

## **MODERN INNOVATION & SUSTAINABILITY**

How EGLO is being more sustainable by using Innovative Solutions.

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## **ABSTRACT**

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This thesis is commissioned by EGLO Leuchten GmbH. The company has a long-standing history in designing and production of decorative lighting. The company operates at an international level and being a multinational corporation required recommendations for their sustainability efforts and innovative solutions. The company already has efforts in the field of sustainability but needed more ideas to gain a competitive edge.

The author of the thesis familiarized themselves with the topics of innovation and sustainability, the concepts of each and the history of them and the effects of sustainability and innovation is today's business dynamic. The author conducted in person qualitative interviews for the best output of the research along with site tour of the factory with the commissioner.

Based on the research, the authors found out how important the need for innovation has been not only for mankind but also for the companies to survive and how sustainability is not a trend, however a broad concept which has been changing the dynamics of every industry throughout the world.

The findings for the same suggested that for the company to avail the benefits on sustainability, the company should be more innovative in their efforts towards sustainability to stand out even further. They have made several efforts with regards to sustainability and innovation; however, they have been just to comply with the regulations and more can be done to stand out from the competition. This would not only help the company with their net zero carbon goal but also attract employee and customer retention and many more benefits as discussed in this thesis.

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Key words: Innovation, Sustainability & sustainability in innovation.

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## **ABBREVIATIONS**

B2B- Business to business

BSCI- The business social compliance initiative

CEO- Chief executive officer

DFC- Design for changeover

DFM- Design for manufacturability

EPI- Environmental Performance Index

EU- European Union

FSC- Forrest Stewardship Council

GDP- Gross domestic product

HDI Index- The human development index

ILO- International labour organization

IMO- International Maritime Organization

ISO- International Organization for Standardization

KW- Kilo watt

LED- Light emitting diode

NPO- Non-Profit Organization

REACH- Registration, evaluation, authorisation, and restriction of chemicals.

RoHS- Restriction of hazardous substances in electrical and electronic equipment

SOI- Sustainability Oriented Innovation

SWOT- Strength, weakness, opportunity, and threat

TEU- Twenty-foot equivalent unit

UN- United Nations

## 1 INTRODUCTION

Innovation is something that has been around us for copious time. It has always been an integral part when evolving a commodity or a service that enhances its exposures to humans.

When a certain degree of innovation is taking place, there is a lot of uncertainty in whether it will be successful or not, since innovation is taking an idea forward essentially, it has not been performed before, thus questions of its workability, uncertainty arise. The greater the change is, the more the uncertainty about technical performance of the change, the market response and even the ability of the organization to absorb the changes taken place. In short, innovation does not always guarantee the change will solve a problem. (Kline & Rosenberg 2010)

Now, it has commenced forward with time, with time and technology, innovation of products, services and ideas is a talk of the daily. Modern innovation has not only minimised these uncertainties, but also made these innovations more ideal for consumers and the companies. More so, with the change in market dynamics, sustainability is a driving force in Innovation nowadays in all aspects included. From what material is used to manufacture a product, to how it is shipped and stored, in the way it is being sold, Innovation in sustainability is the talk of now and the future.

Innovative changes nowadays in one sector tend to now involve several other areas or sectors in its development. Often, these other sectors need to evolve first/quicker for the main developmental process to start taking place. (Fagerberg, 2006) Now, there is development of smart, mega cities which have massive infrastructures for generating desirability, Research & development, and patenting that takes place in these international innovation centres. (Kao 2007)

Amid this all, sustainable innovation practices are of key importance now. Companies need to prioritize that when new changes are being brought forward in whatever aspect of their business activities. Importance arises since eventually the companies that are following it are more likely to navigate through a crisis and

survive it. Not only that but also have a chance in having more turnover than competitors who are not following focusing on the environment. A sustainable business is a stronger model, open avenues in more approachable target group. Moreover, it gives a big an opportunity for the company to supply products/services directly to consumers who are asking for sustainable products/services. (Loughlin 2023)

Following the above comments, the commissioner hopes for a report on the sustainability initiatives in their company and how innovation is the driving force of nature within its roots. Henceforth, coming up with ideas to initiate more sustainable and innovative changes in their manufacturing process at their production plant. In the end, the commissioner is hoping for the solution(s) to help them move forward with their sustainability goals.

The first chapter is the introduction, which gives brief insights onto what the reader can expect from the thesis, information about the company and the way the dissertation is being written. The second chapter is about details, concepts and fundamentals that are being used in the thesis. The reader gets a thorough knowledge about them in this part and about the theories applicable through which further parts will be used in the company analysis. Chapter three is about company information, building up a case for the analysis part, the conditions the company is working in, company history and what they are expecting from the author. Chapter four is the analysis of the data that is being provided by the company, and of the interviews that were being performed. The data will also be used in chapter five, in which the theories mentioned in chapter two would be applied to the case of the company and solutions would be derived. Chapter six is the final chapter in which the solutions are stated along with the conclusion for the case.

## **2 THESIS PLAN**

The following topics give an insight into the topic, the objective of it and the purpose of the thesis. The same includes details about the concepts, theories, and methods which will be used in the thesis. Furthermore, it will include the data collection process, method and run through of the structure in which thesis is written.

### **2.1 Thesis topic**

The topic of the thesis is Modern Innovation and Sustainability. The focus of the thesis is researching and understanding the modern innovation methods and the role of sustainability behind them. Innovation happens every day around us all the time, change is good, with the same sustainability is another topic which has key importance in today's scenario. Thinking of the same, the thesis will put emphasis about innovation and sustainability together. The same is thought of because the commissioning company are manufacturers of lighting products in abundance and are dealing with the question of sustainability on a global scale.

It was important for the commissioner to see that the research output is focused on how more sustainable and innovative changes can be researched & performed, which will help the manufacturing plant. The changes do not have to only start from the manufacturing process but can be rooted from the designing and developmental stages of the same. Being one of the industry leaders in lighting, and in the manufacturing industry, sustainability is one of the biggest challenges they are facing and adapting to every single day. Coming up with more solutions for them helps them making better off the environment and the products they are making for customers.

Sustainability is important in every industry now since there are several types of wastes, energy release that are recorded every day in an abundance which are harming the environment we live in at the very moment.

Various industries now, who are prominent manufacturers are under the scrutiny of publishing not only their efforts of how they are being sustainable but also how their business operations are affecting the environment and society. (Sartal et al. 2014)

Hence, knowing the importance of innovation and sustainability, the author of this dissertation is motivated to research and build a case on how EGLO has been sustainable and the future of it in its manufacturing by coming up with Innovative and sustainable solutions.

## **2.2 Thesis objective, purpose, and research questions**

The objective of this thesis is to research about the topic and coming up with an extensive report on how the case company has been sustainable and recommending innovative sustainable solutions for the future. The written objective can thus be written in form of a research question as follows:

*“What are the sustainability efforts taken by EGLO so far, & how their manufacturing can produce more innovative solutions to be sustainable in the future?”*

There will be more sub questions included in the thesis to answer the research question. Those are as follows:

*“How can EGLO be sustainable by also having sustainable execution of strategies?”*

*“In what manner should the case company follow these innovative and sustainable solutions for more growth in the future?”*

*“How is sustainability playing a role in the future of innovation?”*

The dissertation focuses on answering these questions and building up a report from the answers to these questions. They will be used as a guide in the research.

The purpose of the thesis is to build a report on the sustainability efforts from EGLO and coming up with innovative ways to make their manufacturing efforts more sustainable.

Objective would be achieved when solution(s) are provided which ultimately make their production efforts more sustainable in terms of surrounding environment and societal efforts.

## **2.3 Concepts**

In this following section of the thesis, various concepts are stated and explained in detail which are related to Innovations and sustainability. These theories therefore will be used as the theoretical framework upon which the thesis is formed. To begin with there would be explanations about the terms Innovation and sustainability also for better understanding.

It is crucial for the reader to grasp these concepts as it will be referenced to throughout the length of this thesis. They are also important when creating a report for EGLO in their sustainability efforts.

### **2.3.1 Innovation**

It is clear innovation is there today and it is everywhere. Even still, whilst knowing that innovation is present around us, many organizations have a hard time achieving all its benefits. To do so, they must understand and recognize three of its most important branches which are understanding the outcomes of innovation, the process that is behind innovation, and the mindset that is needed & put through when innovating. (Kahn 2018)

When there is understanding of what innovation is and what is needed to achieve it in its best configuration, one must also understand the different types of innovations.

