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**Applying Content Analysis and Thematic Analysis in
Identifying the Sustainable Supply Chain Practices
- Case Study of TOYOTA company -**

Dissertation Submitted in Partial Fulfillment of the Requirements
for a Master Degree in Management

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Abstract

The concept sustainability in the supply chain has received significant attention in academia and industries in few years later, which obliges the governments and economists to adhere sustainability. In this regard, businesses are responsible for their activities' social, environmental and economic aspects, named triple bottom line. This paper studies sustainable supply chain practices in the Automotive manufacturing industry to this discussion by providing new insight into exploring that view.

The main focus of this research is to investigate TOYOTA company points of view to control the sustainability during implementation its supply chain strategies. Therefore, we conducted a thematic analysis, a powerful method that strives to understand policies sustainable supply chain in TOYOTA company from September 2022 to May 2023 using NVivo qualitative software.

The findings reveal that sustainable supply chain in TOYOTA company have the most significant attention with circular economy. The findings reflect strong relation between advanced sustainable supply chain practices and circular economy. This study will conclude that TOYOTA company consider circular economy as a means to improve their advanced sustainable supply chain practices. The research confirms that the integration of circular economy principles within sustainable supply chain management can provide clear advantages from an economic, social and environmental point of view

Key words: Sustainability, Supply chain, Automotive manufacturing industry, Circular economy, TOYOTA company.

ملخص:

أصبح مفهوم الاستدامة في سلسلة التوريد يحظى مؤخرًا باهتمام كبير في الأوساط الأكاديمية وسرعان ما انتقل ذلك الإهتمام إلى مجال الصناعات سنوات قليلة بعد ذلك، كتحصيل حاصل للترابط بينهما، الشيء الذي دفع بالدول والاقتصاديين إلى الالتزام بالاستدامة. في هذا الصدد، تكون الشركات مسؤولة عن الجوانب الاجتماعية والبيئية والاقتصادية لأنشطتها، والمعروفة باسم المحصلة الثلاثية. يدرس هذا البحث ممارسات سلسلة التوريد المستدامة في صناعة تصنيع السيارات لهذه المناقشة من خلال تقديم رؤية جديدة لاستكشاف هذا الرأي.

التركيز الرئيسي لهذا البحث كان للتحقيق في وجهات نظر شركة TOYOTA COMPANY للتحكم في الاستدامة أثناء تنفيذ استراتيجياتها في سلسلة التوريد. لذلك ، أجرينا تحليلًا موضوعيًا ، وهي طريقة قوية تسعى جاهدة لفهم سياسات سلسلة التوريد

المستدامة في TOYOTA company وذلك خلال الفترة الزمنية من سبتمبر 2022 إلى ماي 2023 باستخدام برنامج التحليل النوعي NVivo14.

تكشف النتائج أن سلسلة التوريد المستدامة في شركة تويوتا تحظى بأكبر قدر من الاهتمام بالاقتصاد الدائري. تعكس النتائج علاقة قوية بين ممارسات سلسلة التوريد المستدامة المتقدمة والاقتصاد الدائري. ستخلص هذه الدراسة إلى أن شركة TOYOTA تعتبر الاقتصاد الدائري وسيلة لتحسين ممارسات سلسلة التوريد المستدامة المتقدمة. يؤكد البحث أن دمج مبادئ الاقتصاد الدائري ضمن إدارة سلسلة التوريد المستدامة يمكن أن يوفر مزايا واضحة من وجهة نظر اقتصادية واجتماعية وبيئية

الكلمات المفتاحية: الاستدامة، سلسلة التوريد، صناعة السيارات، الاقتصاد الدائري،

تويوتا

Dedication

Great thanks are due only to the most merciful ALLAH, for inspiring us in this work...

For you...

For my honorable parents

For whom I love...

We dedicate this humble work.

Asma

Acknowledgments

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

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List of Abbreviations:

- **CE:** Circular Economy.
- **SC:** Supply Chain.
- **SSC:** Sustainable Supply Chain.
- **SSCM:** Sustainable Supply Chain management.
- **GSCM:** green supply chain management .
- **S&OP:** sales and operations planning .
- **GPSNR:** Global Platform of Sustainable Natural Rubber.
- **NPOs:** non-profit organizations.
- **TPS:** TOYOTA company Production System.



