Strategic: Jurnal Pendidikan Manajemen Bisnis

Journal homepage: https://ejournal.upi.edu/index.php/strategic/

Artificial intelligence and machine learning in supply chain decision-making in an organisation

Ram Prabhu Veluru, Santi Novani
Master of Business Administration Program, Institut Teknologi Bandung, Indonesia
*Correspondence: E-mail: ram_veluru@sbm-itb.ac.id

ABSTRACT

The apparel industry is characterised by a complex and culturally diverse global supply chain that requires a high degree of collaboration and is complex with multiple perspectives. We will use Soft System Methodology (SSM) to tackle this complex and ill-structured problem that needs a clear-cut solution.The project will involve conducting extensive market research, analysing business intelligence reports, surveying employees, and conducting interviews with top management, clients and suppliers of Asmara's founding office in Indonesia. There is a potential to improve efficiency, reduce costs, and enhance the customer experience. This thesis aims to analyze the impact of Artificial Intelligence and Machine Learning on the apparel industry. The suggested course of action using SSM involves involving stakeholders actively in deciding on transformational measures and instilling a sense of ownership in the change process.

ARTICLE INFO

Article History:
Submitted/Received 07 Feb 2023
First Revised 12 Feb 2023
Accepted 13 Feb 2023
First Available online 01 May 2023
*Publication Date 01 May 2023_*

Keyword:
Artificial intelligence,
Machine learning,
Supply chain management,
Decision making,
Predictive analytics, Automation,
Collaboration, Soft System Methodology

1. INTRODUCTION

The apparel industry is a complex and culturally diverse global supply chain (Christopher, 2006), and there is already a wealth of knowledge and research on the topic. For example, the apparel industry is one of the world's largest and most globalised industries, with a vast network of suppliers and customers spanning many countries and regions. However, we also know that the industry faces many challenges, including supply chain disruptions caused by the pandemic and geopolitical conflicts and increasing pressure to address sustainability and ESG concerns.

However, despite this wealth of knowledge, many gaps and missing links exist in our understanding of the apparel industry supply chain. For example, there is still little research on the specific challenges and opportunities facing companies like Asmara International Limited, with its extensive client base and network of suppliers. Additionally, while there have been some studies on the use of technology, such as AI and ML, in the apparel industry, much is still to be learned about how these technologies can be effectively integrated into supply chain management.

Addressing these gaps is significant because it can potentially create real value for stakeholders in the apparel industry, from suppliers and customers to employees and investors. By developing new technologies and strategies for managing the supply chain, we can improve efficiency, reduce waste and costs, and enhance the customer experience. Additionally, by addressing sustainability and ESG concerns, we can ensure that the industry is better equipped to address future challenges, such as climate change and resource scarcity.

The rationale of our study is to develop a technology-driven service application that can positively impact both the downstream and upstream supply chain at a global level for Asmara International Limited. Through the integration of AI and ML, we aim to create a more efficient and effective supply chain management system that can deliver better outcomes for all stakeholders. We hypothesise that leveraging the latest technologies and best practices in supply chain management can create a more agile and resilient supply chain that can better adapt to changing market conditions and customer needs. Additionally, by addressing sustainability and ESG concerns, we can ensure that Asmara International Limited remains a leader in the industry and is well-positioned for future growth and success.

2. METHOD

Research Design

Soft Systems Methodology (SSM) is a powerful approach to problem-solving and decision-making that can help organisations and individuals address complex and challenging problems in a structured and systematic way (Checkland, 1999; Jackson, 2001; Petkov, 2007). Its focus on stakeholder engagement shared understanding, and practical solutions make it a valuable tool for anyone seeking to improve complex systems. SSM approach explained in **Table 1.**

DOI: https://doi.org/10.17509/strategic.v23i1
p-ISSN: 1412-1964 and e-ISSN 2684-8066

Table 1.
SSM approach

Approach	Description
Inquiring systems	A process of inquiry to identify and understand the different perspectives and assumptions that stakeholders bring to a problem situation through interviews, focus groups, and other forms of dialogue.
Expressing human activity systems	Developing visual tools, such as rich pictures, diagrams, and flowcharts, to represent the different aspects of a human activity system.
Comparing ideal and real activity systems	Comparing the current state of a human activity system with an idealised version of the system and identifying discrepancies.
Conceptual modelling of real-world systems	Developing a simplified model of a real-world system to guide decision-making and problem-solving, using abstraction and generalisation to create a model that is simple enough to be understood by stakeholders but comprehensive enough to capture the complexity of the system.

Data Analysis Method

Soft Systems Methodology (SSM) emphasises the importance of engaging with stakeholders throughout the problem-solving process, including data analysis. The data analysis process in SSM involves several steps following **Table 2.**

Table 2.
Steps in SSM analysis methods

Steps in SSM Data Analysis Method	Description
Categorising and clustering data	Organise the collected data by grouping them into categories and clusters to identify patterns, similarities, and differences.
Identifying perspectives and assumptions	Analyse the data to identify stakeholders' perspectives and assumptions about the problem.
Developing conceptual models	Develop conceptual models that represent the different perspectives and assumptions identified in the data.
Comparing ideal and real-world systems	Compare the conceptual models with an idealised version of the system to identify discrepancies and gaps between the current situation and an idealised version of the system.
Evaluating potential solutions	Evaluate potential solutions based on the conceptual models and the gaps identified, and develop scenarios to test the effectiveness of different solutions.
Refining the conceptual models	Refine the conceptual models based on the insights gained through the data analysis process, and revise the models to make them more useful for problem-solving and decision-making.