The four types of Innovation are-

**Incremental Innovation:** Increment means adding or negating from something to make a change. Similarly, in incremental innovation the existing technologies, products or services are taken with some changes to increase the value of it to the customer. This type of innovation is found in already existing markets of these products. All companies are participating in incremental innovation one way or another. Because existing products are taken with small changes, it is not complex and thus the type of innovation that is observed the most. (Lopez 2015)

**Disruptive Innovation:** Another term to define disruptive innovation is stealth innovation. It is so because in disruptive innovation the company is adding new technologies and processes to the already existing ones in the current market. What makes it stealth is that the new technology that is being applied to the existing products or services will be subservient to the existing markets tech. The new technology that is now released by the company is often more costly, difficult to access and doesn't match the visual standards of the market even. After a few tries, the newer tech surpasses the old one, interrupts all the older/existing technology. This also subsequently results in the existing companies to fall behind in the market. (Lopez 2015)

**Architectural Innovation:** When someone taken already existing lessons, skills, and technology from one industry and puts it in another, that is known as architectural innovation. This is particularly successful when the market is receptive and can be great way of increasing the customer base in various industries. Often, there is a risk due to this, if there is a lack of reliability and reintroduction of the proven tech, it can fail. However, many times the new technology only requires a few changes and updates to match with the existing market standards. (Lopez 2015)

**Radical Innovation:** This type of innovation is the one we mostly think of when innovation comes to our mind. New industries arising or submerging existing ones is what happens in radical innovation. This always happens when the new technology is ground-breaking. For example, invention of the car. (Lopez 2015)

These are the four ways that help the companies to innovate. There are though more ways to innovate other than these four. The important thing to always note is the suitability of them to the company and the end goal. (Lopez 2015)

### **2.3.2 Sustainability**

Sustainability is the crossroads in between politics and science. It is where both meet. (Gieryn 1999) In the last two decades, sustainability has been a trend for companies, governments, and individuals. Nowadays there is sustainability everywhere. (Scoones 2007)

Knowing that today, sustainability is a term that is heard on the daily, there was a time when sustainability or sustainable were just words and the world went on without them. (Cardonna 2022) Now everywhere we look, whatever we shop for, however we travel, sustainability comes in mind and is something that is of vital importance. Whether it is shopping for groceries, travelling, we look for options that are always the most sustainable and friendly to the environment and our planet.

Till now, it has been established what and why sustainability is. It is also important to understand the 3 pillars of sustainability:

**Economic:** In this, it mentions the ability of the economy to progress sustainably. This is crucial in today's times since now sustainable ideas and models require financing and should be strong economically. (Browne 2022)

**Social:** It places significance on the social factors on the society and sustainable outcomes. It includes outcomes such as the well-being and harmony of the society, factors of poverty, wars, and injustice. Social sustainability relates to how these factors affect the society and how they can be prevented, solved, or improved by sustainable solutions. (Browne 2022)

**Environmental:** Out of the three pillars, this is the most significant of all. It puts emphasis on the natural resources, biodiversity, and support life on Earth. What,

how many, and by what means these resources are being utilised to be sustainable is vital today. (Browne 2022)

Once we understand what sustainability is and what are the three pillars of sustainability, it is also important to know the importance of sustainability which is:

Safety is key, whilst sustainability not only guarantees that but also helps in the economy's rapid growth. It is important for the economy to grow sustainably since it ensures improved living standards for the people in that economy all while ensuring there is no crisis or any given calamities for the future generations. (Nguyen 2022)

As noted, and proven by the HDI Index, when an economy is going through sustainable development that it does not only ensure economic sustainability and improvement, but also the social aspect of the society which can be the social justice systems and basic human development. It includes big parts of the economy too such as the healthcare, food, and nutrition, nurturing and education systems, poverty, and so on. (Nguyen 2022)

In the end, when talking about company's, sustainable activities help them to grow a brand, and achieve competitive advantage. Standing out because the company is sustainable is showing concern, and respect towards environmental and social aspects of society and of that business. (Nguyen 2022)

Sustainability is evident for the present and future needs. It is vital and a must have for companies in every industry.

### **2.3.3 Sustainability Oriented Innovations**

When there is a realization that there are ideas and concepts which will benefit the society and the environment, whilst at the same time benefiting the competitiveness of a product or a service, Sustainability oriented innovations are being performed. SOI deals with the better use of the resources, the innovation of better

products/services, and the emergence of new business principles/models, and all these are directly linked to the pre-existing business norms. (Kennedy & Bocken, 2020)

The concept of SOI is not relatively modern, it has been researched and discussed for about the better part of the 21<sup>st</sup> century now. (Lovins et al. 2007)

Now, it can also be understood as the restoration or replacement of the less sustainable options from the market via innovations. As to whether the new solution is taken on as SOI depends on the already existing options in the market. (Schaltegger et al. 2012)

To further elaborate sustainability-oriented innovations, it can be put in various categories that are often taken to elaborate the day-to-day innovations with no regular necessities. The following can be products innovation (goods or services), innovation in processing methods (manufacturing and supply chain methods), innovation in marketing (designing, packaging, placements, promotional activities, pricing of the goods and services) and organizational innovation (day-to-day business activities, human resources, external relationships). (Hansen & Grosse-Dunker 2013)

#### **2.3.4 Sustainable development**

In 20 and 21<sup>st</sup> century, humans have been at the peak of technological advancements. Yet somehow, despite all that success there was an error where the biggest limitation caused by this was not seemed relevant. There was an experiment done named Biosphere 2 in the USA in which it was concluded that, despite all the technological advancements, humans had failed to create a self-sustaining environment capable of supporting life. (Diesendorf 1999)

This was one of the many reasons which caused the need for Sustainable Development.

Sustainable development is the progression of the society and its needs in the present without compromising the availability of resources for the future generations.

Within Sustainable development, it entails two concepts which are:

1. Concept of needs, which is the idea of catering to the world's poor, on which the first emphasis should be. (Brundtland 1987)
2. There is an idea of limitations imposed too, which is by the status of technological advancement and societal group's capacity to encounter the needs of present and that of the future. (Brundtland 1987)

As witnessed in the past decades, there is a big demand for sustainable demand for a lot of reasons. Such as Innovation and efficiency, for better and versatile technologies, long term viability of in terms of present and future resources now and so on. (Rehal 2023)

### **2.3.5 Sustainability strategy**

To understand what Sustainable strategies are, we need to also understand what EPI is. EPI stands for Environmental performance index. EPI is responsible for making a data-driven analysis and summarise the situation regarding sustainable all around the world. It currently does the same for over 180 countries. (EPI n.d.)

A sustainable strategy includes a vision that the country/company wants to take, what their goals are for the future. Secondly, there should be adequate mechanisms for integrated policy in different sectors, meaning discussion in between the actions taken in between various levels and their results affecting the social and economic groups. And lastly, enough resources to monitor the on-going socio, economic and environmental trends, through which predictions for the future are deemed. When all these three factors are put together, a sustainable strategy can be put together. (OECD 2001)

Since the sustainable strategies are a way of implementing and measuring the sustainability of a region, company etc. EPI and sustainable strategies go hand in hand. The results of these strategies are important to measure the EPI and EPI is important to the sustainable strategies to measure, track and see how they are performing. Vital in knowing the present circumstances and planning. (Steurer 2008)

Here are a few examples of what these sustainable strategies can be to measure it, and to be sustainable:

Partnering with Non-profits: NPOs or Non-profit organizations are working towards the social and environmental benefit of the society. They also have the resources to help businesses out to in some cases. It sometimes a case when an officer or employee has been tasked with implementing a sustainable strategy and it can be overwhelming for them, hence leading to non-completion of the task. (Stobierski 2021)

Supply chain change: In a big company which has its own units, sourcing and purchasing of materials for production or resale are critical. Companies that find the right sources for materials, that are made sustainably is a good effort. It also accounts in manufacturing by how the company can reduce the efforts in use of natural resources. Transportation via more sustainable methods over the quick ones that use and harm the environment is encouraged. At last, reducing their carbon footprint. It is always good to install carbon sensors to measure the footprint and how they can bring it down, much so even eliminate it. (Stobierski 2021)

### **2.3.6 4 Cs of Innovation**

Till now, it has been determined that innovation is an important aspect for every organization moving forward. There must be support from the upper management levels, because without that, most of the ideas are always just left in their initial phases. The four Cs are a framework that most professionals follow from day to day. (Cleek 2018)

They are mentioned below:

**Creativity:** Creativity is the drive of innovation. It is where everything begins. It enables organizations to remove themselves from the traditional thinking and move to the newer solutions. There are steps within creativity itself so that one is being as creative and out of the box thinker as they can. It is important to create a protective environment where one feels powerful with their ideas, it is important to gather experience when a group of people are creating creatively. When there is a set of people who have only one experience at a certain level, the solutions will also be limited whereas compared to the set with different people from various perspective, skills and experiences, the solutions would be vaster and more creative. It is also crucial that there are ample resources being provided to maximise the output. (Debnath 2023)

