Portfolio Prism: A Light Show

A case study about managing product portfolios in the EU lighting industry

Jai Chahar

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by

Student Name	Student Number	Email ID
Jai Chahar	5166195	J.Chahar@student.tudelft.nl

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Graduation Committee:	
Chair:	Dr. Victor Scholten
1st Supervisor:	Dr. Victor Scholten
2nd Supervisor:	Dr. Ben Wagner
Company Supervisor:	Indu Kapoor

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Executive Summary

In the European Union (EU) lighting industry which is highly regulated and competitive, the process of managing product portfolios has become crucial for companies to stay ahead of their competition and enhance market share and profitability. After the supply crisis post COVID-19, competition in the market has extended beyond the EU border. Asian companies are capturing the market share by low cost production. Having said that, this thesis underlines the case of Signify, a global market leader in lighting products. The research study explores the impact of factors that impact profitability and market share within product portfolios. In order to narrow the scope of the research, linear indoor drivers portfolio at the OEM business of Signify has been pursued in this research.

Existing literature on product portfolio management (PPM) and their subsequent impact on market share and profitability discusses the quantitative measures via scoring models to assess the impact. In addition to this, product portfolio management has mostly been addressed from a general point of view in addressing how an organization should deploy its commercial activities. A gap was found around industry-based frameworks and qualitative assessment on identifying these factors to tackle the issues originating around enhancing profitability and market share. This led to extensive literature study and identification of factors relevant in the case of lighting industry. The company case provided relevant context into exploring in detail about these factors which strengthened the process of reviewing literature.

Moreover, the factors that stood out as most relevant and influential were technical specifications, pricing strategies, market positioning (which has further extended to environmental impact and business strategy from a resource based view: horizontal and vertical integration of portfolios) and competition benchmarking. Using existing theoretical models such as SWOT analysis and Porter's 5 forces, a guiding framework was developed to direct the research methodology.

This study follows a qualitative research design. The process of empirical analysis consists of semi-structured interviews with Signify's PPM experts who are associated with the linear indoor drivers portfolio. Purposive sampling was adopted to select the participants of the interviews. The data analysis was carried out by creating quotations from the interview transcripts and further creating codes to reach the necessary themes required for the second stage of iterative coding analysis. Axial coding has been done to establish relationships between the quotations and codes to further extend the analysis on understanding how each factor influences profitability and market share.

The results provide detailed insights on the implications of the factors in managing product portfolios for each participant. The participants have highlighted how market-orientedness in pricing processes is crucial while following internal assumptions on a product category. In addition to this, targeting product segments that have products which cannot be differentiated too much on features for lower margins initially to regain market share is crucial in achieving high profitability in long-term. These insights are further discussed using quotations (statements from interviewees) to understand the sub-factors associated to each factor in the research study.Lastly, the conclusion summarizes the findings of the research and further addresses limitations, practical and theoretical implications of this study.

Contents

List of Figures

List of Tables

Nomenclature

EU	European Union
PPM	Product Portfolio Management
MOT	Management of Technology
DSR	Design Science Research
NPD	New Product Development
HR	Human Resources
USP	Unique Selling Proposition
SKU	Stock Keeping Unit
IS	Information Systems
KPI	Key Performance Indicator
R&D	Research and Development
TU Delft	Delft University of Technology
CRM	Customer Relationship Management
EPD	Environmental Product Declaration
SWOT	Strengths, Weaknesses, Opportunities and Threats
PESTEL	Political, Environmental, Social, Technological, Economical and Legal
FMCG	Fast Moving Consumer Goods
RBV	Resource Based View
IoT	Internet of Things

1
Introduction

1.1. Background

In the recent years, the lighting industry has witnessed an evolution in promoting energy efficiency which is driven by factors such as technological advancements, changing consumer needs and regulatory standards (Lamperti, 2020). Companies producing lighting applications and operating within the European Union (EU) experience a dynamic and rigid market environment illustrated by changing consumer demands and stricter regulations. (European Commission, 2021). Companies are facing intense competition as the market is cluttered by many international players and advanced lighting technologies. The competition has extended beyond the EU border as many companies are battling against the global giants from North America and Asia. Technological advancements have resulted into an international rivalry amongst firms that has decreased the entry barriers for new entrants (potential competitors). They have also diversified consumer preferences by providing alternatives in different dimensions such as competitive prices.

Asian companies are entering the EU market easily as they are capitalising on their production capabilities to compete within the market. The COVID-19 pandemic resulted into a supply crisis in the lighting industry (Litetronics, n.d.). Lighting application manufacturers were unfortunately forced to shut down their factories because of the lockdown and safety norms. Consequently, there was a shortage in raw materials and other essential components. Shipping and logistics were also heavily influenced due to the pandemic and this further magnified the supply chain issues within the industry. Many companies faced delays in their production and delivery timelines. Some of them even had to consider allocation of inventory.

The growing demand in LED lighting has become a crucial shift in this industry as the durability of this technology is significantly higher than traditional lighting solutions. Therefore, it is becoming a more popular choice for both consumers and lighting application manufacturers. This has led to increased competition in this industry as companies are now prioritizing on developing innovative and more user-friendly lighting control systems that can disrupt the market.Companies are working on preparing attack plans against their competitors in order to ensure that they do not lose out on the existing market share and can further increase it by catering to the competition's customer base.

However, the regulations in the EU market have also influenced the supply chain dynamics within the industry. Strict policies and standards have been established for pushing sustainability (International Energy Agency, 2019). Consequently, there exists only a few suppliers who completely comply with the EU directives, forcing companies to trade materials and components from a smaller range of suppliers. This regulatory obstruction along with the need to keep up with rapid technological changes has resulted into a constrained situation for the companies as they are forced to improve their operational efficiency and increase their product offerings to stay competitive.

Energy Performance of Buildings Directive (EPBD) and the Ecodesign Directive are a few examples of the directives launched by the EU at promoting energy efficiency in the lighting industry. Further, in December 2019, the EU also introduced the Green Deal which is an idea to ensure that the EU's economy becomes more sustainable by reducing greenhouse gas emissions. These regulations have had a substantial impact on the lighting application companies as they are required to strictly comply with the new established energy efficiency standards in their products. As a result, additional costs have been incurred by the companies in order to cater to these energy efficiency standards and it has further impacted their profitability and market share. In addition to this, firms need to innovate continuously and launch unique product offerings in the market to remain competitive and survive financially (Berman & Evans, 2020). As a result, the process of product development and portfolio management becomes more challenging in this industry (Dalhammar, 2016) (Burman et al., 2014) .

An effective way of managing products in a portfolio is paramount in successful product innovation. Portfolio management is about making choices strategically regarding the market, products and technologies where the business (company) would invest in. It is also important for efficient resource allocation and decision-making around spending in sparse engineering capabilities, R&D and marketing resources. In addition to this, the process of product portfolio management focuses on selection of projects. It acts as a tool in assessing which projects to work on from the many options a company might have. Furthermore, portfolio management is a dynamic business process, where a list of active new products and products in development is maintained on a quarterly basis. This list is constantly revised, as a detailed evaluation is done by the product managers of a company on the performance of the projects in the preceding quarters. After analysing the business performances of each product separately, a decision is made if a project should be continued to taken ahead or killed/discontinued. Resources are re-allocated based on this decision-making process (Cooper et al., 2014) .

Lastly, effective product portfolio management has become extremely vital for organisations wanting to mitigate the risks associated with such market complexities and further heighten sustainable growth and profitability. (Cooper et al., 2014).

1.2. Problem Statement

Despite the significance of Product Portfolio Management (PPM) in guiding the lighting application companies towards achieving sustainable market growth and leadership, there exists a prominent research gap in identifying the specific strategies and practices that effects the product profitability and its subsequent market share in the creation of an effective product portfolio. The context of developing this product portfolio for the lighting application companies while considering the market dynamics of the EU further supports the exploration of the research gap. Moreover, this gap is of equal importance for both industry professionals and in theory as product managers are continuously working on the decision making processes around creating strategies for effective PPM in order to respond to the rapid technological and regulatory changes. Exploring whether the fundamental strategies and practices employed in creating an efficient and effective product portfolio can enhance a firm's profitability and market share is essential for the growth of lighting application companies. This investigation will not only contribute to their expansion but also support their visions to become market leaders of the industry.

On the contrary, the research gap is significant in the world of academia as it will develop the foundation of the research around refining effective PPM strategies in the markets that are surrounded by heavy regulations and are innovation-driven. In addition to this, the crossroads of PPM with the diverse characteristics of the lighting industry within the EU portrays an untapped research domain. It is noteworthy to say that existing literature does talk about the contribution of PPM in driving innovation and facilitating decision-making processes across different sectors. However, the relationship of PPM practices with its effects on enhanced market share and increasing profitability in the lighting industry within the EU still appears to be blurred from a research viewpoint.

Furthermore, this research gap will be addressed by developing a study that focuses on identifying particular PPM strategies and practices employed by the lighting application companies in the EU. It would include the basis of how companies make decisions regarding product development, termination and resource allocation in a portfolio (Kester et al., 2011). Analysing the relationship between the PPM strategies and their financial performance, focusing on understanding how the strategic decision making around managing a portfolio contributes towards enhanced financial performance over time (Markowitz, 1952). Also, the ability of PPM practices to forecast and adapt to market trends and comply with the changing regulations will also be relevant in this research as these factors can influence the market share of companies (Cooper et al., 2001).

1.3. Research Objective

The objective of this research is to develop a comprehensive framework for managing product portfolios in the European Union's lighting industry, focusing on optimizing profitability and market share. This framework integrates diverse academic models to analyze key factors such as technical specifications, pricing strategies, and market positioning. The study aims to explore how aligning PPM with EU energy efficiency and environmental regulations, incorporating unique resources and capabilities can address the challenges posed by regulatory compliance, rapid technological advancements, and global competition. By addressing the existing knowledge gap, this research seeks to provide actionable insights and strategic recommendations for industry leaders, demonstrating how a cohesive application of these models can drive innovation, enhance competitive positioning, and foster sustainable growth in a dynamic market environment.

1.4. Research Question and Sub-Research Questions

Building on the research objective, the next step is to develop a research question that narrates the problem in a concise manner. Understanding the dynamics of PPM in the EU lighting sector and its subsequent impact on how companies are looking after their profitability and market share has been structured in the form of a question which delineates the foundation of the research. The main research question of this study is,

RQ: What are the factors influencing profitability and market share in the product portfolios within the EU's lighting industry ?

Further, the research question is divided into specific sub-research questions that direct the research into investigating the core factors behind analysing the relationship between PPM and lighting application companies increasing their profitability and market share. The sub-research questions are as follows,

- ***SRQ1 : What is the relationship between technical specifications of lighting products and their profitability and market share in the EU market?***

- ***SRQ2: How does various pricing strategies and models impact profitability and market share in the EU lighting industry?***

- ***SRQ3: In what ways does the market positioning of lighting products affect market share and profitability within the EU?***

- ***SRQ4: How does competition dynamics influence profitability and market share of a company in the lighting industry?***

- ***SRQ5: To what extent does the horizontal and vertical integration of portfolios effect profitability and market share?***

1.5. Management of Technology (MOT) Relevance

The research on managing product portfolios in the EU lighting industry and further performing a case study within Signify to target profitability and market share aligns well with the main objectives of the study program Management of Technology (MOT). In this research, the adoption of Porter's 5 forces, Business Value Proposition Canvas (BPVC), SWOT Analysis, PESTEL Framework strengthens the alignment with the study program as these models and theories are a major part of the study program's curriculum. Furthermore, the prime objectives of the program is to use technology that develops products and services which benefit customer satisfaction, profitability, market competitiveness and market share. In the courses **Technology, Strategy and Entrepreneurship (MOT1435)** and **High Tech Marketing (MOT1534)**,emphasis was laid on analysing customer profiles, focusing on marketing and product commercialization strategies. The integration of such concepts in this thesis further strengthens the scope and relevance of the study program, MOT.

1.6. Report Structure

Firstly, chapter 1 (Introduction) of the report provides an overview of the background of the problem. It talks about the relevant context necessary to develop the formulation of the research problem. It further includes the main research questions and sub research questions of the research study. Chapter 2 explains the case of the company and describes the portfolio of linear indoor drivers in detail for deeper understanding of product categories. Chapter 3 talks about the literature studied for developing this research case. It further includes synthesis and integration of the findings, conceptualization (diving into academia to find frameworks and models) and lastly the guiding framework that has been developed to reach the next stage of the research study (methodology). Chapter 4 describes the methodology of the research design. Chapter 5 presents results and the findings and Chapter 6 discusses them in detail to justify their applicability.Lastly, Chapter 7 concludes and summarizes the findings of the research.

1.7. Design Science Research (DSR) Framework

Figure 1.1 illustrates a conceptual framework about understanding the Information Systems research combining behavioural-science and design-science models. This framework is further used to compare and position the paradigms.

The environment talks about the problem areas, in which lies the domain of interest (Simon, 1996). In the Information Systems (IS) research, it comprises of People, (Business) Organizations and their existing or planned technologies (Silver, 1995). Inside the framework are also the tasks, goals, problems and opportunities that describe about the formation of business needs as perceived by different people inside an organization. These ideas are shaped by the roles, strengths and characteristics of people working inside the same organization. Further, business needs are assessed in terms of organizational strategies and culture and existing business operations. These business needs are structured relative to existing technology and capabilities. Consequently, business needs are developed after this stage as understood by the researcher. Together defining research activities to address business needs promises relevance of the research.

After understanding the business need in depth, the IS research is carried out in two different phases. Behavioral science explains about research through development and relevance of theories that address or predict the occurrences related to the initially identified business problem. Design science discusses research via development and evaluation of theories to meet the identified business need.

The objective of behavioral science is to understand the truth. Truth is referred to as an explanation of identified theories in behavioral science originating from the principles of a phenomena. On the contrary, design science is understanding about utility. It is possible that a theory may not be completely developed but its truth could be implemented into design. Research assessment by justifying and assessing the activities can lead to discovery of weaknesses in the respective theory and the necessity to further refine and re-evaluate.

The knowledge base addresses the importance of raw materials through which the IS research is brought to completion. It comprises of methodologies and underpinnings. Existing research and results allow in identifying foundation theories, constructs and frameworks used in the development phase of a research study. Furthermore, tentative guidelines are defined using the adapted methodologies used in the justify/evaluate phase. In addition to this, rigor is accomplished by correctly implementing existing foundations and methodologies. It further talks about the relevance of application of the foundations and methodologies (Hevner, 2004).

In context of this research about analysing the factors that influence profitability and market share within product portfolios in the environment of a lighting company in the EU, an approach adapted from

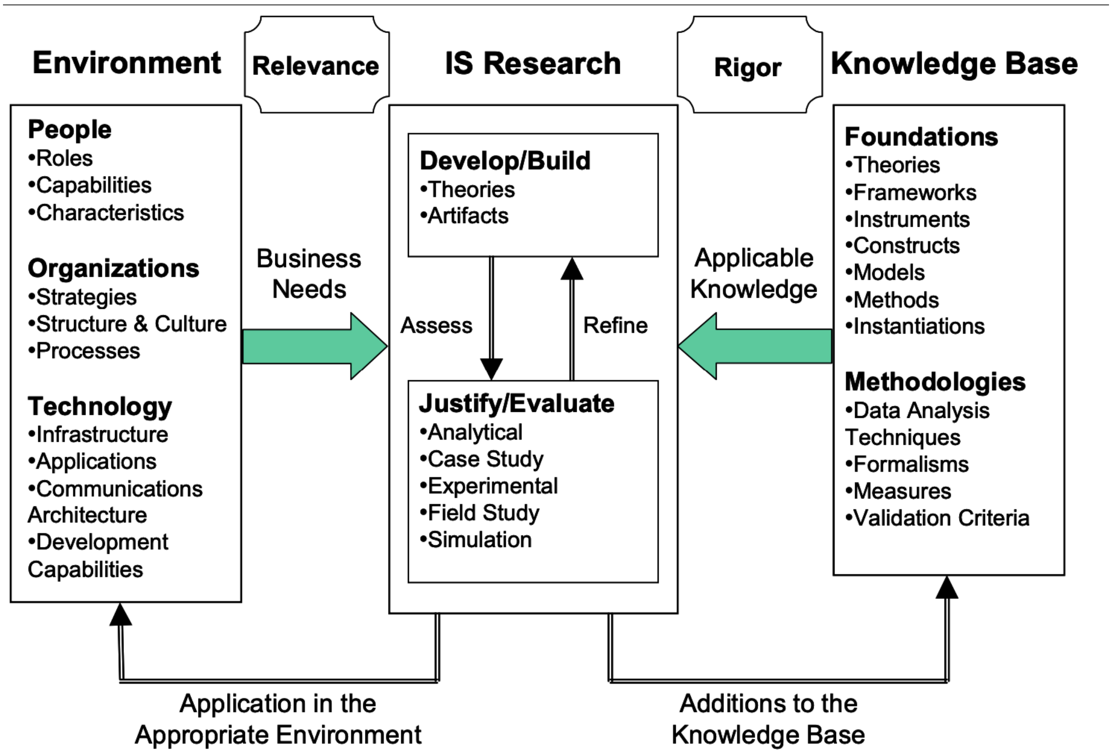

Figure 1.1: Information Systems Research Framework(Hevner, 2004)

the information systems research framework has been chosen.

After considering the environment of the initial research problem and further narrowing it down from lighting industry in the EU to a single product portfolio consisting of multiple product segments (categories) within a market leader in the lighting industry (Signify), the scope definition allowed to investigate the factors in detail. The broad context of EU was also significant at the same time in exploring about specific factors that influence profitability and market share in an organization based in EU. Emphasis on these factors will be laid out further in chapter 3.

As a result of knowing in detail about the problem and the environment, academic theories and frameworks have been used to better frame and define the business needs in order to justify the research study (case study). The inspiration and adaptation from the information systems research framework has played a crucial role in setting up the co-relation of foundational theories from knowledge base with the application of the identified problem in the appropriate environment.

At Signify, under the linear indoor drivers portfolio, which was finalized as a domain of research within this case study, there were some core factors highlighted in the light of the main problem. Profitability and Market Share are two areas where the organization wants to enhance and refine their processes, strategies and ideas to gain a stronger foothold in the market. This problem was further decomposed into factors that directly presumably impacted profitability and market share. However, after understanding the scope of the problem, the research study was formulated into assessing the impact of these factors and further identifying the missing factors and their contribution in strengthening the findings of the research.

2 Case Introduction

Signify is a market leader in providing lighting solutions. It is a company that focuses on developing specialized designs, manufacturing and sale of lighting products and systems for both B2B (Business to Business) and B2C (Business to Consumer) markets. The portfolios of the company's products is quite extensive ranging from solutions for indoor and outdoor applications, including LED lighting, luminaires, control and software etc.

The company has multiple businesses out of which, OEM (Original Equipment Manufacturer) division is a significant share of the overall revenue of the company. At the OEM division, Signify offers lighting products that allow other companies to integrate the lighting technology into their own product. Some of the examples of such products are, LED drivers, modules and control.

During this research, the portfolio of linear indoor drivers will be investigated and worked upon. Figure 2.1 illustrates the categorical division of the linear indoor driver portfolio. In the OEM business at Signify, there are multiple sub-divisions based on the type of lighting application. LED Electronics focuses on all the applications that are composed of LED's. Under the umbrella of LED Electronics, fall different portfolios such as outdoor drivers (meant for outdoor applications), point modules (spotlighting systems), retail design lighting, linear indoor drivers (meant for indoor applications) and etc. It is worth noting that at the OEM division, the company is manufacturing products that are further moved along in the supply chain of the industry. A linear driver is a component used to complete the LED lighting systems. It works on the principle of converting alternating current (AC) from the main power supply to direct current (DC) as required by the LED lighting system (IntechOpen, 2023). These drivers are then sold to luminaire makers who make use of the driver's electrical capabilities to project light from the design and shape of the luminaire according to the customer requirement.

Linear Indoor Drivers Portfolio mainly consists of two sub-categories. These are namely, Isolated and Non-Isolated. Under both these categories, the products are classified based on four different segments. These segments are Statement products, Performance products, Core products and Entry products. It is important to note that this segregation of segments within the portfolio is the company's approach in using the specific capability of a product in the most favourable market segment. There are some products that are demanded more on a frequent basis because of there utility in comparison to products that would have a lower demand. After these products are initially segregated based on the market segment, they are further united when they built specifically to design requirements. The drivers have different technical specifications and different output performances. For instance, if one driver could be designed in a manner that it could be dimmed easily, another would be designed to function with multiple output currents depending upon the output required by the luminaire maker.

Every design of the driver has its own set of characteristics that are defined by 'Lifetime' (Capacity of the driver in number of hours), 'Dimensions (LxWxH)', 'Electric Current (Ripple)' specifications and etc. These characteristics further act as major differentiators to customers during any new project introductions or pitching of business opportunities.

It will be crucial to understand about technical specifications of each product for instance, efficiency or output voltage influencing the competitiveness in the market. It further means that if Signify's competition is able to manufacture products that have a higher efficiency and better delivery standards and times to the market, it will be crucial to study their strategy. Pricing will also be an essential component of this research as it is an integral part of ensuring how can the company increase its market share by attracting the customers who are in business with the competition. Analysing the pricing strategies and further researching on what kind of strategies and pricing models can be best suited for Signify's position in this portfolio in order to stay competitive will be done.

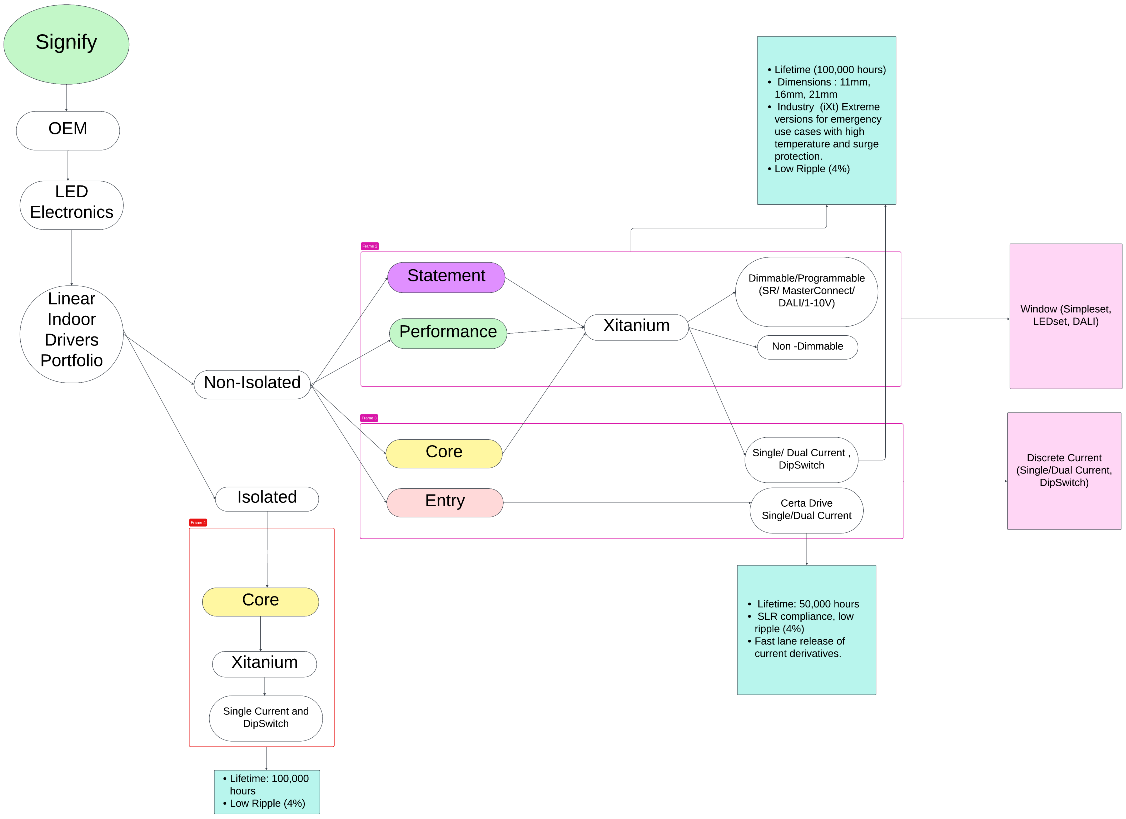

Figure 2.1: Linear Indoor Drivers Portfolio at Signify

The broad focus will be on studying the competition through a benchmarking analysis within the indoor linear driver portfolio. Currently, Signify is doing this to ensure how it can become a market leader in this portfolio. In addition to this, identifying existing gaps in the portfolio of the company and providing strategic recommendations on how to improve product strategy in order to increase overall sales and profitability will be the idea of the research.