The data analysis process will involve stakeholders to ensure their perspectives are considered and facilitate a shared understanding of the problem, which can help to ensure that the resulting solutions are practical, sustainable, and effective. It's important to note that these steps are not always linear and may occur simultaneously or differently depending on

DOI: https://doi.org/10.17509/strategic.v23i1
p-ISSN: 1412-1964 and e-ISSN 2684-8066

the specific problem situation and the available data. Additionally, stakeholder involvement is critical throughout the data analysis process to ensure their perspectives and insights are incorporated into the resulting solutions.

3. RESULT AND DISCUSSION

Analysis of Soft System Methodology

In this section, we will employ the soft systems methodology in Asmara, utilizing a service system science perspective. This involves applying the seven stages of SSM to analyze and address the challenges and opportunities within Asmara.

Stage One: Addressing the Perceived Problematic Situation

In recent years, technology has played a pivotal role in improving efficiency, and it requires immediate attention at Asmara. The integration of technology and innovation will lead to qualified results, fostering a synergy that drives further progress in the organization. After collaborating with key stakeholders at Asmara regarding the digital transformation of all its operations, it has been recommended that Asmara actively focuses on its service platforms' functional benefits and features.

Asmara's primary goal has been to enhance customer experience while improving supply chain efficiency and forecasting methods. To achieve this, we have decided to concentrate on five functional benefits while designing and developing the features of the service platforms. These include: differentiation in products and services, ease of operation, collective learning and engagement, easy accessibility to useful information, demand forecast and speed.

Stage Two: Rich Picture of Asmara Supply Chain Process

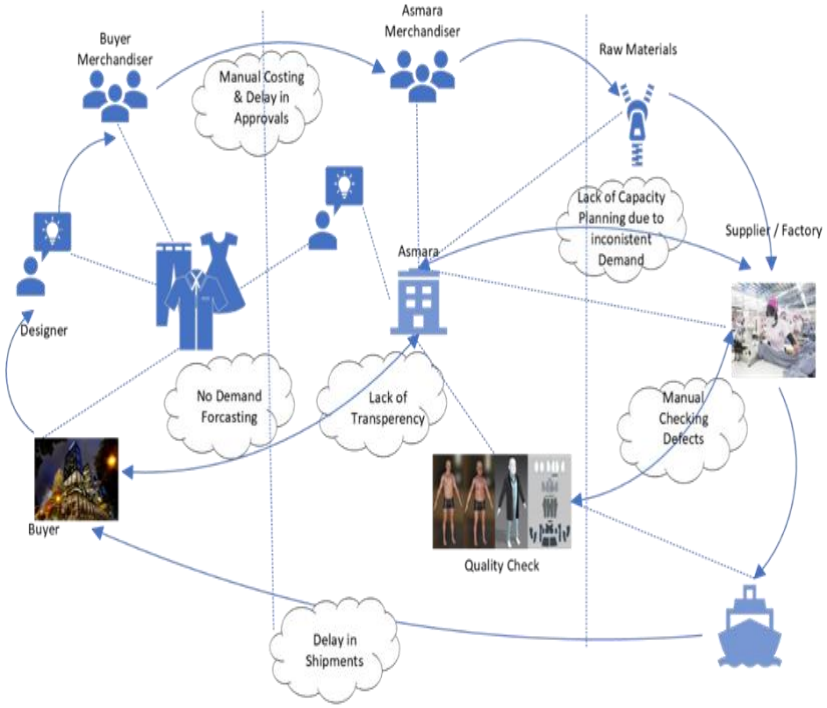

Figure 1.

Asmara supply chain rich map diagram

DOI: https://doi.org/10.17509/strategic.v23i1
p-ISSN: 1412-1964 and e-ISSN 2684-8066

As shown in **Figure 1.** The Rich Picture Diagram is useful because it allows stakeholders to visualise the problem situation in a way that is more concrete and understandable than text-based descriptions. The outcome of this stage is a set of root definitions that provide a clear understanding of the problem situation and serve as a basis for developing conceptual models in the next stage of the methodology.