**Communication:** Communication is essential in everything one does when there is a process involved. Sharing ideologies, team alignments, and ensuring the right implementation of those ideas is essential in communication and for innovation. An organization must promote and adapt different ideas to see open communication. The organizations should be striving forward in adapting to an open communication and non-exclusive styles of communication. There must be a response system set in place for the employees to express their concerns, ideas etc. Again, there can be more resources available for trainings, support for the employees to always enhance their skills. (Debnath 2023)

**Critical thinking:** Analysing difficult scenarios, exploring different options, being flexible to changes, and making well educated choices are all part of critical thinking. To being more innovative, it is encouraged to be better at critical thinking. There is a lot an individual can do to ensure critical thinking. It is good to ask questions and challenging themselves with thoughts, facts, and questions. Making data-driven decisions. It is appreciated to have self-reflection and assessments, to make employees getting taught by mistakes made by themselves. (Debnath 2023)

Collaboration: It is the step in the 4 C's that puts the above-mentioned steps together. Companies should be developing and maintaining a collaborative environment. There are solid ways by which they can be ensuring the right collabs such as having stated clear roles and responsibilities, making sure everyone in the team has understood their roles and jobs to do. Along with realizing and awarding the correct behaviour in collaboration. Enforcing qualities of right teamwork and mutual prosperity. (Debnath 2023)

## **2.4 Theories applicable**

In this part of the dissertation, the author has explained and corelated some theories that are applicable to Innovation and sustainability and for creating an analysis and a plan for EGLO's manufacturing plants.

### **2.4.1 Driving forces of Sustainability**

As we move forward, organizations have started to adopt sustainability because of its essence is the business dynamic nowadays. It is vital strategically for branding, environmental and social aspects of the corporations. (Stoughton & Ludema 2012) EGLO strives for the same sustainable goals. Throughout their supply chain, it is key to use materials, methods and processes that are sustainable in terms of its three main aspects which are economic, social, and environmental.

As mentioned above in the report, it is no doubt that the previous couple decades have been witnessed as the growth of the organizations all over the globe. (Korten 2001) Throughout the supply chain, the Corporate Sustainability can be co-related in between the internal and the external factors.

In the case of external factors, drivers, what can be defined as the same are for example, national policies, competitors benchmarking, customer satisfaction and so on. (Macloed & Lewis 2004)

Similarly, there are drives which are driven by the internal factors of an organisation. One of the most important internal factors is recognized to be ethical leadership. More factors for corporate sustainability internally can be defined as trust, innovation, productivity, profits and growth & so on. (Dawson 1994)

It can be seen in Figure 1, the distinction between internal and external factors for corporate sustainability. (Lozano 2013)

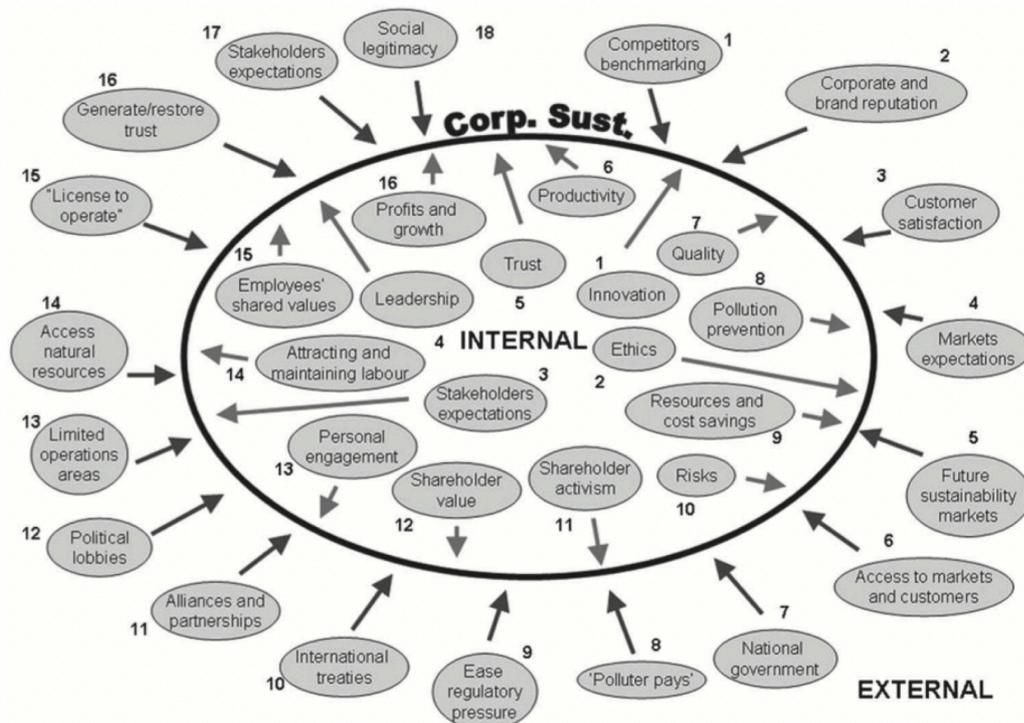


FIGURE 1. Corporate sustainability internal and external drivers. (Lozano 2013)

Figure 1 mentions the internal and external factors that affect Sustainable corporations and its drivers for sustainable and innovative changes.

The figure is important to keep tracks and noting down the drivers for EGLO to make more sustainable changes and keeping track of the changes already implemented. Calculating and analysing the effects of it within the organization and externally in its surroundings.

The metrics can be calculated internally and externally as follows:

Internal:

1. Attraction and retention of employees is always a positive reminder for an organization to being sustainable.
2. Having a more effective workforce that is completing their tasks much more efficiently.
3. Motives and initiatives to improve product quality.
4. Uplifting innovation and innovative processes.

(Lozano 2013)

External:

1. Abstaining from fines and penalties.
2. Customer satisfaction.
3. Ethical behaviour.
4. Better reach and access for customers and markets.
5. Reaching and going above the stakeholders' expectations.

(Lozano 2013)

It is encouraged and expected from EGLO to follow these practices throughout their Supply chain efforts and manufacturing processes. The same set of grounds will be used to analyse current situation and to implement further changes.

#### **2.4.2 Implementing Innovation**

Implementation and sustaining the innovation process is crucial for any organisation. Various researchers have stated down ways by which sustainability can be executed. (Stoughton & Ludema 2012)

In this research, we would be following an implementation strategy which has been proven by several researchers and organisations to implement strategy. It is important to do as there are also several shortcomings because of which the implementation strategies are often considered as failures.

Those such failures can come because the implementation strategy was not able to conclude into realistic approaches, was hard to keep track off, there was not proper delegation for responsibilities. (Allio 2005)

To avoid that:

Stating a clear vision/strategy: For any strategy to work a clear vision, objective should be stated. When a team has that, they know what they are working towards, which is important in this case. In this scenario, there is a popular idiom which says the soup is only as good as the ingredients. There are set number of ways by which the management can plan clear strategy and vision. Starting the draft with the idea of the vision and strategy is good to know with what the management is thinking and expects thereon. (Allio 2005)

Discussing individual roles for implementation: After a clear vision is set, it is important to narrowing it down even further, in term of what the vision is, the time, the expectations of management from the team and emphasis into the individual roles, responsibilities and expectations too. Mainly, this role is carried out by the CEO. It is their job to compile, implement and supervise the above-mentioned point. (Allio 2005)

Integration of implementation plan: Integration is important in every strategy plan. This part is crucial so that the vision stated is executed correctly, the methods used are the right ones and there are correct metrics placed. Key Performance Indicators can be used to tracking these metrics. KPIs do not have to be for all the metrics but only the most important ones which affect the performance of the strategies. When the process of implementation is taking place, discussing, and altering metrics, the ways to execute these implementations can be changed for better results. (Allio 2005)

Discussing progress, changes: After a set amount of time, which should be stated before point 3, the implementation. The amount of time can be a few weeks to 8 weeks after which a discussion must take place with preferably the CEO of the company, in the meeting the on-going implementation, metrics, proposed

changes and ways to being more effective in the strategy should be discussed. (Allio 2005)

Re-implementation: From point 4 onwards, the processes should be more re-fined. Through improved metrics, changes and discussions taking the implementation till this point into consideration. Below there is an implementation template which EGLO would follow to efficiently implement new innovative and sustainable solution. (Allio 2005)

TABLE 1. Project implementation and control sheet.