3
Theoretical Background

This chapter discusses in detail about the existing literature on lighting industry, EU trends, PPM practices, NPD process and academic models and theories. It is then organised into four main areas: Key Themes and Research Areas, Synthesis and Integration, Literature Gap and Conceptualization. The idea of segregating the gathered information from current literature sources and reviewing the theory in detail is to provide coherency in understanding what comes from literature and theory assessment and how can it be further integrated with the conceptualization of academic models to move towards developing a guiding framework. This framework will further help in directing the research into its methodology.

3.1. Key Themes and Research Areas

3.1.1. Lighting Industry in the EU

Lighting industry has faced immense transformation towards energy-efficient LED technology over the recent years. Technological advancements in the market have been a major reason behind this transformation (Karlicek, 2018). For any firm to enhance its market share and improve overall profitability in this industry, adherence to EU regulatory standards and further integrating smart lighting solutions has become a dire need of the hour. SKU (stock keeping unit) management is a crucial element in this industry due to large and varying product categories. Consequently, companies adopted PPM practices in response to the nature of operation in the industry. These practices allow firms to strategize on a long-term basis and further helps in monitoring the performance of each product in a portfolio individually. Moreover, it also allows companies to make strategic decisions on a product's continuation or discontinuation in the forthcoming quarters of a financial year. The rise in IoT (Internet of Things) technologies has served as a major technology push in the industry. Firms are ensuring that they adopt all the sustainable way to not only increase operational efficiency but also focus on securing a competitive advantage (Hart & Milstein, 2003) (Haverinen-Shaughnessy & Shaughnessy, 2015).

3.1.2. Technical Specifications and Product Development

Organizations try to adapt to new R&D processes in such a way that they always wish to acquire maximum customers in the market or hold the largest market share in a particular industry. As mentioned earlier in subsection 3.1.1, companies in the lighting industry have to focus on portfolios with multiple number of products (SKU) in a single portfolio. There are different kinds of product categories which are being managed by product managers. While some of these could be innovation-centric, some of them are extremely commoditized. In the commoditized categories where differentiation factor is usually the price as there is not much to play around. It is very important to analyse the specifications (for instance, studying the power (Watt) or the current (A) that is being generated by an LED bulb that is being manufactured) to differentiate with the competitors in the market. According to (Barczak et al., 2012), time-based management in the new product development (NPD) process is essential as it emphasizes developing products faster and more efficiently. This is especially important in industries facing rapid advances in technology and shorter product lifecycles.

Speed is a factor that differentiates organizations, largely in the process of NPD. It will be insightful to study how the NPD process impacts the timing of entry of different products in the portfolio and how would this impact the profitability in the lighting industry.

Time Management in New Product Development

According to (Barczak et al., 2012), time-based management in the new product development (NPD) process is essential as it emphasizes developing products faster and more efficiently. This is especially important in industries facing rapid advances in technology and shorter product lifecycles. Speed is a factor that differentiates organizations, largely in the process of NPD. It can provide a competitive advantage to companies that bring innovation quicker to the market and establish a stronger market preference. Faster NPD processes also make room for quicker feedback loops, which result in the mitigation of risks throughout the product development stage. Also, cost reductions go hand in hand with efficient time-based management of different processes in NPD.

Industry based NPD Frameworks

In the research done by (Calantone et al., 1995), there are no specific frameworks around NPD processes developed for every industry. This pertains to a major gap in the existing literature that has been addressed in this research. The organizations that have already been successful in their industries and outside tend to focus on activities that are vital in developing their core competencies in their specific industry. A framework that has been developed to target market constraints or potential market constraints that could be faced by the organization in the future prepares the organization for intense competition in the market and follows a set of activities that is most likely to be successful.

3.1.3. Pricing Strategies

Pricing a product is an indispensable element of maintaining an efficient product portfolio for managers because it represents their product offerings in the market. It is a factor that determines the product's acceptance rate by consumers in comparison to its competitors. Organizations tend to differ on their pricing strategies because battling competition is correlated with setting an attractive price in the market.

"Pricing is an art, a game played for high stakes; for marketing strategists, it is the moment of truth – all of marketing comes to focus in the pricing decision" (Corey, 1983). Price management is a significant research area within the field of marketing. Alongside product, promotion, and place/distribution management, pricing is one of the original four areas of the marketing mix (Kotler et al., 2005) (Ivy, 2008) (Lilien et al., 1992) (T. Nagle & Holden, 1995) . It is often considered one of the oldest fields within marketing (Cannon & Morgan, 1991) and still has a large impact on the entire subject.

Pricing is a highly flexible element of the marketing mix and can be changed relatively quickly compared to product features and channel commitments (Kotler et al., 2005). It is the only element of the marketing mix that actually generates revenue (Rao, 1984). Setting a price too low may lower the company's, brand's, or product's reputation, while a price set too high will lead to lower sales figures. According to Nagle and Holden (1995), pricing is about "harvesting your profit potential," highlighting its critical importance for organizations.

Despite its importance, many companies do not manage their pricing well (Kotler et al., 2005). Managers face the challenge of using their market power efficiently, deciding how to set prices, choose quantities of input factors, and determine output to maximize profits in both the short and long term (Pindyck & Rubinfeld, 2009).

What is Price? Price is the part of the marketing mix that generates revenues, where other elements create costs. It can be narrowly defined as "the amount of money charged for a product or service" and more broadly as "the sum of the values that consumers exchange for the benefits of having or using the product or service" (Kotler et al., 2005). This broader definition highlights that price is distinguished from costs and includes profits.

In daily life, terms such as rent, honorarium, salary, or fee are often used similarly to 'price'. These terms still refer to prices as they represent amounts exchanged for goods or services (dos Santos Fraga & Anema, 2022).

A pricing strategy is the decision made to set the price for a particular product in a specific situation. Tellis (1986) defines it as "a reasoned choice from a set of alternative prices (or price schedules) that aim at profit maximization within a planning period in response to a given scenario."

Buyer's Perspective
Understanding the customer's perspective is crucial when setting prices. The value for the customer is often central to pricing decisions (T. Nagle & Holden, 1995). Value is described as "the total savings or satisfaction that the customer receives from the product" (T. Nagle & Holden, 1995) or as "a fair return or equivalent in goods, services, or money for something exchanged" (Baker, 2000). (Reilly, 2003) adds that value includes the sales price, total life-cycle costs, and the product's impact on the customer.

Christopher (2005) combines these elements in a formula:

$$\text{Customer value} = \frac{\text{Quality} \times \text{Service}}{\text{Cost} \times \text{Time}} \tag{3.1}$$

where quality represents functionality, performance, and specifications, service includes availability, support, and commitment, cost encompasses price and life-cycle costs, and time refers to the response time to customer needs. This formula emphasizes that value is subjective and varies per buyer.

Factors influencing customer price sensitivity include perceived substitutes, unique value, switching costs, difficulty in comparison, price-quality effects, expenditure effects, end-benefit effects, shared-cost effects, fairness effects, and inventory effects (T. Nagle & Holden, 1995). For example, customers are less sensitive to prices if a product differentiates significantly from substitutes or if switching costs are high.

An example of price sensitivity can be seen in the case of IBM, where customers were willing to pay a higher price for computers that were not necessarily of better quality but provided non-hardware aspects that differentiated IBM from competitors (Ratchford & Ford, 1976). Generally, price sensitivity is lowest for the highest and lowest priced products (T. Nagle & Holden, 1995).

Models Based on Pricing
Pricing models such as cost-plus pricing, competitive pricing, and value-based pricing help firms align their prices with production costs, market competition, and perceived value ((Weller, 2021). Cost-plus pricing involves adding a markup to production costs, while value-based pricing sets prices based on the value delivered to customers. Competitive pricing matches competitors' prices, ensuring market relevance (Vendavo, 2023).

Product-mix pricing involves determining different prices for each product in a portfolio, aligning with its development stage and market segment. This approach allows firms to strategically position their offerings to attract different consumer segments and optimize market share .(Vendavo, 2023).

Importance of Pricing in Marketing Strategy
While making decisions about setting prices, it is crucial to consider the importance of the product's costs (T. Nagle & Holden, 1995). Regardless of the chosen pricing strategy, the ultimate goal is to make a profit, necessitating a thorough financial analysis. However, plain knowledge about cost levels is insufficient for making pricing decisions. As T. Nagle & Holden (1995) describe it: "Managers who really understand their costs know more than their levels; they know how their costs will change with the changes in sales that result from pricing decisions." For pricing decisions, it is key to isolate and consider only the costs that directly affect the profitability of the decision (T. Nagle & Holden, 1995).

(T. Nagle & Holden, 1995) also state that "effective pricing cannot be done in steps." They advocate for a holistic approach where each trade-off, such as higher costs leading to higher prices or cutting gross profit to lower expenses, should be analyzed holistically. They recommend developing a separate managerial costing system independent of accounting systems to avoid misleading data, like historical investments, which may not be relevant for pricing decisions.

Commitment from top management is crucial in the process of choosing the right pricing strategy (Rich, 1983). Pricing strategies significantly affect the profitability of the entire organization and involve legal considerations. Knowledge of legal matters is a prerequisite for setting a price or pricing strategy.

Finally, the product sold is usually a combination of different functions, characteristics, and benefits. For pricing decisions, it is essential to identify the individual benefit components that together constitute the totality (Mohajan, 1970).

Setting the price involves several aspects that affect the decision about choosing a pricing strategy and setting a price. (Kotler et al., 2005) present this in a model of factors affecting price decisions.

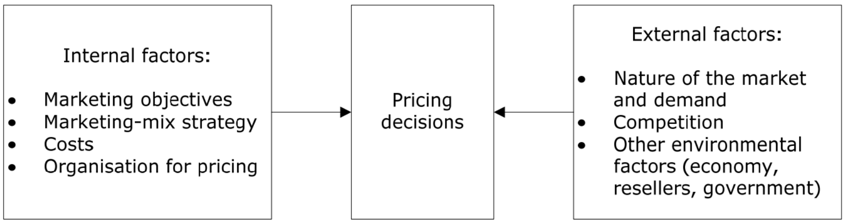

Figure 3.1: Factors influencing price-setting decisions (Kotler et al., 2005)

A price should always be market-based, although historically, cost-based pricing approaches have been the most common (T. Nagle & Holden, 1995) (Christopher, 1982). Cost-based methods are suitable in non-competitive markets or when the product is distinct from competitors (Monden, 1995) Kaplan & Cooper (1998). Market-based approaches are appropriate when there are no major distinctions between products, short product life cycles, or when the market has matured into a buyer's market (Monden, 1995).

A framework developed by (Cannon & Morgan, 1991) helps with pricing decisions by comparing six pricing strategies based on six rules:

Scale rule: Questions the size of orders. If purchases are too small, sealed-bid and negotiated pricing are not appropriate.

Consumer knowledge rule: Evaluates if customers can assess the monetary value of a product. If not, perceived-value pricing is not suitable.

Demand rule: Considers the importance of price in the customer's decision-making. When price is not important, target-profit pricing is not useful.

Information rule: Questions the company's ability to determine price/value evaluations and demand levels. If not, target-profit pricing and perceived-value pricing are not applicable.

Competitive substitute rule: Relates to competitive products on the market. If substitutes exist, the product's price can be set accordingly.

Patronage rule: Considers non-quality or non-price reasons affecting purchasing decisions, such as interpersonal ties or reputation. If present, negotiated pricing is not suitable.

(T. Nagle & Holden, 1995) propose a different framework for making pricing decisions. The first step is data collection on costs, customers, and competitors. Then, a strategic analysis process should be conducted, analyzing the financial situation, market segmentation, and competition. Finally, this should culminate in a clear strategy formulation about price setting.

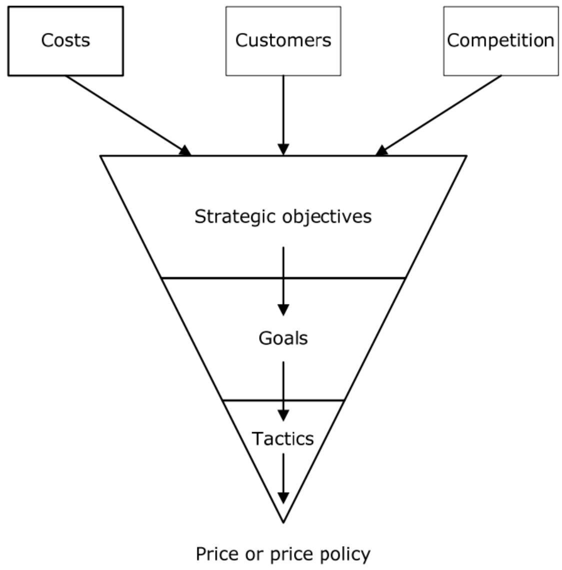

Figure 3.2: Price Policy Framework (T. Nagle & Holden, 1995)

3.1.4. Environmental Impact

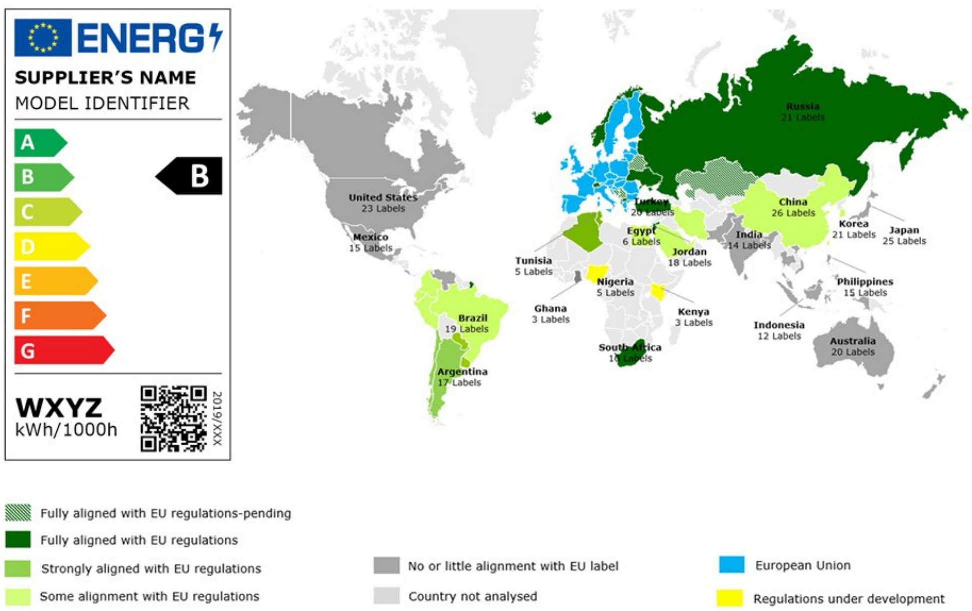

Figure 3.3: Alignment of countries with EU energy labelling regulations for lighting products (professional, 2024).

Environmental innovations are often regarded as a key determinant of green growth strategy. In the case of energy efficiency innovations, the discussions around how the impact of such innovations has been on various climate goals still revolves around a subjected debate. It is true that on one hand, energy efficiency innovations lead to significant cost-effective CO2 reduction capability. However, this might turn into increased consumption because of the "rebound effect" (Braungardt et al., 2016). Figure 3.3 represents an overview of all the countries in the world complying with the EU regulations. This is a major highlight in understanding the impact of EU regulations on the lighting industry in terms of profitability and market share for companies.

The EU's energy labeling and Ecodesign regulations compel manufacturers to focus on high-efficiency lighting products, such as LED technologies. Compliance with these regulations not only improves energy efficiency but also enhances the environmental profile of products, making them more attractive in a market increasingly sensitive to sustainability. As a result, companies that align their product portfolios with these standards can leverage these attributes to gain a competitive advantage, potentially increasing their market share in both EU and non-EU markets that recognize EU standards as a benchmark (professional, 2024).

The EU's stringent energy efficiency requirements push companies towards innovation. By focusing on developing products that meet or exceed these standards, companies can differentiate themselves through superior technology and performance. This innovation often leads to the development of premium products, which can be sold at higher margins, thereby enhancing profitability. Additionally, the introduction of new energy labeling systems, such as the rescaled A-G labels, creates opportunities for products to be clearly distinguished based on their efficiency, further aiding in competitive positioning (Eurostat, 2017).

3.1.5. Benchmarking (Competitor Analysis)

In today's business landscape, competition has become one of the most inevitable forces. Every organization irrespective of their size or stature has competitors in the industry. These competitors often influence the strategic road maps that an organization develops in targeting healthy financial performance. Moreover, competition has now become a considered element of business world for organizations that are driven by profitability (Adom et al., 2016).

Moreover, it is crucial for managers to take into account the strategies of competitors while formulating their own organizational strategies as it provides a holistic overview of how different companies approach the process of targeting profitability within a industry. This overview can further help managers to asses their strengths and weaknesses against their competitors and further use it before the stage of commercialization (Adom et al., 2016).

(Zahra & Chaples, 1993) describe the process of competitor analysis as "the process through which an organization tries to define and comprehend its industry". In addition to this, they mention that the process of competitor analysis exemplifies both understanding of data for making managerial decisions and using competitive strategies to collect data on competitors.

According to (Fleisher & Bensoussan, 2003) and (Fleisher & Bensoussan, 2007), competitor analysis is a tool used in strategically analysing competition's strengths and weaknesses. It further includes in its assessment the data of current and potential competitors context into preparing defensive and offensive strategies to highlight opportunities and threats.

A good competitor analysis involves diving deeper into the surface of a company's end products to identifying the hidden element contributing to the company's competitive growth. It can be also stated as an approach of visualizing companies as trees that 'grow' products from the root competencies (Giget, 1988). The concept of a root system looks after the company's organizational capabilities and therefore, influences its strategic idealogy (Hamel & Prahalad, 1989) and its ability to stay in the business, compete and grow ahead (Prahalad & Hamel, 1990)

3.1.6. Business Strategy: Resource Based View

The resource based view (RBV) of a business strategy talks about capitalizing on a company's unique resources and capabilities to achieve a competitive advantage (Barney, 1991). This approach includes four elements of viewing resources. They include 'valuable', 'rare', 'inimitable' and 'non-substitutable' (VRIN). These elements help in determining which resources can give a competitive edge in the market (Peteraf, 1993).

Horizontal Integration

Horizontal integration is a business strategy that involves a company acquiring or merging with other companies that operate at the same level of the supply chain. In the lighting industry, this can mean a lighting company acquiring another lighting company that offers similar products or services. This strategy has several potential benefits, including expanding a company's product portfolio, increasing its market share, and improving its bargaining power with suppliers.

One of the primary advantages of horizontal integration is the ability to expand a company's product portfolio. By acquiring companies that offer similar products or services, a company can quickly and easily expand its offerings and capture a larger share of the market. This can be particularly beneficial in the lighting industry, where there are many different types of lighting products and technologies.

Another advantage of horizontal integration is the ability to increase a company's market share. By acquiring competitors or merging with other companies in the industry, a company can reduce competition and gain a larger share of the market. This can be particularly important in highly competitive industries like lighting, where companies are constantly looking for ways to differentiate themselves and gain an edge over their rivals.

Finally, horizontal integration can improve a company's bargaining power with suppliers. By acquiring or merging with other companies in the industry, a company can benefit itself when negotiating with suppliers. This can lead to lower costs and improved profitability, which can be critical in a highly competitive industry like lighting. However, there are also potential risks associated with horizontal integration. For example, integrating two companies can be a complex and time-consuming process, and it can be challenging to merge different cultures and business practices. Additionally, there is always the risk that an acquisition or merger will not be successful, which can result in financial losses and damage to the company's reputation.

The value of horizontal integration in investigating the influence of PPM on profitability and market share in the EU lighting industry lies in the potential to increase efficiency and reduce costs. By merging with or acquiring other companies in the same industry, a firm can effectively manage its operations and resources, eliminate redundancies, and perform economies of scale. This can lead to improved production processes, better pricing strategies, and increased market power. Additionally, horizontal integration can provide access to new markets, technologies, and customer bases, which can help to diversify a firm's revenue streams and reduce reliance on a single product or market segment. Overall, horizontal integration can be a useful strategy for firms looking to improve their competitive position and profitability in the EU lighting industry.

In conclusion, horizontal integration can be an effective strategy for companies in the lighting industry looking to expand their product portfolio, increase their market share, and improve their profitability. However, it is important to carefully consider the potential risks and challenges associated with this approach before pursuing it. With careful planning and execution, horizontal integration can be a valuable tool for companies looking to stay competitive in the lighting industry and beyond (Tolonen et al., 2015).

Vertical Integration

Vertical integration is a business strategy where a company acquires or merges with suppliers or customers in the same industry, either upstream or downstream in the supply chain. In the lighting industry, vertical integration can involve a lighting manufacturer acquiring a supplier of raw materials or a distributor, or it can involve a lighting retailer acquiring a manufacturer or a logistics company. Companies can use vertical integration to influence their profitability and market share through product portfolio management by gaining more control over their supply chain and reducing their costs. For example, a lighting manufacturer that acquires a supplier of raw materials can ensure a steady and reliable supply of inputs, reduce its costs, and improve its quality control. Similarly, a lighting retailer that acquires a manufacturer can ensure a reliable supply of products, reduce its costs, and improve its pricing strategies.

Vertical integration is different from horizontal integration because it involves the acquisition or merger of companies at different levels of the supply chain, rather than companies in the same industry.

Horizontal integration is more focused on increasing market power and reducing competition by acquiring or merging with competitors in the same industry.

The choice between vertical and horizontal integration depends on the strategic goals of the company. Vertical integration is more suitable when a company wants to improve its control over its supply chain and reduce its costs, while horizontal integration is more suitable when a company wants to increase its market power and reduce competition.

3.2. Knowledge Gap

The primary knowledge gap addressed in this research is the lack of an integrated approach to applying various academic models such as Porter's Five Forces, the Business Value Proposition Canvas, Kotler's Price Setting Decision Model, and others in the context of the lighting industry. Typically, these models are used in isolation to analyze specific aspects of a business, like market competition, customer needs, or pricing strategies. This research will provide a holistic framework that combines these models to offer a comprehensive analysis of how companies can manage product portfolios to optimize profitability and market share.

Moreover, this research addresses the critical role of regulatory compliance in EU regulations that further shapes product portfolio strategies and their impact on profitability and market share. While many studies acknowledge the importance of compliance, few delve into how it can be strategically leveraged for competitive advantage.

3.2.1. Reasons for the Gap

- Fragmented Application: In many academic and business practices, different models are used independently, focusing narrowly on specific problems without a unified strategy. This fragmentation leads to a limited understanding of how different business elements interact and affect overall company performance.

- Industry-Specific Adaptation: The lighting industry, with its unique regulatory environment, rapid technological advancements, and increasing emphasis on sustainability, requires tailored analytical tools. Existing models are often too generic and do not fully address the dynamics of this industry.

- Evolving Regulatory Landscape: The dynamic nature of EU regulations, particularly concerning energy efficiency and environmental sustainability, presents challenges in keeping academic models updated and relevant. This evolving landscape necessitates a more integrated and adaptable approach to strategy formulation.

3.3. Conceptualization

In this section, a brief introduction has been given about the conceptual models used from theory to integrate the business needs with academic knowledge. This has been done to arrive at a guiding framework that includes specific elements of such models that bring value to the identified factors influencing profitability and market share. The idea behind using these academic models is to increase the research robustness of this study and also provide academic validation to the framework that will be further used to develop a methodology for this research study.

3.3.1. Porter's 5 Forces

Porter's Five Forces model is a framework that is commonly used in the field of business strategy to analyze the competitive environment of an industry. The model identifies five key forces that shape the industry's competitive structure and ultimately determine the level of profitability for firms within the industry (Porter, 1985). These five forces are:

- Threat of new entrants: This refers to the likelihood of new companies entering the market and competing with existing firms. High barriers to entry, such as significant start-up costs or government regulation, can make it difficult for new firms to enter the market and compete. The threat of new entrants is high when there are low barriers to entry, such as minimal capital requirements or easy access to distribution channels.