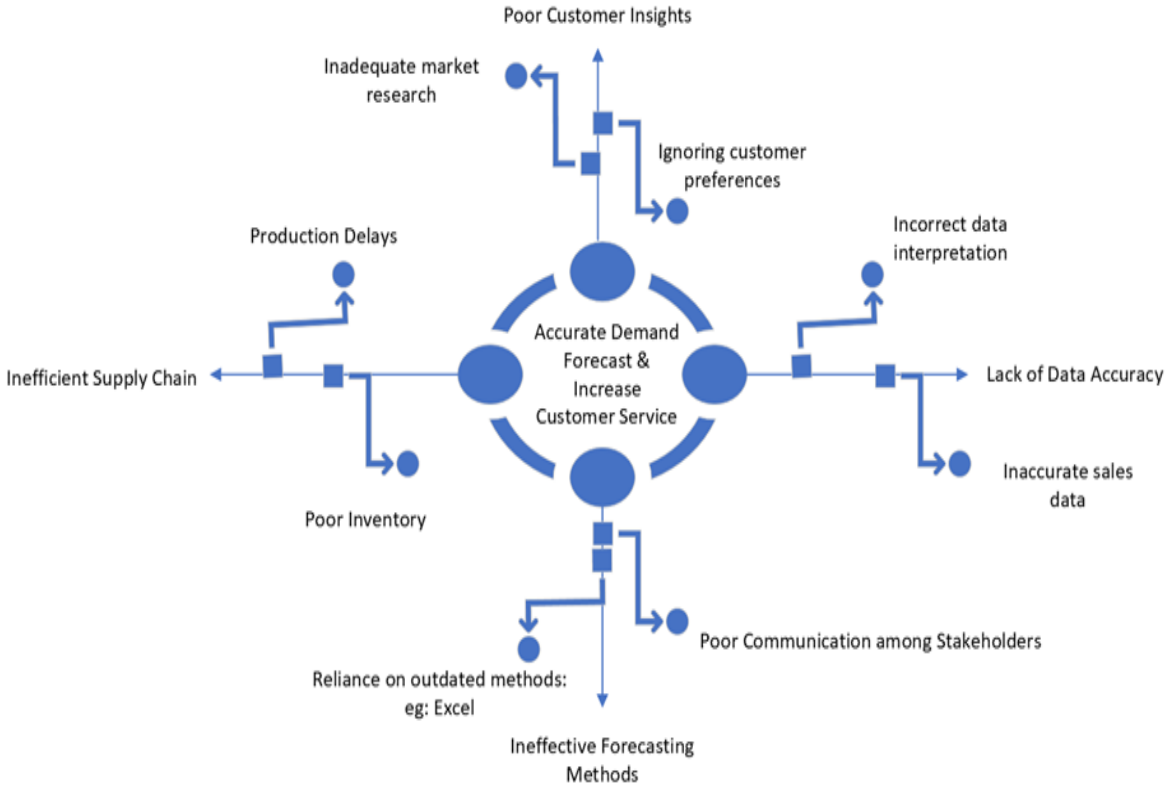

Figure 2.
Cause map diagram

Figure 2. explains the cause map diagram in Asmara Supply Chain. Factors that Affecting Asmara Growth & Profits:

a. Lack of Data Accuracy: Incomplete sales data, inaccurate sales data, incorrect data interpretation and Data entry errors
b. Poor Customer Insights: Inadequate market research, Limited customer feedback, ignoring customer preferences and Misunderstanding customer demographics.
c. Inefficient Supply Chain: Long lead times,
d. Poor inventory management, Production delays, Ineffective Forecasting Methods, and Reliance on outdated methods.
e. Ineffective Forecasting Methods: Poor communication among stakeholders and Overreliance on subjective opinions

Outputs/Consequences or effects of the problem:

a. Overstocked or understocked inventory & Delay in Shipment
b. Missed sales opportunities
c. Wasted resources
d. Lost revenue and profits

DOI: https://doi.org/10.17509/strategic.v23i1
p-ISSN: 1412-1964 and e-ISSN 2684-8066

Stage Three: Structure of Situation and Relevant Purposeful Systems

As a result of conducting a comprehensive analysis of the supply chain processes, the management and key stakeholders acknowledged the root causes of inefficiencies and wastage. The report developed using the SSM approach provided a clear understanding of the problem areas and recommended strategies to eliminate inefficiencies and waste. Keeping customer experience as a benefits focus, strategic moves, KPIs (Key Performance Indicators), and strategic options to accomplish those moves are listed below in **Table 3.**

Table 3.
Strategic options

Customer Centric Benefit Focus – CUSTOMER EXPERIENCE			
Strategic Moves	Key Performance Indicator (KPI)	Strategic Option 1	Strategic Option 2
Strengthening Global Presence	Increase in business in EU and USA and develop business in UK, South America & Asia Pacific.	Opening large offices with a design team and brick-and-mortar product development showrooms in key markets.	Small offices empowered with overall market strategy and virtual design incubators. Develop an app with the ability to collaborate with suppliers and clients to provide exclusive, focused, and latest product development
Differentiation in Product and Services	YoY[1] increase of business for each category/segment.	Centralised brick-and-mortar Design Studios in many cities and countries.	Forecasting with Virtual Design Incubators without disrupting the current location of designers.
Agility and Speed Flexibility and Reliance	Reduction in Lead time. OTD [3] Performance.	Extension of DRIVE software to suppliers and clients.	Extension of DRIVE software to suppliers, & clients and launching and integrations with a software application that can enhance communication.
Enhancing Competencies of Resources	Quantification of Qualitative Performance	To enhance the performance of its associates, structure a comprehensive learning program.	An efficient mix of the learning program and virtual learning software application equipped with highly flexible learning features
Support for Sustainability and ESG initiatives	Quantification to measure progress YoY basis.	To open a cost centre in each country to develop and measure YoY progress	Use of digital power to develop and measure YoY progress.

Notes:

1) YoY stands for Year on Year

DOI: https://doi.org/10.17509/strategic.v23i1
p-ISSN: 1412-1964 and e-ISSN 2684-8066

2) DRIVE – an internal window-based digital platform developed by Asmara International Limited, currently open to only Asmara associates globally to monitor delivery performance on critical activities of all purchase orders.
3) OTD stands for On-Time Delivery

Traditionally, sourcing services were limited to strategic options such as investing in physical offices, engaging in in-person interactions, developing tangible prototypes, and managing data through traditional software. However, with the advent of digital disruptions, Asmara seeks to invest in digital technology architecture to manage its sourcing operations. This includes the creation of a virtual design incubator to enhance product development speed, develop 3D-powered prototypes, and acquire data for reporting purposes. Through digital transformation, Asmara aims to improve the client, supplier, and employee experience while enhancing operational excellence and product differentiation. By leveraging technology, Asmara can empower its employees and suppliers, increase performance, and offer speedy quality services to clients while upscaling its capabilities in information services.

Stage Four: Asmara Conceptual Framework

Analysing relationships and interactions between the management and suppliers, customers, and other stakeholders in the supply chain helped identify areas where collaboration and communication could be improved. This led to stronger partnerships with suppliers and other stakeholders in the supply chain. The below **Figure 3.** represent the conceptual framework to bridge the gaps to address the problem situation to solve the research question.