**PROJECT IMPLEMENTATION & CONTROL SHEET**

S. No.	PROJECT NAME	TEAM LEADER	DEADLINE	PERIODIC REVIEW DATES	MEASURING PARAMETERS	REMARKS/ UPDATE/ CHANGES, if any
01						
02						
03						
04						
05						
06						
07						

Table 1 will used in the action plan to define the roles and responsibilities for the manufacturing unit, the changes it will be bringing on to increase their sustainable output for the best possible results. The table was made by the author with the help of the CEO of the manufacturing plant. Team leaders would be assigned from the commissioner and follow up dates also to keep track of the project and follow the guidelines stated by the top management and re-implementation, if need be. (Allio 2005)

### 2.4.3 Sustainability in manufacturing

In this dissertation, the author has quite often pointed out the need for sustainability and how it has emerged in the past recent decades. Sustainability poses a new challenge with new scientific approaches and technological advancements. The abilities of talent available across the globe, in businesses and corporations is key to accessing and moving forward with innovation, in the direction of the more than rational take of sustainability on our planet. (Seliger 2012)

It is established and proven that sustainability is a need in manufacturing, therefore here a few points that should be considered regarding the same topic:

**Maintaining the design:** Improvements can be made to the design of products when evaluations are made in the product management department. It is important to also provide data for maintaining the strategies the tasks being undertaken. (Seliger 2007)

**Strategizing:** Opting for a maintenance strategy is important for each specific products and its parts. (Seliger 2007)

**Maintaining control:** After the strategy has been chosen, it is important to control it and performing tasks as per the strategy and not freelancing. (Seliger 2007)

**Metrics for results:** Meanwhile the execution and maintenance of tasks is going on, keeping metrics for knowing whether to change or continue the current strategies. (Seliger 2007)

**Changes for improvement:** There is always arenas in which there can be something which can boost the performance of the strategies implemented. It is based on the metrics performed and the evaluations done after. (Seliger 2007)

End of planning: This is the part where the planning and execution comes to an end. It is the end of product life cycle, and all the tasks performed have been with efficiency, sustaining the environment, and costs. (Seliger 2007)

## **2.5 Working methods and data.**

The primary data for this thesis will be collected via interviews. The interviews are being conducted with the sustainability managers, the production head of the factory and the workers at the factory. Through these interviews, information is to be gathered to create an analysis of the company, their efforts in innovation and sustainability, and at the end, recommendations for the manufacturing unit to input for change. The author is also taking data from the research already done via several authors in the fields of innovation, manufacturing, and sustainability to attain more viable solutions for the case company. This would be part of the secondary data.

As mentioned in the paragraph above, the interviews are conducted one-on-one and in person. It is beneficial in this case as thorough, inside knowledge is being gathered to make a case for the company that is reliable and credible for both the readers and the case company. As written and discussed by Edwards & Holland (2013) qualitative interviewing includes a certain set feature which make it crucial. Those are having an interaction, a conversation with the interviewee in between a set number of participants. It can be performed in person, via text platforms such as emails, and in other different contexts. The conversations being made are focused on the research questions, answering them, and are in a biographical manner. At last, it is key that from the standpoint of the interviews being performed contains the concepts that are pertinent to the research being performed. Comprehensions are summarised from answers that display explanations of the core concepts of the research being done. (Edwards & Holland 2013)

One-on-one interviewing is beneficial in this case as important information is needed to create an analysis. The topics chosen are also deeply fundamental to

the company and a survey would not provide much better information than interviews.

The research that is performed there on would also be concrete. That is because it would be derived from concepts that are in place at the manufacturing unit and researched and practiced by various other researchers across the world in different conditions which only make them more viable.

### **3 EGLO LEUTCHEN GmbH, INNOVATION AND SUSTAINABILITY**

This following chapter introduces the commissioning company in detail, their operations and industry it is based in. Then there are further explanations about their sustainability and innovation efforts within the company followed by discussion about the innovation and sustainability initiatives in India where the manufacturing plant is located. It is important to understand the company, how it operates and the circumstances it is currently operating under.

#### **3.1 EGLO LEUTCHEN GmbH**

EGLO Leutchen GmbH is a multinational organisation based out of a small town from Tyrol, Austria. EGLO is an industry leader in manufacturing, design, and supply of home lighting products. At the pinnacle of it all, they are creating and producing products to the exact needs of their customers. EGLO has discovered a spot in the timeline of light, wonders of lighting over the past half century and has been on the constant path of only success. (EGLO n.d.)

The company was started in 1969 as a small lighting shop and it has grown to the size of more than 600 million euros in 2023 alone. Until the 80s, the company was based solely in Austria and its operations too. After that the globalisation of the company began. As it states on their website, they are taking it from Tyrol into the world. (EGLO n.d.) EGLO took its first step in globalisation by opening a sales agency in Germany, and fast forward they are now successfully operating in over 70 companies in over 50 countries with more than 5000 employees worldwide, various production sites and subsidiaries. EGLO has a production site in Hungary which was their first one, it was opened in 1994. The site has grown, with now expanding over a 4-hall production area of 14000 m<sup>2</sup> and a 5000 m<sup>2</sup> warehouse which is automated fully. In 2001, EGLO opened their second production site in China. The facility covers an area of over 12000m<sup>2</sup>. The factory in China itself has over 1100 employees. With the future vision in mind, 2006 was the year for growing consciously and sustainably. They switched to LED lights for their long life and energy saving benefits. Moving from that in 2016, they launched their first

smart lighting concept, with the touch on your phone you could then control every light in your home. Following that year in 2017, they opened their production site in India, which is also in the scope of this thesis. Following that in 2021, yet another milestone was accomplished when EGLO opened one of their biggest warehouses, expanding over 76000 pallets in it, employing over 150 people. It is their fourth warehouse which is connected to the EU logistics network of the company. In 2023, to commemorate their success, 50 years of the company, right in the heart of Tyrol, where it all started, the company opened Europe's largest lighting store which offers a wide variety of selection articles and auditory impressions. (EGLO n.d.)

EGLOs clients are mainly B2B customers. They are big retailers in EU from where you can buy EGLO products. For example, ALDI, LIDL throughout Europe. In Finland they do sell to the S-group. You can buy EGLO products from the Prisma near you. They are selling to big retailers in every other continent too, for example, wayfair, Home Depot etc. (EGLO n.d.)

EGLO follows a set number of values which guide them every day. They are the foundation of their decision making, planning process which guide them every day. Their first value is that they are established around the world. How they have increased their manpower, how they are still a family-owned business are some key aspects to their business activities. Second, the company is proud about how global they are. EGLO is established in over 50 countries which includes several sales organisations, warehouses, factories and EGLO partners. Their third value is about the understanding in between people and light. EGLO designs over 900 new luminants every year which is a new product type every 2 hours. This makes they article tally over 4000 products. EGLO is very proud about their organization and working methods integrated and developed from the roots of the organisation. The company has over 5000 employees which are in constant communication, hierarchy which is the best example of their fourth and last value. One of the big factors why it favours them is because they are still a family-owned business. (EGLO n.d.)

EGLO has taken a lot of initiatives in their sustainability growth. They have been complying with the FSC certificates, local and state government compliances

which has helped them keep in track with the sustainability standards that are kept in the industry. EGLO has also taken up the Sustainable development goals stated by the UN. However, the company is still looking forward to increasing their sustainability efforts in the future, becoming more innovative, with growth and albeit being sustainable in their operations and the surroundings. (EGLO 2023)

### **3.2 Sustainability and Innovation at EGLO**

From the introduction, the company is innovative and has been taking steps in being sustainable too. Sustainability is a priority at EGLO 2022 onwards. The company headquarters and the India production facility were ISO 14001 certified in the same year. After achieving that certification, the company has started to attain that certificate for all the working offices, storage units and factories to ensure that the sustainability efforts are being made. The company is working towards having carbon neutral facilities. The goal is then to offer the customers climate neutral products. The company is committed and claims that the most sustainable alternatives are being followed currently at all operation levels of the company. EGLO is regularly informing and educating their employees about the upcoming and updated environmental changes to the workplace. Since EGLO is a company that is operating on a global scale, it is important to them that they are not only sustainable environmentally but also socially, meaning in terms of fair pay, safety at work all whilst being dedicated towards themselves and their suppliers about the BSCI and International Labour Organization (ILO) guidelines. The company is focused on being sustainable from their HQ in Pill to around the world. They focus on using the most sustainable resources and put focus towards the efficient use of natural resources with their subsidiaries, production facilities, and offices all over the globe. EGLO has already taken steps towards having recyclable, compostable, and biodegradable packaging, with which they are building a path towards an even more sustainable future.