- Bargaining power of suppliers: This refers to the degree of bargaining power that suppliers have over firms in the industry. Suppliers with significant bargaining power, such as those with a monopoly on key resources, can drive up costs and reduce profitability for firms in the industry. The bargaining power of suppliers is high when there are few suppliers in the market or when suppliers have significant control over key resources.

- Bargaining power of buyers: This refers to the degree of bargaining power that buyers have over firms in the industry. Buyers with significant bargaining power, such as those who purchase large volumes of products or services, can negotiate lower prices and reduce profitability for firms in the industry. The bargaining power of buyers is high when there are few buyers in the market or when buyers purchase large volumes of products or services.

- Threat of substitute products or services: This refers to the likelihood of customers switching to alternative products or services offered by other industries. The availability of close substitutes can reduce the demand for products or services within the industry and impact profitability. The threat of substitute products or services is high when there are alternative products or services available that can perform the same function as the products or services offered by firms in the industry.

- Intensity of competitive rivalry: This refers to the level of competition between firms within the industry. High levels of competition can lead to price wars and reduced profitability for firms in the industry. The intensity of competitive rivalry is high when there are many firms in the market competing for the same customers.

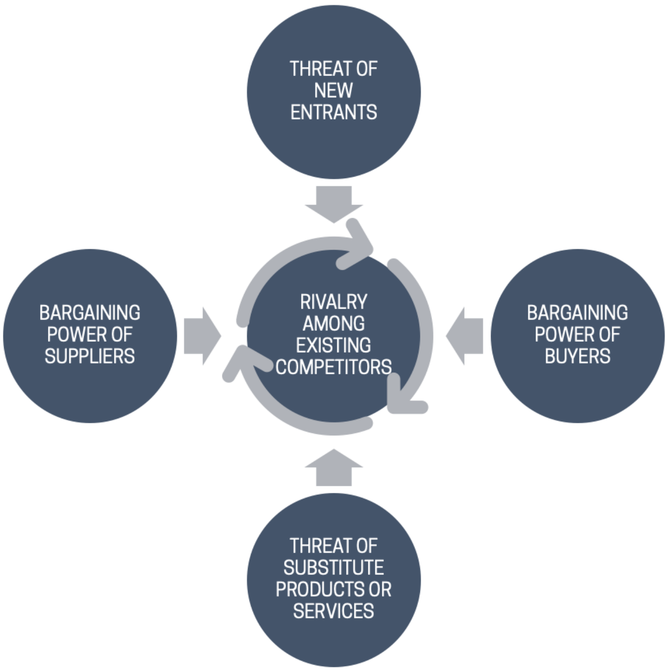

Figure 3.4: Porter's 5 forces (Models, 2024)

3.3.2. PESTEL Analysis

The PESTEL framework is used to understand more about the external macro-environmental factors that affect an organization. The abbreviation PESTEL extends to Political, Economic, Socio-cultural, Technological, Environmental, and Legal factors. The PESTEL framework helps organizations gain a better understanding of the external environment in which they operate and develop strategies to address potential opportunities and threats. By analyzing each segment of the PESTEL framework, organizations can identify key trends and issues that may impact their business and develop strategies to address them. The PESTEL framework is a valuable tool for conducting market research and developing a comprehensive understanding of the factors that may impact an organization's success.

- Political Factors: These refer to the government policies, laws, and regulations that impact an organization. Political factors may include tax policies, trade restrictions, labor laws, environmental regulations, and political stability. Political factors may vary depending on the country or region in which an organization operates. For example, changes in government policies or regulations may impact the way a company operates in a specific market. The EU's political environment has a significant impact on the lighting industry. For example, government policies and regulations related to energy efficiency and sustainability can impact the demand for lighting products. Additionally, trade policies and regulations related to imports and exports can impact the competitiveness of lighting companies in the EU market.

- Economic Factors: These refer to the economic conditions that impact an organization. Economic factors may include inflation, interest rates, exchange rates, and economic growth. Economic factors may impact consumer spending habits and the demand for products or services. They may also impact the cost of doing business, such as the cost of raw materials or labor. Economic factors may vary depending on the country or region in which an organization operates. Economic factors such as consumer spending, inflation rates, and exchange rates can impact the demand for lighting products. In addition, the cost of raw materials and labor can impact the profitability of lighting companies. Therefore, the PPM strategy should be designed to account for these economic factors.

- Socio-cultural Factors: These refer to social and cultural factors that impact an organization. Socio-cultural factors may include demographics, lifestyle changes, consumer attitudes, and social values. Socio-cultural factors may impact the demand for products or services and the way in which consumers interact with a company. For example, changes in consumer attitudes towards sustainability may impact the way in which a company markets its products. Socio-cultural factors can impact the demand for lighting products. For example, consumers may prefer energy-efficient and sustainable lighting products. PPM strategy should be aligned with these changing preferences to increase profitability and market share.

- Technological Factors: These refer to advancements in technology that impact an organization. Technological factors may include advancements in automation, artificial intelligence, and the internet. Technological factors may impact the way in which a company operates or the products or services it offers. Technological factors may also impact the competitive landscape of an industry. Technological advancements in the lighting industry can impact the competitiveness of companies. PPM strategy should be designed to take advantage of these advancements to increase profitability and market share.

- Environmental Factors: These refer to environmental issues that impact an organization. Environmental factors may include climate change, sustainability, and natural disasters. Environmental factors may impact the way in which a company operates or the products or services it offers. Environmental factors may also impact consumer attitudes towards a company or its products. Environmental factors such as climate change and sustainability are increasingly important in the lighting industry. PPM strategy should be designed to address these factors to increase profitability and market share.

- Legal Factors: These refer to laws and regulations that impact an organization. Legal factors may include labor laws, intellectual property laws, and consumer protection laws. Legal factors may impact the way in which a company operates or the products or services it offers. Legal factors may also impact the competitive landscape of an industry. Legal factors can impact the lighting industry. PPM strategy should be designed to comply with these laws and regulations to increase profitability and market share.

By analyzing each segment of the PESTEL framework, organizations can gain a better understanding of the external environment in which they operate and develop strategies to address potential opportunities and threats (Akbalik & Çitilci, 2019).

3.3.3. Business Value Proposition Canvas

The Business Value Proposition Canvas (BVPC) is a strategic tool designed to help businesses define and achieve their value proposition. It is a framework that focuses specifically on creating and delivering value to customers, which is crucial for achieving profitability and market share. The BVPC is an extension of the Business Model Canvas, developed by Alexander Osterwalder, and emphasizes the customer's perspective more intensely (Osterwalder & Pigneur, 2014).

The BVPC is divided into two main parts:

- Customer Profile:

  1. Customer Jobs: These are the tasks, problems, or needs that your customers aim to solve or satisfy. Understanding what the customer is trying to achieve helps businesses tailor their offerings more effectively.

  2. Customer Pains: These are the negative experiences, emotions, or risks that customers face in their current situation. Identifying these pains allows businesses to create solutions that alleviate these issues.

  3. Customer Gains: These are the positive outcomes or benefits that customers desire. By recognizing these gains, businesses can design products and services that deliver these benefits.

- Value Map:

  1. Products and Services: This component lists all the products and services a business offers to its customers. It includes everything that contributes to the value proposition.

  2. Pain Relievers: These are the ways in which your products and services alleviate customer pains. Effective pain relievers address significant customer frustrations and problems.

  3. Gain Creators: These describe how your products and services create customer gains. They highlight the benefits that customers can experience from your offerings.

3.3.4. SWOT Analysis

SWOT analysis is a tool that is used for planning processes in strategy. It is further used to highlight and evaluate the internal and external factors that effect an organization's performance. Moreover, SWOT represents strengths, weaknesses, opportunities and threats. This tool ensures companies create strategies to further enhance their strengths, tackle their weaknesses, capitalize on their opportunities and mitigate the threats.

Strengths
These are capabilities that discuss about an organization's resources that can be utilized to achieve the goals. For instance, brand reputation, efficient process management etc. (Helms & Nixon, 2010)

Weaknesses
Weaknesses refer to internal factors that creates barriers for an organization to achieve its objectives. For instance, lack of experience, old technology and etc. (Pickton & Wright, 1998)

Opportunities
External factors that an organization can further utilize to its own benefits are referred to as opportunities. For instance, regulatory changes, market developments etc. (Gürel & Tat, 2017)

Threats
Challenges that negatively impact the organization in achieving its goals are known as threats. For instance, increased competition and economic hurdles etc. (Helms & Nixon, 2010)

3.4. Guiding Framework

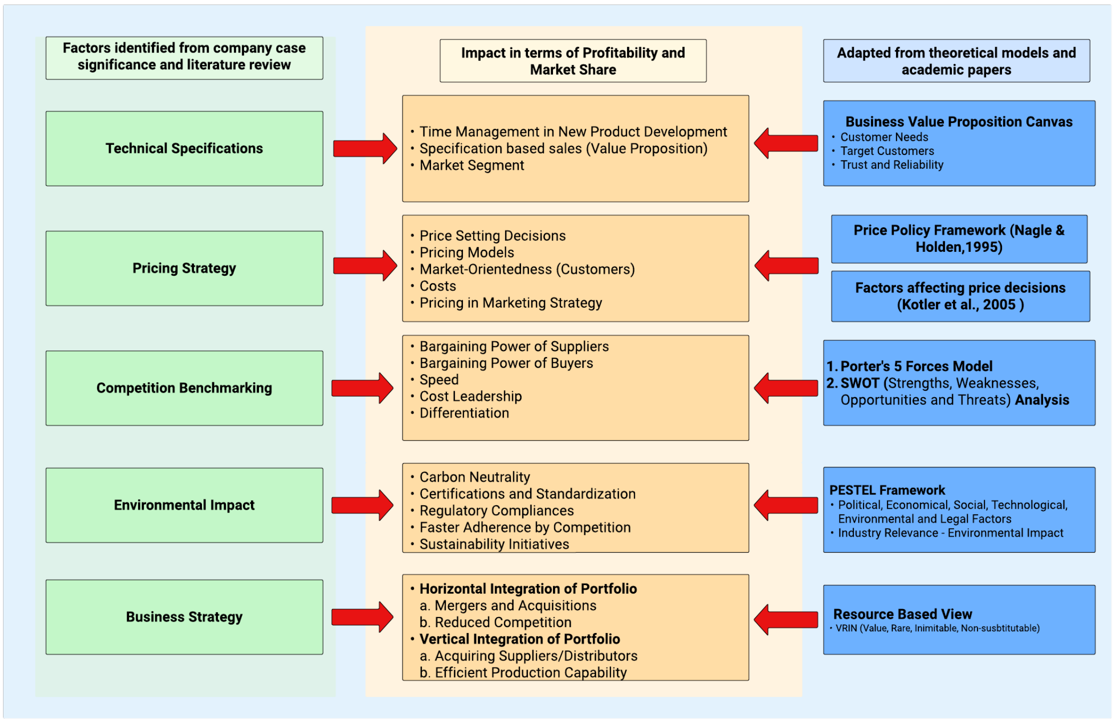

Figure 3.5: Guiding Framework (Own Composition)

After reviewing literature in depth and extracting the relevant theories present in existing models, a guiding framework was constructed to further direct the research design. This framework consists of three building blocks namely, "identified factors from literature and company case", "impact in terms of profitability and market share" and "adaptation of theories from existing models". This is a framework that has been independently developed by the researcher to make the study structured and detailed. It is an own composition of the researcher that will be further presented as a contributing element in this research.

The framework works on the principle of using the identified factors as the main topics to be researched upon for tackling the effect on profitability and market share. These factors have been identified after exploring papers and articles which have been mentioned in section 3.1. Followed by which on the right hand side of the framework as shown in Figure 3.5 in the blue are the concepts that have been chosen from the existing academic models to tailor the requirements of drawing relevance between the identified factors and their subsequent impact on profitability and market share.

In the centre of the framework, the impact on profitability and market share has been presented in terms of what it could mean for each factor. This can be also explained using an example. Porter's 5 forces model is an existing academic model that has been used in the conceptualization phase of this research. It has been found that the bargaining power of suppliers and buyers is a concept that is highly relevant in understanding the impact of competition analysis on targeting high profitability and market share. Similarly, PESTEL Framework has been adapted to cater to the investigation of environmental impact on the two dependent variables.

4
Methodology

In this chapter, a structured approach has been laid out on defining the methodology of the research. It further talks about the nature of a qualitative approach that has been employed in this study. Followed by which, the discussion revolves around case study protocol and development of interview design. The research question guides the research study towards highlighting specific phenomena related to the concept of product portfolio management in companies. Semi-structured interviews have been done to gather data and an inductive approach has been further used to extract meaningful results in contributing towards developing theoretical insights. In addition to this, this research aims to provide practical significance through its framework developed around managing product portfolios in the EU's lighting industry on an analytical level. This framework is further enhanced using the insights of product managers and industry experts. Lastly, this section will talk about selection of participants (interviewees), data collection and analysis processes.

4.1. Research Design

An exploratory qualitative research design has been opted in this study to understand about the factors within product portfolios influencing profitability and market share in the EU Lighting Industry. This approach will allow investigating in detail about the complex mechanisms and the strategic decision-making processes involved within companies. This will also include the assessment of different factors within product portfolios. In addition to this, a qualitative research design will further capture essential insights and experiences of product managers, industry experts and other important key stakeholders who are an integral part of PPM practices within companies.

4.1.1. Case Study Protocol

A case study protocol is a detailed plan of action that outlines the steps involved in conducting a case study research. The purpose of a case study protocol is to ensure that the research is conducted in a systematic and rigorous manner, and that the research questions are answered using reliable and valid data.

A case study protocol is particularly useful in research designs where the researcher is investigating a complex phenomenon, such as the impact of PPM on profitability and market share in the EU's lighting industry. By using a case study protocol, the process of ensuring that the research is conducted in a structured and systematic way will become easier. It will also help to ensure that the data collected is reliable and valid.

In this research, a selection of case will be done to investigate in detail about the impact of PPM in influencing profitability and market share. This will allow to study a lighting application company's existing portfolio management strategies in detail and how can the company use the output of this research in a way that it benefits their overall financial health.

In Figure 4.1, a research design process has been presented to provide an overview on how the research will be conducted and what will be the crucial steps in successfully answering the research questions.

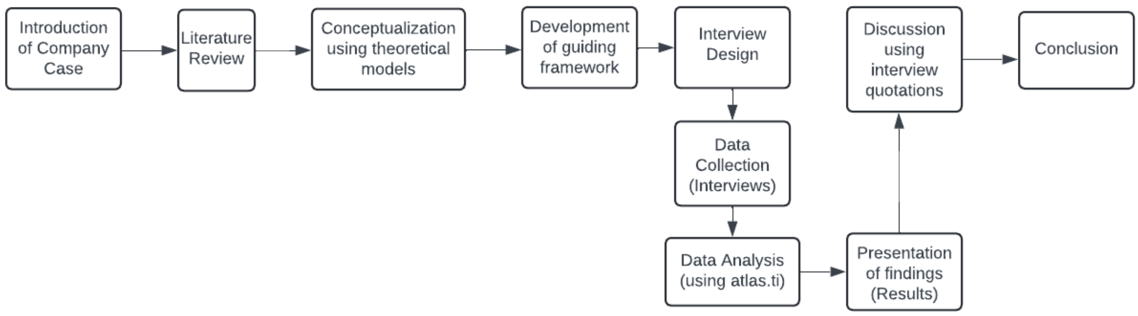

Figure 4.1: Research Design Process

4.2. Research Strategy

In this study, the research strategy that has been adopted consists of various steps. After the problem identification and introduction of company case. A thorough literature review was done to better understand the developments of each factor and what does it mean to imply in the context of this case study.After the literature review was done, a guiding framework has been created using the factors identified during the literature review and the important aspects considered while managing product portfolios according to the company case.

This guiding framework consists of relevant relationships stemming from the conceptualization phase of reviewing existing literature and studying the relevant theoretical background. BPVC, Porter's 5 forces, SWOT Analysis and PESTEL Framework along with specific pricing frameworks discussed in the literature review were used to develop the foundation of the guiding framework. After the development of the guiding framework, empirical analysis was carried via interviews within Signify and the linear indoor drivers portfolio to understand about the impact of the identified factors in the guiding framework and further find similarities and discrepancies in the framework to revise it and propose it as a completed guide towards managing product portfolios in targeting high profitability and market share.

4.2.1. Selection of Participants (Interviewees)

The participants for the interviews were selected based on their expertise and experience with managing product portfolios within Signify. Most of the participants are working closely within the linear indoor drivers portfolio and have a deep understanding of how does the factors associated in this research study look like for the products within this portfolio. In Table 4.1, a list of all the interviewees and their expertise along with the interviewee codes has been presented.

Product Managers work closely with managing different portfolios and focusing on all operations such as pricing, commercial releases, follow-ups on product development with internal teams, engaging about product performance in terms of sales with the market and etc. Similarly, key account managers for different regions are responsible for shaping the product portfolios, making roadmap decisions and further working closely with product management teams. Their engagement with the customers is more direct than product managers. One of the main reasons behind selecting them as an appropriate participant for this research was to gather the customer perspectives in terms of price-setting decisions, technical specifications and the vitality of environmental impact of the manufactured products.

Moreover, global system architect looks after the technology and the platforms that are used in the linear drivers portfolio, globally. The choice of interviewing someone like a global system architect was based on the knowledge integration on technical specifications of the products. In addition to this, the interviewee has an experience of more than 15 years within the company working at same tasks over different customers and suppliers globally.

As the research also dives into understanding about market positioning of the product within the portfolio, it was necessary to choose interviewees who have been involved in working with sustainability related projects at the product management level. One of the interviewees was an I2M Project Manager who also manages product portfolios but is also involved in the development of EPD's (Environmental Product Declaration) of the products that are created within the portfolios. Understanding about the influence of energy efficiency, packaging materials, sustainability within the products and the future potential regarding business opportunities were the main reasons to select this participant.

Similarly, a product marketeer was selected a participant to explore in detail the feasibility of the identified factor of business strategy from a resource based view. This explains in detail about the integration of horizontal and vertical integration of portfolios. Moreover, as the product marketeer is also largely involved in supply chain management and how are the process inefficiencies leads to impact on profitability and market share, it was considered important to select this participant.

Lastly, the regional marketing manager was chosen as the participant heads all the product managers and is highly experienced with product portfolio management processes and all other major tasks done by a product manager.

Interviewee Code	**Role**	**Expertise**
P1	Product Manager	PPM, Operations, Portfolio Pricing, Customer Relationships
P2	Key Account Manager	Market Information, Technical Specifications, Pricing, Customer Relationships
P3	Key Account Manager	Market Information, Technical Specifications, Pricing, Customer Relationships
P4	Global System Architect	Product Technology, Customer Relationships, Competitor Analysis
P5	Key Account Manager	Market Information, Technical Specifications, Pricing, Customer Relationships
P6	I2M Project Manager	PPM, Operations, Customer Relationships, Sustainability (Environmental Product Declarations)
P7	Regional Marketing Manager OEM Europe	Heading all Product Managers
P8	Product Marketeer	Supply Chain Planner
P9	Product Manager	PPM, Operations, Portfolio Pricing, Customer Relationships, Luminares (Portfolio)

Table 4.1: List of interviewees with their roles and expertise

4.2.2. Interview Design

The interview design was created using the guiding framework and the necessary information acquired from company case to investigate in depth about the influence of each factor on profitability and market share. It further comprised of questions ranging from the impact of differentiation in technical specifications to assumptions made about pricing for each product category in impacting profitability and market share. The construction of the interview design was also done using the relevant elements of the adapted academic models as mentioned in the guiding framework. A detailed version of the interview questions can be found in Appendix A.

4.3. Data Collection

Interviews were conducted with participants to get important data on the topic of research for further analysis and conclusion development in the research study. An informed consent form was prepared in advance that requested for official consent from all the participants before the interviews took place. This was done to ensure all protocols of human rights and ethics. The same form has been attached in Appendix B. The interview protocol began with some open-ended questions initially to understand the holistic approach the participant about the factors that influence profitability and market share within product portfolios. The discussion was then delved towards the respondent's answer. As the interview progressed, the identified factors were brought up in different phases of the interview to question in depth about their impact and its subsequent sub-factor which has been discussed in detail in section 6.2. It is important to note that the access to all the interview transcripts and recordings have been already provided to the graduation committee of this thesis project.

4.4. Data Analysis

The process of data analysis began with retrieving the transcripts from the recorded teams meeting of the interviews for which consent was already granted using the consent form and verbally during the meeting as well. As a part of the human research and ethics protocol, the names of the interviews were anonymised during the analysis process. It should be also noted that these transcripts when retrieved from the recorded meetings were not easily followed due to inaccurate and automized transcribing from the recorded meetings.

They were first manually corrected after listening to the recordings multiple times.Thematic analysis was then performed on each anonymised transcript. The identified themes were nothing but the factors that were identified in the initial phase of research design. This process of identification happened through reading the transcripts several number of times to highlight patterns from the data and further connect them using the themes to move towards drawing conclusions (Fereday & Muir-Cochrane, 2006). Quotations were created based on the relevance from the responses for every identified factor. Furthermore, codes were deployed to each of these quotations to further transition towards categorization into themes. These themes were then combined aligned with respective codes and quotations to develop relationships using which further conclusions could be made in the phase of data analysis. This is referred to as axial coding. Iterative coding analysis has been employed in this research study. The process initiates with open coding and further moves to axial coding in the second stage. In the next chapter, examples have been illustrated to describe the process of open and axial coding.

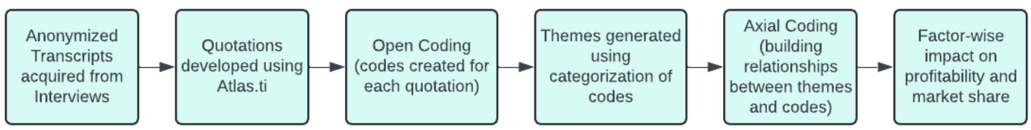

Figure 4.2: Data Analysis Process (Fereday & Muir-Cochrane, 2006)

5 Results

In this chapter, findings of 9 semi-structured interviews have been presented. The interviews were targeted to understand the impact of every factor on profitability and market share. Moreover, the interviewees discussed about the elements that are common between these factors while focusing on high profitability and market share. The researcher conducted a thorough thematic analysis, which resulted into identifying the areas that could be prioritized over other factors. Furthermore, it helped in identifying the factors that were not considered by the researcher in the guiding framework before the process of empirical analysis. This inclusion by the interviewees strengthened the validity of the guiding framework from an industrial point of view. Moreover, a direct factor-wise impact analysis has been presented for each interviewee. This is further followed by a sensitivity analysis of each factor on the dependent variables to understand in depth about their manipulation impacts and subsequent conclusions.

5.1. Coding Analysis

5.1.1. Open Coding

After the interviews were completed, the collected transcripts were reworked upon using the interview recordings to ensure the relevance of statements. These transcripts were then imported in the software Atlas.ti to initiate the first step of iterative coding analysis. Open Coding was done using quotations from the transcripts. These quotations were created using the relevance of themes. The questions asked during the interview were based on these themes and how these themes look like in the current scenario of linear indoor drivers portfolio at Signify. This process allowed for highlighting the essential sub-topics (codes) related to each theme and their subsequent impact on the profitability and market share (dependent variables of this research study).

Figure 5.1 illustrates how different codes are part of a specific theme. For instance, 'cost management' and 'cost road map' are two important elements that have been discussed in the interviews regarding the influence of pricing/costing on market share and profitability. These codes identified in the first step of the iterative coding analysis have been presented with the specific quotations in the next section. Relationships between the themes and the dependent variables can be identified using axial coding. This will further lead to giving crucial insights on the pain points within the current portfolio for increasing profitability and market share.

5.1.2. Identification of New Themes

After the step of collecting insights from literature about the identified factors from the company case, a guiding framework was developed using the analytical models from theory to direct the empirical analysis towards strategic recommendations about further developing or improving upon existing practices in these factors within the portfolio.