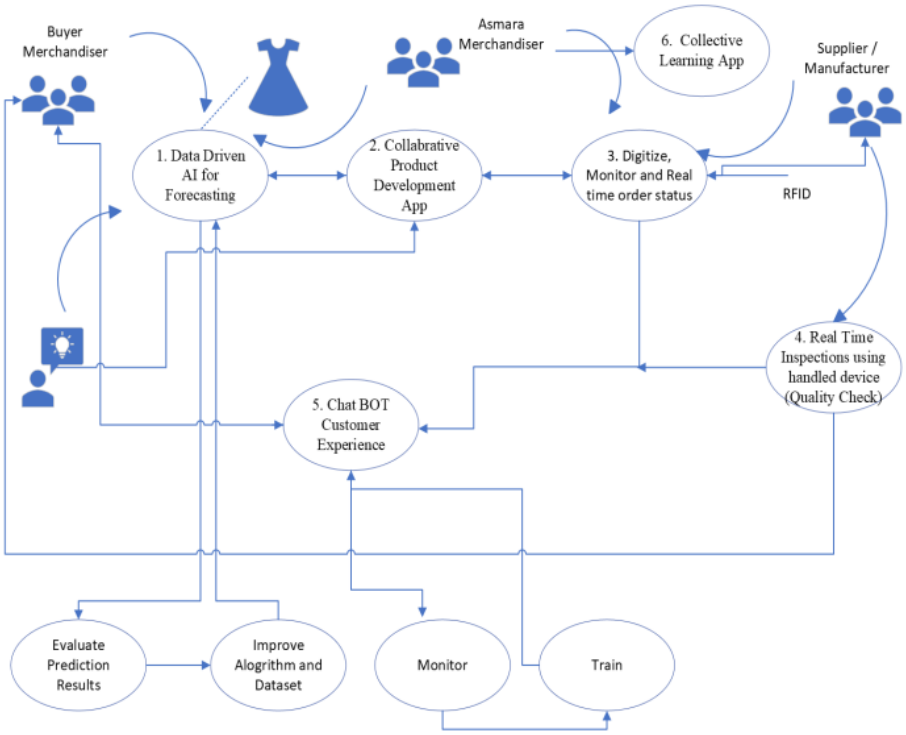

Figure 3.
Asmara conceptual framework

Comprehensive surveys and interviews are conducted to determine the optimal strategic options for each move. The project is planned to launch in one of the Asmara sourcing

DOI: https://doi.org/10.17509/strategic.v23i1
p-ISSN: 1412-1964 and e-ISSN 2684-8066

locations and then gradually scale it to all global offices. As part of this process, a thorough online "client survey" was conducted for clients of Asmara. The survey included Asmara's oldest global client, Tom Tailor GMBH; one of its largest clients, Abercrombie and Fitch, both of whom represent 50% of Asmara's global revenue, as well as several other clients of Asmara who are expected to be growth drivers in the future. A total of 14 responses were recorded for the client survey. In addition, an online "supplier survey" is conducted for both the suppliers of the Asmara office and cross-functional heads. The survey was conducted for 30% of the total suppliers, but these suppliers manage more than 45% of the business value of Asmara. Also, a survey was conducted for 30% of the cross-functional heads of Asmara. A total of 53 responses are recorded for the "supplier survey".

To ensure alignment of objectives and management commitment to recommended strategic moves and directions, a series of interviews were conducted with top management at Asmara. These interviews lasted a cumulative total of 20 hours and took place between January 2023 and March 2023. Interviewees included Mr Avdhesh Sharma, CEO, a working Shareholder; Mr Hemant Jain, Country Manager for Indonesia; Mr Gaurav Ajit Roop Chand, Finance Manager for Indonesia; and Mr Sandi Surya, IT manager of Digital Technology.

The results of the online surveys and interviews, provided a clear mandate for exploring and developing a digital technology architecture to manage sourcing operations effectively and efficiently. These findings also highlighted the importance of empowering Asmara's global resources and supply chain partners and enhancing operational excellence and product development.

Stage Five: Comparison of Models with Reality

During step 5 of the SSM process, the ideal state undergoes a comparison and adjustment process, taking into account the real-world context as shown in **Table 2.** This is done in order to formulate final actions that are both applicable and feasible in the real world, ensuring that the proposed actions effectively address the problematic situation. The evaluation of these tables was conducted in relation to the provided problem situation.

Table 2.
Comparison of models with reality

Proposed Activities in Model	Ideal State	Real World	What Asmara Can Do
1. Data Driven AI forecasting	an ideal state for data-driven AI forecasting would involve a system that can accurately predict demand for specific products and materials, anticipate trends, and optimise the supply chain to minimise costs and lead times while maximising Quality and sustainability.	Data-driven AI forecasting can help companies to better understand consumer demand and optimise their supply chain, leading to improved efficiency, cost savings, and higher customer satisfaction.	Using historical sales data, consumer trend data, Social Media data, and other relevant data points, Asmara could create accurate demand forecasts, optimise its supply chain, and make data-driven decisions about sourcing and production

DOI: https://doi.org/10.17509/strategic.v23i1
p-ISSN: 1412-1964 and e-ISSN 2684-8066

Proposed Activities in Model	Ideal State	Real World	What Asmara Can Do
2. Collaborative Product Development App	an ideal state for a collaborative product development app would involve a platform that enables apparel companies to collaborate with their suppliers and partners throughout the product development process. The app would need to be easy to use, customisable, and provide real-time insights and communication capabilities to all parties involved in the development process.	It helps companies to streamline their product development process and improve collaboration with their suppliers and partners.	By providing a centralised platform for collaboration and automating workflows and processes, Asmara can streamline its product development process, reducing manual effort and improving efficiency.
3.Digitize, Monitor & Real-Time order status	provide real-time visibility and communication capabilities to all parties involved in the supply chain.	The platform should support order management capabilities, enabling companies to create, manage, and track their orders throughout the supply chain.	Enhance the existing platform DRIVE and enable the visibility to their clients
4.Real-time inspection using handled devices	Real-time inspection technology provides detailed data on defect rates, root causes, and trends, enabling proactive quality management	Real-time inspection data may require manual processing or analysis to be actionable	Asmara can invest in data analysis tools and processes to turn real-time inspection data into insights that can inform quality management decisions and process improvements
5. Chat BOT for Customer Experience	Chatbots provide a seamless and personalised experience for customers, with the ability to handle a wide range of queries and tasks	Chatbot performance can vary based on factors such as user input, language, and technical issues	Asmara designs chatbots with user experience in mind, ensuring they are intuitive, responsive, and able to handle a wide range of queries and tasks, as well as regularly monitors and optimises chatbot performance

