice value
22	Currency	Currency of invoice	Currency
23	Incoterms	Incoterms	Incoterms
24	Y-code / FTA document	FTA document codes or other customs regime codes	Y-code / FTA document
25	Weight gross	Weight of the shipment, including packaging	Weight Gross
26	Weight net	Weight of the shipment without packaging	Weight Net
27	Confirmation of exit	Exit confirmation date/ import duties paid	Import duties paid
28	MRN/ Customs Registration Number	Customs registration number	MRN/ Customs Registration Number
29	Bill of Entry	Bill of lading number /airway/house number for Import	House Bill of Lading Number

Table 19 Minimum Data Set for KPI based on MBA thesis (Krishnamurthy, 2017).

6.4 Summary

This chapter has described how the different pieces of the customs broker integration Framework fit into the puzzle by establishing the list of requirements for different types of system integration designs, the system architecture of such integration, and supplier selection criteria which are needed during the supplier selection evaluations of the broker and lastly the minimal data set for the auditing and reporting of the customs brokers. The next Chapter discusses the evaluation of the model based on the informal interview as the firm has yet to implement the rest of the pieces of the whole framework.

Chapter 7: Evaluation of Design

This Chapter is to evaluate if the proposed framework can help in the customs broker integration rollout. In Chapter 2, we established that the evaluation process will be done in India as we took it as the pilot country, and the stakeholders are called to evaluate the elements which are developed in the framework. It is to be noted that the whole framework is not subjected to the evaluation process as the framework's various elements such as the local policies, auditing of the brokers are yet to be developed. Evaluation process is shown in Figure 26.
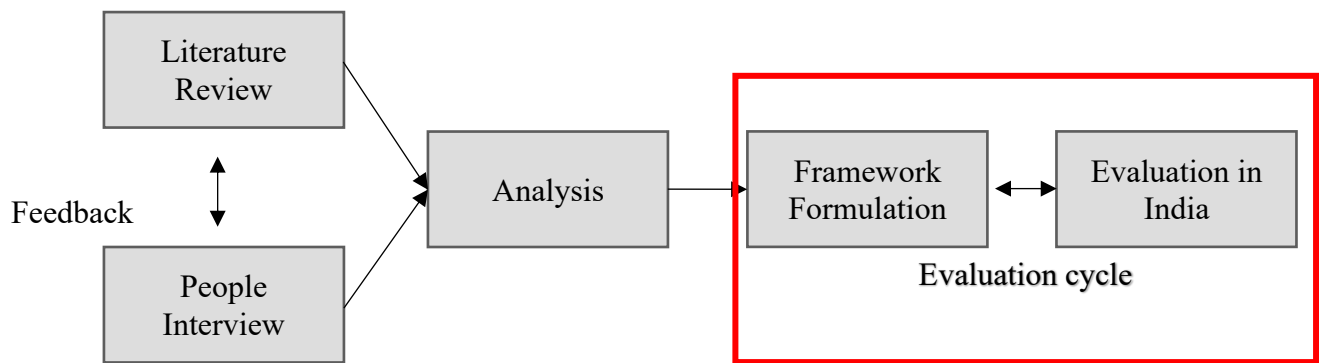
Figure 26 Evaluation cycle

The content which is subjected to the evaluation as part of the thesis is highlighted (Red) in the framework Fig 27. The evaluation was conducted via meeting with the stakeholders. The strategy is evaluated by the panel of the business area trade managers, global trade operation manager and global trade programme manager (7 Person). A series of 3 meetings were conducted to explain the best strategy for the firm and what are the pitfalls and advantages of each. The panel concluded that further sessions with the global logistics and operation head of each division must take place to set the guidance on the business area level. It was recommended by the author that divisions can pursue the country's strategy, and it was proven to be working in countries like Finland and Poland. Also, it was noted that in each country, each division should align itself with the common mode