During the empirical analysis, it was observed that apart from the insights gathered from the literature and chosen factors that influenced profitability and market share, there are some other aspects which

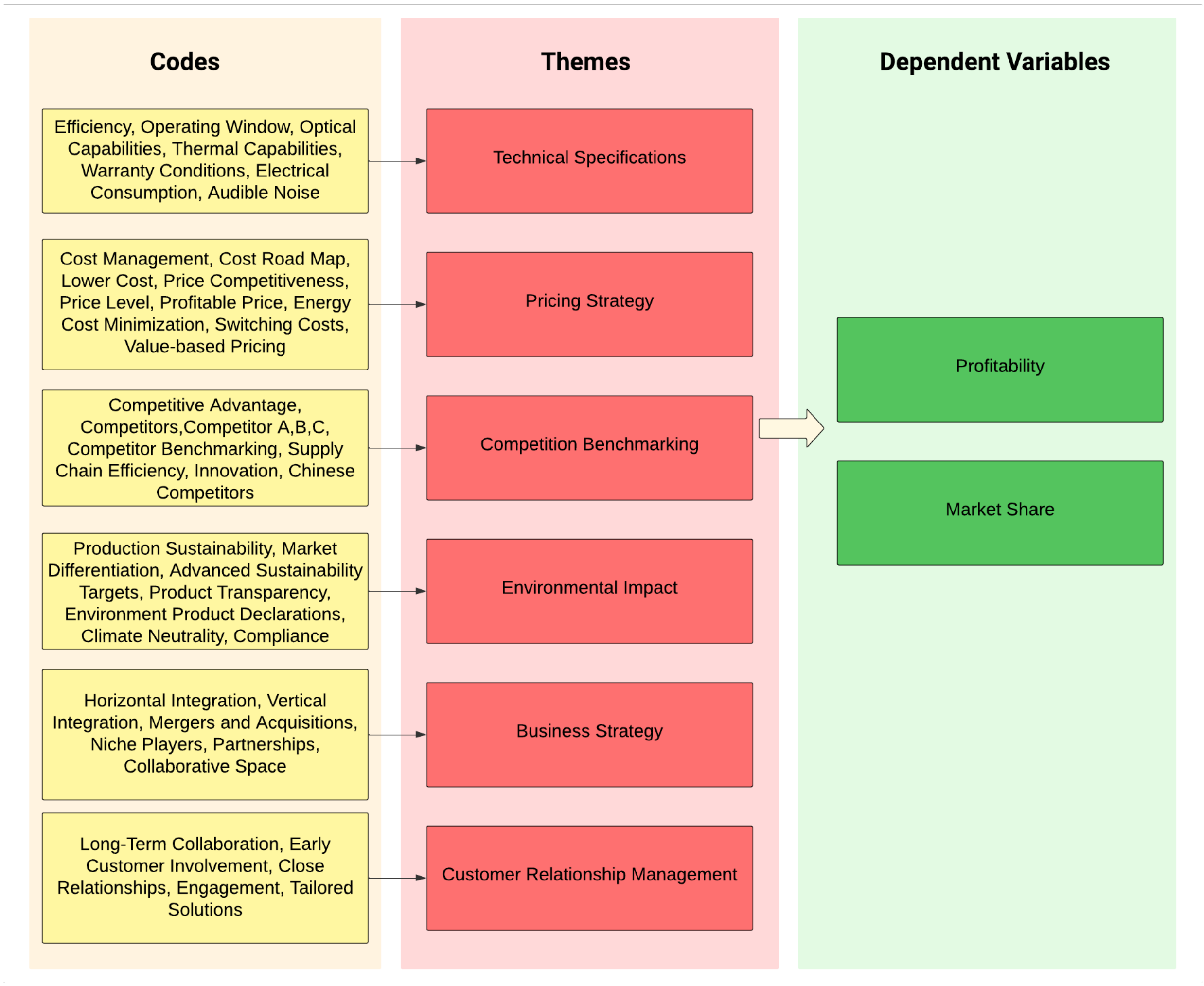

Figure 5.1: Categorization of codes emerged from interviews and further arranged under relevant themes that influence the dependent variables.

also influence profitability and market share in the lighting industry. During the interviews, it was found as a common perception from majority of the interviewees that **'Customer Relationship Management'** is a crucial factor when it comes to maintaining profitability over a long period of time.

This was something that was only found out through the empirical analysis (interviews) as interviewees were posed with questions that talked about the potential to-do's one should keep in mind while targeting profitability in both short-term and long-term scenarios. Further, it was mentioned that this aspect of product portfolio management is often neglected in ensuring the financial success of a company. At Signify, it is of prime importance to manage customer relationships effectively in order to sustain the market share of the industry and not let it wither away to a competitor.

Linking with customers over years on good partnerships ensures that the customer starts foreseeing future business growth along with the same company with whom business was done previously. The results gathered about the impact of this theme on profitability and market share will be presented in depth in the next section.

5.1.3. Axial Coding

As a next step after open coding, it is important to find out about the relationships between the codes identified from the transcripts of the interviews and the dependent variables to be researched upon in the study. Axial coding is the second step of the iterative coding analysis which helps in breaking down the data into smaller segments and then underlining each segment with a descriptive code that explains the meaning of the segment. It is also referred to as grounded theory approach.

In this section, a few examples have been presented to provide an overview of how the codes found in the first step of the analysis correlates with the quotations (actual words of interviewees). It will also indicate the subsequent impact of the particular factor on profitability and market share.

Quotation 1 (Theme: Pricing/Costing)

"If you are talking about profitability and market share, there are several elements involved. One, how good you are able to manage your cost road map? And the second one is how good you are at setting your commercial conditions in the market, because at the end you are profitability all about either you need to have lower cost or you need to have good price or profitable good price level that will help for better profitability. Then you need to look at those two elements in terms of profitability"

- **Open Codes**: Cost Management, Cost Road Map, Lower Cost, Price Level
- **Impact on profitability**: It can be clearly seen in the quotation by the interviewee that the influence of how good the cost road map can be developed throughout the business cycle contributes directly to profitability. In addition to this, establishing good commercial conditions is essential in determining positive growth targets as either volume production (lower cost) or limited sales at a premium price.

Quotation 2 (Theme: Customer Relationship Management)

"But, for example, cooperation with your customers is also important for your market share, because we are not talking about the daily contacts with your customer, but you should also look a bit ahead and for the future then how you need to make sure that you are able to engage with your customer for your future propositions. So it is kind of a collaborative product development or a long term collaboration with your customers. We are not talking about what you have today. We are talking about what you will have in the future and how you can work with your customers in the future. So this is also important."

- **Open Codes**: Long-Term Collaboration, Close Relationships, Engagement
- **Impact on market share**: The interviewee talks about the importance of looking ahead in time with a customer in order to engage in future business opportunities. The impact of collaborative product development and long-term collaboration with customers enables strong working relationships and this further helps in capturing the market share from the competitors who are competing to acquire the same customer.

5.2. Interview Analysis

In this section, insights from the interviews have been presented. These insights are divided based on the interviewee codes as mentioned in Table 4.1 and different themes identified earlier in section 5.1. Furthermore, the insights have been summarized from the responses of the interviewees on the subsequent impact of these themes on profitability and market share.

5.2.1. Technical Specifications and Pricing Strategy

Technical specifications of the products within the linear indoor drivers portfolio differ based on the performance and the output characteristics of a driver. In the interviews, it was noticed that these specifications determine how each product is segmented. Figure 2.1 shows the categorization of products into Entry, Core, Performance and Statement ranges.

This segregation is based out of products that have a core differentiating factor (new technology) and the products which are not very different from what is already selling in the market but are marketed based on price adjustments. In the empirical analysis, the questions that were asked to the interviewees about technical specifications were structured around the impact of a technical specification of a driver on its profitability and how does a particular technical specification ensure market competitiveness in aiming for a higher market share.

In addition to this, the interview design also involved discussions around what are these technical specifications in the linear indoor drivers portfolio that are most critical in differentiating Signify's products from the competition's offerings. Moreover, the discussion also involved the impact of technical specifications of the products on customer satisfaction and retention. Customer retention and satisfaction are two key metrics that can be used to understand more about the efficacy of the company's value proposition as discussed in subsection 3.3.3.

The objective behind analysing pricing as another factor that influences profitability and market share within the product portfolios was to also highlight the interconnected relationship between a technical specification of a driver and additional costs involved in producing that technical specification. Having said that, it is also essential to find out the subsequent impact on pricing strategy of a product after having incorporated a technical specification that includes additional cost. Therefore, the second phase of the interview initiated with exploring the relevance of pricing a product in ensuring high profitability and winning the market share in the lighting industry.

The balance between competitive pricing and maintaining profitability is important to explore how does an organization decide on winning the market share from the competition and sustaining healthy margins on their sale. The interviewees responded with their opinions on pricing strategy and to-do's around setting a good price for targeting positive business growth.

For instance, value-based pricing was described by majority of the interviewees as a strategy to determine prices for cost savings and higher efficiency gains in comparison to what a competitor could provide. Product differentiation can be created in the market using this type of a pricing strategy as it takes into consideration the 'value' incurred by Signify in its products that sets them apart.

A logical pricing guideline is also used within the linear indoor drivers portfolio to add additional margins to different product segments within the portfolio. These margins differ based on the value created by each product segment to the customer. Value creation is interpreted in terms of the technology served by Signify to its customers and depending upon each technology's incorporation cost, the pricing guideline is adjusted. The idea behind investigating the influence of this logical pricing guideline on capturing the maximum market share and reporting high numbers in sales was to understand the process of price setting process in this portfolio. This discussion with all the interviewees further provided interesting insights about the market-orientedness in pricing strategies.

Similarly, focusing on operational challenges such as increasing production efficiency, inventory management that could arise while targeting a competitive cost price and maintaining a healthy selling price was done to better understand the changes required to be brought in pricing or costing in aiming for high profitability.

Table 5.1 represents the impact of these two themes (Technical Specifications and Pricing Strategy) on profitability and market share. These insights are concluded and summarized based on the discussions as mentioned earlier. The influence and development of relationships between the factors and the dependent variables will be described further in the next chapter.

Interviewee	**Technical Specifications**	**Pricing Strategy**
P1	Importance of application understanding. Specifications vary by customer/application. Examples: audible noise for hotels, efficiency for general lighting.	Managing cost roadmap and commercial conditions. Value-based pricing for efficiency gains and cost savings.
P2	Right specification, stable quality. Examples: high power luminaires, EMC compliance, EL for emergency lighting.	Competitive pricing for high runners. Continuous value engineering. Market price-oriented pricing guidance.

P3	Conformity and safety standards, DALI controls compliance, efficiency, flicker-free performance. Efficiency crucial due to high energy costs.	Balancing competitive price with profitability. Importance of quality and reputation of Philips.
P4	Importance of new technologies and distinguishing features. Focus on reliability, compliance, and ease of design.	Logical pricing guidelines: higher margins for high-end products to cover R&D costs. Different margins for different product categories based on volume and cost.
P5	Performance and quality parameters crucial. Examples: efficiency, flicker performance, ripple current.	Active cost management post-release. Importance of cost downs to stay competitive.
P6	Importance of product availability and supply chain efficiency. Innovation and market demand are key.	Managing costs versus pricing. Cost management and setting prices that reflect product value.
P7	Understanding customer challenges and translating them into unique differentiators. Focus on mature market for linear LED drivers. Efficiency and intelligence in drivers. Examples: dimming for energy saving, human-centric lighting.	Value-based pricing considering differentiation and competitor pricing. Balancing high performance with cost efficiency. Competitive pricing for specific market segments.
P8	Importance of unique products to maintain high margins. Focus on performance and uniqueness.	Importance of pricing for unique products. Margin management critical for profitability.
P9	Importance of both quantitative (efficacy) and qualitative (brand reputation) differentiators. Customer-specific requirements influence technical specs. Examples: total harmonic distortion, efficiency. Differentiating through value propositions validated with customers.	Focus on margin value over margin percentage. Competitive pricing critical for winning projects. Logical pricing guidelines often adjusted based on market and customer needs. Negotiations often prioritize competitive pricing over strict margin targets.

Table 5.1: Interview Insights on Technical Specifications and Pricing Strategy

5.2.2. Competition Benchmarking and Environmental Impact

As mentioned in Table 4.1 about the roles of interviewees, it can be seen that some of the interviewees look after the business of the linear indoor drivers portfolio in different regions within EU. While a competitor could be dominant in a particular product category in one region, it could vary in another region. The discussion about the relationship between competition benchmarking and winning the market share opportunities was done in the next phase of the interviews.

In subsection 3.3.1, the conceptual model of Porter's 5 forces has been discussed. Bargaining power of suppliers and buyers was emphasized out of the five forces in identifying the importance of maintaining good long-term relationships with suppliers and customers in continuing business with them in a market that is highly competitive. This further meant that if a customer has a bargaining power in the competitive market of lighting industry, how would it impact Signify to ensure that the customer is not lost because of a better deal offered by the competition.

As discussed in subsection 3.1.5 about the competitors of Signify within this portfolio. Preparing attack plans and strategies on winning a customer that is doing business at a larger scale with competition is a crucial element of product portfolio management. The interviewees were asked about the strengths and weaknesses of these competitors in their experiences of working within the linear indoor drivers portfolio. In addition to this, it was also important to understand how competition's strengths and weaknesses can be translated into opportunities and threats for Signify. The adoption of SWOT analysis was used to highlight the areas of improvement analytically in the product portfolio of linear indoor drivers in comparison to the biggest competitors. Similarly, after understanding about the weaknesses of the competition, opportunities can be focused upon to create a competitive edge and capture the untapped market share.

Potential areas of innovation were also discussed in order to stay ahead of competition in different product categories of the portfolio. Knowing in advance about what the competition is doing often helps in creating something that becomes competitive in order to fight for sales and eventually the market share. The interviewees also mentioned about how does studying how many product ranges in terms of output voltage, output power and output current does the competition produce in comparison to Signify helps in targeting profitability and market share.

Followed by competition benchmarking, environmental impact was discussed next in understanding more about the factors affecting profitability and market share. At Signify, sustainability is the prime focus area across all dimensions of the organization. Similarly, in the linear indoor drivers portfolio, the empirical analysis explored the impact of environmental impact created by the products on profitability and market share. While some of the interviewees mentioned that there is no significant or direct contribution of this impact on profitability, there could be an impact in long-term profitability and opportunities for capturing the highest market share. Different perspectives of the interviewees solidify the research in terms of identifying action points for future improvement within the areas of sustainability.

Communication of environmental benefits of Signify's products to its customers was mentioned as an area that could be strengthened in future as it draws significant attention from the customers. It will be further validated in the next section using quotations from interviewees.

Product transparency in terms of declaring openly about the impact of the manufactured products on the environment,use of recycled plastic in the packaging process and other such activities which are necessary to create differentiation in the market have been discussed in the interviews. After having studied about the PESTEL framework in the conceptualization stage of this research as discussed in subsection 3.3.2, it was identified that the environmental factor of the framework hold the most relevance in the case of lighting industry. The energy performance of buildings directive (EBPD) and the eco-design directive launched by EU at promoting energy efficiency impacted the lighting industry. One of the main discussion points in regarding the influence of this factor was its impact on profitability and market share. It addresses how did the launch of these directives in the EU influenced the sale of products and furthe, the manufacturing of the products.

Cost implications in implementing different sustainable practices within the linear drivers portfolio was also discussed to assess the interconnectedness of having a larger positive environmental impact with increasing costs. Moreover, improvements in the product lifecycle management to enhance sustainability and further driver market share were also mentioned in the discussion which will be later talked about in detail in the next section.

Table 5.2 represents the impact of these two themes (Competition Benchmakring and Environmental Impact) on profitability and market share. These insights are concluded and summarized based on the discussions as mentioned earlier. The influence and development of relationships between the factors and the dependent variables will be described further in the next chapter.

Interviewee	**Competition Benchmarking**	**Environmental Impact**
P1	Cooperation with customers for future propositions. Collaborative product development.	Sustainability driven by end-user demand, especially in tenders. Market differentiation through sustainability.
P2	Emphasis on competitor benchmarking via reflection on competition's price points).	Advanced sustainability targets at Signify. Importance of product transparency (e.g., reducing box sizes, environmental product declarations).
P3	Keeping an eye on competition for pricing and product features. Examples: Competitor A's availability advantage in the UK.	Early adoption of sustainability practices crucial. Leading in sustainability efforts recognized by customers.

P4	Benchmarking against competitors for major projects. Learning from competitors' technology and cost strategies.	Signify's broad portfolio helps customers with sustainability. Environmental product declarations assist customers in compliance.
P5	Importance of understanding competition and their strategies.	Environmental impact crucial for long-term growth. Need for proof points and external verification.
P6	Benchmarking for supply chain efficiency. Importance of aligning with competitors in innovation.	Emphasis on sustainability in production processes and product lifecycle. Importance of clear communication about environmental impact.
P7	Benchmarking essential for gaining market share. Competitor analysis for product and company levels.	High value of sustainability for Signify. Energy efficiency recognized, focus on environmental product declarations.
P8	Competitors producing in China for low-cost advantages. Signify's flexibility in Europe as a strength.	Sustainability as a key factor for market growth. Importance of climate neutrality.
P9	Competitor data is essential for benchmarking. Detailed analysis of competitors' products and strategies. Importance of knowing competitors' strengths and weaknesses. Examples: Osram and Tridonic. Benchmarking helps in identifying areas for improvement and maintaining competitiveness.	Sustainability increasingly important in tenders and customer decisions. Focus on compliance and environmental certifications. Regulatory compliance and sustainability as competitive advantages.

Table 5.2: Interview Insights on Competitive Benchmarking and Environmental Impact

5.2.3. Business Strategy (Horizontal and Vertical Integration)

Business Strategy from a resource-based view that talks about how a company's resources and capabilities are the most important elements of gaining a competitive advantage. As this has been emphasized upon in subsection 3.1.6 as a part of literature study, it was further incorporated in the interview design to compare the insights from the empirical analysis. The integration of horizontal and vertical alignment in product portfolios has a significant impact in influencing the profitability and market share. The interviewees discussed about the impact in different perspectives. While some of them considered the impact to be relatively less due to other factors being more dominant, it was also observed that the influence of mergers and acquisitions (M&A) or vertical integration (enhancing supply chain control) could impact profitability and market share.

Signify has done major mergers and acquisitions (M&A) in the past to strengthen the company's overall sales and reduce competition in the market (Signify, 2020). While horizontal integration talks about acquiring competitors to reduce competition and increase market share, vertical integration discusses the acquisition of a distributor or a retailer to have more control over the production process and further improve supply chain co-ordination.

While majority of the interviewees approached this factor from an organisational perspective, one of the interviewees who specialises in supply chain and finance provided essential insights about the supply chain related processes and the consequential impact of horizontal and vertical integration on the portfolios. The organisational perspective is describing about the direct impact of these integration strategies on influencing market share and profitability. It also refers to what Signify has already done in the past and how could either of these strategies help Signify in the future.

Signify has its own manufacturing factory setup in Poland where most of the company's products are produced within the OEM business. The discussion also included the outsourcing of components in Europe and how the company is focusing on increasing the speed at which these outsourced components arrive at their own factory. Further, it was highlighted that the global outreach of Signify helps the company to use the top benefits from distribution centers across Europe in case the company misses out on the direction to proceed with sales.

As the discussion directed towards supply chain efficiency, quality control processes in order to boost profitability and market reputation was also mentioned. This was further continued by discussing efficient inventory management and the impact of slow moving stock on overall financial health of the portfolio and largely, OEM business.

Table 5.3 represents the impact of the theme, Business Strategy (Horizontal and Vertical Integration) on profitability and market share. These insights are concluded and summarized based on the discussions as mentioned earlier. The influence and development of relationships between the factors and the dependent variables will be described further in the next chapter.

Interviewee	Horizontal Integration	Vertical Integration
P1	Different kinds of businesses integrating LED/board suppliers to maintain high value. Filling portfolio gaps to maintain leader position.	Considering vertical integration for high value. Understanding market position/trends before integration.
P2	Not explicitly mentioned.	Not explicitly mentioned.
P3	Collaborative space with competitors drives sales. Examples: standardizing control protocols and resistor values across the industry.	Acquisitions within Signify for shared resources and driving industry standards.
P4	Horizontal integration for broad portfolio coverage. Acquiring niche players to fill gaps.	Vertical integration through acquisitions and joint ventures for better supply chain control.
P5	Horizontal integration through acquiring niche players to cover gaps.	Vertical integration to control crucial parts of the supply chain.
P6	Horizontal integration to leverage market opportunities. Partnering with other firms for innovation.	Vertical integration for better supply chain control. Enhancing production capabilities through acquisitions.
P7	Active horizontal integration strategy. Example: acquiring niche players to broaden market coverage.	Vertical integration through joint ventures and acquisitions. Example: managing supply chain in China.
P8	Horizontal integration through partnerships for innovation. Leveraging market opportunities.	Vertical integration for better supply chain control. Enhancing production through internal capabilities.
P9	Horizontal integration through mergers and acquisitions to fill portfolio gaps and expand market reach.	Vertical integration for better supply chain control and reducing dependency on external suppliers.

Table 5.3: Interview Insights on Business Strategy (Horizontal and Vertical Integration)

5.2.4. Customer Relationship Management

Business Value Proposition Canvas (BVPC) as discussed in subsection 3.3.3 addresses the importance of understanding the customer profiles, values, pains and gains to position a product in the market effectively. As mentioned in subsection 5.1.2 about the identification of customer relationship management as a new theme in this research, it was crucial to highlight its influence on profitability and market share.

All the interviewees stressed upon maintaining long-term and close relationships with customers as a key contributor towards the profitability and further expanding the market share of Signify. In addition to this, it was especially highlighted out of all the other factors in consideration in this study due to its practical relevance in the context of lighting industry.

This theme was not targeted in the interview design as it was not gathered from existing literature and the initial company case setting. The identification was done during the empirical analysis and was further incorporated as a new influencing factor in the guiding framework presented earlier in section 3.4.

Table 5.4 represents the impact of the theme, Customer Relationship Management on profitability and market share. These insights are concluded and summarized based on the discussions as mentioned earlier. The influence and development of relationships between the factors and the dependent variables will be described further in the next chapter.

Interviewee	Customer Relationship Management
P1	Long-term collaboration, future propositions with customers. Collaborative product development and customer engagement.
P2	Early involvement with customers in development phase. Building trust, acting as a technology partner.
P3	Maintaining technical relationships and promoting technological features to secure business. Importance of early technical engagement.
P4	Maintaining close relationships with customers globally. Personal engagement is crucial for market share.
P5	Importance of maintaining long-term customer relationships. Educating customers on product specifications.
P6	Close engagement with customers to understand their needs and preferences. Providing tailored solutions to enhance satisfaction.
P7	Understanding customer problems and providing differentiated solutions. Personal engagement for capturing market share.
P8	Strong customer relationships through tailored solutions. Flexibility in addressing customer needs.
P9	Strong focus on maintaining long-term customer relationships. Importance of understanding and meeting customer needs.

Table 5.4: Interview Insights on Customer Relationship Management

5.3. Influence of factors on profitability and market share

After having presented the insights on each factor by every interviewee, an overall analysis of the contribution of each factor on both profitability and market share is explained in this section.

In the Figure 5.2, it can be seen how does each factor impacts profitability. The green ticks represent direct impact of a particular factor as explained in the interviews on profitability. Similarly the red crosses explains that there is no direct impact on profitability for different reasons that will be discussed in the next chapter. It is important to note as this research was conducted using a case study protocol, the interviewees were chosen based on their expertise in managing product portfolios and also on specific factors (such as sustainability and supply chain processes). Some of the interviewees had little to no expertise on different phases of the interview design and therefore the comment, "out of expertise" has been mentioned in the analysis below. Similarly, in the Figure 5.3, the analysis has been presented for the influence of each factor on market share.

The influence of some factors result in direct impact on profitability and indirect impact on market share. This happens due to the immediate and long-term effects of each factor. For instance, the environmental impact of the products being sold in the market might not directly influence sales as it is not the first thing a customer might look for (*obtained from interviews, to be discussed in depth in the next chapter)*. However, from a long-term perspective, when the sustainability standards are going to rise, the dependency of the environmental impact of products can lead to winning substantial market share.

5.4. Sensitivity Analysis

The sensitivity analysis provides a framework for understanding the relative importance of various factors on profitability and market share, two critical dependent variables for any business. This analysis is based on qualitative insights from interviews and other data sources, reflecting how changes in these factors can impact business outcomes. Below, we delve into each factor, explaining how manipulating it can influence profitability and market share.