DOI: https://doi.org/10.17509/strategic.v23i1
p-ISSN: 1412-1964 and e-ISSN 2684-8066

Proposed Activities in Model	Ideal State	Real World	What Asmara Can Do
6. Collective Learning App	E-learning app provides a seamless and intuitive experience for users, with personalised learning paths and interactive features	User experience can vary based on factors such as usability, content quality, and technical issues	Asmara can design e-learning apps with user experience in mind, ensuring it is intuitive, engaging, and able to provide personalised learning paths and interactive features, as well as regularly monitor and optimise the user experience.
7. RFID Automation	RFID tags enable end-to-end visibility across the supply chain, from manufacturing to Delivery	RFID data may be limited to certain stages of the supply chain or specific products	Asmara to work with their suppliers and partners to adopt RFID technology and share data, as well as invest in middleware and other tools to integrate RFID data with other systems.

Business Solution

Stage Six: Solution Analysis: Recommended Strategic Moves

The SSM approach helped to identify the most effective solutions to address the problems of inefficiencies in the supply chain and ineffective forecasting methods as shows in **Figure 4.** This led to the development of strategies such as adopting modern technology and software tools for supply chain management and forecasting and implementing a comprehensive training program for employees. The gamut of all Asmara's service platforms, including existing ones like FLO and DRIVE and proposed ones, is encapsulated in the figure below.

Figure 4.
Gamut of asmara service platforms

DOI: https://doi.org/10.17509/strategic.v23i1
p-ISSN: 1412-1964 and e-ISSN 2684-8066

StyleGenie App– AI-Based Forecasting

Purpose : The e-commerce industry is currently grappling with the significant task of anticipating upcoming fashion trends. However, despite being armed with vast amounts of data, these companies struggle to comprehend customers' preferences and their buying tendencies. Typically, such enterprises spend several months making educated guesses on customers' clothing choices, followed by preparing and introducing the merchandise to the market, which can take several months.

Process : This platform is based on the idea of an AI-based solution to tackle the time delay associated with predicting fashion trends. The company's approach involves scanning the digital space, including fashion portals, social media, and customer data, using computer vision and machine learning to discern customer preferences. The insights gained are shared with the ML tools that implement them into designs and introduce the finished product suggestions to Asmara Design and Merchandising Team. The system then uses customer purchasing data to learn and recommend the best products. Collaborative filtering is applied to demographic data collected from the company's database, allowing the system to recommend clothing options such as designs, printing patterns, and sizes based on metadata associated with the demographic data.

Value Proposition : The integration of AI in Asmara Supply Chain forecasting will enable to release of collections much faster. Typically, brands sell only 50% of their new collections at full price over a period of 4-6 months, with the remainder sold at discounted prices. However, the utilisation of AI technologies has the potential to enable brands to sell 80% of their new inventory at full price within just two months.

Shasha ChatBOT– Supervised Learning

Purpose: The chatbot's purpose is to enhance customer experience and provide efficient and personalised support to customers, improve customer satisfaction, and reduce customer service costs for businesses. Chatbots are programmed to understand customer queries and provide relevant information, answer frequently asked questions, and even help customers get complete real-time order status visibility. Moreover, they can be available 24/7, allowing customers to get help whenever they need it. Chatbots can improve customer satisfaction and help businesses build a positive reputation by providing fast and accurate responses. Chatbots can also help reduce customer service costs by handling routine inquiries, freeing human agents to focus on more complex issues. Overall, the purpose of a chatbot in customer experience is to provide quick and effective support to customers while also reducing costs and improving efficiency for businesses.

Process : The purpose of this system is to enhance customer service and provide real-time visibility of order status. It is built on the Microsoft Power Apps platform and is integrated with Microsoft Teams. The system utilises a guided menu that is internally linked with ERP modules to retrieve order information and present it to clients and users in real time. Additionally, the system will be periodically trained in a controlled environment to improve and enrich the customer experience.

Value Proposition: Having a chatbot will have the following common benefits:

1. Improved customer service: Chatbots can respond quickly and efficiently to customer inquiries, reducing wait times and increasing customer satisfaction.
2. 24/7 availability: Unlike human customer service representatives with limited working

DOI: https://doi.org/10.17509/strategic.v23i1
p-ISSN: 1412-1964 and e-ISSN 2684-8066

hours, chatbots can operate around the clock, providing customers with assistance whenever needed.
3. Cost savings: the bot can handle a large volume of inquiries at once, reducing the need for human customer service representatives and lower labourosts.
4. Increased efficiency: Shasha bot can automate routine tasks, freeing up employees to focus on more complex or strategic tasks.
5. Personalisation: With advanced machine learning and natural language processing capabilities, the Shasha chatbot can provide personalised responses and recommendations to customers based on their preferences and behaviour.

Overall, the Shasha chatbot can improve customer experience, save time and money, and increase efficiency for businesses.

ProtoShare – A collaborative product development app

Objective: To establish a virtual design incubator platform for collaborative product development.