of operations as the difference in strategy on a country level will again trigger the issue of the lack of visibility.
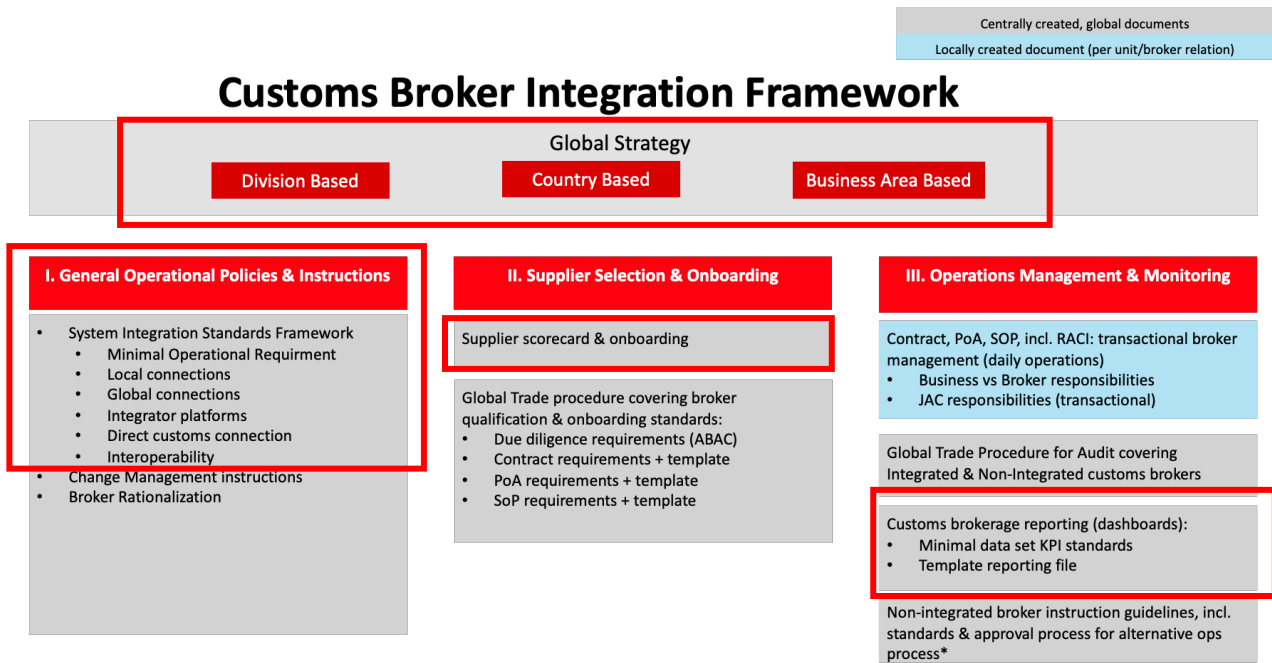

Figure 27 Evaluation of Framework

Rest of the framework elements, such as the system integration standards and the customs broker reporting are evaluated in India. In India, the firm kickstarted the customs broker integrations, one following the global template and another the regional template. The actuate integration development works did not occur during the time of the thesis; as a result, the evaluation of the framework is not supported by the quantitative method. For these parts of the framework are put to the test by holding informal meetings (with Customs managers, Customs broker, GTM IT, and others meeting every week from April till June) with the stakeholders. For example, the communications protocol between the customs broker and the GTM software is discussed to get confirmation on which is more feasible for them to implement. Based on the conversation, it was mentioned that having the XML protocol was preferred instead of EDI or others, as it was mentioned that ease of use of the XML makes it the choice. The changes in the middleware

(BIZtalk) were initiated to make the middleware able to determine based on the country and the broker, but it was contested by the system architects of BIZtalk that the logic to determine what broker model and the country lie in the GTM system rather than in the middleware as it will be far easier to maintain it in the GTM. Moreover, the global and regional template designs on the system integration were showcased to the broker to get feedback from them. In the case study country of India, 2 brokers are involved in the new integration project. The brokers first welcomed the approach, and more technical conversations took place with them. The evaluation was done for 2 models proposed.