DIRECT IMPACT ON PROFITABILITY

INTERVIEWEE	TECHNICAL SPECIFICATIONS	PRICING STRATEGY	COMPETITION BENCHMARKING	ENVIRONMENTAL IMPACT	BUSINESS STRATEGY (HORIZONTAL/VERTICAL INTEGRATION)	CUSTOMER RELATIONSHIP MANAGEMENT
P1	✓	✓	✓	✗	✓	✓
P2	✓	✓	✓	✗	✗	✓
P3	✓	✓	✓	✓	✓	✓
P4	✓	✓	✓	✗	✓	✓
P5	✓	✓	✓	✗	✗	✓
P6	✓	✓	✓	✓	Out of Expertise	✓
P7	✓	✓	✓	✗	✓	✓
P8	✓	Out of Expertise	✓	Out of Expertise	✓	✓
P9	✓	✓	Out of Expertise	✗	✗	✓

Figure 5.2: Factor-wise impact on Profitability by each interviewee.

- Technical Specifications
  - **Relative Weight:**
    1. Profitability: 9
    2. Market Share: 8
  - **Analysis:**

    Profitability: Enhancements in technical specifications, such as improving efficiency or introducing innovative features, allow for premium pricing and cost reductions. For example, better energy efficiency can lower operating costs, directly impacting the bottom line. Moreover, unique features can justify a higher price point, increasing margins.

    .
    Market Share: Superior technical specifications differentiate products in the market, making them more attractive to consumers. For instance, advanced features like smart connectivity or improved reliability can generate new customers and retain existing ones.
  - **Manipulation Impact:**

    Enhancing Specifications: Can lead to a significant increase in both profitability (through higher prices and reduced costs) and market share (through differentiation and customer attraction).

    Neglecting Specifications: May result in losing market share to competitors with better

DIRECT IMPACT ON MARKET SHARE

INTERVIEWEE	TECHNICAL SPECIFICATIONS	PRICING STRATEGY	COMPETITION BENCHMARKING	ENVIRONMENTAL IMPACT	BUSINESS STRATEGY (HORIZONTAL/VERTICAL INTEGRATION)	CUSTOMER RELATIONSHIP MANAGEMENT
P1	✓	✓	✓	✓	✓	✓
P2	✓	✓	✓	✓	✗	✓
P3	✓	✓	✓	✓	✓	✓
P4	✓	✓	✓	✓	✓	✓
P5	✓	✓	✓	✓	✗	✓
P6	✓	✓	✓	✓	Out of Expertise	✓
P7	✓	✓	✓	✗	✓	✓
P8	✓	Out of Expertise	✓	Out of Expertise	✓	✓
P9	✓	✓	Out of Expertise	✗	✗	✓

Figure 5.3: Factor-wise impact on Market Share by each interviewee.

offerings and potentially lower profitability due to an inability to justify premium pricing.

- Pricing Strategy
  - **Relative Weight:**
    1. Profitability: 8
    2. Market Share: 7
  - **Analysis:**

    Profitability: A well-designed pricing strategy, such as value-based pricing, can optimize revenue by capturing more consumer surplus. It balances the need to be competitive with the desire to maximize profitability. However, aggressive pricing (like that of Competitor B) might lower margins but could also fend off competitors.

    Market Share: Competitive pricing is essential for attracting price-sensitive customers and gaining market share. It helps in retaining existing customers and attracting new ones, particularly in markets where price is a critical decision factor.
  - **Manipulation Impact:**

    Aggressive Pricing: Can quickly increase market share but may erode profitability if not balanced with cost control.
    Value-Based Pricing: Can increase profitability by capturing higher margins, but if set too

high, may result in a loss of market share to more competitively priced alternatives.

- Competition Benchmarking
  - **Relative Weight:**
    1. Profitability: 7
    2. Market Share: 9
  - **Analysis:**

    Profitability: By understanding competitors' strengths and weaknesses, a company can position its products more effectively. For example, identifying and surpassing competitor features can justify premium pricing or improve cost efficiencies.

    Market Share: Benchmarking helps a company stay competitive by adopting best practices and responding swiftly to competitors' innovations or pricing strategies. It's crucial for maintaining and expanding market share in dynamic markets.

  - **Manipulation Impact:**

    Effective Benchmarking: Leads to strategic positioning, better market understanding, and potential market share gains.

    Neglecting Benchmarking: Can result in missed opportunities, an inability to respond to competitor moves, and potential loss of market share.

- Environmental Impact
  - **Relative Weight:**
    1. Profitability: 5
    2. Market Share: 6
  - **Analysis:**

    Profitability: Sustainability initiatives can initially increase costs but may result in long-term cost savings and increased profitability, especially as regulatory requirements tighten. They can also open new markets or segments willing to pay a premium for sustainable products.

    Market Share: Consumers and businesses are increasingly valuing environmental responsibility. Being an early adopter of sustainability standards can enhance brand image and attract eco-conscious consumers, thus boosting market share.

  - **Manipulation Impact:**

    Enhancing Sustainability: Can lead to long-term gains in profitability through cost savings and increased market share by attracting new customer segments.

    Ignoring Sustainability: Risks losing market share to more environmentally conscious competitors and potentially facing regulatory penalties or market exclusion.

- Business Strategy (Vertical Horizontal Integration)
  - **Relative Weight:**
    1. Profitability: 8
    2. Market Share: 8

- **Analysis:**

  Profitability: Vertical integration can reduce costs by bringing more of the supply chain in-house, reducing dependence on external suppliers, and capturing more value from each transaction. Horizontal integration, such as acquiring niche players, can also reduce costs and expand the product portfolio, leading to economies of scale.

  Market Share: These strategies can enhance market share by quickly expanding into new markets or technologies (horizontal integration) and increasing product availability and control over quality (vertical integration).

- **Manipulation Impact:**

  Successful Integration: Can result in significant cost savings, improved product offerings, and a larger market share.

  Unsuccessful Integration: Can lead to increased operational complexity, higher costs, and potential brand dilution, negatively impacting both profitability and market share.

- Customer Relationship Management (CRM)

  - **Relative Weight:**
    1. Profitability: 8
    2. Market Share: 8

  - **Analysis:**

    Profitability: Strong customer relationships lead to increased customer loyalty, higher lifetime value, and potentially more upselling and cross-selling opportunities. This translates into better profitability.

    Market Share: Effective CRM helps in retaining customers and attracting new ones through positive word-of-mouth and brand loyalty. It also aids in understanding and responding to customer needs more effectively, which can be a critical differentiator in competitive markets.

  - **Manipulation Impact:**

    Strong CRM: Leads to higher customer satisfaction, loyalty, and retention, thereby enhancing both profitability and market share.

    Weak CRM: Risks losing customers to competitors and missing out on opportunities to upsell or cross-sell, negatively impacting both profitability and market share.

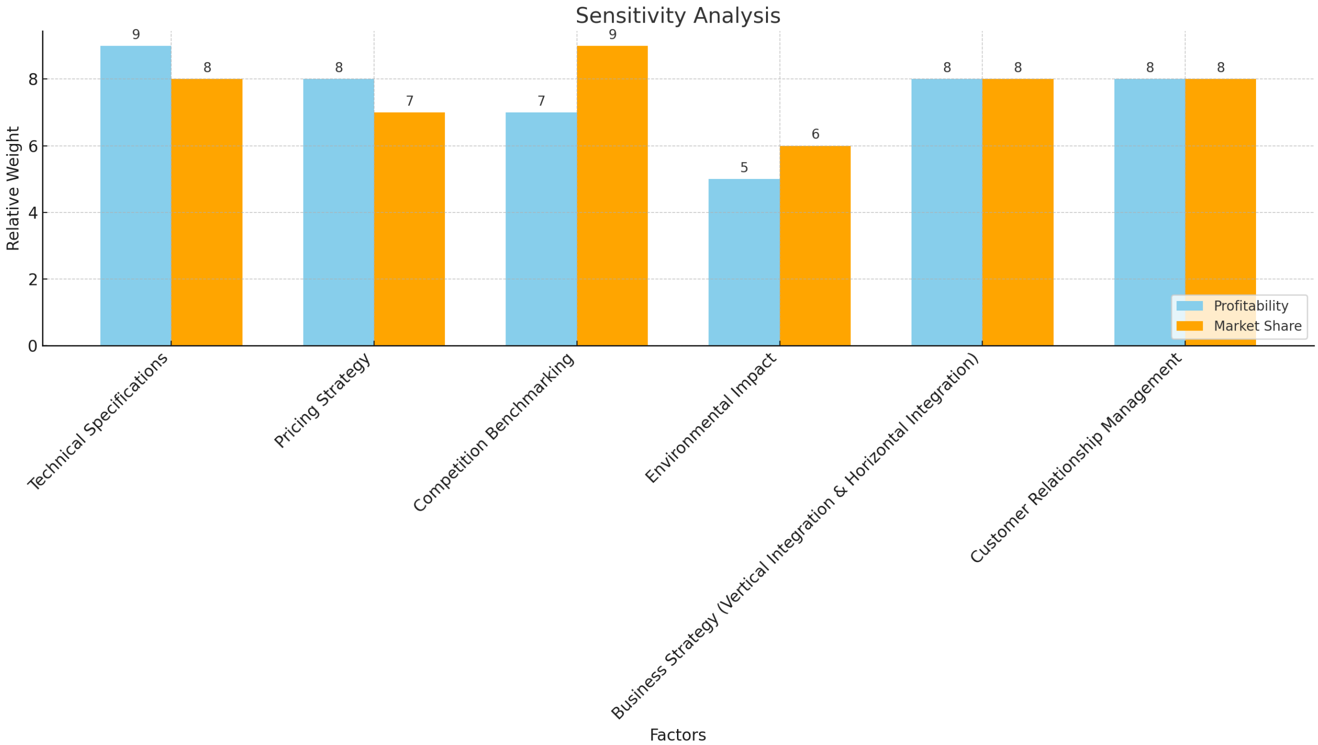

Figure 5.4: Sensitivity analysis of different factors on profitability and market share

6 Discussion

The main research goal of this thesis has been to identify the factors influencing profitability and market share within product portfolios in the EU lighting Industry. Using a guiding framework developed by the researcher combining elements of existing literature and academic models, a thematic analysis was done on the data collected during the interviews. In the previous section of this report, results acquired from the gathered data have been presented. Furthermore, a summary of all the observations and findings and further presenting interpretation of all the findings reported in the previous chapter will be done in this section.

6.1. Key Findings

- According to the factor-wise impact analysis as presented in Figure 5.2 and Figure 5.3, it can be concluded that based on the results gathered from empirical analysis, **Technical Specifications**, **Pricing Strategy**, **Competition Benchmarking** and **Customer Relationship Management** have the maximum impact on influencing profitability and market share within product portfolios. It also indicates that these factors are prioritized in assessing the management of product portfolios in an organization within the lighting industry.

- Environmental impact of the products in a portfolio equally impact profitability and market share within the lighting industry. However, it is a factor that is still evolving in terms of becoming the primary contributing element to overall profitability and market share. Customers are shifting their preferences towards companies that are adhering to all the necessary certification standards and regulations but it does not reflect any severe impact on decision - making around closing business opportunities. Moreover, it was found from the empirical analysis that the effect of environmental impact on widening the market share for companies will grow higher in the long-term due to the trend development of the industry as mentioned in subsection 3.1.4.

- Supply chain efficiency can be significantly improved in long-term by the adoption of vertical integration strategy. Signify also focused on adopting this strategy by doing acquisitions to strengthen its market position. On the contrary, horizontal integration is a strategy that does reduce competition by doing a merger or acquisition with a competitor. However, it involves absurdly high costs at the expense of unsure returns. Moreover, these are decisions that generally taken by the top management of an organization and at a product management level would hold less significance.

- Customer Relationship Management was identified as a major contributing factor in influencing profitability and market share during the empirical analysis. This is one of the key findings of this research as the participants emphasize the importance of managing customer relationships to be of prime importance in ensuring long-term sustainability in profitability and eventually the market share of a company. A few examples discerning relationships with customer and suppliers and their resulting benefits on business opportunities have been discussed in subsection 6.2.3.

- The sensitivity analysis presented in Figure 5.4 discusses about the complex interplay between various business factors and their impact on profitability and market share. Technical Specifications and Pricing Strategy emerge as the most critical factors, directly influencing both profitability and market share. Competition Benchmarking is crucial for market share, while Environmental Impact, though currently of moderate importance, is likely to grow in influence. Business Strategy (Vertical & Horizontal Integration) and Customer Relationship Management are equally important, affecting both profitability and market share.

- It is worth noting that the sentiment analysis of the interviews presented in Appendix C concluded that the interview responses were positively dominant in the phase of discussion around Technical Specifications and Customer Relationship Management out of all the factors. It also highlights the mixed and negative sentiments during the phases of discussions around Environmental Impact and Business Strategy which were also indicated by the factor-wise analysis and sensitivity analysis.

- Code frequency analysis was also done as a part of data analysis process using Atlas.ti to understand about the occurrences of codes under a category (theme). In Figure D.1, it can be seen that 'efficiency' (a technical specification), 'Competitors' and 'Competitors A and B' were amongst the most frequently occurred codes across all the interviews, depicting the influence of technical specifications and competitor analysis as common characteristics of the analysis.

6.2. Interpretation of Results

After describing about the influence of all the factors on profitability and market share, it is crucial to investigate the sub-factors associated with each factor that justifies the insights presented in chapter 5. Quotations have been mentioned under each sub-factor to distinguish different perspectives. As these quotations are statements from interviewees,they have been further interpreted and analysed to justify their contribution in the research study.

6.2.1. Analysis of Technical Specifications

- **Differentiation in technical specifications in comparison to competitor's products**

  "So it's a very simple thing that just has to be recognized. Customers come to us and say we need a very simple driver in terms of specifications. It's really not from a lifetime perspective or from an efficiency perspective, but simply from price positioning perspective. It's a very "entry" range product (DipSwitch Driver, Fixed Output, Non Dimmable). But there's competitor 1 on the market and in the 1st place they had a nice driver, but the EL feature for emergency lighting systems was missing. It's a feature that costs a few cents. Of course you can say, it's never needed, Why put it in? But they didn't make it. So we came up with product having all these specs. Also, this is very easy to realize specs and then we want a big business. So sometimes it's just having the right combination of specs. It's not that you always focus on super innovation." - P2

  "Conformity in terms of safety, the product needs to be safe.It needs to be have the conformity certificates to prove that it's a reliable and a safe product and customers do ask for that and they do check to make sure that we comply with the relevant standards from a safety point of view. "Flicker" was a very hot topic and I'd say probably six years ago and and and it's still a hot topic now where you've got to prove that your product is flicker free and has certain requirements. So you have to demonstrate that that you can do that as well. Although, the driving force is really the efficiency because everyone's looking to get the most out of their money." - P3

  "You must find the sweet spot because you can specify a product which makes it far too expensive or you have to find the sweet spot where you match the right specification level to the right cost." - P5

  Technical specifications play a crucial role in ensuring the differentiation of a product in the market. As understood from the interviewees and verified by different quotations above, the correct set of specifications is important to sell to a customer for targeting high profitability. The impact of missing out on a specific feature that might be present with the competition could easily allow the customer to get in business with the competition.

At times, these additional features would not entail very high costs but the marginal loss in business value on losing a customer could be higher which consequently effects both profitability and market share. Furthermore, as safety in the products is a key aspect of proving reliance in the eyes of customer, it also becomes important to keep in consideration the flickering of products. Overall, the most technical specification that stood out the most out of all the interviews is **efficiency**. It is a major performance indicator and can prove to be a significant reason to acquire a customer.

In addition to this, higher profitability is also dependent upon creating the balance between the price and the specification. As the lighting industry is a quite commoditized, it is essential to differentiate on innovation and new technology integration that could be further justified using an increase in the price which will eventually lead to more sales. This explains the influence of having the right technical specifications in the products within the portfolio in order to create a competitive advantage and sustain the market share/further increase it.

- **Impact of technical specifications on customer retention and satisfaction.**

  "So we do an analysis or we should do an analysis before every major project and we should indeed define a CTQ. For instance, what is really critical to a customer? It needs to be indeed reliable. It needs to have high efficiency and so we before we start major projects, we define the the value drivers of the of the customer." - P4

  "Customers typically have technical teams working alongside product designers. These teams evaluate product features, fit, and functionality. Price negotiations occur later, but the initial focus is on product suitability. By emphasizing advanced features and building strong relationships with technical teams, businesses can secure sales even if their prices are slightly higher. The technical perspective plays a crucial role in successful business transactions." - P3

  "I think they have a big influence. Every procurement engineer or procurement manager or purchasing manager who decides on a decision about what contract to ask for has some underpinnings to it.For instance, these are the reasons behind my choice and etc. A part of that underpinning is comparing an excel sheet of different specifications that somebody else has educated that procurement person about is most crucial. Depending on how well that job is done, you can be in or out." - P9

  According to (Fleisher & Bensoussan, 2003) and (Storbacka & Lehtinen, 2001), customer retention rate has a major impact on the overall profitability of a company. It can be seen from the quotations above that defining the customer needs before any project is taken further into development is important to understand the value drivers of the customer.

  Customers typically have separate technical teams who look after the suitability of the products being bought from an OEM (for instance, Signify in this case). Good relationships with these technical teams can also lead to securing higher sales. Price negotiations often occur later but first and foremost remains to be technical adaptability of the product. A linear driver manufactured by an OEM should be able to provide adequate electrical power, voltage, current and efficiency to the luminaire maker (customer) according to the application. The higher the suitability, the higher the sales. This further ensures the longevity in the maintaining customer relationships which further secures the market share.

  In addition to this, a simplified process-driven approach needs to be accommodated by the person responsible for procurement. The correct comparison of the specifications demanded by a customer is highly crucial in ensuring the confirmation of any business deal. It is another element of how the details of technical specifications can lead to further widening the market share and targeting profitability.

- **Implementation of cost-intensive features and consequently maintaining a balance between cost and pricing.**

  "It depends upon the topology of the driver. Market segment is equally important as you want to enter the part of the market, you are trying to launch the product in.So if you are targeting a very low end segment, then of course you need to choose a suitable topology which has the lowest cost base but also comes with very limited specifications because those specifications are good enough for that part of the application. Furthermore, "Miniaturization" and "High Performance" comes with additional cost but you can always optimize your requirement as some topologies are able to offer all together in one package" - P1

  "When developing products, it's essential to consider competition and uniqueness. For instance, simple features like efficiency cannot command high prices if competitors offer similar specs. However, creating innovative products with unique features—allows businesses to secure higher margins initially. As competition arises, some compromises may be necessary. " - P2

  "The most cost-intensive parts of drivers are the high-end features, such as dimming and color control. Extreme efficiency can also be expensive. While a base efficiency level of 93-94% is reasonable, going beyond that can significantly increase costs. Businesses evaluate whether customers truly need these premium features or if a more basic model suffices " - P4

  "Several factors drive the cost of our drivers, particularly the integration of intelligence and miniaturized components. Our pricing is value-based, comparing our product's benefits, such as efficiency and meeting tender specifications, against competitors. While cost is crucial, especially in setting competitive prices, we aim to reduce it to maximize profit margins.Differentiators and the value they bring, like energy savings, are key in our market strategy." - P7

  The importance of aligning the cost structure of a product with the market segment that needs to be addressed is paramount.For low-cost market segments, choosing a topology with a lower cost base and limited specifications is important. This approach allows the basic requirements of an application to match the product without spending too much. On the contrary, "miniaturization" and "high performance" are the high end features that are priced at a premium but can be integrated in a solution which can be sold as a single package.

  The importance of innovation and competition in product development is also touched upon from the quotations as basic specifications such as efficiency cannot do justice to high prices if the competitors offer specifications in a similar range. Although, introduction of new and innovative products with unique features ensures businesses to target higher margins initially.Further, as competition rises, some adjustments on prices are appeared to be necessary. However, the innovativeness of the product already establishes a competitive edge in the market and adopts the market share based on the technology.

  It can be also seen that the integration of premium features such as dimming, color control etc. might not be required from a specific customer and instead a more basic model can suffice the customer request. This is important to consider as basic level features might not imply additional costs, however increasing the thresholds from basic levels (efficiency at 93-94%) to higher levels (beyond 95%) will significantly impact the cost structure. Therefore, businesses must cross-validate if a customer really needs the premium features or a basic version can also do the job. This understanding of the correct product-fit allows managing costs while still responding to customer needs.

  Cost reductions can lead to healthy margins but serving differentiators to the customer can also lead to addressing the untapped market. Adoption of value-based pricing strategy provides a comparison of the product's benefits such as efficiency, tender specifications against the competitors. Moreover, the cost reduction process is important in price-setting activities and maximizing profit margins, the core differentiators such as energy savings further strengthen the market strategy. These value propositions can further justify higher prices to businesses and secure a larger market share.

6.2.2. Analysis of Pricing Strategy

- **Importance of Logical Pricing Guideline on maximizing profitability and gaining market share**

  "When pricing LED drivers, businesses must consider both technical specifications and market dynamics. Value-based pricing involves assessing the value of additional features for end-users and other stakeholders. For instance, increasing efficiency from 89% to 92% may justify a higher price due to energy savings. However, competitive positioning matters—pricing too high can hinder market share growth. Leaders can take advantage of unique features, while followers must balance competitiveness and profitability. Ultimately, understanding the field impact and strategic context informs effective pricing decisions." - P1

  "Understanding your product's value is crucial. Many products have similar features to competitors, requiring lower margins. However, identifying and valuing premium products allows for healthy profitability due to their quality and unique features. It's essential to differentiate core-level products from premium ones to avoid devaluing them. Competitors face similar challenges, and excessive discounting can harm long-term profitability. Maintaining a healthy product value without sacrificing margins ensures sustainable business growth and avoids setting unrealistic future pricing expectations." - P3

  "From a customer perspective, we often make mistakes that cause us to lose market share. We focus too much on internal discussions rather than being proactive, which can result in losing customers and becoming more expensive to regain them. We need to be more market-aware and proactive, especially as market dynamics differ. In Northern Europe, the approach might be uniform, but we must adapt strategies for different regions. Our current strategy may be too rigid, causing challenges in meeting market needs. Speed to market and reliability in communication are crucial for maintaining customer trust and delivering promised offers on time." - P5

  "The idea is that a particular category of products is 5% more expensive than another category and further offers flexibility that we value at more than 5%. We aim to capture that 5% value, making it an attractive offer to customers. Each product family is assessed similarly, with around a 5% charge for additional features. It is possible that drivers with different applications may differ in this mechanism of pricing due to market conditions. Consistency in pricing logic is essential to avoid confusion. Customer perspective (outside-in) should guide pricing, ensuring the value perceived justifies the cost, adapting based on market feedback. Always prioritize customer acceptance over internal assumptions." - P7

  As discussed earlier, value-based pricing includes the assessment of values of additional features for the end-users. While increasing the efficiency of a product from 89% to 92% will incur additional costs due to energy savings, pricing a product too high can also reduce market share growth due to inefficient competitive positioning. Leaders in the market can capitalize on the premium features but followers must focus on creating the balance between competitiveness and profitability. The strategic context and business environment at the time of pricing a product can lead to informed pricing decisions that further brings balance between value and market position.According to (Kotler et al., 2005), the price-setting decisions should be done after keeping into consideration the nature of market and demand, market competition and the marketing objectives of the organisation.

  Product value is crucial in targeting profit margins. If a product is from an entry or a core category of the portfolio (as mentioned in chapter 2), the features will not differ too much from the competition. In such a scenario, the fight in the market is only surrounded by price adjustments. It is crucial to identify that accepting lower margins in these categories initially can lead to consecutive sales from a particular customer. These sales allows the customer and the OEM to get in a long-term relationship which further leads to higher volumes in sales. An OEM can then reduce the production costs and eventually increase the margins. On the contrary, selling a product from statement or performance (as mentioned in chapter 2) can strive for higher margins in the market intially to the cutting edge technology. Furthermore, it is very important to differentiate between core-level and unique-value proposition driven products to ensure that the premium products are not devalued.

  It was highlighted during the interviews that logical pricing guideline that includes pricing every product category from an inside-out perspective of visualizing the prices is not the most efficient in doing pricing. Market awareness and being proactive is equally important in considering the price-setting decisions. Adoption of pricing strategies for different regions is crucial as the market dynamics differ from one region to another. Further, speed to market reliability in communication are vital for maintaining customer trust and fulfilling the promises on time.

Consistency in the logical pricing guideline is essential for avoiding confusion. An outside-in (market-based) perspective should guide price setting processes It also determines the value perceived by the customers which justifies the cost based on feedback from the market. In addition to this, customer acceptance should be prioritize over internal assumptions to better align market expectations with pricing strategies.