Methodology: The platform aims to enable virtual collaboration among designers across all Asmara offices, suppliers, and clients, allowing for rapid product evolution without the need for physical meetings. Using CLO 3: 3D Design software, the platform digitises fabrics and patterns, enabling interactions between segments, sub-segments, categories, clients, countries of production, Asmara branches, and Asmara designers, resulting in a focused design basket equipped with necessary tools such as digitised materials and silhouettes. This empowers Asmara designers worldwide to offer clients exclusive and useful design services weekly or fortnightly. Each design basket is led by the biggest stakeholder of the business, ensuring only high-quality and useful information is stored inside. Multiple design baskets offer leadership opportunities to Asmara designers worldwide, providing mainstream integration and recognition for each designer's effort.

Value Proposition: As a collaborative design platform, the virtual design incubator offers worldwide Asmara designers the ability to collaborate with suppliers and clients to provide exclusive, focused, and latest product development through 3D design software. It allows Asmara's clients to receive continual product development efficiently and at lightning speed, breaking homogeneity and offering differentiated products to their consumers without wasting costly resources.

CoLearn – A collective Learning app

Purpose: This initiative aims to develop a digital e-learning library and collective learning app that encourages Asmara associates to share their professional experiences in a structured format, empowering competencies such as effective presentation and addressing context, issues, and solutions impactfully. In addition, the platform aims to enable cross-functional experts to share their real-life professional experiences with all associates globally and facilitate recognition and interactions of associates with other associates and guidance from top management.

Process: The focus of this customer-centric service platform cannot be fully realised through diverse service platforms alone. A value architect is required to empower knowledge, skillsets, and competencies to each associate of Asmara globally, enhancing their potential. This platform is an endeavour to address this void. The service platform allows participants to share and learn from one another's professional experiences, capturing key learnings to scale it in the future to train associates across supply chain partners. A fortnightly learning interaction among presenters, appraisers, and each associate of Asmara's all global offices

DOI: https://doi.org/10.17509/strategic.v23i1
p-ISSN: 1412-1964 and e-ISSN 2684-8066

aim to inculcate learning skills through fixed templates prompting presenters to think on topic relevance in 8-20 words (why?), the context in 2/4 sentences (what is at stake?), structure in 10-15 bullet points, and presentation skills (how?) 4/5 images or 60 sec 120 sec (video). The system randomly picks up two presenters every week, one from the merchandising function and the other from the rest of the function in proportion to the organisation's functional strength. Appraisers are also chosen randomly from top management. A mandatory rating from all associates in 2 weeks, accessibility to rate only once content is viewed, and investment of only 5 minutes at discretion for any presentation make this an efficient platform to share and learn across all associates having diverse job functions. Additionally, the platform would be a source of recognition and inspiration for associates as the content is evaluated by a top management appraiser and rated by all associates. Easy-to-follow steps to structure, store, and file each presentation into a relevant section ensure that the presentation is duly stored under a specific header and subsection, allowing it to be accessible at ease in the future. Rating a presentation helps differentiate presentations within a header and subsection.

Value Proposition: For cross-functional experts of Asmara globally who seek to share and learn collectively, the collective learning app is a platform to scale up the learnings and competencies of each associate of Asmara, creating a strong differentiating value attribute for the company and enhancing the Quality of interactions of Asmara's associates with clients and suppliers.

Key Takeaways: The main points covered in this chapter include describing Asmara's digital transformation software, with customer experience at the centre of its benefits. The software ensures differentiation in products and services, ease of operation, collective learning, easy accessibility to useful information, and Speed as functional benefits. Asmara plans to scale FLO, a digital service platform for quality audits and real-time quality audit reporting, to suppliers and clients. Additionally, Asmara plans to scale DRIVE, a digital service platform for real-time access to performance on critical processes, and improve On-Time Delivery performance, to suppliers and clients.

Furthermore, Asmara is also planning to develop a virtual design incubator, the Collaborative Product Development app, which enables virtual collaborative product development using CLO 3: 3-D design software, reducing the need for physical prototype development and minimising in-person dependence on product development. Additionally, they have plans to develop the StyleGenie-AI Based forecasting app, which aims to increase the Speed to market. Lastly, Asmara is looking to enhance its customer service by introducing the Shasha ChatBOT.

Monitoring and Evaluation

The Final Stage of the SSM approach has been utilised in this section to evaluate the effectiveness of the action plan strategies, enabling tracking of key performance indicators, identifying areas for improvement, and necessary modifications to the strategies. By implementing continuous improvement procedures, Asmara can ensure the optimisation of its supply chain operations.

Plan of Action: Involving and Communicating with Asmara's Customers

Asmara has developed a concrete action plan to convey a uniform brand value to all stakeholders in the supply chain. The plan involves creating a CRM-centric full-time functional

DOI: https://doi.org/10.17509/strategic.v23i1
p-ISSN: 1412-1964 and e-ISSN 2684-8066

role, which will be a part of a newly designed cost centre consisting of strategy, CRM, and digital functions. The role will be led by a top management representative with global participation, and a talented full-time professional will head the team. The team will be structured by defined processes, supported by software applications, and benchmarked by customised customer-centric KPIs. The blueprint for the entire digital transformation and the creation and constitution of the new cost centre will be prepared over an 11-week period, starting from August 15, 2023, through October 31, 2023.

As a part of the strategy, CRM, and digital functional role, the following steps are recommended:

1. Conduct client visits with the Country Managers once a year to review strategy, receive in-person feedback on KPIs, and evaluate performance on operations and product development.
2. Engage with stakeholders through quarterly surveys, especially to understand their feedback on how the company can excel and enhance the capabilities of its resources and supply chain partners.
3. Frame opportunities based on client feedback, reset and publish KPIs for BUs, and review progress half-yearly for all stakeholders, including Asmara associates and its supply chain partners.
4. Continually upgrade CRM software application with a cross-functional change/transformational team.
5. Work on strategic talent management, collective engagement, and learning of Asmara associates and its supply chain partners and incentives at the BU level by tying business strategy with measurable KPIs.
6. Recruit business strategists and market leads.
7. Enhance the visibility of the company's brand value to its worldwide clients and non-clients by working on social platforms such as LinkedIn.