A) Regional integration

B) Global integration

In the India case study, the customs broker (CB2) was an existing broker and was selected based on the volume of trade flowing with them and their ability to integrate via EDI to GTM. Based on the model, regional integration was proposed as the customs broker; even though it has a global presence, it was only used in a particular country alone. The GTM technical communicated with the broker team the technical requirement, and the XML model is suggested for the build as the broker has prior experience with it. After the initial conversation and during the project planning, the cost of developing the solution was insisted by the broker to be borne by the JAC; as a result, the project halted. This was an evaluation point to add the following question to the model on the broker selection to know about the brokers' ability to bear the development cost of the EDI connections. The initial calls took place with the customs broker account manager for JAC, the Customs manager of IN and the author.

In the same case study of India, global integration was proposed for another broker CB1 based on the volume of the trade flowing, and the global integration was proposed since other countries

already used the customs broker. The technical team proposed the solution to connect the XML, which is used by the other countries for customs communication, and additional requirements of the local customs team are incorporated in the same structure. This approach is agreed upon by the Customs broker technical team, and the cost of the integrations is absorbed by the broker as they are rolling out the existing functionality to a new country. And the project is running now.

The elements of the framework, such as supplier selection, were discussed with the trade manager, program manager and customs manager of the case study country for feedback. The initial reviews of the framework are captured informally in the meeting as it was on the completeness of the framework and find out if any crucial elements were missed. The feedback received based on the conversation is that the cost element and the return-on-investment calculation are to be explained in much more detail; also, the supplier selection questionnaire to add the cost elements of the integration was asked to be included.

7.1 Summary

As the whole framework is not subjected to evaluation, further evaluations are planned internally in the firm to ratify the strategy, integration approach and proof of concept for the integration platform. Hence, it is very early to conclude the evaluations; further studies and implementation will make the model more robust.

Chapter 8: Conclusion

This chapter concludes with the findings from the above chapters and further research needed in the domain of the standardisation of the approach for the integration and the global standards of communications with different business-to-business integrations.

The assessment of the problem statement relevance realised in Chapter 5 confirms that global firms and customs brokers are struggling to get the standardised system integrations that appear not optimally supported by current GTM implementations , and the communication between the brokers and the firms differs based on the technical capabilities of brokers. The main reason for the trade managers in the JAC being unable to visualize the data is that reports from brokers are not asked or sent. The research activities conducted on the different customs brokers and the firm's different divisions, the Customs Compliance Function, and the GTMS market allow the conclusion that business strategy on where to connect the brokers and how to connect to them play a vital role in the success of the customs broker integration. It is noted that because customs is a regional subject, the best strategy to be taken is the country-level strategy, as it gives the customs manager the ability to consolidate the customs brokers and create a uniform process in the country. So, in a nutshell, the following are the findings from the case study:

A) Firms' strategy to use the customs broker plays a role in which type of integrations are needed.

B) The GTM software is not optimized out of the box to aid in the integration of customs brokers.

C) The data visualization must be firm driven by rallying the suppliers (customs brokers).

D) The global strategy on customs is not recommendable as customs is a regional topic, and it needs the regional policy to execute it well.

E) The firm must decide on the integration methodology and should have flexibility as there is no one solution that fits all.

F) The global communications standards would aid in interoperability and reduce the development time for various stakeholders, and decisions must be made with the external stakeholders (customs brokers).

G) Selection of the supplier of desired capabilities will help the firm in achieving its strategic goals.

H) Apart from global guidance, local policies are to be drafted and implemented since contractual law is a regional topic.

I) Change management plays a vital role in the adoption of solutions; it is evident from the past implementation in the firm was not successful due to the less involvement of middle-level management.