- **Balance between competitive pricing and targeting high profitability**

"For high-volume, commoditized products, it's crucial to keep architectures updated. For instance, updating drivers reduced costs by over 20% without changing specs or production location. Continuous value engineering keeps these products competitive. For innovative products, we can balance in different ways to achieve higher margins." - P2

"It's always a target to have a good profitability and good margin. The thing we have to realize that if you're getting designed out from a product, meaning that competition is coming in and and and we are losing that market share, it's not enough to sacrifice a price to the same level as competition did to win that deal, we have to be lower again." - P5

"The market has become price-driven, making it tough to maintain past profitability levels. You don't need to be the lowest cost, but close enough, with Philips' quality and reputation helping in negotiations. The influx of low-cost competition from China is impacting Europe and will soon reach the UK. Success now requires aggressive pricing strategies, especially for commoditized products, while preserving margins on unique products with strong selling points." - P3

"I prioritize competitive pricing over high profitability and focus on margin value rather than percentage. Targeting margin percentages can lead to missed deals. Accepting projects at lower percentages can increase overall margin value, which is what matters. Balance the value from each project instead of focusing solely on percentage margins" - P9

Value engineering activity should be performed in a continuous manner for high-volume and commoditized products. The developments in the architectures of the product categories resulted in cost reductions by over 20% without changing any specifications or locations of product manufacturing. This shows that the approach of identifying cost-reductions through mechanisms that do not involve major changes can improve profitability.

Competitive pricing plays a key role in retaining market share. When a company is designed out of a product because of its competition, it is not enough to just meet the price of the competition, going to lower prices in order to win a deal is equally important to stay in the game. This explains the challenge of maintaining profitability while staying competitive. This also means that sometimes aggressive pricing strategies are important to preserve the market share in the longer-term.

A price-driven market impacts profitability as can be seen in the example of China. The arrival of low-cost competition from the chinese businesses has made it hard to achieve past-profitability levels (Dams & Martin, 2022). Although it is not necessary to the lowest cost provider, being close to what the chinese competitors can produce combined with brand reputation of Phillips can largely help in negotiations. Brand reputation helps in convincing a customer during negotiations due to a proven track record of a company in engaging with clients (Tinsley et al., 2007).Furthermore, this strategy explains how aggressive pricing is needed for commoditized products and preserving margins on products with unique selling points is important towards higher profitability. Quality differentiation can be a key factor in winning market share eventually.

Higher profitability can be also achieved by emphasizing more on the margin value rather than percentage. Margin percentages can lead to unfinished business deals as targeting projects at lower percentage margins can increase overall margin value which is what contributes to profitability at the end of the day. This approach underlines the importance of looking at the overall value from each project and balancing it out instead of only focusing on relative percentage margins.

6.2.3. Analysis of Competition Benchmarking

- **Influence of bargaining power of buyers and suppliers in targeting profitability and market share.**

  "Currently, large customers hold the upper hand, using tender tactics to push suppliers to lower costs. To regain market share in competitive segments like linear drivers, we may need to accept lower margins for key customers we've lost. Internally, we should ensure a solid cost structure to restore margins in the long term. Short-term, low margins are necessary to outcompete rivals in specific deals." - P4

  " Customers often prefer existing suppliers for large orders, negotiating lower prices based on competitors' quotes. For example, we've been trying to supply some products to a leading manufacturer handling enormous number of units yearly. Despite offering a lower price per module (saving a huge amount of money annually), the customer sticks with the current supplier due to the minimal savings compared to the high switching costs. This insider-outsider issue is prevalent in our OEM business across various areas." - P2

  "We must benchmark competitors, assess our product's value, and determine who captures that value. In B2B, our customers integrate our products into their fixtures, so it's crucial they understand our value. We engage not just purchasing teams but also R&D, product management, and sales heads. Competitors might target procurement with low-cost products, but we focus on differentiating our offerings and highlighting unique selling points to various stakeholders." - P7

  "Suppliers aim for maximum profitability, negotiating with every supplier for the best price, including competitors. Building a strong relationship with purchasing teams is crucial. If we can't meet target prices, we maintain respect and open dialogue. We clarify product differences and value, ensuring ongoing conversations. This approach keeps future business opportunities open, making continuous negotiations vital in the industry." - P3

  Big customers often hold significant bargaining power, pushing suppliers towards lower costs using tender tactics. In order to regain market share in a competitive landscape such as the linear drivers, businesses will have to accept lower margins initially for the key customers they have lost. This strategy will imply that in short-term, lower margins could prove to be important in exceeding rivals in specific business deals. Although, a solid internal cost structure is vital in targeting healthier margins in the long-term. It is noteworthy to say that the balance of immediate competitive pressures with long-term profitability goals is required in responding to such market forces which are driven by buyers.

  The role of developing strong relationships with purchasing teams and the vitality of continuous negotiation is important in ensuring customer retention when bargaining power of buyers is dominant.Supplier loyalty is a core aspect of doing business with selective suppliers over a long period of time. It has its own influence of profitability as the loyalty of a customer to its existing suppliers for big orders is a deciding factor in the decision-making of such deals (Worm & Srivastava, 2014). For instance, if a supplier offers a lower price, the high switching costs can prohibit the customer from changing suppliers. As mentioned in one of the quotations above about how a lower price offer per module to a manufacturer handling a large quantity order did not get successful. This highlights the importance for suppliers in offering a unique value proposition and not just price reductions to make the customers switch to a new supplier.

  The bargaining power of buyers and suppliers impacts profitability and market share significantly as big customers utilize their power to go to lower costs, allowing short-term sacrifices in profit margins to re-acquire market share. High switching costs and supplier loyalty pose challenges that needs suppliers to present value propositions different than just price reductions. Effective stakeholder management and differentiation in the product are important in the value communication and ensuring competitive market positioning.

- **Analysis of strengths and weaknesses of Competition A and B and subsequent transformation into opportunities and threats for Signify**

  "Our main competitors are Chinese electronics manufacturers, Competitor A, and Competitor B. The chip shortage two years ago opened doors for these competitors. Competitor A competes through differentiation and added value, but we have larger scale and broader market segments. While competitor B follows a similar strategy but struggles with profitability. Competitor B aims to be a cost leader by cutting R&D and relocating production to China" - P7

  "Competitor A grew strong in the UK by stocking products locally, ensuring quick availability post-Brexit, unlike Signify, which ships from Poland with longer lead times. Moreover, Competitor A's quick delivery for urgent projects gave them an edge. Competitor B, used aggressive pricing pre-acquisition and leverages low-cost Chinese manufacturing with their brand. This combination could strengthen their market position. Signify is relatively improving with quick wins but excels in forecast-based deliveries. Key factors for success in the UK include efficiency, connected lighting solutions and sustainability, where Signify excels by using recycled materials and optimizing packaging logistics." - P3

  "Competitor A, has strong ODM/OEM capabilities in Asia and a manufacturing facility in Serbia. They are trustworthy and close to customers, similar to Signify. Despite being smaller, they are responsive to market changes, especially in pricing. Competitor B, causes uncertainty for OEM customers due to the change in ownership and its aggressive pricing strategy." - P2

  "Competitor A focuses on a small market area, primarily in Europe, excelling in linear drivers through continuous optimization and cost-cutting. They are more innovative due to concentrated resources, while Signify spreads efforts globally across various applications, including solar. To compete, Signify must focus on specific products,updating them to lower costs. Competitor A's concentrated innovation efforts make them a formidable competitor.Competitor B's recent acquisition by a Chinese company may impact their customer perception. Signify can leverage this by emphasizing its reliability, local presence, and diversified application approach to maintain a competitive edge and regain market share." - P4

  As discussed in subsection 3.1.5, the impact of what and how the competition does is significant in terms of addressing the market share that can be captured from the hands of competitors. Focus, cost-leadership and differentiation are elements of competitive benchmarking that expands the horizon of strategies through which market competitiveness can be achieved. These concepts have been discussed in subsection 3.1.5 and further used in assessing the meaning and importance of benchmarking against competitors from the interviewees. Competitors A and B are the two competitors against whom Signify can create attack plans in every product category within the linear indoor drivers portfolio to stay ahead of them. However, after the empirical analysis, it was found that these competitors have their own sets of strengths and weaknesses that should be studied in depth in strategizing against them.

  Moreover, as already discussed in subsection 3.3.4, a detailed SWOT analysis has been presented below that explains how the interviewees view the competition's strengths and weaknesses and Signify's potential opportunities and threats in the future. This analysis also helps in understanding about how can the opportunities further enhance profitability and market share by managing the product portfolios using this analysis.

  Strengths (Competitor A)

  - Effective in differentiation and added value.
  - Competent product performance.
  - Strong reputation and historical performance.
  - Well-known and established brand.
  - Strong ODM/OEM capabilities in Asia.

- Manufacturing facility in Serbia, close to Europe.
- Responsive to market changes and pricing adjustments.
- Strong local presence in the UK, enabling quick delivery.
- Innovative due to concentrated resources.

Strengths (Competitor B)

- Strong market presence and brand recognition.
- Competent product performance and specifications.
- Good reputation and historical reliability.
- Wide range of innovative lighting solutions.
- Acquired by a Chinese company, pushing aggressive pricing strategies.
- Leveraging low-cost Chinese manufacturing with a recognizable brand.

Weaknesses (Competitor A)

- Limited product differentiation in commodity markets.
- Difficult to compete on price in commodity segment.
- Potentially slower reaction to customer needs in new product development.
- Smaller scale compared to competitors.

Weaknesses (Competitor B)

- Struggles with profitability compared to competitors.
- Limited differentiation in commodity product segments.
- Potential vulnerability in high-end applications due to slower development speed.
- Customer uncertainty due to change in ownership.

Opportunities (Signify)

- Expansion in smart lighting and IoT solutions.
- Leveraging design and technical capabilities for high-end applications.
- Enhancing after-sales service and warranty conditions
- Strengthening collaborative cooperation with OEMs for faster reaction to customer needs.
- Potential to capitalize on customer uncertainty with Competitor B.
- Emphasizing sustainability efforts, such as using recycled materials and optimizing packaging.

Threats (Signify)

- Intense competition from Chinese manufacturers and established players like Competitors A and B.
- Market fluctuations and economic downturns.
- Rapid technological advancements requiring constant innovation.
- Pressure to compete on price in commodity product segments.
- Perception of being a super aggressive competitor in pricing, especially in trade business.

- **How does benchmarking a product against the competition further enhance profitability and help in capturing the market share**

  "To win market share, we must convince customers to switch from competitors, customer by customer. This involves understanding competitors' key products, strengths, and weaknesses, and highlighting our strengths. For customers where our strengths are critical, we must demonstrate high value. Benchmarking at product and company levels is essential, especially when competitors, like Inventronics, undergo significant changes. Offering strong alternatives with attractive performance and pricing can facilitate customer shifts." - P7

  "A few years ago, we observed that Competitor B had developed small, efficient drivers using a new technology. We analyzed these drivers, leading to the development of our smaller range drivers to regain market share. Similarly, before major projects, we sample and analyze products from all major competitors, including Asian players, to compare specifications and learn from their innovations." - P4

  "Benchmarking is crucial for our core linear business. For example, Competitor A's product lineup offered drivers at price almost similar to our drivers. Benchmarking helps our engineers analyze competitors'

products to understand their pricing strategies and adjust our price levels accordingly to stay competitive." - P2

"Benchmarking allows to stay aware of competitors' actions, product features, and marketing strategies. Often, competitors promote common features like "flicker-free" drivers or low harmonic distortion as unique selling points, gaining extra business. For example, Competitor A highlighted the best possible numbers on their data sheets early, while we published overall numbers, impacting customer decisions. Signify has since adjusted its data sheets to emphasize key features upfront. It's essential to monitor competitors' promotions and ensure customers know we offer similar capabilities to avoid losing business over perceived differences" - P3

Benchmarking against competition equips OEM's with convincing power that can be used to ask customers to switch from competitors (Kumar et al., 2006). This can be done by analysing the key products, strengths and weaknesses of the competitor's portfolio. Furthermore, this approach also allows the R&D team to study the products from competition in depth in further designing changes in their own products. In the process of winning a deal from a customer, highlighting your own strengths in areas important to the customer's needs is crucial. Benchmarking at both product and company level is vital when the competition undergoes major organisational and product development changes. Providing better alternatives with prices and performance that stands out can facilitate positive business growth and can further cater to profitability and market share.

This practise of benchmarking has helped Signify in the past by observing Competitor A's development of small, efficient drivers using a new technology which led to creation of smaller drivers to further regain the market share. Moreover, the sampling of products from big competitors, including asian players before the commencement of projects not only provides businesses to distinguish between specifications from competition but also learn from their innovations. This process allows in identification of opportunities in order to improve and continuously innovate to stay ahead of the competition.

Competitor's actions, product features and marketing strategies are equally a part of the benchmarking process as targeting the adoption of market share would include monitoring the competition's strategy at every front of business. It has been observed that competitors often promote common features as USP's which provides them with additional business opportunities. As mentioned in the quotation about Competitor A's highlighting of best possible numbers on their datasheets while Signify published overall numbers resulting into impact on customer decisions. These changes and improvements are minor with respect to having the technology embedded in the products. However, marketing the product using the appropriate methods is also crucial in targeting high profitability.

6.2.4. Analysis of Environmental Impact

- **Effect of environmental impact in targeting positive business growth**

  "Signify prioritizes sustainability, with a significant focus on energy efficiency, which is highly valued by customers. The biggest environmental impact of lighting products is their energy use, making efficiency crucial. Other sustainability aspects include reducing carbon footprints, rare earth metal usage, and plastic waste. European legislation is expected to enforce stricter sustainability standards in the future. While the competition could be performing positively in producing environmental product declarations than us, the overall market demand for such documentation is still emerging. Signify continues to invest in sustainable products, anticipating future rewards as legislation and market demands evolve" - P7

  "Signify leads the electronics industry in sustainability, achieving carbon neutrality and transparent reporting. This commitment is recognized by customers and validated by certifications like EcoVadis. Signify's efforts include reducing packaging sizes and materials, and providing Environmental Product Declarations (EPDs) to detail product footprints, usage impact, and recyclability. While EPD requests are currently low, demand is expected to grow as more customers prepare for sustainable practices" - P3

  "Sustainability is essential, requiring companies to demonstrate environmental impact through verifiable numbers rather than mere claims. Environmental Product Declarations (EPDs) are crucial, showing

the environmental impact from cradle to cradle, including supply processes, manufacturing, distribution, energy efficiency, and recycling. While everyone claims to be green, the challenge lies in ensuring that sustainability metrics are trustworthy and comparable across competitors. This issue is similar to fuel consumption claims in the automotive industry. Signify's emphasis on accurate, competitive, and fairly compared sustainability metrics will lead to effectively communicating environmental benefits to its customers and further maintainings integrity amidst varying standards." - P6

In lighting products, the most crucial factor in terms of environmental impact is the energy use of these products. In the interviewees, it was well highlighted about Signify's excellent contribution and commitment to a carbon neutral future. The value of energy efficiency as a key performance indicator is of high importance for customers. Sustainability might not be the most influential factor out of all the factors discussed in this research study in the short term. Although, in the longer-term for acquiring the largest market share in this industry, sustainability will become a topic of utmost importance.

In the empirical analysis, it was observed that the communication of such environmental benefits is equally important as producing them. The circulation of the environmental impact a company is trying to bring via its products in the eyes of the customer is equally important as producing them to acquire sales. Competition is slightly ahead in terms of presenting these benefits via their marketing strategy and this could be something that Signify will enhance further in the coming years.

At Signify, environmental product declarations (EPD's) are produced for every portfolio and every resulting product to market the efforts taken around sustainability. Furthermore, Signify's efforts in reducing the packaging sizes and materials and preparing EPD documents to communicate in detail about the product footprints and recyclability of the products provides them a significant advantage in the market. However, the demand for EPD's is currently not the maximum from the customer's side and is further anticipated to grow over the years as the trend to shift towards sustainable practices will be much more dominant within customers.Nonetheless, being at the forefront of sustainability initiatives, it will bring customer trust and loyalty to Signify which will further increase their market share and profitability in the longer run.

As can be seen in Figure 5.2 and Figure 5.3, the direct impact of environmental influence on profitability and market share is not present according to some interviewees. These insights arise from the perspective of a short and long term approaches in both profitability and market share. While evaluating the direct impact of all the factors on profitability and market share, it is safe to say that environmental influence impacts indirectly to a certain extent.

In addition to this, it was also discussed in the interviews that presentation of demonstrating environmental impact through quantifiable numbers is also important in delivering the information to customers. The EPD's should further be modified to exhibit the environmental impact from cradle to cradle, including each sub-component within the products and supply chain processes. Many companies claim about to be highly sustainable but cannot justify themselves in adequate sustainability metrics.

- **Influence on market share if competition adheres faster to sustainability standards and certifications**

  "Initially it will, but quite soon I think it is simply a must have and if you don't do it, you will lose market share. Yeah, because it is a very, very popular subject in the market." - P4

  "No, I don't think so. But it is dependent on how far behind you are. If you're behind by three months to six months and I would think now doesn't matter if you are behind by three years, then that has a completely different flavour. " - P9

  "It's important as it impacts the market share because at the end, for example, big end users, their business is based on the tenders.And in those tenders, sustainability is a tender specification. So if you don't comply with

the tender specification, then you are out simply " - P1

" Early adoption is crucial because it ensures our target customers adopt our products first. It's easier to retain a product than to replace a competitor's. If a competitor introduces a suitable product first, customers have no reason to switch. Retaining business is easier when our product is already integrated, as redesigning is more work for customers. Thus, being an early adopter helps secure and maintain market share." - P3

Faster adherence to sustainability standards may provide a competitive advantage initially. However, it will sooner transition into a basic requirement for everyone. Companies that will not be able to comply with these standards will lose out on market share as sustainability has become immensely popular and expected subject in the market of lighting industry. This explains the reliance on sustainability is shifting from being a core differentiator to a mandatory practice for engaging in business in this market.

The impact of staying behind competition when it comes to sustainability and environmental influence is also evaluated by how far behind a company is. While a delay of 3-6 months will not effect the market share largely, a delay of 3 years and more can have a more severe influence. In conclusion, it is clear that the timely adoption of sustainable practices within the company is crucial to stay competitive in the market and further increase profitability and market share in the long term.

The adoption of sustainability standards early in the market will not only maintain and widen the market share but also secure the target customers. These customers can then already adapt to Signify's products first and further help Signify retain the business than to lose the customer to a competitor's product later.Therefore, being an early adopter certainly impacts the capturing the market share.

6.2.5. Analysis of Business Strategy (Horizontal and Vertical Integration)

- **Potential benefits and risks in adoption of horizontal and vertical integration**

  "The strategy for vertical or horizontal integration depends on the product and market trends. For high-value businesses like horticulture, vertical integration (e.g., producing LEDs and drivers in-house) can maintain profitability by hiding cost elements from customers. In contrast, for commodity products, horizontal integration (e.g., acquiring companies to fill portfolio gaps) helps maintain market leadership and competitiveness without substantial new investments. The choice of integration strategy varies based on market position, the value of the business, and the need to maintain or enhance market leadership" - P1

  "The benefits include achieving economies of scale by leveraging the same sales force to increase turnover and supplier leverage. Vertical integration provides more control points in the value chain and removes additional markups. Exploring new areas by acquiring competencies offers higher certainty than developing from scratch. Signify actively pursues acquisitions and internal research ventures for long-term growth and new business opportunities." - P1

  Horizontal and vertical integration of portfolio both offer several benefits for companies to operationalize their business processes efficiently. Economies of scale is one of the major benefits of using these integration strategies as exploiting the same sales force to increase turnover.Vertical integration allows for more control points in the value chain and further get rid of any unwanted markups that ensures cost savings and better profitability. As a result of vertical integration, companies can also negotiate better with the suppliers, and reduce dependency on external suppliers.

  The exploring of new areas by taking control over competencies that provide greater assurance than starting something from scratch. Signify has actively pursued such aquisitions in the past.Further, acquiring existing technologies mitigates the risks associated with creating new capabilities such as larger costs, long development times etc. This idea provides companies to enter new market segments faster and keep driving their potential in staying competitive in the market. The faster entry into new market segments also leads to tapping the market share at a larger level comparatively.

Horizontal Integration

"The lighting market is broad, covering entertainment to offices, making it challenging to innovate and be present everywhere. To address this, Signify sometimes acquires strong niche players, like Color Kinetics in 2008, a pioneer in colored entertainment lighting. This strategy helps fill gaps where developing our own products would be costly and resource-intensive, allowing us to maintain a comprehensive market presence." - P4

"Signify engages in horizontal integration by collaborating with competitors to standardize protocols and components. This universal approach facilitates interoperability across products from different manufacturers making it easier for customers and increasing overall sales. Sharing resources and aligning standards drive industry-wide adoption and enhance market share." - P3

The scope of lighting industry in itself is quite broad. This makes it difficult for all players to continuously innovate and maintain presence in all market segments. In order to address this problem, Signify has acquired niche players in the past such as, "Color Kinetics", a pioneer in the colored entertainment lighting. This strategy helped the company complete the gaps where the creating new products seemed cost and resource intensive. The process of acquiring niche players equips immediate access to new markets and technologies which heighten the company's product portfolio value and expand the market reach.

The interoperability across products from various manufacturers can be achieved via collaboration with these competitors to standardize components used in the product and other business protocols. It also leads to increased overall sales as it becomes more convenient for customers to us. Market share can also be enhanced by the adoption of horizontal integration as resources are equally shared within the competitors. It can be concluded that this strategy creates an environment that is co-operative and further improves customer satisfaction.

Vertical Integration

"Signify has strengthened its market position in North America by acquiring large luminaire companies like Cooper Lighting, becoming a market leader in both components and luminaires. Additionally, to address inefficiencies, Signify closed its Shanghai factory and formed a joint venture with K-Light. This move improved control over the supply chain, access to low-cost manufacturing, and enhanced profitability through lower-cost components." - P4

As can be seen in the quotation, Signify strengthened its market position in North America by acquiring large luminaire companies like Cooper Lighting. This explains that Signify decided to become a market leader in both components and luminaires. It further allows for larger control over the entire value chain. Moreover, vertical integration would decrease dependency on external suppliers and further enhance the suppl chain management process.

In addition to this, Signify has been putting consistent efforts to tackle inefficiencies by shutting down the factory in Shanghai and establishing a join venture with K-Light. This shift has ensured improved supply chain control and provided access to manufacturing of products at a lower cost, further increasing profitability. Vertical integration has also allowed Signify to streamline operations, reduce costs and improve overall efficiency.

However, there are also some risks associated with adopting vertical integration. These include significant capital investment, getting into the troubles of monitoring a larger integrated operations (Huang, 2016). These risks can be mitigated by efficient planning and strategic management. This concludes the influence of both horizontal and vertical integration strategies on profitability and market share. While some of the interviewees mentioned that the impact is indirect, it can be concluded that these strategies are not equally influential in comparison to pricing or technical specifications. However, the fact that Signify has been using these strategies explains the dependency on such integration methods for enhancing profitability and widening the market share.

- **Influence of quality control processes in the supply chain on boosting profitability and market reputation**

  "Signify is focusing on availability-based model by increasing inventory and buffers. This requires significant cash investment but aims to improve product availability, operating on a first-come, first-served basis. However, the complexity of the extensive product portfolio, with slow-moving items complicating this strategy. Reducing the portfolio could optimize inventory turns and allow greater investment in high-demand core products, enhancing overall efficiency and responsiveness to market needs." - P8

  Signify's emphasis to a model that is worked around availability by focusing upon increasing inventory and buffers requires high cash investment but promises to improve product availability issues. The operations with the adoption of such a strategy focuses on the principle of first-come, first-served basis. It was highlighted in the interviews that the slow-moving stock and the extensive product portfolio create inefficiencies in the supply chain management process as when there is no resulting demand for slow moving stock, it results into marginal losses for the company. This can be addressed by efficient product portfolio planning and further optimizing inventory by promoting higher investment in high-demand product categories.

  Moreover, the approach of ensuring that the products are available can allow Signify to meet customer demands timely, enhancing further market reputation and profitability. However, there could be some risks associated such as overstocking of slow-moving items and significant cash investment in managing the inventory levels. By creating a balance between managing inventory levels and prioritizing high demand product, these risks can be mitigated to a certain extent.