Asmara is recommended to take a series of actions to enhance its visible and non-visible brand values and achieve its goals of desirability and visibility. A crucial step is establishing a centralised cost centre consisting of functional roles for strategy, CRM, and digital transformation, led by top management with global participation. The centre should have defined processes, software applications, and customised customer-centric KPIs for benchmarking. To support the centre, a change/transformational team should focus on strategic talent management, collective engagement and learning of Asmara associates and its supply chain partners, and incentives at the BU level by aligning business strategy with measurable KPIs. Asmara should also hire business strategists and market leads and utilise social platforms like LinkedIn for communication. To accomplish these actions, Asmara should allocate 11 weeks, starting from July 15, 2023, to prepare a blueprint and develop a comprehensive constitution of the new cost centre integrating Digital, CRM, and strategy implementation.

Existing Asmara IT Systems and Implementation Plan

To begin, Asmara International Limited's existing architecture was analysed to comprehend its hardware, programs, data, processes, and personnel as show in **Figure 5**. As a result, Asmara has established a basic information system utilising cloud computing services from Microsoft Azure, CAD/CAM machines, and desktop, laptop, and tablet devices, as well as a program from WFX, a leading third-party software company in India's fashion industry. Asmara's vision has also resulted in the launch of two software applications, FLO and DRIVE, created by a team of one senior developer and two junior programmers, on their platform.

DOI: https://doi.org/10.17509/strategic.v23i1
p-ISSN: 1412-1964 and e-ISSN 2684-8066

DRIVE is a window-based application that manages timelines for all purchase contracts' critical tasks, while FLO is an Android-based application that standardises quality auditing procedures and offers access to online quality audit reporting. Asmara has also given its global workforce access to hardware and CLO 3-3D software to enhance virtual product development capabilities. Components of Asmara International Limited IT Systems

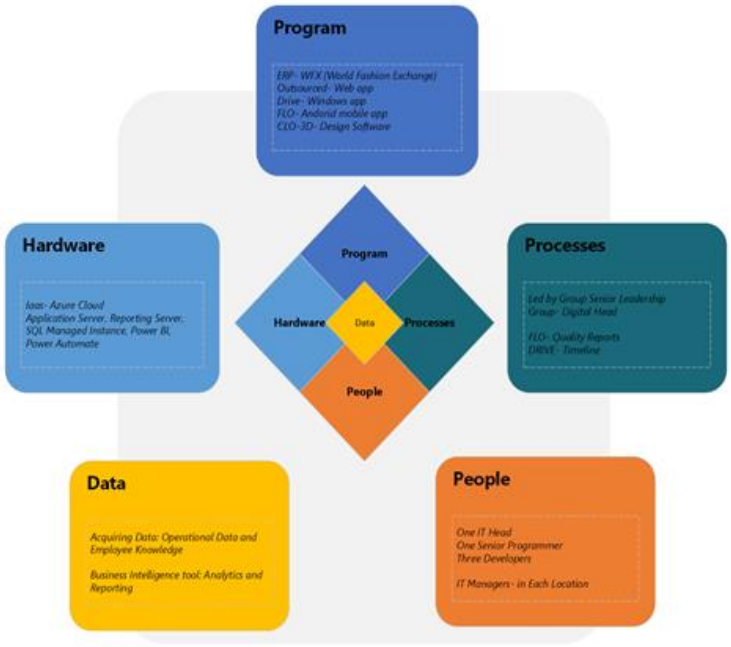

Figure 5.
Components of Asmara international limited IT systems

Stage Seven: Accepted Digital Transformation Action Plan

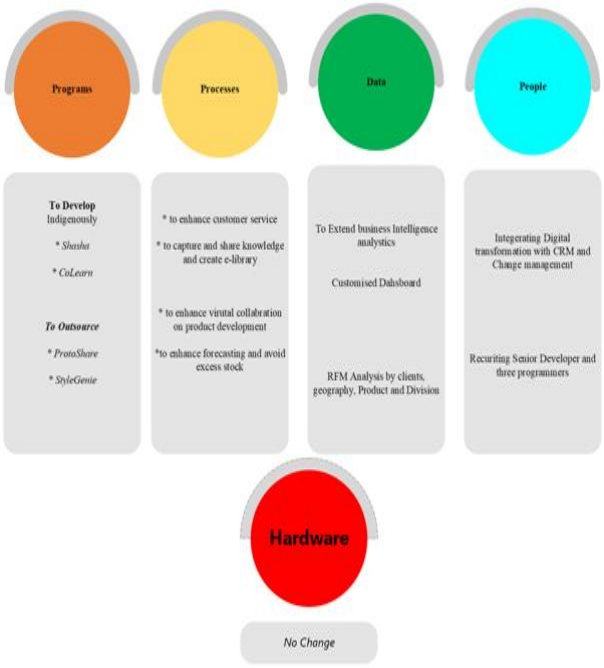

Figure 6.
Recommendation on digital transformation: action plan

Notes : RFM Stands for Recency, Frequency and Monetary Value

DOI: https://doi.org/10.17509/strategic.v23i1
p-ISSN: 1412-1964 and e-ISSN 2684-8066

Base on **Figure 6.** Asmara embarked on its digital transformation journey around the time this capstone project was initiated. However, the company had already foreseen the need for empowered partners in the supply chain to cope with the unpredictable business environment. As a result, the company has laid the foundation for a digital transformation and is now poised to make significant strides in this area in the years to come. To this end, it is recommended that Asmara establish a new cost centre that integrates digital transformation with CRM and strategy. Additionally, the company should launch new digital applications that enable all-round operational excellence and product development while also enhancing its business intelligence capabilities for reporting and establishing a foundation for machine learning and predictive analytic tools.