The elements of the framework, which are presented in Fig. 26, are derived based on the findings mentioned above.
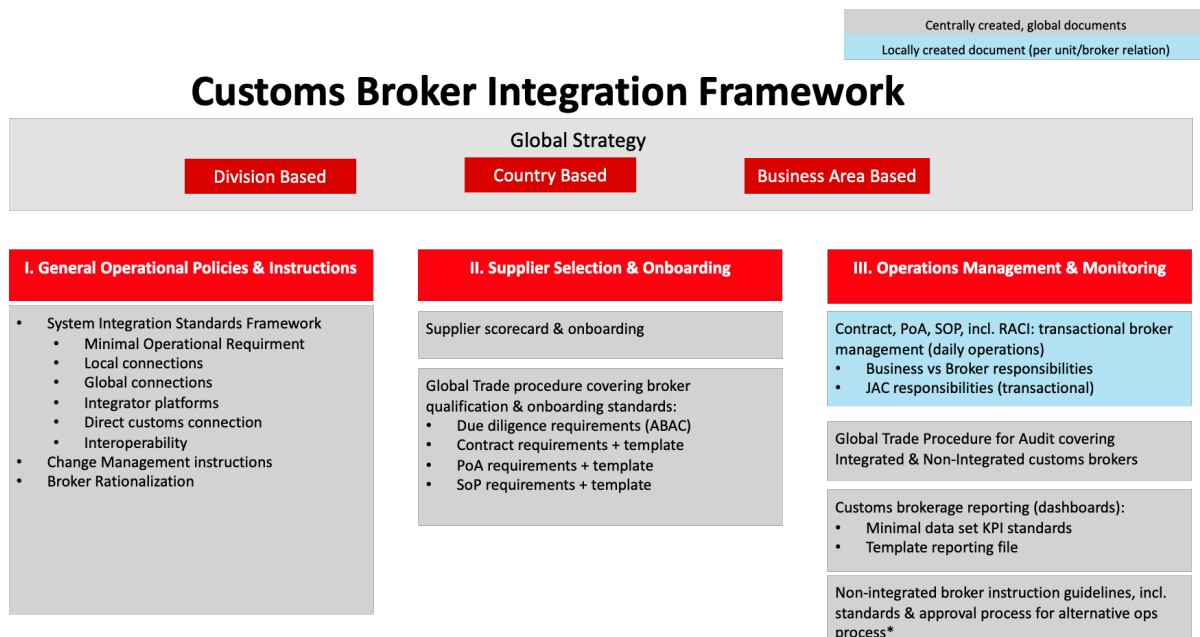

Figure 26 Customs broker integration framework

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Even though there are multiple elements which need to be developed for the overall framework, such as the auditing process for brokers and the monitoring of the global KPI, etc. The elements of the framework which need to be developed are added to the future projects in the firm. From the evaluation mentioned in Chapter 7, we can confide that the solution architecture and elements of supplier selection are functioning, and it is recommended by the IT department that the cost of development be reduced. The supplier selection criteria and the supplier scoreboard have been able to provide the guidance needed for the selection of the broker, which we can infer from the case study. The strategy part of the framework needs more stakeholder alignment as JAC is decentralized, but the stakeholders acknowledge the pros and cons of the different strategy outcomes and the impact on the organization. At the time of writing this thesis, the direction for the strategy is guided towards the country-wise strategy as it was showcased to have more pros than cons. The outcome of this will come from the firm as the trade domain leaders will meet with the transportation domain leaders in the upcoming Q4. Change management topic, even though it is not part of the thesis, recommendations are given to the management for proper change management; it has the following phases (Aladwani, 2001).

- **Knowledge Formulation Phase:** Effectively identify and evaluate the attitudes of the users and influential groups in the organisation and should include questions like.

    I.   Who is resisting the change and why?

    II.   What are the needs and interests?

    III.   What beliefs and values do they have?

Answers to these questions provide the necessary insight into the users, tailor the program to their needs, and educate them about change so that fear can be removed.