EGLO has already taken various steps towards sustainability, but still, it is only the start. Looking back to the roots of every production is the manufacturing units where the sustainability process starts, although most of the products by EGLO

are already FSC certified, there is lot more to do in becoming carbon neutral and friendly. These changes towards sustainability are a good look towards their innovation process too, as they are adapting with the different dynamics of the customers and making these changes in their products from the get-go even. (EGLO 2023)

### **3.3 Sustainability and Innovation in India**

India is one of the biggest countries in the world in terms of area, gross domestic product, population, and diversity. It is one of the fastest growing economies in the world and does have a crucial role to play in sustainability. India since the independence has been an agrarian focused economy with not a lot of foreign trade involved. It was only in the 1990s that they opened doors with pro-business reforms that supported the globalisation of the country. This shift resulted in the turn from an agrarian to a heavily service reliant economy. Now, the service sector in India contributes to around 57% of the GDP. Like the service sector the manufacturing sector also saw significant growth. The tremendous growth of these sectors in India did raise questions about it being sustainable too. In the past couple decades, the country has seen a staggering rise in the jobs and the living standards have also been improved. (Urfi 2023)

India has a large economic base, with over 1.4 billion people in the country, India truly has the possibility in becoming sustainability giants. It is also important for the country's long term growth plans. (Urfi 2023)

In the past decades both the state and local governments have been putting emphasis on sustainability by having initiatives such as using of renewable energy. Solar energy has been a huge regarding the use of renewable energy. When we see India geographically, it has sunlight around the year, making solar a viable option for most houses and industries. The country has made lots of other efforts towards decarbonization and has certain implications globally. (Urfi 2023)

## **4 Data collection and Analysis**

This following chapter mentions the objectives of the research, the design and the data collection method are explained. Henceforth, the results of the primary data will also be mentioned. Theoretical framework which was explained before will be used as an analysis tool for the data collected and presented in this section too.

### **4.1 Research Objectives**

According to Taylor (2005) qualitative interviewing is considered to get a better understanding of the interviewee, their roles, responsibilities, and nature of working for better research output in certain scenarios. In this thesis, qualitative interviews were taken as information was gathered directly from the personnel working in the fields of innovation and sustainability at the company. These interviews give the participants a chance to clarify, discuss the research questions directly and subsequent questions directly there on. For this thesis, it was essential to get accurate information, thus keeping the interviews limited to the professionals working at the company in the fields of sustainability helped the author get answers and keep it just. (Taylor 2005)

The author of the thesis also found also current trends, sustainable goals which helped to compare and interview the participants to make a fundamental research base for the topics related to the thesis.

### **4.2 Conducting the research**

When the objectives, research questions for the thesis were understood, a set number of questions were formed upon which the actual research about the company was planned. The author thereon came to an understanding that the best research method for this research objective would be the qualitative research

methods. It was based upon the reason that, to keep the research related around the research question and how they were related to the company. Innovation and sustainability are two very broad concepts. For a company such as EGLO they are tackled with daily, with new products being designed and finalised every 2-4 working days. Since the operations are at a global level, with several hundred employees being in a loop, interviewing was the right way to go about it according to the author.

The questionnaire was based upon the current activities of EGLO and the future of those activities. It was designed to be asked in a way a lot of depth can be acquired from the participants answers about their operations and how they are dealing with the topics of sustainability and innovation in their day to day.

The interviews were conducted in forms of emails, in person and a factory visit also by the author. The commissioner was the one to find the participants and to contact them too. The author formulated the interview questions as mentioned in the above paragraph. The participants were the CEO of EGLO production plant in India and the Global sustainability manager of the company. The interviews took place in the first two weeks of February, and the in-person interview with the head of the production plant was on 10.02.2024. After this, if there were more questions, they were responded through emails with the production head and the global sustainability manager. The interview questions can be found in the appendices which were asked from both the participants. Their answers included company data, processes and figures that were being followed and monitored by the company.

### **4.3 Validity, reliability, & limitations**

The goal is to attain information about the methods that are set place in the company right now about innovation and sustainability. Thus, it would be clear which methods are most effective and should be in place to attain the goals of future sustainability.

It was in authors benefit that the company was open to interviews, factory visits and images which would help in building a good research case. Since the interviews were done both in the forms of email and in person, the author was able to get a good background and on the ground analysis of the operations of the company and how they are tackling the problems of sustainability and innovation in their activities. It was also beneficial to the research that the company was open to responding questions afterwards to get a good perspective if any doubts had risen.

This process made the research process more authenticate for the author and a good experience to get the best results possible.

#### **4.4 Sustainability and Innovation at EGLO**

The interviews were designed in a manner that the participants give information about the current situation at the company and the factory. The interviews were designed using the theories mentioned in chapter two of this thesis. It is in no doubt that when a company is clear about their current situation, they can strategize plans in the direction of making improvements, betterment of current processes, or introduce new plans.

At EGLO, the sustainability process begins at the very beginning stage when products are at their early design stages. Their aim is to always develop new products which are more sustainable when compared to products designed earlier. At the design phase, the flowing of pointers is encouraged and evaluated when work starts on the development of the new products. When answering the questions, the CEO of the production plant put emphasis onto the fact that there is only one planet where on which we live and EGLOs philosophy is to reduce the impact on natural resources at every stage of the supply chain including production, transportation, usable products by the end consumer and the discharge of products at the end of their product cycle. It is a clear thought at EGLO that sustainability is not an additional cost. They stated that if they carefully use the materials, then it does not only make them environmentally friendly but also prof-

itable in the long run. As mentioned before by Dawson (1994) that there are several benefits of operating sustainability. These were defined as the internal drivers of an organization, and it includes aspects of innovation, trust, profits, and growth.

The aim of EGLO is to reduce the greenhouse gas emissions across the EGLO value chain and move towards using recycled and renewable materials in the next 10 years together with generating new resources wherever there is an opportunity for it.

Further on, below mentioned are the steps that EGLO is currently taking across its supply chain to maintain the right standard of innovation and sustainability.

**Material Selection:** At EGLO, the design focus is kept on selection of materials to choose more sustainable raw materials without affecting design product appearance, quality, and functionality of it. The balance is maintained by the company to achieve design requirements, to increase product performance and meeting the cost targets. The materials are preferred which come from renewable sources, recyclable or even if there is a possibility to recycle waste produced sometimes. Natural materials are used whenever there is a possibility such as bamboo, rattan, or sea grass from the company by the method of water finishing processes. In addition to this goal is to get raw material from well-managed and certified sources.

**Packaging design:** When asked about the current supply chain in follow up questions, packaging came up and the participants stated that at the company packaging process starts at the very beginning stages when the product idea is conceived. The primary purpose of packaging is to keep the product safe from point of manufacturing to the point when the end consumer receives it. Packaging is tricky since it must look appealing, but at the same time it should be made more recyclable and disposable materials. EGLO has an innovative method in place through which they are developing packaging whilst keeping sustainability in mind. The products travel through containers from manufacturing in Asia to across the world. The bigger packaging always means more volume and costs.

TABLE 2. Estimates of CO<sub>2</sub> emission factors on cargo ships. (IMO 2009)Estimates of CO<sub>2</sub> emission factors for cargo ships

Type of ship	Size	Emission factor (gCO <sub>2</sub> / tonne-km)
Products tanker	60,000 + dwt	5.7
Products tanker	20,000-59,999 dwt	10.3
Products tanker	10,000-19,999 dwt	18.7
Products tanker	5,000-9,999 dwt	29.2
Products tanker	0-4,999 dwt	45.0
Chemical tanker	20,000 + dwt	8.4
Chemical tanker	10,000-19,999 dwt	10.8
Chemical tanker	5,000-9,999 dwt	15.1
Chemical tanker	0-4,999 dwt	22.2
LPG tanker	50,000+m <sup>3</sup>	9.0
LPG tanker	0-49,999 m <sup>3</sup>	43.5
LNG tanker	200,000+m <sup>3</sup>	9.3
LNG tanker	0-199,999 m <sup>3</sup>	14.5
General cargo	10,000+dwt	11.9
General cargo	5,000-9,999 dwt	15.8
General cargo	0-4,999 dwt	13.9
General cargo	10,000 + dwt, 100 + TEU	11.0
General cargo	5,000-9,999 dwt, 100 + TEU	17.5
General cargo	0-4,999 dwt, 100 + TEU	19.8
Refrigerated cargo	All	12.9
Container	8,000 + TEU	12.5
Container	5,000-7,999 TEU	16.6
Container	3,000-4,999 TEU	16.6
Container	2,000-2,999 TEU	20.0
Container	1,000-1,999 TEU	32.1
Container	0-999 TEU	36.3
Vehicle	4,000 + ceu	32.0
Vehicle	0-3,999 ceu	57.6
Ro-Ro	2,000 + lm	49.5
Ro-Ro	0-1,999 lm	60.3

According to this data presented by the IMO (2009) in Table 2, international shipping produces about 3% of greenhouse emissions every year. (IMO 2009)

EGLO believes that less cargo can be shipped if they come up with innovative solutions to package their products and bringing the volume down. The CEO of production plant explained from figure 3 that one TEU generates in between 12-30 grams of CO<sub>2</sub> emissions per ton kilometres depending on the volume inside the containers to support their idea of bringing the volume of shipments down.