Monitoring the Effects of Extending These Moves on Suppliers, Asmara, and Clients

The recommended strategic moves aim to capture qualitative functional and ultimate benefits for Asmara's clients. However, **Table 5.** describe measuring these impacts quantitatively is challenging, and it is crucial to ensure that progressive all round benefits are periodically quantified and communicated during and after implementation. Furthermore, these benefits must evolve over time to objectively measure the impact of these platforms in the long run. The table summarises the discussion with Asmara's top management on capturing and measuring the quantitative impact on KPIs for each software application and its functional impact. By agreeing on these KPIs and regularly analysing the data in the future, the implementation and evolution of the digital architecture can be empowered over time.

Table 5.
Measuring impact of extending these moves among suppliers, Asmara, and clients.

Strategic Moves (Medium)	KPI	Period of review	Differentiation	Speed & On Time Delivery	WTP	Quality	Efficiency, Ease of Communication, & Flexibility	Collective Engagement & Competencies	Customer Experience
FLO	Final Inspection Pass rate	Monthly							
	Customer Quality Complaint	Monthly							
DRIVE	On Time Delivery Reports	Quarterly							
	Task Performance by Buying Contract/s	Monthly							
PROTOSHARE-COLLABORATIVE PRODUCT DEVELOPMENT APP	Participation of Stakeholders for a Design Basket	Half yearly							
	# Of Collections sent	Quarterly							
	Conversion on ODM	Quarterly							
COLEARN-COLLECTIVE LEARNING APP	All round Participation	Quarterly							
	Global Rating on Presentations	Yearly							
STYLEGENIE-AI BASED FORECASTING	Business Growth	Yearly							
SHASHA BOT-ML SUPERVISED LEARNING	Customer Satisfaction	Yearly							

IMPACT	
Positive	Highly Positive

DOI: https://doi.org/10.17509/strategic.v23i1
p-ISSN: 1412-1964 and e-ISSN 2684-8066

4. CONCLUSION AND RECOMMENDATION

The supply chain industry is becoming increasingly complex and volatile due to the growing demands of customers, the globalisation of trade, and the emergence of new technologies. Like many other companies in this industry, Asmara faces numerous challenges, such as supply chain disruptions, rising costs, and increased competition. Digital transformation has emerged as a critical tool to help companies cope with these challenges and achieve sustainable growth. Lack of demand forecast with customers/buyers and lack of capacity planning with suppliers are major challenges for companies that can cause supply chain disruptions and significant losses. However, by leveraging data analytics, predictive modelling, and collaboration tools, companies can overcome these challenges and ensure the smooth functioning of their business. Lack of transparency, increased costs due to manual processes, and shipment delays can harm customer service. However, by implementing a single source of truth, automating order tracking and quality control systems, and using predictive modelling and data analytics, companies can overcome these challenges and provide a high level of service to their customers. Overall, the project has provided a comprehensive roadmap for Asmara to embark on its digital transformation journey. By embracing digital technologies and processes, Asmara can streamline its operations, improve its customer experience, and drive growth and profitability in the years to come.

Based on the conclusion and the discussion of the use of technology, AI, and ML in the supply chain, here are some recommendations : Asmara should invest in developing a dedicated team, Asmara should launch new digital applications to capture all round operational excellence and product development, Asmara should improve its business intelligence by implementing reporting and plant foundations for machine learning and predictive analytic tools, Asmara should invest in AI and ML to automate routine tasks, optimise operations, and identify potential disruptions before they occur, Asmara should foster a culture of innovation to encourage its employees to think creatively and explore new ideas, Asmara should prioritise sustainability in its operations and supply chain by adopting green initiatives, reducing waste and emissions, and working with suppliers who prioritise sustainability, Asmara should focus on enhancing its customer experience by leveraging technology to improve the Speed and efficiency of its operations and offering personalised and convenient services to its clients. By implementing these recommendations, Asmara can position itself as a leader in the supply chain industry, gain a competitive advantage, and achieve sustained growth in the long term.

REFERENCE

Alicke, K., Rexhausen, D., & Seyfert, A. (2017). Supply Chain 4.0 in consumer goods. *Mckinsey & Company*, *1*(11)

Baryannis, G., Dani, S., & Antoniou, G. (2019). Predicting supply chain risks using machine learning: The trade-off between performance and interpretability. *Future Generation Computer Systems, 101*, 993-1004.

Checkland, P., & Scholes, J. (1999). *Soft systems methodology in action*. John Wiley & Sons.

Christopher, M., Peck, H., & Towill, D. (2006). A taxonomy for selecting global supply chain strategies. *The International Journal of Logistics Management*.

D. Ni, Z. Xiao, & M. K. Lim. (n.d.). A systematic review of the research trends of machine learning in supply chain management. *International Journal of Machine Learning and Cybernetics*, *pp. 1–20, 2019*.

DOI: https://doi.org/10.17509/strategic.v23i1
p-ISSN: 1412-1964 and e-ISSN 2684-8066

De Cremer, D. (2020). What does building a fair AI really entail. *Harvard Business Review*.

Jackson, M. C. (2001). Critical systems thinking and practice. *European Journal of operational research*, *128*(2), 233-244.

Petkov, D., Petkova, O., Andrew, T., & Nepal, T. (2007). Mixing multiple criteria decision making with soft systems thinking techniques for decision support in complex situations. *Decision Support Systems*, *43*(4), 1615-1629.

S. Thomassey. (n.d.). Sales forecasts in the clothing industry: the critical success factor of the supply chain management. *International Journal of Production Economics*, *128, nos. 2, 2010*, 470–483.

DOI: https://doi.org/10.17509/strategic.v23i1
p-ISSN: 1412-1964 and e-ISSN 2684-8066