- **Strategy Implementation Phase:** Effective solution marketing and communication marketing is the key strategy to ensure the change can be implemented with less resistance. Aladwani, (2001) mentions that the following are stages in this phase

    I. Marketing the solution and explaining the system's benefits, the process and input, outputs of the system and ease of use.

    II. Influencing the affective component of the user's attitude by providing hands-on training and positively affecting the adoption attitude potential of users.

- **Status Evaluation Phase:** Effective monitoring processes and continuous change management are necessary for this phase to be implemented effectively.

Trade managers, CoE Trade and GTS IT, have welcomed the framework and expressed that further work needs to be completed on the whole framework to implement it, which will be done in a project cycle of its own.

8.1 Research Contributions

This research has contributed to the following findings, which need further study to refine the requirement.

A) Strategy of the firm on customs brokers, which needs to address why, how, and where.

B) Global standard for customs broker communication is needed.

But as the high-level framework, it contributes majorly to identifying the various functional and technical pillars which are necessary for such integrations and brings in the foundation for the digitalisation of the customs practices with indirect actors.

As for the practical contribution, the thesis provides the fundamental steps that need to be taken for customs broker integrations and explains the concept of the various integration types which are available and the main considerations for such integration are listed for further study.

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Appendix

Minimum data set for the broker communications

Questionnaire

01.03	Section	Technology		
01.03.01	Questions	Does your organization have the ability to digitally clear goods with customs authorities (Import, Export, Transit) ?	Yes / No	Any Value
01.03.02	Questions	Does your organization have the ability to digitally share that clearance data with ABB?	Yes / No	Any Value
01.03.03	Questions	If "Yes", what kind of method would be available?	The dropdown box is for the supplier to select, and it should include the following A)Via XML B)Via EDI C)Via SFTP D)Via Integration platform (ex Wisetech, Seeburger EDI)	Any Value
01.03.04	Questions	Does your organization have experience with such system integrations	Yes / No	
		If "Yes" kindly list out type of Integrations	Text (single line)	Any Value
01.03.05	Questions	Does your organization support the registration of cross-border movements of excise goods in the applicable registration system of the authorities?	Text (single line)	List of Choice
01.03.06	Questions	Does your organization offer dashboard showing : Processing status of declarations & Performance indicators?	Yes / No	Any Value
01.03.07	Questions	If "Yes" - Please provide a list of reports.		
01.03.08	Questions	Do your organizations have dedicated customs clearance systems?	Yes/No	
01.03.09	Questions	Does your organization have dedicated IT support team for working on integration projects?	Yes / No	
		If "Yes" - Please provide team size		

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Strategy pros and cons and overall outcome