Further on, EGLO states that packaging is the material where there is the possibility to use recycled materials and EGLO has made it mandatory for subsidiaries and production plants to use 100% recycled materials in the packing boxes for their products.

Role of FSC in products: FSC is a certificate system that is used in verifying the sources for acquiring forestry products sustainably. The standards set by the FSC are then converted into substantial methods which help in making a change in the forests around the world for good. Each one of these FSC labels is based

around an environment which is created with forest managers, Non-profit organizations, and several other people who have pledged to uphold the common standards of the forestry industry around the world. (FSC n.d.)

EGLO has made it a practice to use wood and paper in its products. The sourcing of these materials should be coming from FSC certified and well managed sources only.

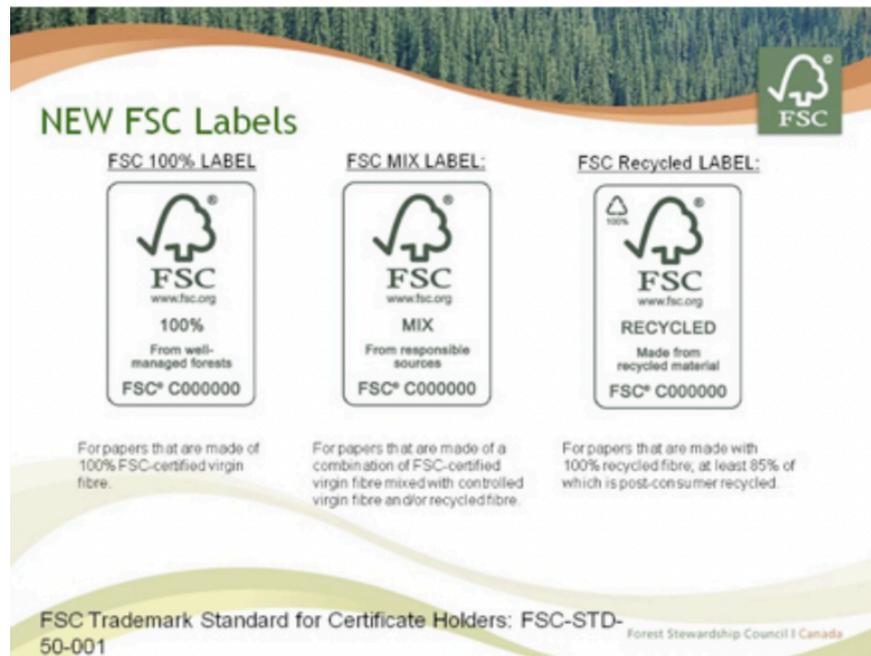


FIGURE 2. FSC labels. (EGLO, n.d.)

Figure 2 is the FSC mark which can be found on EGLO products which use wood or paper in its production.

The use of recycled materials: The company has a strategy in place which focuses on the use of recycled materials and how the recycling should be done also. EGLO realises that using of recycled materials is more beneficial when it comes to sustainability. Recycling reduces the waste that goes to the landfills and incinerators, prevents pollution and conserves natural resources.

EGLO has made it mandatory for its packaging to be already made from recycled materials. In the future there is another directive being implemented which would see that the company's productions plants are using all recyclable plastic also.

More from less approach: The title of this approach explains itself. EGLO has made it clear too. The company as time goes on innovates in a way by which they are producing the same product with even less materials. This can be done from the very beginning until the end of manufacturing. This possibility is explored to know how much less material the production plants can use, how simply a part can be made using less energy & how closer the stations in a manufacturing plant are situated to make the transportation of these products less time consuming, more energy efficient until the point when they are packed and stored for shipping.

Energy efficient products: It is always in the company's mind when a product is being designed, they should be energy efficient when the end consumers use the final product.

To maintain the standard, EGLO follows the energy regulations that prevail from different markets regulations such as EU regulations 2019/20 for establishing eco-design requirements for products in Europe.

Production friendly design: The company has made sure that all the products that are being offered by them are designed for manufacturing. They call it the DFC Approach. It helps them in preventing quality issues and manufacturing wastes. Less waste means that the product is more sustainable and different products are measured consistently when in production to analyse the potential improvements along the process.

Following the DFC approach, production risk assessment of each item is done at a very early stage to eliminate the risks in future. If there is any identified risk to quality, then an alternative process is explored. The manufacturing processes are defined as soon as the sketch for the designed products are prepared. There are five principles in place that are examined during the DFC approach which are process, design, material, environment, compliance, and testing phase.

During the process itself there are many factors that are in place. They are:

1. Minimizing part count that minimizes control (more from less)
2. Standardizing parts and materials thereof (higher volume of the same parts means less energy consumption)
3. Creating a modular assembly line (avoids air guns or pressurized pressures for fixing and in return saves energy consumption)
4. Number of manufacturing operations (the less operations means less movement of parts and less energy consumed)
5. Clearly defined acceptable surface finish (lacquering and electroplating are main surface finish processes that are used in EGLO; hence it is important to define the requirements to avoid repair or rework)

DFM is just a process for the company that is means for saving resources. At the end, it is also reducing costs & at the company sustainability means being competitive which this process is helping with.

Certified production site: EGLO factories are ISO 14001 certified. This assures that the internal processes are also validated by the third parties to keep continual improvements to achieve the defined environmental goals.

Figure 3 is a copy of EGLOs ISO certification.



FIGURE 3. EGLO INDIA Production Pvt. Ltd. ISO certification. (EGLO, n.d.)

ISO 14001 is a standardization system which internationally recognises the EMS systems which stand for environmentally managed systems. The goal is lay out the ground works for the organizations globally the metrics to design and launch an EMS to track and steadily improve their environmental performance. (ISO 2015)

For EGLO the standard is helping them in improving resource efficiency, reducing wastes, driving down costs, provide the assurance that the environmental impact is being measured, gaining the competitive edge in their supply chain design, creating more business opportunities, meeting legal obligations, increasing the trust in between stakeholders and customers & at last, improving the sustainability measures throughout the company and managing the environmental obligations with consistency. In EGLO, most of the operations at various locations are ISO 14001 certified and the rest which are not, are on track attaining the certificate within the next 2 years.

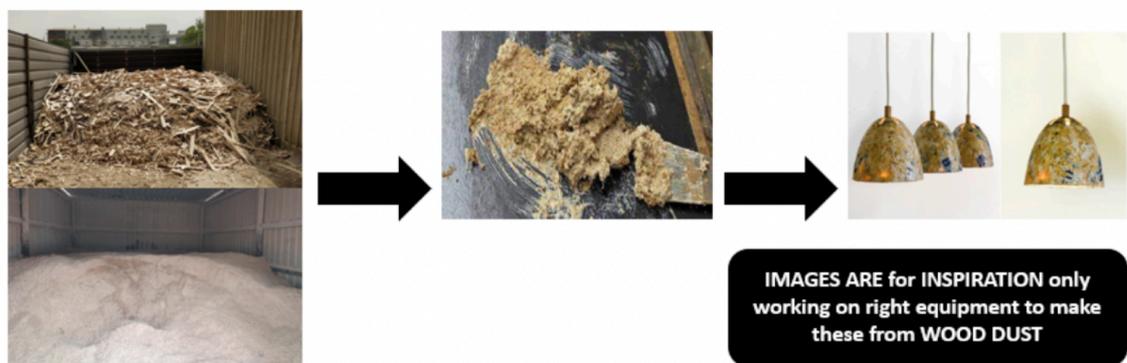
The sustainable energy for tomorrow plan by EGLO: EGLO believes in the fact that there is only one planet and to their end, they must do everything to save the natural resources. In their everyday lives and everyday tasks. Sustainability has been and will become integrated part of EGLO and explores the possibility of renewable energy whenever possible.

At the EGLO production plant in India, 38 percent of the energy consumed is being produced by a 1500 KW solar plant. Their current solar power plant emerges in the span of 16000 square meters with 1200 solar panels of the roof of EGLO India plant. In 2024, an additional 500KW solar energy plant would be added to the plant capacity means 400 more panels. Till date, EGLO has saved more than 2700 tonnes of CO2 emissions. The company calculated that equals to a total of 249954 trees planted.

Transitioning to renewable energy is one of the impactful ways to lower carbon emissions. As part of the company's commitment to reach net carbon zero, the

company is on a path to powering our operations with 100% renewable energy by 2028, which is two years ahead of their original target which is 2030. To reach this target, they want to have 100% renewable energy for their operations in the factory.

Utilizing waste in products: EGLO always sees the potential in using the waste materials in their products. One of the undergoing projects in the company is to convert the wood paper waste to wood composted plastics and then turning that into lamps.



PICTURE 1. Wood compost process for lamp products. (EGLO n.d.)

Picture 1 depicts the process in visual manner which was provided by the company for further understanding.