- **Impact of demand forecasting on profitability of a product portfolio**

  "Signify is focusing on a statistical forecasting model to improve accuracy and efficiency. This new approach, which uses six best-fit models for each product, aims to reduce costs related to transportation, customer escalations, and management. By increasing forecast accuracy, Signify expects to enhance profitability and streamline operations, moving away from the less effective demand planner-based model previously used" - P8

  Demand forecasting is a crucial aspect in any business to foresee the tentative amount of sales in order to efficiently manage production and other supply chain processes (Bala, 2012). Signify's shift towards a statistical forecasting model for focusing on accuracy and efficiency employs six best-fit models for each product. This will result in reducing costs related to transportation, management and customer escalations. Increasing accuracy in forecasting will also lead to enhancing profitability and streamlining of operations accordingly.

6.2.6. Analysis of Customer Relationship Management

- **Influence of any other factor apart from the ones included in the initial guiding framework on profitability and market share**

  "Understand your customers' problems and options to differentiate. This generates value, allowing you to decide whether to pass it to customers for increased market share or capture it to boost profitability." - P7

  "Maintaining close relationships with customers is crucial in the lighting market. Signify excels by having knowledgeable personnel globally, allowing for personal engagement and support. Unlike other electronics, lighting products require strong interpersonal connections and understanding of local governments. By being present, responsive, and helpful, Signify ensures continued business and market share, as customers value these strong relationships over mere online or in-store availability.." - P4

  "Customer centricity is key. Involve knowledgeable salespeople and different company layers, including R&D and product managers, to build trust. Engaging customers early fosters collaboration and innovation, creating solutions that benefit both parties. This relationship-driven approach distinguishes us and ensures competitive products that meet market needs" - P2

The process of understanding a customer's gains and pains is crucial to generate value and further surpass it in either enhancing profitability or increasing the market share. As discussed in subsection 3.3.3, having a detailed analysis of a customer's profile is highly beneficial in adapting business processes to generate long-term growth. A thorough evaluation of customer needs and challenges can allow businesses to tailor their products to meet specific demands. This can also benefit in creating a differentiation for themselves from the competition and further creating a higher value in the eyes of the customer. This approach also ensures smooth competitive positioning of the products in the market.

Customer relationship is the most influential factor in determining profitability and market share as addressed by the majority of the interviewees. It is one aspect that was missing from the initial setup of company case and the literature review. It was purely identified and highlighted during the empirical analysis. Further, this factor was studied in detail to find out its relevance and interconnectedness in other factors that have been identified in the guiding framework of this research study.

Signify is a global company with a strong foundation of customer networks, maintaining long-term relationships that have contrbuted largely in the business growth of the company and still continues to do so. Unlike other electronic products, lighting products need good interpersonal connections and a solid understanding of the local government. In subsection 3.3.2, it has been explained in detail the interplay of legal factors in enhancing profitability and market share. Market share and business sustenance is further ensured by Signify as the company gives equal importance to being honest, responsive and avaiable for the customer at all times. The prioritization of customer values brings additional trust in the eyes of a customer and secures the faith for future collaborations. This is extremely important in impacting market share as the relationships of today lead to future business opportunities and expansion which could possibly rule out competition due to their reduced network opportunities to do business.

Customer centricity is equally important in focusing on customer satisfaction and retention. Engaging with customers early in a collaboration opportunity that allows creating solutions, giving benefits to both parties is crucial (Valls Giménez, 2018). This approach of developing relationships ensures that a company is distinguished and the offerings are competitive in meeting market needs. Adopting various company layers during customer interactions can foster a better understanding of customer requirements.

6.3. Case Recommendation

After analysing the data collected in interviews and understanding the interpretation of the results, the most-suited recommendation based on the integration with theory within this research has been presented below. It is a suggestive recommendation that the company can use or follow to consider 'customer' specific factors while formulating a pricing strategy.

Implementation of market-oriented pricing strategy

- **Utilization of Nagel's Price Policy Framework**:

  Implementation of the structured approach of Nagel's Price Policy Framework (as discussed in Figure 3.5 to align pricing decisions with customer value perception, market segmentation, and competitive analysis. Developing flexible pricing models to cater to different segments and maximize revenue based on product value and cost savings.This can be further understood by taking into account the calculation of customer value purely from a buyer perspective.
- **Buyer's Perspective and Customer Value**

  In understanding this perspective, it is crucial to recognize that customer value is central to pricing decisions, as described by (T. Nagle & Holden, 1995). This involves understanding that value includes not just the sales price but also total life-cycle costs and the product's impact on the customer. Using Christopher's formula (Equation 3.1) to calculate customer value can provide the company a competitive advantage over its competitors. A hypothetical example has been showcased below,

  Quality:

1. Signify: Offers high-quality LED lights with superior energy efficiency (85% energy savings) and a lifespan of 50,000 hours.

2. Competitor A: Offers LED lights with 75% energy savings and a lifespan of 40,000 hours.

Service:

1. Signify: provides comprehensive customer support, including free consultations, installation support, and a 5-year warranty.

2. Competitor A: offers standard customer support with a 3-year warranty.

Cost (including initial purchase and total life-cycle costs):

1. Signify: higher upfront costs but lower operating costs due to better energy efficiency and a longer lifespan.

2. Competitor A: Lower upfront cost but higher operating costs due to less energy efficiency and shorter lifespan.

Time (response time and service speed):

1. Signify: Fast response times with 24/7 customer support and quick installation service.

2. Competitor A: Standard response times and installation service.

Calculation using formula:

Assigning numerical values to these factors for simplicity purposes:

Signify:

- Quality = 10 (high energy savings and long lifespan)
- Service = 9 (excellent support and warranty)
- Cost = 8 (higher upfront, lower life-cycle)
- Time = 9 (fast response and installation)

Competitor A:

- Quality = 8 (lower energy savings and shorter lifespan)
- Service = 7 (standard support and warranty)
- Cost = 7 (lower upfront, higher life-cycle)
- Time = 7 (standard response and installation)

Using the formula:

Signify's Customer Value = **1.25**
Competitor A's Customer Value = **1.14**

By effectively communicating this superior customer value, Signify can justify its higher pricing strategy while demonstrating the long-term benefits and cost savings to potential customers. This strategy not only helps in attracting customers who prioritize quality and long-term value but also in differentiating Signify from competitors who may compete primarily on upfront price alone.

Thus, by focusing on comprehensive customer value a company can gain a competitive advantage, appealing to a customer base that values quality, efficiency, and reliable service, ultimately leading to increased market share and profitability.

7 Conclusion

The research study aims to investigate the factors influencing profitability and market share within product portfolios in the EU's lighting industry.In order to narrow the scope of the research, emphasis has been given on the case of Signify's linear indoor drivers portfolio as it was also a part of the researcher's graduation internship. Moreover, a combination of literature review and empirical analysis with semi-structured interviews was used to present key insights from industry experts that could further strengthen the knowledge of the research study.

In a product portfolio, it has been concluded from the empirical analysis that the technical specifications affect both the profitability and market share. The elements of cost management and product innovation play a key role in further impacting the dependent variables. Product features that match well with the market demand and technological advancements boost competitive positioning, therefore driving profitability and market share. This explains the alignment of insights gathered from interviews to identifying cost management and road mapping as significant factors.

Pricing strategy is divided into two segments for understanding equally the impact of costing as profit management requires the optimization of both these aspects. For the price aspect particularly it has been highlighted in the research study how various approaches such as value-based pricing, competitive pricing, price setting using internal and external factors influence profitability and market share. The price policy framework by (T. Nagle & Holden, 1995) explains in depth about the importance of customer and competition in effective determination of a price. The market-orientedness in the way pricing should be carried out explains the missing aspect of "outside-in" perspective at companies that is validated by academic theories (Kotler et al., 2005). The strategic pricing of the products taking into consideration aspects like regional demand and competitor pricing have been showcased as instrumental in enhancing profitability and market share. Moreover, the interviews highlights the importance of pricing strategies subjected to market conditions, further supporting the guiding framework developed in this research study.

Market positioning stood out as a pivotal factor in determining profitability and market share. From the data collected via empirical analysis, it has been suggested that well-positioned products, with defined value propositions and differentiation capabilities perform better in sales in competitive markets. Further, Signify's strategic focus on fostering innovation and promoting quality and sustainability has ensured strong market positioning which further contributes towards their profitability and market share.

In order to answer the sub-research question of how does market positioning influence profitability and market share in the EU lighting industry in detail, the research study dived deeper into understanding the most essential factors that emerged as having strong impact on profitability and market share in the context of this case study. As lighting industry is heavily regulated when it comes to the environmental impact, it was deemed important to research on what initiatives are being taken in the assessment of the environmental impact while managing portfolios. Signify's relentless commitment to targeting sustainable practices at creating energy-efficient products comply well with regulations of the industry and further create a cutting edge over their competitors in the market to build customer trust and reputation which leads to increased to market share and profitability. However, as the demand of EPD's are not the maximum currently and it is a change that the interviewees foresee in the long-term to have a significant impact on market share and profitability, it was highlighted to have an indirect impact on profitability and market share in section 5.3

In addition to studying environmental impact, emphasis was also laid upon understanding the business strategy from a resource based point of view. This included both horizontal and vertical integrations of portfolios. It was found from the empirical analysis that these strategies have been employed by Signify in the past and have helped the company to increase efficiency in its supply chain processes which has further resulted into higher profitability over the years. Similarly, it has allowed Signify to regain market share by performing mergers and acquisitions and sharing resources with competitors to reduce competition. However, there are some risks associated to these strategies that have been discussed in the research study which justifies the responses of some of the interviewees concluding the impact of such strategies as indirect on profitability and market share.

Competition Benchmarking is another important factor that was studied in detail to understand about the strengths and weaknesses of the main competitors for Signify and how can Signify further capitalize on these weaknesses as opportunities to capture the market share and reflect on creating attack plans on the threats posed by their strengths to ensure high profitability. It was also discussed in chapter 5, how different competitors have dominance in a specific product category in different regions. Moreover, it was also concluded that benchmarking at a product and at the company level is equally important to brainstorm around marketing activities in capturing market share. If competitors are going through major organizational changes or product development changes, it is ideally considered one of the best times to benchmark against the competition and further use it to acquire higher sales and develop better customer relationships. Staying competitive in the market and knowing in detail about competition's product is highly influential in ensuring long-term profitability and market share.

7.1. Theoretical Implications

The research on the impact of PPM in increasing profitability and market share in the EU's lighting industry has significant academic contributions. Firstly, the research can contribute to the literature on PPM by examining its impact on profitability and market share in the lighting industry. This can help to fill a gap in the literature on PPM, which has mostly focused on its implementation and benefits in general terms rather than industry-specific studies.

Secondly, it contributes to the literature on the lighting industry by examining the impact of PPM on profitability and market share. This can help to provide insights into the factors that contribute to the success of lighting companies in the EU market. It can also provide useful information for policymakers and industry stakeholders who are interested in promoting the growth of the lighting industry.

Thirdly, this research can contribute to the literature on the external environment of the lighting industry by using the several frameworks to analyze the impact of various macro-environmental factors on profitability and market share. This can help to provide insights into the factors that are most important in shaping the external environment of the lighting industry, which can be useful for future research.

The guiding framework developed in this research study using the existing theories from academic models and investigation on factors that have impact on profitability and market share can be used to further add research contributions on assessing profitability and market share within lighting industry. The expanded version of this framework that has been presented in next section highlights the importance of carrying out the empirical analysis which led to identification of an important factor that was not highlighted in the literature review in detail.

Overall, this research can contribute to the academic literature by providing insights into the impact of PPM on profitability and market share in the lighting industry, as well as the external factors that shape the industry's performance. It can also provide useful information for policymakers and industry stakeholders who are interested in promoting the growth of the lighting industry in the EU market.

7.2. Practical Implications

The practical implications of this research study are important for product managers and other stakeholders within Signify and the lighting industry. The guiding framework developed in this study presents a well defined approach for managing product portfolios to enhance profitability and market share. It is done by focusing on different aspects of PPM that have been referred to as factors in this research. These factors include, technical specifications, pricing strategies, market positioning, environmental impact, business strategy. Using this emphasis in the guiding framework, companies can make informed decisions on further optimize their portfolios in various aspects such as looking forward in time in terms of attack plans for competitors. Employing competition benchmarking to improve upon your products by comparing to competition and further entering the market at competitive prices can significantly help companies enhance their profitability and market share.

Strategic Adaptation

This approach highlights the importance of strategic flexibility and adaptation, which is crucial for industries facing rapid technological changes or volatile market conditions. By continuously monitoring external factors (through PESTEL analysis) and internal capabilities (via Resource Based Value), companies can quickly adapt their strategies to mitigate risks and seize opportunities. This flexibility is particularly vital in industries like technology, where product lifecycles are short, and innovation is constant (Eisenhardt & Martin, 2000) (Teece et al., 1997).

- Companies in rapidly evolving industries, such as technology and telecommunications, should invest in systems and processes that allow for real-time data collection and analysis. This will enable them to swiftly adjust their strategies in response to changing market conditions, regulatory landscapes, or technological advancements.

Customer-Centric Pricing Mechanisms

The framework's inclusion of pricing models and customer-oriented strategies underlines the importance of understanding and responding to customer needs and value perceptions. This is particularly relevant in consumer goods and retail industries, where customer satisfaction and loyalty are critical. By utilizing tools like the Business Value Proposition Canvas and pricing models, companies can tailor their offerings and pricing strategies to better meet customer expectations, thereby enhancing customer satisfaction and loyalty(T. T. Nagle et al., 2016) (Kotler & Keller, 2012).

- Retailers and consumer goods companies should use data analytics to gain deeper insights into customer preferences and purchasing behaviors. This data can be used to develop personalized pricing strategies, loyalty programs, and targeted marketing campaigns, thereby increasing customer retention and profitability.

7.2.1. Revised Guiding Framework

In Figure 7.1, a revised guiding framework has been presented. Customer Relationship Management has been added as a new identified factor in the framework after the empirical analysis.The research study suggests that the framework has been developed to guide the process of managing portfolios effectively in tackling high profitability and market share. The inclusion of academic theories strengthens the results of this framework and further makes it a structured approach for decision-making in companies around product portfolios.

Customer Relationship Management has been found to be the most crucial aspect of looking after profitability and market share, as all the other factors only influence profitability and market share until a point where the customer is interested in doing business. The moment a customer relationship is not maintained and customer centricity is not created, the chances of ensuring larger business opportunities fade away and therefore it has been concluded to include this factor in this guiding framework.

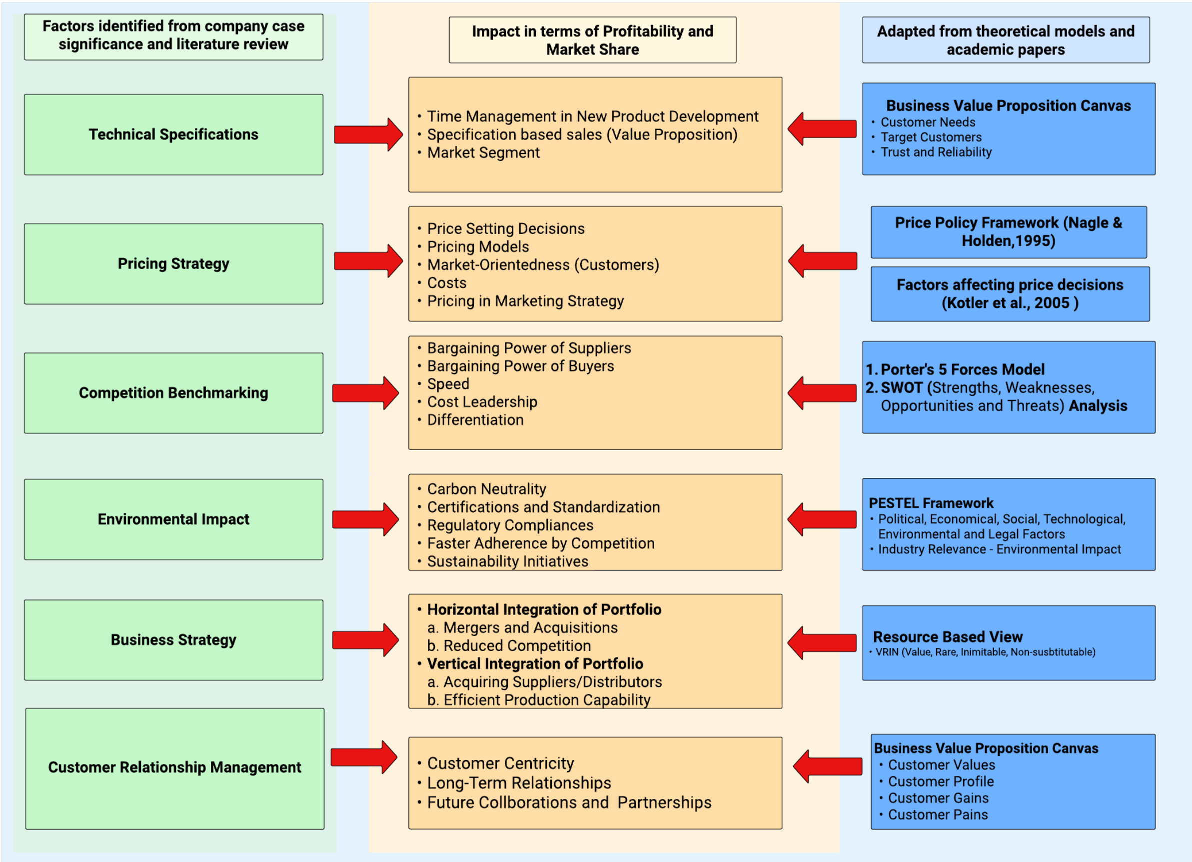

Figure 7.1: Revised Guiding Framework

Industry Orientation:

- Competition Benchmarking: Porter's 5 Forces and SWOT analysis are essential tools for understanding market dynamics, including competitive forces and strategic positioning (Porter, 1980) (Ghemawat, 2002). These frameworks emphasize understanding the bargaining power of suppliers and buyers, cost leadership, and differentiation strategies.

- Environmental Impact: The PESTEL framework helps identify external macro-environmental factors affecting the industry, such as political, economic, social, technological, environmental, and legal factors (Yüksel, 2012).

- Business Strategy: The Resource-Based View (RBV) focuses on internal resources and capabilities, such as mergers and acquisitions, and vertical integration, which are crucial for maintaining a competitive edge in the industry (Barney, 1991).

Customer Orientation:

- Pricing Strategy: The Price Policy Framework by Nagel and Holden, along with Kotler's factors affecting price decisions, emphasize understanding customer needs, price sensitivity, and value perception (Nagel & Holden, 2002) (Kotler et al., 2005). This approach is crucial for developing market-oriented pricing models.

- Customer Relationship Management: The Business Value Proposition Canvas (BVPC) highlights customer-centric strategies, focusing on customer needs, values, and long-term relationships, ensuring that the company's offerings align with customer expectations (Osterwalder & Pigneur, 2014).

7.3. Limitations

While the research study has its contributions, as mentioned in this report, it is important to discuss the limitations of this research to be aware about the future steps that can be taken in making the contributions of the study more valuable.

7.3.1. Generalizability in Framework

A single case study protocol within Signify limits the generalizability of the findings. Although, the guiding framework can be later generalized across other portfolios within the lighting industry, it has its own limitations for other company contexts. Moreover, research carried out at multiple companies within lighting industry can also help in validating and further extending the analysis of the findings. This would also provide competitor insights and information on how they tackle profitability and market share.In addition to this, further research into making each concept proposed in the guiding framework quantifiable will help in enhancing both the practical and theoretical implications of the framework.

7.3.2. Data Subjectivity

Using a mixed methods approach in data-collection process could also avoid generating any kind of bias in the semi-structured interviews. Further, the study employs purposive sampling to choose participants for the interviews (data collection). This sampling process ensured that the participants were intentionally chosen based on their relevant experience with managing product portfolios and working around the development of other factors such as sustainability and supply chain management. While this approach ensured a focused participation in the research study, it could also lead to bias introduction. In addition to this, a small sample size could also lead to difficulty in generalizability of the findings of this research as within the company, there could be existing different viewpoints around managing product portfolio as Signify is a global organization.

7.3.3. Challenges: Integration of academic models and theories

- Different academic models often come from distinct theoretical backgrounds and have unique assumptions. For example, the Business Value Proposition Canvas emphasizes understanding customer needs and market segments, which aligns with customer-centric approaches. In contrast, Porter's Five Forces model focuses on external market dynamics, such as competition and industry structure, which are more aligned with strategic management perspectives. The challenge in this situation is ensuring that these models do not contradict each other and that they collectively provide a consistent view of the business environment. For instance, aligning customer-focused insights with broader market and competitive analyses requires careful synthesis to avoid conflicting recommendations.

- Models like the Price Policy Framework and Porter's Five Forces often rely on quantitative data for pricing strategies, market positioning, and competitive analysis. On the other hand, frameworks like the Business Value Proposition Canvas and SWOT analysis may use qualitative data to assess customer perceptions and internal strengths and weaknesses. Considering the limitations of each model,balancing the data requirements and integrating qualitative and quantitative insights can be difficult. The challenge lies in creating a subject that respects the nature of data used in each model and provides a unified strategic direction. For instance, quantifying customer satisfaction or brand loyalty may not align neatly with the financial metrics used in pricing strategy formulation.

- Academic models often assume static conditions or focus on specific time frames. For example, SWOT analysis provides a snapshot of strengths, weaknesses, opportunities, and threats at a particular time, while PESTEL looks at broader, long-term trends. Combining models with different temporal perspectives requires a strategy for addressing changes over time. This involves continuously updating the analysis and ensuring that strategic recommendations remain relevant in the face of dynamic market conditions and evolving business environments.

7.3.4. Different Industry Context (Automotive and FMCG)

It is also crucial to understand the implications of these factors from the perspective of other industries, as it highlights the limitations of these factors in impacting profitability and market share. For instance, in the car industry, technical specifications such as fuel efficiency, safety features and engine performance are major determinants of high profitability and capturing the highest market share. This is because the industry is highly dependent upon high technical standards and innovative features to stay competitive in the market. The benefits of such features lead to establishment of a loyal customer base that are ready to pay more.

On the contrary, high R&D costs and the fact that technological trends can also become outdated quickly demanding for further innovation are some of the limitations that technical specifications might have in the automotive industry. However, in the FMCG (fast-mover consumer goods) industry, technical specifications are more influenced by product quality, packaging and shelf life. They are less bounded by technological advancements. For instance, innovations in packaging that extend shelf life can reduce waste and appeal to environmentally conscious consumers (Sarkar, 2012).

Consumer appeal and cost-efficiency are the main advantages of assessing profitability from a technical specification perspective in the FMCG industry, while lower differentiation capabilities and cost sensitivity some of the limitations of using technical specifications as a factor to assess profitability and market share.

Moreover, the process of pricing differs in both the automotive and FMCG industry. Premium pricing can lead to enhanced brand equity and perceived value in the car industry. However, price elasticity can make price-sensitive customers hesitant towards higher prices. In the FMCG industry, market penetration happens on competitive pricing which can further increase sales volume and consumer base but at the same time, margin pressures (competitive pricing) can lead to lower profit margins.

Benchmarking against the competitors in the automotive industry includes understanding competitor's technology integration, brand positioning and market strategies. For instance, the process of benchmarking against competitors in the case of Toyota lead to a successful lean manufacturing system which enhanced the company's market share and profitability(Liker, 2004). While strategic insights into competitors' strengths and weaknesses can provide a company a competitive advantage over its competitors, imitation risks and the dynamic nature (rapid changes making benchmarking data obsolete faster)of markets still persist to be a disadvantage of benchmarking in this industry.

In the FMCG industry, the process of benchmarking ensures that the products meet market demands and stay relevant to the market needs. It also provides a significant edge by gaining information about the competitors. However, benchmarking can often lead to short-term focus rather than long-term innovation.This can be better understood by focusing on an example where a competitor launches a new flavour of a beverage and other companies might want to imitate the competitor and want to bring in the market their own versions to capture market share. While this can lead to higher sales in a short span of time, it can also divert resources away from making unique products. In addition to this, this reactive approach can lead to erosion of brand loyalty as consumers comprehend little differentiation between competing brands. Therefore, resulting in reduced overall profitability and market share.