| Sr No | Ownership | Possible Strategies | | Outcome | JAC outcome based on conversation with stakeholders | | | | | | Overall |
		Organization	Process		Process Alignment	Analytics Development	IT Development	Geography	Work Force	Cost	
1	Business Area level	Centralized	Self Filing	GTM/ middleware	+ (Standard SOP)	+ (Simple)	- (Complex)	-(time zone)	+ (less resources)	- (Costly)	- (not recommended)
2	Business Area level	Centralized	Broker	Regional/GTM	- (complex SOP)	- (Complex)	+ (Simple)	-(time zone)	+ (less resources)	+ (Cheap)	- (not recommended)
3	Business Area level	Centralized	Broker	Global/GTM	+ (Standard SOP)	+ (Simple)	+ (Simple)	-(time zone)	+ (less resources)	+ (Cheap)	+ (Recomended)
4	Business Area level	Centralized	Broker	Platform	+ (Standard SOP)	+ (Simple)	- (Complex)	-(time zone)	+ (less resources)	- (Costly)	+ (Recomended)
5	Business Area level	Decentralized	Self Filing	GTM/ middleware	- (complex SOP)	+ (Simple)	- (Complex)	+ (local)	- (More resources)	- (Costly)	- (not recommended)
6	Business Area level	Decentralized	Broker	Regional/GTM	- (complex SOP)	- (Complex)	+ (Simple)	+ (local)	- (More resources)	+ (Cheap)	- (not recommended)
7	Business Area level	Decentralized	Broker	Global/GTM	- (complex SOP)	+ (Simple)	+ (Simple)	+ (local)	- (More resources)	+ (Cheap)	+ (Recomended)
8	Business Area level	Decentralized	Broker	Platform	- (complex SOP)	+ (Simple)	- (Complex)	+ (local)	- (More resources)	- (Costly)	+ (Recomended)
9	Divison Level	Centralized	Self Filing	GTM/ middleware	+ (Standard SOP)	+ (Simple)	- (Complex)	-(time zone)	+ (less resources)	- (Costly)	- (not recommended)
10	Divison Level	Centralized	Broker	Regional/GTM	- (complex SOP)	- (Complex)	+ (Simple)	-(time zone)	+ (less resources)	+ (Cheap)	- (not recommended)
11	Divison Level	Centralized	Broker	Global/GTM	+ (Standard SOP)	+ (Simple)	+ (Simple)	-(time zone)	+ (less resources)	+ (Cheap)	+ (Recomended)
12	Divison Level	Centralized	Broker	Platform	+ (Standard SOP)	+ (Simple)	- (Complex)	-(time zone)	+ (less resources)	- (Costly)	+ (Recomended)
13	Divison Level	Decentralized	Self Filing	GTM/ middleware	- (complex SOP)	+ (Simple)	- (Complex)	+ (local)	- (More resources)	- (Costly)	- (not recommended)
14	Divison Level	Decentralized	Broker	Regional/GTM	- (complex SOP)	- (Complex)	+ (Simple)	+ (local)	- (More resources)	+ (Cheap)	- (not recommended)
15	Divison Level	Decentralized	Broker	Global/GTM	- (complex SOP)	+ (Simple)	+ (Simple)	+ (local)	- (More resources)	+ (Cheap)	+ (Recomended)
16	Divison Level	Decentralized	Broker	Platform	- (complex SOP)	+ (Simple)	- (Complex)	+ (local)	- (More resources)	- (Costly)	+ (Recomended)
17	Country Level	Centralized	Self Filing	GTM/ middleware	+ (Standard SOP)	+ (Simple)	- (Complex)	+ (local)	+ (less resources)	- (Costly)	+ (Recomended)
18	Country Level	Centralized	Broker	Regional/GTM	- (complex SOP)	- (Complex)	+ (Simple)	+ (local)	+ (less resources)	+ (Cheap)	+ (Recomended)
19	Country Level	Centralized	Broker	Global/GTM	+ (Standard SOP)	+ (Simple)	+ (Simple)	+ (local)	+ (less resources)	+ (Cheap)	+ (Recomended)
20	Country Level	Centralized	Broker	Platform	+ (Standard SOP)	+ (Simple)	- (Complex)	+ (local)	+ (less resources)	- (Costly)	+ (Recomended)
21	Country Level	Decentralized	Self Filing	GTM/ middleware	- (complex SOP)	+ (Simple)	- (Complex)	+ (local)	- (More resources)	- (Costly)	- (not recommended)
22	Country Level	Decentralized	Broker	Regional/GTM	- (complex SOP)	- (Complex)	+ (Simple)	+ (local)	- (More resources)	+ (Cheap)	- (not recommended)
23	Country Level	Decentralized	Broker	Global/GTM	- (complex SOP)	+ (Simple)	+ (Simple)	+ (local)	- (More resources)	+ (Cheap)	+ (Recomended)
24	Country Level	Decentralized	Broker	Platform	- (complex SOP)	+ (Simple)	- (Complex)	+ (local)	- (More resources)	- (Costly)	+ (Recomended)

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