

# Manufacturing strategy for start-up company electrifying Africa one vehicle at a time

## *Master thesis*

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*Kenya stands at the forefront of Eastern Africa's economic growth, showcasing potential driven by a robust economy, a vast market, and a steady progress in education and infrastructure. Central to Kenya's transformative agenda is Vision 2030, a blueprint to accelerate the country into a newly industrialized, middle-income country by 2030. However, the country's industrial experience is often overshadowed in comparison to the global north. Therefore, companies manufacturing high-tech products will face different challenges, when establishing and scaling up manufacturing in Kenya, compared to other industrialized countries. With the backdrop of these challenges, strategic and operational challenges will be explored, using well established frameworks collectively, for more efficient processes to facilitate scaling.*

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### **Introduction and Background**

In recent years, manufacturing trends have shifted from outsourcing to Asia back to localizing production closer to consumers. Initially, companies moved production overseas to benefit from lower costs and abundant labor in countries like China (World Economic Forum, 2023). However, logistical challenges, geopolitical risks, and recent events like the COVID-19 pandemic have prompted a reevaluation of this strategy (Burke et al., 2021) (Swanson, 2022). Now, firms are to a larger extent prioritizing quality control, supply chain resilience and market proximity (Burke et al., 2021).

Africa, despite its rich artisanal history, did not become a major manufacturing hub due to technological gaps, high labor costs, and

colonial legacies (Austin et al., 2017). However, the continent shows great potential for future manufacturing growth. Countries like South Africa and Kenya rank high in innovation capacity (KPMG, 2014). With a youthful workforce, increasing foreign investments, and improving education systems, Africa is becoming an attractive destination for higher-value manufacturing (MO Ibrahim Foundation, 2023).

Kenya, driven by its Vision 2030 initiative, aims to become a newly industrialized country (Ministry of Planning and National Development, 2007). This plan focuses on ICT, manufacturing, and renewable energy, positioning Kenya as a knowledge-based economy. The Silicon Savannah, a growing tech hub, and investments in renewable

energy highlight Kenya’s potential (Swiss Business Hub Southern Africa, 2021).

Overall, the shift towards local production and Africa’s emerging role in global manufacturing present exciting opportunities for sustainable growth and innovation on the continent. Companies will face different challenges in Kenya in comparison to other regions.

### **Purpose & methodology**

The purpose of the thesis was the following:

*Describe and analyze the manufacturing strategy for a company in Kenya that produces environmental high-tech product(s), taking into account the demands set by its product(s) and market strategies, and propose strategic and operational improvements for more efficient processes.*

Due to the nature of the purpose, being exploratory and problem solving, a suitable method for the thesis was to study a case company which passed the criterias presented in the purpose. The wide scope of the purpose made an abductive approach most appropriate. The data used were almost strictly qualitative, and was gathered from interviews with stakeholders at the case company, observations at the site as well as interactive workshops.

### **Theory**

Four different theoretical models were used in the master thesis to address the purpose. Firstly, Kotler’s three levels of product were used to get a deep understanding of the company’s product, and how it impacts the manufacturing (Kotler et al., 2016). Thereafter, Hill’s manufacturing strategy was used to analyze the interplay between the corporate objectives, market strategy and manufacturing strategy, with focus on

the manufacturing strategy (Hill, 2000). Then, Porter’s value chain was used to identify where the value adding activities and processes were, with the purpose to locate the most impactful processes (Porter, 2001). Lastly, the most relevant processes for the manufacturing were mapped using Ljungberg and Larsson’s mapping technique (2001). Figure 1.1, called Efficiency Shield, is a conceptual illustration of the theoretical models that were used in the master thesis, with the purpose to identify efficiency improvements for a manufacturing company.

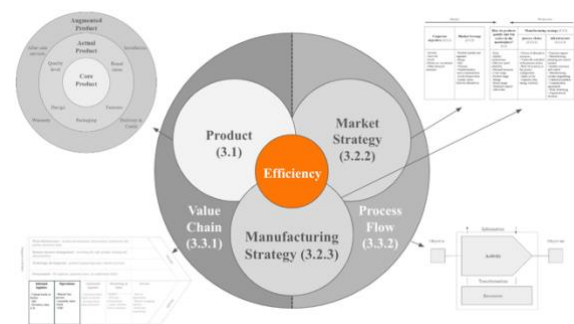


Figure 1.1 Efficiency Shield, a conceptual illustration of the theoretical frameworks used in the master thesis.

### **The study**

In the following section, the case company will first be introduced. Later, there will be an empirical study about the company according to the theory presented.