This summarizes how the identified factors influencing profitability and market share within product portfolios in the lighting industry can and cannot be a part of the most suited assessment criteria for companies. It further highlights the generalizability of the research study as a limitation in applying the implications of such factors in different industry contexts.

7.3.5. Evaluation of Results

In this research study, a qualitative analysis of what are the most crucial factors and how do these factors influence profitability and market share within product portfolios in the EU lighting industry has been discussed. However, the insights collected using the interviews underlined the effect of such factors using other company examples (competitors), product information specifying technical specifications and pricing logic. The process of further validating the discussed insights could have made the presented framework more robust for implementation purposes.The guiding framework presented after reviewing different models consists of conceptual themes that can be executed within a product portfolio using data analysis on specific factors of each portfolio. While this research aims to have identified such factors within the context of this industry, a data-driven model implementation to incorporate the concepts of the framework will improve the validity of the framework proposed in the thesis.

7.4. Future Research

In addition to this, recommendations for future studies can be to dive deeper into the impact of emerging technologies and market trends on PPM in the lighting industry. Exploring the role of digital transformation, smart lighting solutions and major sustainability initiatives can provide crucial insights for industry stakeholders.

As discussed in section 7.3, the limitations of this research study unfolds the possibilities of continuing this research in the future in multiple aspects.

- Quantitative Data : In order to better understand the factors influencing profitability and market share within product portfolios, a comprehensive analysis on competitor data can be done. Identifying key trends or patterns in the way a competitor does pricing for a particular category can provide insights to a company that can be fed back in a loop to its own strategy. This feedback from quantitative insights gathered using competitor data can allow the company to already target the customer base that is outside of its market share and belongs to the competitor.

  Furthermore, it was mentioned in the interviews that companies are now focusing on producing documents that standardize the adherence to environmental regulations and certifications necessary to do business in the lighting industry. As a future action point, a thorough comparison of such documents with the competition and comparing each numerical value based on the environmental impact will allow companies to focus more on using sustainability as a unique value proposition to enhance profitability and widen market share.

- Scoring Model: Scoring models allow for the quantification of qualitative data, making it easier to compare and prioritize different factors systematically. This objectivity is crucial in business decision-making, as it reduces biases that might influence qualitative assessments (Elder et al., 2012).

  By assigning scores to various aspects such as product features, customer satisfaction, market conditions, and competitive positioning, researchers can analyze the data more comprehensively. Statistical tools and techniques, such as regression analysis or factor analysis, can be used to identify patterns, correlations, and causations.

  Furthermore, the scores can help prioritize initiatives by highlighting the areas with the highest potential impact. This ensures that resources are allocated efficiently, focusing on the most critical aspects that drive growth and profitability (Cooper et al., 2014).

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A

Interview Protocol

Interview Introduction

Hello,

Good Morning/ Afternoon (Name of the Person). Firstly, thank you for your taking out some time for this interview and contributing to my research study. I am Jai Chahar, and I am currently interning at Signify as a product management intern under linear indoor drivers portfolio. Alongside I am also pursuing my master thesis research project at TU Delft in collaboration with Signify. I am investigating about the factors that influence profitability and market share in a product portfolio within Signify to identify the areas where Signify can improve upon its existing strategy in capturing the highest market share in each of its product segment within the portfolio.

Phase 1: General Questions

1. What is your name and what is your role at Signify?

2. What do you think is crucial in managing products within a portfolio to target high profitability and market share within Signify?

Phase 2: Technical Specifications (Factor 1)

1. Which technical specifications are most critical in differentiating our products from competitors' offerings?

   Follow up questions about top specifications (Efficiency, Output Power, Output Current Range, Output Voltage Range)

2. From all the 4 major categories of non-isolated segment (Dimmable/Programmable, Non-dimmable/ Single-Dual Current, DipSwitch and Certa Drive), which product category do you think has been most demanded from the customer's perspective in the past or has been better than the competition. If yes, why so?

3. How do the technical specifications of our products influence customer satisfaction and retention?

4. Are there any technical specifications that are particularly cost-intensive, and how do we balance these costs with pricing strategies?

Phase 3: Pricing Strategy (Factor 2)

1. What are your thoughts on the balance between competitive pricing and maintaining profitability ?

2. According to the logical pricing guideline in our portfolio at Signify, there are different marginal contributions to different product categories Why do you think this is important in the order of how it is done ?

3. What operational challenges do we face in maintaining competitive cost price while ensuring high sales price ?

4. How do market trends and customer preferences influence our pricing strategies and margin targets ?

Phase 4: Competitive Benchmarking (Factor 3)

1. How do you think our competitive analysis should evolve to keep pace with industry changes ?

2. What kind of impact does the bargaining power of buyers (customers) has on retaining a customer in a highly competitive market.

3. Competitor A and B are the two big competitors for Signify across the entire portfolio of linear indoor drivers.

4. What do you think are their main strengths and weaknesses? Also in addition to that, what do you think can be our opportunities and threats at the same time to capture the market share that belongs to them.

5. What are the key areas of innovation we should focus on to stay ahead of our competitors, especially in the linear indoor driver portfolio?

6. How do you believe our value proposition is perceived by different customer segments, and how does it influence their purchasing decisions?

7. What KPIs do you believe are the most critical in determining the profitability and market share of our products?

8. What role does benchmarking against our competitors play in influencing the market share and profitability of Signify. Can you share any instance where you experienced this?

Phase 5: Environmental Impact (Factor 4)

1. How crucial do you think environmental impact or targeting sustainability is in targeting positive business growth for Signify?

2. How fast is competition adhering to it? Does the impact in terms of market share?

3. How can we enhance our sustainability practices to not only meet regulatory requirements but also exceed customer expectations and gain a competitive edge?

4. How do our customers perceive the environmental impact of our products in a linear indoor drivers portfolio?

5. How can we turn regulatory compliance into a competitive advantage to enhance our market share and profitability?

6. How do you think the energy performance of buildings directive and the eco-design directive launched by EU at promoting energy efficiency has impacted the industry in terms of profitability and market share ?

7. How can we better communicate the environmental benefits of our products to enhance customer perception and drive sales?

8. What are the cost implications of implementing sustainable practices in the linear indoor drivers portfolio and how do these costs impact our profitability?

9. What innovative sustainability initiatives can we adopt to outperform our competitors in the [Linear Indoor Drivers Portfolio]?

10. What improvements can we make in our product lifecycle management to enhance sustainability and drive market share?

11. How can we turn regulatory compliance into a competitive advantage to enhance our market share and profitability?

Phase 5: Business Strategy: Horizontal and Vertical Integration (Factor 5)

1. Has the company implemented any vertical integration strategies, either backward or forward? If so, what were the main objectives and outcomes of these initiatives?

2. What are the potential benefits and risks you see in pursuing further horizontal integration within our industry?

3. How can our integration strategies support our innovation and RD efforts to stay ahead of industry trends and customer needs ?

Supply Chain Management

1. How can we further enhance or how are we still working on our quality control processes in the supply chain to boost our market reputation and profitability?

2. What specific specific cost saving measures have we implemented in our supply chain to enhance the profitability of our product portfolio ?

3. How accurate do you think currently is our demand forecasting and how does that impact the profitability of the product portfolio ?

4. Do you think do you are there any additional risk management strategies in addition to what we are already doing or do you think personally and also be adapted that we can implement to ensure supply chain reliability and further outpace competition?

Phase 6: Reflection on Factors

1. After having discussed all the factors, are there any other internal or external factors that have a direct or indirect impact within product portfolios on influencing profitability and market share

B

Informed Consent Form Template

Master Thesis Research Informed Consent Form

1. **Title of Research Study**: Managing Product Portfolios in the EU Lighting Industry: A case study for Signify's market share and profitability.

2. **Researcher(s)**: Jai Chahar (student) from TU Delft and with Signify Netherlands BV

3. **Purpose of the Study**: This research study aims to explore the impact of product portfolio management (PPM) practices on profitability and market share in the EU's Lighting Industry through conducting a single case study within Signify's Linear Indoor Drivers Portfolio. The expected duration of your participation will be approximately 35-40 minutes. The findings from this study may be used for academic publications (thesis repository of TU Delft) and improving upon strategic decision-making around product portfolios for Signify.

4. **Study Procedures**: You will be asked to participate in a semi-structured interview where you will share your experiences, perspectives, and insights related to the PPM factors which influences profitability and market share identified in the theoretical framework developed in the research. The questions will explore areas such as competition analysis, pricing of SKU's, impact of regulations (sustainability) and business strategy to capture the highest market share. After the interview, there will be a quick survey of 5-10 questions to summarize the interview and the opinions captured.

5. **Confidentiality**: All the information provided and gathered from the participants will remain confidential and only the researcher will know what has been said during the interview and the survey. All the confidential data used will be first scrutinized by the internship host and with the graduation committee at TU Delft. The data will be stored securely in the TU Delft institutional storage to which only the student intern and the supervisory committee of the thesis at TU Delft will have access. The personal data of the participants will include name, company (domain) in which you work, email address, and role in the company and only the intern and the supervisory committee of the thesis at TU Delft will have access to this data and will be securely stored on the institutional storage of TU Delft. The personal data will be destroyed one month after the project completion (approximate date- 30th September 2024). In addition to this, product data will be destroyed after the end of the research project.

6. **Open Data**: The data in the form of a report will be made available to the TU Delft, the Product Management team of Signify in an anonymised way without revealing any personal information of the participants. The report will also be shared with Signify for any confidential data verification and validation.

7. **Voluntary Participation**: Your participation in this study is entirely voluntary. You have the right to withdraw at any time without penalty. You may also choose not to answer any questions you do not feel comfortable with. Please note that the interview will be audio recorded for analysis purposes.

8. **Contact Information**: Should you have any questions or require further information about the research, please contact:

Declaration of Consent:

Consent to Participate: By proceeding to the interview, you acknowledge that you have read and understood this consent form and agree to participate in the research study under the conditions outlined above. In addition to this, you also agree that your responses, views or other input can be quoted anonymously in research outputs. Please sign and date this form to indicate your consent to participate in the study. A copy of this consent form will be provided to you for your records.

Signature of Participant:

Date:

C
Sentiment Analysis

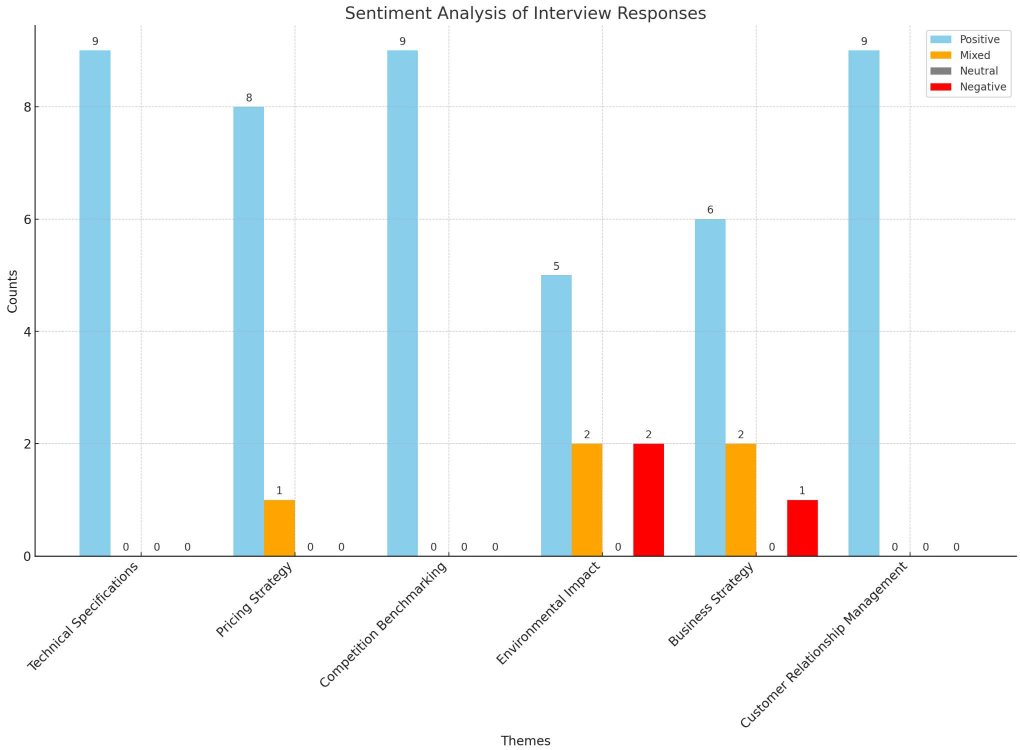

Figure C.1: Sentiment analysis of all the interviews collected in the study

The sentiment analysis presented in Figure C.1 provides a breakdown of the sentiments expressed in interview responses across six different themes: "Technical Specifications," "Pricing Strategy," "Competition Benchmarking," "Environmental Impact," "Business Strategy," and "Customer Relationship Management."

Key Findings:

- Technical Specifications:
  - Positive Sentiment: Dominant with 9 counts, indicating a strong approval or satisfaction with the technical aspects discussed.
  - Mixed, Neutral, Negative Sentiments: None recorded, suggesting no ambiguity, neutrality, or disapproval in this area.
- Pricing Strategy:

- Positive Sentiment: 8 counts, showing a generally favorable view towards pricing strategies.
- Mixed Sentiment: 1 count, indicating some ambiguity or mixed feelings.
- Neutral, Negative Sentiments: None recorded, showing a lack of indifference or disapproval.

- Competition Benchmarking:
  - Positive Sentiment: 9 counts, reflecting strong positive feedback about competitive positioning.
  - Mixed, Neutral, Negative Sentiments: None recorded, suggesting clear and unanimous approval.
- Environmental Impact:
  - Positive Sentiment: 5 counts, indicating some approval.
  - Mixed Sentiment: 2 counts, showing mixed reactions possibly due to conflicting views or partial agreement.
  - Negative Sentiment: 2 counts, highlighting concerns or dissatisfaction related to environmental impacts.
  - Neutral Sentiment: None recorded, indicating that responses were polarized into positive or negative categories.
- Business Strategy:
  - Positive Sentiment: 6 counts, showing favorable opinions towards business strategies.
  - Mixed Sentiment: 2 counts, indicating some uncertainty or mixed opinions.
  - Negative Sentiment: 1 count, pointing out a small amount of disapproval or concern.
  - Neutral Sentiment: None recorded, indicating clear positive or negative leanings in responses.
- Customer Relationship Management:
  - Positive Sentiment: 9 counts, indicating strong positive feedback.
  - Mixed, Neutral, Negative Sentiments: None recorded, suggesting a consensus on the positive aspects.

  Conclusions:

  - Overall Positive Sentiment: The majority of the themes have a predominant positive sentiment, indicating strong approval and satisfaction in most areas.
  - Lack of Negative Sentiment: Except for "Environmental Impact" and "Business Strategy," negative sentiments are absent, which suggests overall favorable views or no significant issues identified in most themes.
  - Notable Concerns in Environmental Impact: The presence of both mixed and negative sentiments in the "Environmental Impact" theme suggests that while some see the positive aspects, there are notable concerns that need to be addressed. This indicates a need for potential improvement or communication in this area.
  - Business Strategy: The presence of mixed and negative sentiments, though minor, suggests some uncertainty or areas for improvement in business strategies.

This sentiment analysis provides valuable insights into how different aspects of a project or company are perceived. The overwhelmingly positive sentiments across most themes are encouraging, but the identified concerns, especially in "Environmental Impact," highlight areas that may require further attention or improvement. Addressing these concerns could enhance overall satisfaction and reduce any further doubts.

D

List of Codes: Open Coding

Detailed List of Codes

Technical Specifications

- Efficiency
- Operating Current
- Operating Voltage
- Operating Window
- Optical Capabilities
- Thermal Capabilities
- Warranty Conditions
- Electrical Consumption
- Audible Noise
- Product Family Approach
- High-End Product Focus
- Performance Parameters

Pricing/Costing

- Cost Management
- Cost Road Map
- Lower Cost
- Price Competitiveness
- Price Level
- Profitable Price
- Energy Cost Minimization
- Switching Costs
- Value-based Pricing
- Cost vs. Value-Based Pricing

Competition Analysis

- Competitive Advantage
- Competitors
- Competitor A
- Competitor B
- Competitor C
- Competitive Positioning through Innovation
- Benchmarking Importance
- Benchmarking Competitors

Sustainability

- Environmental Impact
- Sustainability Communication
- Sustainability Focus
- Environmental Regulations and Compliance

Business Strategy

- Horizontal Integration
- Mergers & Acquisitions
- Vertical Integration
- Vertical and Horizontal Integration
- Customer-Centric Strategy
- Intelligent Lighting Solutions
- Regulatory Compliance as a Competitive Advantage

Customers

- Customer Profile
- Co-operation
- Bargaining Power
- End-Users

Market

- Availability
- Company Reputation
- Follower
- Leader
- Future Propositions
- Market Segment
- Market Pull
- Winner
- Trends

OEM

- B2B Business
- Business Requirements
- Collaborative Co-operation
- Commercial Conditions
- Decision Makers
- Influence
- OEM Feedback
- Purchasing Power

Operations Management

- Inventory Management
- Operational Cost
- Business Operations
- Value-Chain
- Supply Chain Flexibility
- Cost-Efficiency in Supply Chain
- Component Scarcity and Supply Chain Challenges
- Risk Management in Supply Chain

Product

- Collaborative Product Development
- Electrical Consumption
- Luminare Makers
- Product Impact
- Utility

Type of Business

- Commodity
- High-End
- Tenders

Driver Specs

- Application
- Topology
- High Performance
- MasterConnect
- Miniaturization
- Portfolio Dependency

Customer Interaction

- Customer Lock-in Strategies
- Customer Relationship Building
- Customer Interaction and Negotiation

Governmental Influence

- Governmental Subsidies

Value Proposition

- Value Proposition Clarity
- Qualitative Differentiators

D.1. Code Frequency Analysis

The Code Frequency Analysis (Interviews) chart visually represents the frequency of various themes and codes discussed across multiple interview transcripts. This analysis, conducted using the qualitative data analysis software Atlas.ti, helps identify key areas of focus, concerns, and strategies mentioned by interviewees, thereby providing a comprehensive understanding of the factors influencing profitability and market share within a specific industry or company.

Themes and Codes:

Figure D.1 categorizes the data into various themes, such as "Technical Specifications," "Pricing/Costing," "Competition Analysis," "Sustainability," and more. Within each theme, specific codes represent detailed aspects or topics discussed during the interviews. For example, under "Technical Specifications," codes like "Efficiency," "Operating Voltage," and "Product Family Approach" are tracked. These codes highlight the aspects of technical features that are frequently discussed, indicating their importance to the interviewees.

Frequency Representation:

The horizontal bars represent the frequency of each code's mention across the interviews. Longer bars indicate more frequent mentions, suggesting that the corresponding topics are of greater interest or concern among the interviewees.
For instance, if "Efficiency" appears frequently, it suggests that this attribute is critical in discussions related to product performance and competitiveness.

Key Observations:

The high frequency of certain codes, such as "Competitor A," "Customer Profile," and "Regulatory Compliance as a Competitive Advantage," indicates a significant emphasis on understanding competition, customer needs, and regulatory adherence.
The presence of new codes like "Sustainability Communication" and "Customer-Centric Strategy" shows emerging areas of focus, reflecting contemporary market trends and strategic shifts.

Strategic Insights:

The code frequency analysis provides strategic insights into what the industry experts or company representatives prioritize. For instance, frequent discussions around "Pricing Competitiveness" and "Value-based Pricing" highlight the delicate balance companies must maintain between competitive pricing and profitability.

Understanding frequent mentions of "Environmental Impact" or "Sustainability Focus" suggests an increasing consumer and regulatory pressure towards sustainable practices, which can be leveraged for market differentiation and compliance advantages.

Product Development and Innovation:

Insights into frequently discussed technical specifications, like "Efficiency" or "High-End Product Focus," guide product development priorities. Companies can invest in these areas to enhance product appeal, improve market share, and justify premium pricing strategies. Frequent mentions of qualitative differentiators such as "Brand Quality" or "Customer Relationship Building" underscore the importance of non-technical factors in consumer decision-making, influencing brand loyalty and retention.

Market Positioning:

The data provides a basis for benchmarking against competitors ("Competitor A," "Competitor B"), helping companies identify strengths and weaknesses relative to market peers. This information can be crucial for strategic positioning and capturing market share.
Codes related to "Governmental Subsidies" and "Regulatory Compliance" indicate areas where companies can seek competitive advantages through compliance and leveraging governmental incentives, potentially leading to cost reductions or new market opportunities.

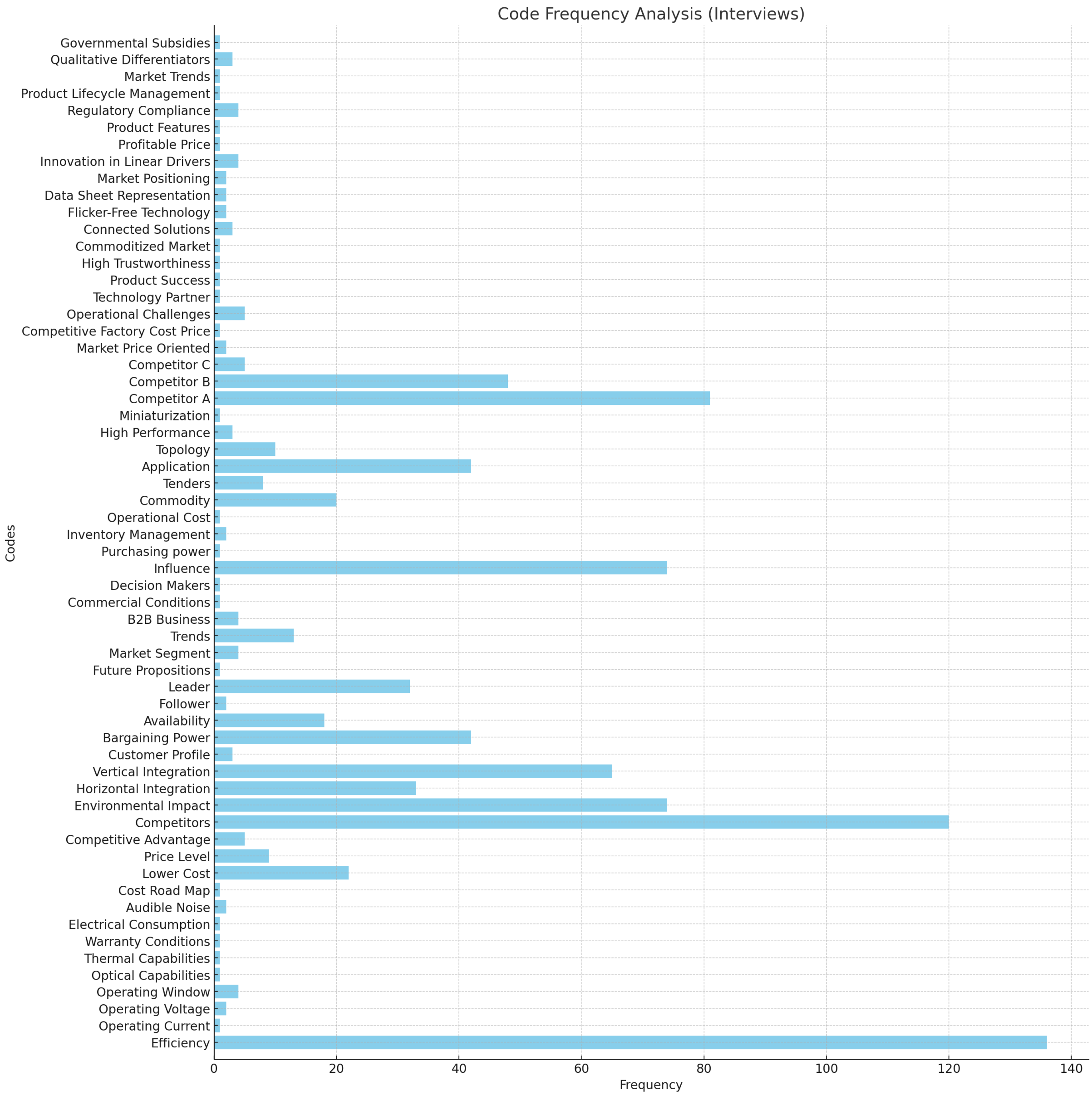

Figure D.1: Code frequency analysis adapted from all the interviews collected during the research