Social compliance audits: To ensure the sustainability at the production facility, the factory is BSCI certified. BSCI is focused on the private sector and aims to improve the social conditions in the global supply chains. It is focused on providing a structure for the organisations to analyse and improve their social compliance within their supply chains by promoting ethical practices and equality laws for their workers' rights. The certifications put emphasis on the standards, workers safety, and equitable working conditions. (BSCI n.d.)

From this the company with a well-managed social management system in organisation there several points which are being assessed such as working times, remunerations, child and young labour practices, freedom of association and collective bargaining, no discrimination at work, working conditions and environment, health facilities, occupational health, and dormitories.

## **4.5 INNOVATION AND SUSTAINABILITY PLAN**

This chapter states the sustainability plan which is stated by the author of this thesis for the company. The plan first discusses about the company's current efforts for sustainability, SWOT analysis, followed by discussing the same in terms of the theories discussed in chapter two. At the end, there is the action plan stated which discusses the steps required to be taken to achieve the carbon zero goal more efficiently.

## **4.6 Current situation analysis**

EGLO headquarters are based in Austria and their production plants are based in India and China. The company offers decorative lighting solutions to customers all over the planet. EGLOs clients are mainly B2B customers. They are big retailers in EU from where you can buy EGLO products. (EGLO n.d.)

EGLO has made a lot of changes and initiatives regarding sustainability. They have been innovative in coping up with the changes in accordance with the regulations worldwide but also when compared to their competitors. The company has been strategizing and planning the execution of these changes to have the competitive edge. The company has been keeping metrics with the changes they have been initiating to track, keep control and making changes when there is a need to. These are key steps in every successful strategy initiation and with this EGLO has been on top of their sustainability efforts. (Seliger 2007)

In the lighting industry, it is important to keep up with the trends and what the end customer wants. EGLO has majority of its operations within EU where they have customers with the biggest retail giants in the continent. Since, EU has been very prominent in making sustainability their top priority, EGLO has been supporting that decision too. EGLO follows the sustainability development goals set up by the UN also in which the company has committed to no poverty, zero hunger, good health and well-being, quality education, clean water and sanitation, decent work and economic growth, climate action and life on land. (EGLO 2023)

EGLO does have a lot of competitors in lighting space in EU and worldwide. However, they are not decorative lighting manufacturers which makes the company stand out. Some of the competitors are knock offs of their own products which are being produced in cheaper manufacturing locations. In terms of innovation and sustainability, EGLO has the advantage since the company has its own department for this oversight. The sustainability managers are working towards the attaining ISO certificates and becoming net zero carbon company not only in their headquarters and production facilities, but also in subsidiaries and sales organizations across the globe.

#### **4.7 SWOT Analysis**

SWOT analysis assesses the strengths, weaknesses, opportunities, and threats of an organization. It helps in developing a plan whilst analysing the company's competitive position also in the market. A SWOT analysis is made to analyse in terms of facts and data to look at the company's strengths and weaknesses. (Kenton 2023)

##### **Strengths**

The biggest strength of the company is its long history. EGLO has been developing lighting solutions for over 50 years now with being successful every year. They have had an upward trajectory in the past 20 years where they have made a global presence with being in over 50 countries. Due to being in the same industry for a long time, they have gained expertise and developed an organisation which delivers innovatively to their customers always.

##### **Weaknesses**

EGLO being a manufacturing company, must deal with a lot of technological changes and advancements from period to period. They have been adapting to it well, but it is costly to make upgrades all year around. When it comes to sus-

tainability, better innovative solutions are key, since EGLO has been only following the SDG goals and attaining ISO certificates, there has been no work towards the innovative solutions which would make them stand out from their competitors and in the market space too.

### **Opportunities**

There is a lot of opportunities present for EGLO in the lighting market. The company knows that. In terms of what the customer wants, the technological advancements that are coming, the designs, and the sustainability outcomes too. With the ability to design and produce 900 new products every year, EGLO can also expand globally with a product for every market segment, and it can do it sustainably in the future.

### **Threats**

The technological advancements always possess a threat on the company. It is not something that's unique anymore thought. Sustainability is something that is taken quite serious from the end consumers. It has shifted the business dynamic and is something that would be crucial as the organisations are growing in the future. There are always changes coming in design preferences also by the end consumers, which is important to keep up with as EGLO is changing and innovating new products every year. Often it is good to predict accurately for future needs however it can be hard since it is often difficult to predict human behaviour.

## **4.8 Current Sustainability and Innovation Analysis**

The company has a good level of innovations and sustainability which has already been established by years of trials and testing. EGLO has taken the problems of climate change and is doing their part in reducing and becoming a net zero carbon emissions company by 2030. Sustainability has posed a new challenge in front of EGLO, which requires technological and scientific developments in the fields of not only manufacturing alone but throughout their supply chain as

it is spread in over 50 countries and is very extensive. As Seliger (2012) states, it is not a limitation but also an advantage of accessing global talent, resources and ideas which can take the idea of sustainability and innovation to an even further level at the company. (Seliger 2012)

Overall, the company has a solid foundation of innovation and sustainability. The company has been operating for over 50 years and has been innovating since day one. Decorative lighting products have a long-standing history as they have been ornamental in design and interiors for a long time, with EGLO it saw the modern version of it. Innovating it to date, EGLO is designing over 900 products every year and has a product collection of more than 10000 products. That is the level of innovation and competitiveness they are at. Now, they are dealing with another wave of innovation where the questions are about sustainability. This is not stopping them but only encouraging them to turn into the new direction of trends which will shape their future for the rest of the 21<sup>st</sup> century. The company has taken a lot of initiative in designing, reusing, manufacturing, transportation, and waste management to be competitive and achieve their future goals.

Internally, EGLO has had a reputation always where the employees are content with the company and how the company treats its employees inside and outside the workplace. The company follows the laws in each country and has a flexible, relaxed work schedule which is favoured by most of the employees. The work at EGLO goes at a fast pace also since the company is getting new orders, modifications, and design requests every week which keeps the supply chain continuously under pressure. However, the employees are effective in their roles and how the organisation hierarchy is made which allows the employees in working efficiently. The company has several methods in motivating their employees such as plaques and recognition for working in the company for a certain time, events regularly throughout the year where the employees are directly engaged and so on. The company also has a good system where initiative is encouraged, discussions in the design process of the new products are taken in and seen if they are effective which keeps the innovation at its heels in the company and always rewarded as the company is uplifting in that area. (Lozano 2013)

As for the external matters, EGLO has been consistent. They still have not been charged or have had the suspicion in getting fined by the certification agencies or by government authorities also. The customers are content with EGLO's products as they have been of high quality, made sustainably and in affordable price ranges consistently. EGLO has made sure they have been ethical wherever they have shop to be following the government legislations and following the global sustainability directives. EGLO has a good reach when it comes to their customer base also. They are spread across all continents, with locations in over 50 countries where they are selling their products successfully. The stakeholders of EGLO are their owner since the business is still family owned. They have the expectations of the company being net zero carbon company by 2030 and are content with the efforts the company has been taking so far. The expectations are in line with the global needs of sustainability and set a good company image from EGLO's actions. (Lozano 2013)

The company has plans for future already and as it can be understood from the company analysis too, EGLO has plans that are in place but needs more clarity for the future direction. They have a goal, but a plan needs to be prepared to achieve it. The company has till now been planning only to keep up with the regulations but still has the capability to do more to achieve distinction in the fields of innovation and sustainability.

#### **4.9 Recommendation to the company**

This is an action plan which is created for the company to follow and be the foundation for their sustainability goals and can be looked back to always from 2024 onwards. The company already has a very good basis where they are operating sustainably however the plan is to take it further even and reaching closes to the net zero carbon goal. For the same, the model made by Seliger (2012) is useful. (Seliger 2012) It states the right parameters for the implantation of a strategy into the system and with corroborating it with Allio (2005) methods of implementation, the strategy is designed for the company by the author. (Allio 2005)

The first step of the Action plan should be clearly stating the ideas where the company wants to be from the top management. The idea of having a net-zero carbon by 2030 is a good statement that has been laid out by the top management. (Allio 2005) To achieve that goals must be stated. After reviewing the company's efforts at sustainability that are being taken in place right now, it is the authors recommendation that they should be fully stated.

After the ideation is completed, concrete objectives should be stated to make a strategy thereafter. For the same, EGLO should analyse environmental impact of each production process at the manufacturing plant and continue of doing continual improvement using the ISO 14001 methodology. There are several benefits to having the environmental management system which the company already has but should continue with it. The ISO rules would continue to bring a lot of value to the company's production and supply chain such as, helping in demonstrating and keeping up with the compliance of the ongoing and upcoming regulatory requirements. The management system would also help as it will create an increased involvement of the leadership and employee integration. It improves the confidence of the stakeholders too. Moreover, it will be helping to build the company strategically to achieve their business aims in order with the environmental issues. (ISO n.d.)