### **Case company**

The case company was founded in 2017 by a group of Swedish entrepreneurs. From the beginning, the company has always been dedicated to the development, design, and manufacturing of electric vehicles, including motorcycles and buses, directly from their headquarters in Kenya (the case company, 2023).

The company changed name in April 2022, and it was more than a rebranding effort; it signified a strategic realignment towards a broader ambition of facilitating sustainable transport across the continent. This change

reflected the company’s growth and its expanding vision to create a wider array of electric mobility solutions, tailored specifically to meet the challenges and opportunities presented by the African market (Doll, 2022b).

A cornerstone of the company’s philosophy is its commitment to local production and engineering. The mantra "Made in Kenya, for Africa" encapsulates the company’s belief in leveraging local talent and insights to produce electric vehicles that are suited to the African context. This approach ensures that the vehicles are environmentally friendly, economically viable and culturally resonant with their primary users (Case Company Website, 2023).

**Kotler’s three level of product**

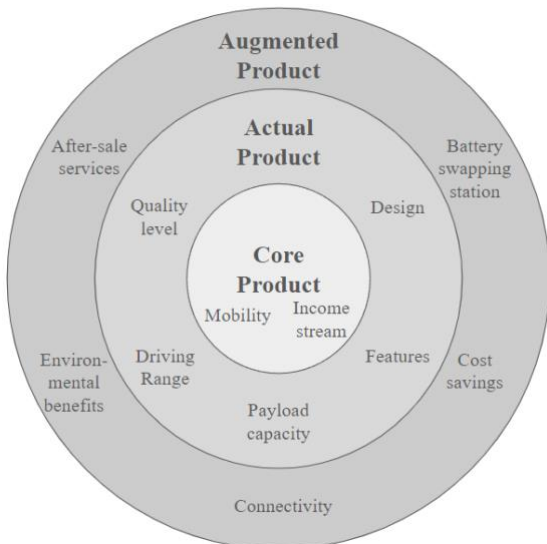


Figure 1.2 The three levels of the company’s product.

The company’s electric motorcycle is designed for African markets with focus on functionality, performance and affordability. In Figure 1.2, the three levels of the product are presented. Currently it is sold to the Nairobi market, and serves the needs as a versatile mobility solution. The motorcycle is used for commercial purposes, such as taxi services, deliveries,

and cargo transport, providing an income stream to the drivers. The product features a functional design suitable for Africa’s landscape, offering a robust build, and a dual battery system. In addition to the product itself, it offers the customer after-sales services, battery charging and swapping stations in Nairobi, lower operational costs compared to their combustion engine competitors and connectivity features for fleet management.

**Hill’s manufacturing framework**

| Market  |   | Production  |   |
|---|---|---|---|
| Corporate objectives (4.2.1)  | Market Strategy (4.2.2)   | How do products qualify and win orders in the marketplace? (4.1.4)  | Manufacturing strategy (4.2.3)  |
|   |   |   | process choice (4.2.3.1)  |
|   |   |   | infrastructure (4.2.3.2)  |
| <ul style="list-style-type: none"> <li>- Electrifying Africa one vehicle at the time</li> <li>- Become profitable</li> <li>- Yearly growth between 50-100%</li> </ul> | <ul style="list-style-type: none"> <li>- Boda Boda Market (starting in Nairobi)</li> <li>- Commercial usage</li> <li>- B2B2C (leasing)</li> <li>- 800 Roam Airs produced 2023</li> <li>- 800 Roam Airs increases manifold in 2024</li> <li>- High standardization</li> <li>- Only electric motorcycle designed for the Africans use case</li> </ul> | <ul style="list-style-type: none"> <li>- Based on the market leader’s design (product market fit)</li> <li>- High carrying capacity</li> <li>- Low maintenance and usage costs</li> </ul> | <ul style="list-style-type: none"> <li>- Line process with subassemblies stations</li> <li>- Aims to only assemble components, no modifications</li> <li>- 44 subassemblies fed into the main line</li> </ul>   |
|   |   |   | <ul style="list-style-type: none"> <li>- Reactive quality control</li> <li>- Incoming quality control for components</li> <li>- Outgoing quality control for Roam Air</li> <li>- Cost and importance classification of inventory</li> <li>- Pareto analysis of inventory</li> </ul> |

Figure 1.3: Hill’s framework applied to the company. The numbers underneath refer to the more detailed descriptions of the chapters in regard to the company.

The company’s manufacturing strategy integrates its corporate objectives through a focused approach to both the market and the processes within the context of the African electric vehicle sector. The overall objectives of the firms, as described by Person 1 (2024), are focused on both the electrification of Africa as well as achieving profitability, with more specific targets for production in order to drive market penetration and financial sustainability.

The market strategy is made to suit the Boda Boda market, which is done through a B2B2C model that enables the end-customer to lease the motorcycle without the company acting as a financier. In Figure 1.3, these specific characteristics are highlighted in Hill’s framework.

The company’s manufacturing strategy aligns well with its product, market strategy, and corporate objectives, offering a well-

constructed assembly process that allows for scalable production. However, a gap exists between the manufacturing strategy and the corporate objective due to flaws in the infrastructure, primarily concerning quality issues and flow of information, which creates inefficiencies within the processes.

### Porter's value chain

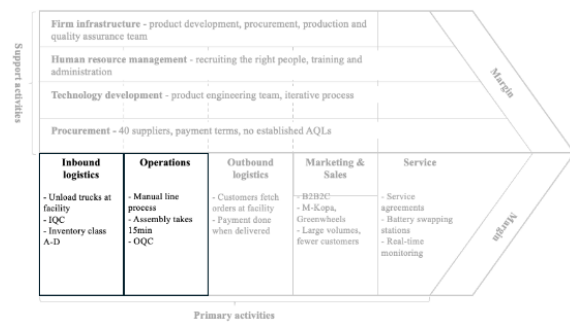


Figure 1.4: Porter's value chain applied to the company.

For the case company, the areas of Inbound logistics and Operations are most relevant for the purpose, however the activities are all interconnected which is critical to understand. These areas are highlighted in Figure 1.4.

### Ljungberg & Larsson's process mapping

The main process from incoming goods to the final OQC have been mapped and analyzed (see Figure 1.5). It has created a comprehensive mapping which started from the different departments that were outlined by the company to then interview each respective manager to understand that specific department. During the analysis, critical points were identified through this detailed mapping. This has allowed for identifying larger, more general problems in individual processes, which will be discussed in the next chapter. Furthermore, this mapping has served as the basis for the analysis, why it is specifically important to understand.

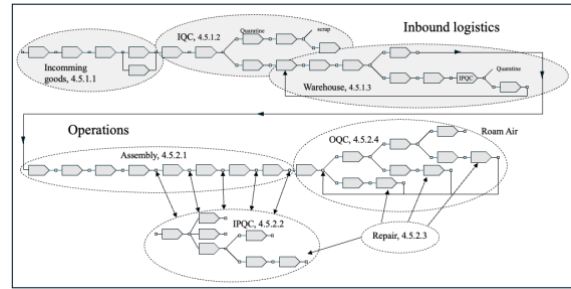


Figure 1.5: Overview of the main processes in inbound logistics and operations.

### Conclusion

By analyzing the company through the presented frameworks, inefficiencies within the company have been revealed. The areas of improvements can be divided into two parts, strategic and operational.

*Strategically*, the company must improve firm infrastructure and enhance support activities such as interdepartmental communication. Illustratively, the departments work in somewhat of silos, leading to redundant testing and quality problems. The strategic improvement that has been identified is that work should be more integrated between the different departments and that each department needs to have a better understanding of its own and other functions, and that communication between the department's needs to be clearer.

*Operationally*, optimizing quality and information flow in the organization is crucial. Streamlining quality control by adopting statistical sampling and eliminating redundant tests can significantly reduce production times. Additionally, targeted training programs for assembly line workers can address the quality aspect of workmanship-related faults. Regarding information flows, improved communication with suppliers will be critical as the production scales, while a unified information system will provide real-time data access, facilitating

better decision-making. Establishing formal feedback loops and promoting accountability will help address quality concerns swiftly.

By focusing on these strategic and operational improvements, the company can enhance its manufacturing efficiency, reduce rework, and increase the output of high-quality products. This approach not only supports the company's current objectives but also positions the company for future growth in the competitive market.

### Reflection

Based on our conclusions of the case company, it is evident that they have similar challenges as other companies, such as insufficient information flow and departments working in silos. In addition, the company faces challenges outside the scope of the purpose, such as finding the right supplier, relatively high tied-up capital and cultural differences within the organization. With increasing foreign investments in Kenya, an interesting area of further studies is the work cultural differences between the Kenyan culture and different foreign work cultures.

The knowledge contributions of the study are both relevant to the industry and the academia. For the industry, the most important knowledge contributions are to break down silos for enhanced integration, improve information flow, and adapting to the local and global contexts when establishing businesses outside your home country. For academia, the main knowledge contributions are the use of versatile theoretical models which are modifiable for specific issues.

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