The company would also be increasing its solar use from 1500KW to 2000KW. This would help them with easier monitoring of their return on investments also. The solar systems provide low maintenance costs, the only work is in keeping them clean. Most reliable solar companies provide warranties of 20-25 years. After the initial cost of installation, the maintenance costs are relatively lower. Another key advantage of EGLO going fully reliant of solar would be the benefits in their operations from the local government. Most countries and its local governments in their regions provide climate friendly policies, branding opportunities, tax benefits etc. (Melo 2020)

EGLO would also be following the strict rules and compliances set up by RoHS and REACH. They stand for restriction of hazardous substances and registration, evaluation, authorisation, and restriction of chemicals respectively. RoHS is the

system in place of restriction of hazardous chemical substance use in electrical products and electrical equipment's to protect the public health. (RoHS, n.d.) Whereas REACH is the system in place to have rulings on substances, banning or restricting use of substances, and authorisations of requirements on use of particularly dangerous substances and its rules on informing the consumers about it. (REACH, n.d.) The company should have all its products tested with these regulations before shipped from its manufacturing places.

At last, the company should focus on making all its products easy to dispose of at the end of product cycle. The company does believe that sustainability is not limited to its operations or manufacturing or materials, but it should cover all the aspects of its operations to be truly net zero carbon. From the start of a products design process, it is important to choose materials and processes to create a product that is easily disposable when it reaches the end of cycle from the customers hands. The company is already invested in constructing products in the similar manner from the start such that the materials are easy to disassemble and can be recycled. The information for the comes with having an ecolabel on the products as well as the packaging in order with the international standards.

Along with all this, the company would also be using the wood dust generated from the manufacturing to produce into products, taking all the products to A level efficiency according to the energy standards, using only recyclable and recycled plastic in all products, reducing the packaging volume by 20%, and at the end, with all these efforts, the manufacturing units aim to upgrade their results of social and environmental audits by 20% or more.

For the doing all the above, execution of strategy is must. With time frames, people who are responsible, check-ups, and correct metrics. Since EGLO is a multi-national corporation and has the workforce to take up projects as the size of this, it is suggested by the author that it all the above suggestions go hand in hand.

**PROJECT IMPLEMENTATION & CONTROL SHEET**

S. No.	PROJECT NAME	TEAM LEADER	DEADLINE	PERIODIC REVIEW DATES	MEASURING PARAMETERS	REMARKS/ UPDATE/ CHANGES, if any during PERIODIC REVIEW
01	Analyzing Environmental Impact of production process and doing continual improvement using ISO 14001 Methodology	PRABHU	31.03.2024	First Week, Tuesday of APRIL, JULY, & OCTOBER	Result of ISO 14001 Audit by EXTERNAL party DNV in NOVEMBER	
02	Increasing Solar Installation from 1500 KW to 2000 KW	SACHIN	31.10.2024	Week 21 & WEEK 36 on FRIDAY	Project Completion	
03	Converting 100% Wood Dust generated in process into products	PRASHANT	31.12.2024	First Monday of Every Month	Product's Validation	
04	Taking all product to "A" level of Energy Efficiency	MANISH	31.12.2024	2 <sup>nd</sup> Monday of Every Month	Energy Compliance Certificate for EU from Certified Testing Lab	
05	Using all plastic from 100% recycled material	NARESH	31.08.2024	Thursday of Every Second Month	%age of total items in which recycled material is used as compared to 2023	
06	Reducing product packaging volume by 20%	PRAMOD	31.10.2024	Monday of Every Last Week of Month	To compare with 2023 with similar items	
07	To upgrade result of social & environment audits by 20% or to next level	ANIL	30.11.2024	Tuesday of Every Last Week of Month	Result from Audits as compared to 2023 by EXTERNAL party	

TABLE 3. Implementation plan for EGLO.

From table 3 and as per Allio (2005) on right sustainable implementation strategies, what EGLO and the manufacturing plant will follow to keep track of personnel, project development and completion. (Allio 2005)

Now, when the plan has been stated and right personnel have been selected for the tasks, the next task for the company would be to keeping track of these projects with the top management levels. Setting up dates for checks, to see whether the project is going as per the plan, or something needs to be changed. According to Selinger (2013) this step is important to track that there is no level of freelancing and everything is only being done to the plan and the most important metrics are also being tracked. (Selinger 2007) This is also important for the sustainable implementation of these projects also. As mentioned above by Allio (2005), this is a controlled initiative to see and track the projects, to make sure that there is no wastage of resources and exploitation of personnel. (Allio 2005) After analysing and making the changes (if there is a scenario when a change is needed in to keep up with the project) the end of planning phase arrives. This is when EGLO has made all these changes and attained their net zero carbon goal!

## 5 CONCLUSION

The objective of this thesis was to lay out the recommendations for EGLO Leutchen GmbH and its production plant to attain their net zero carbon goal. The objective for this plan was to help the company to use innovation and sustainability together to achieve this goal, which was assigned by the commissioner. The author of this thesis also decided to research about the points which would help in better analysing the company and giving the company a thorough review. The information was obtained from research papers and websites. The researched data helped the author in attaining different perspectives of the company and from outside the company also.

The research question of this thesis was *“What are the sustainability efforts taken by EGLO so far, & how their manufacturing can produce more innovative solutions to be sustainable in the future?”*. The answers for this question were answered in chapter 5 where the action plan is mentioned which mentions the suggestions of what EGLO should be doing to achieve their goals and what approach would be the suited to it also. There were also sub questions in the thesis which were as follows: *“How can EGLO be sustainable by also having sustainable execution of strategies?”* and *“In what manner should the case company follow these innovative and sustainable solutions for more growth in the future?”* and *“How is sustainability playing a role in the future of innovation?”*. These following questions were answered in chapter two. This research is for the company and brainstorming long term future goals. The first focus should be to complete the already existing sustainable approaches and completing that project first.

The thesis is beneficial for the company as it studies their existing sustainability approaches and takes it further. Currently the company is making efforts in meeting with regulations and certificates. However, getting an edge in sustainability is important for the company to stand out competitively and this thesis gives them an additional framework to start this on. The end goal of the author is for the company to authorise and witness change from the given suggestions in this thesis.

The recommendation for the company is mostly stated in chapter five of this thesis. The first recommendation for the company was to clearly state the ideas and strategies for the employees to follow. In the thesis, it should be noted that sustainability is a process, implementing a strategy should also be sustainable not only in terms of being environmental however also social. Thus, having a clearly stated strategy and plan helps in employees implementing the tasks sustainably. The recommendations were then also about how the company should fully being in track of ISO regulations and attaining more certificates. For the same, the company needs to do more work and the recommendations stated that too, such as having the manufacturing unit fully being powered by solar. The RoHS and REACH regulations which were implemented by the EU and helping the company to turn all their product's recyclable not only for the end of cycle but also throughout their supply chain. There were also further suggestions after the current situation was analysed, such as the wood dust products which would be 100% recycled and would be disposable too. The design team has a certain level of innovation skills at the company which help them taking a different approach towards sustainability.

During this part of the research, the author realised how much effort the company has made in terms of innovations and sustainability. With the ongoing changes that the business dynamic has brought towards the company and how they have always adapted to these changes. The company has been in the market for over 60 years and like sustainability, they have had to go through a lot of changes and that depicts the level of innovation they have developed throughout their hierarchy. The author feels that the company would be taking their innovation and sustainability level only further.

The author feels like they learnt a lot from this project. About the history, and current situation of innovation and sustainability. There was also a lot information about how sustainability had developed in recent decades and the overall importance of it. There were some hurdles related to time management, however after creating a routine the author was able to work at a rate to deliver the maximum output to the commissioner. This research has taught the author a deeper

understanding about how an idea is changed every day and that is called innovation and how it has shaped sustainability, and how the company are tackling it in their everyday operations.

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## APPENDICES

Appendix 1. Questionnaire asked to EGLO Leutchen GmbH and EGLO India Production Pvt. Ltd.

1. What sustainability practices that are being performed at EGLO right now? Which certificated is EGLO getting for complying with the regulations?
2. How much of a difference has it made so far?
3. What is the societal impact of these changes, how is it benefiting the environment outside the factory?
4. What are the innovative solutions that are already being used to achieve these sustainable solutions?
5. What are the plans regarding the same for the future?
6. In what areas can there be room for more innovative solutions for sustainable changes in the EGLO manufacturing?
7. If there are changes, by how much will they help EGLO India manufacturing in terms with sustainability?
8. What does the manufacturing plant need to do to implement those changes?
9. If there are set changes, plans already made, what is a good tracking method for the same through which data can be collected and the manufacturing site can make sure improvements are.