Introduction



Background of the Study

In the few previous decades, sustainable supply chain management practices and circular economy have been developed together, and companies got involved immediately as a way to make sustainability easier. Attempting to integrate environmental concerns into companies by minimizing unintended negative impacts on the environment of production and consumption processes. However, the discourse of the circular economy has been disseminated in the literature and practices of the industrial environment, by emphasizing that the idea of transforming products in such a way that there are practical relationships between ecosystems and economic growth, is evidenced by the circular economy's support for the limits of environmental sustainability. Therefore, the circular economy is concerned not only with reducing the use of the environment as a sink for waste, but also with creating self-sustaining production systems in which materials are used again and again.

The interdisciplinary area of sustainable supply chain management was created as a result of environmental concerns and the integration of sustainable activities within the context of the supply chain. In the academic literature on operations and supply chain management, sustainable supply chain management has attracted substantial attention from both academia and business. The efforts of governments and regulatory authorities throughout the world to lessen their negative environmental effects are strongly correlated with the responsiveness of businesses to the adoption of such environmental policies throughout the supply chain. Although there is a growing consumer demand for environmentally friendly products, manufacturing companies often adopt sustainable supply chain management methods in reaction to environmental requirements from the government.

As a result, it is argued that there is a study gap in the literature on sustainable supply chain management regarding the factors that influence the adoption of sustainable supply chain management practices. Firms are being required to take into account how adopting such environmental initiatives will affect both their economic and environmental performance as community and regulatory pressures force them to adopt and maintain sustainable supply chain management practices and create environmentally friendly goods and services.

Based on the above, the main research question of this research project is formulated as follows:

What impact does the implementation of sustainable supply chain Have at TOYOTA company?

Our research problem is related to the issue of circular economy in sustainable supply chain practices in toyota company. We attempt to discover tree following sub research question:

- **RQ1:** What are the components of TOYOTA company company's sustainable supply chain?
- **RQ2:** What is the important implementation of sustainable supply chain in TOYOTA company?
- **RQ3:** Which factors endogenous and exogenous to TOYOTA company, need to be in place for implementing sustainable supply chain practices?

Research Hypothesis

These questions in return, led us to formulate the following hypotheses :

- The sustainable supply chain of TOYOTA company contains many components .
- The sustainable supply chain includes important implementation practices.
- There is a group of factors endogenous and exogenous to TOYOTA company that needs to be in place for implementing sustainable supply chain practices.

Research objectives and Importance

In light of this overall aim and the study's research questions we generate the study's overall aim of identifying the conceptual practices of sustainable supply chain. The following objectives are central:

1. To identify the essential sustainable supply chain practices along with their associated driving forces.
2. To explore the relationships between sustainable supply chain practices and circular economic.
3. To develop validated and reflective scales to measure the main research clusters .
4. To conceptualize and empirically assess for sustainable supply chain practices model.

This study aims to provide answers to the suggested research questions through the effective execution of the abovementioned research objectives.

Research Methodology

The data analysis was based on an iterative process which was done based on the data collection process, which was in the form of published several reports via the official website of TOYOTA company. All the data sources were imported into NVivo 14 software to support content analysis. First, initial memos were written summarizing the core around each organization's perspective and finding the consensus in interpretation. Initial coding included an in-depth analysis around the concepts derived from the main and sub research questions and through the coding process. Next, the organization views while looking for common themes, patterns and categories. Content analysis was done on Integrated Report 2022 and Sustainability Data Book 2020. TOYOTA company in academic year 2022-2023. The thematic analysis qualitative method was adopted in examining this report using the content analysis and thematic analysis to perform the coding with NVivo14 to apply our qualitative study.

Research limitations

In this dissertation, the section of analysis is centred on sustainable supply chain management in a manufacturing context. we are choosing the manufacturing sector of Automotive primarily due to the fact that this is an area that has generated greater environmental challenges. The automotive industry follows a set of characteristics, e.g. strong supplier, higher use of energy, high level of material usage, high level of waste, higher fixed costs, and is highly cyclical, which forms key principles of the whole manufacturing industry. Thus, the automotive industry is deemed to be a fair representation of the manufacturing sector. In regards to newly emerging environmental concerns, automotive manufacturers are under more careful scrutiny in relation to their environmental impacts, such as emissions or waste generation, which further justifies the adoption of this sector for analysis.

Research motives

The TOYOTA COMPANY brand leads, making the brand the best-selling brand in the world since 2010. Moreover, in 2022 the company captured 11.5% of the market share with a rise in its sales further widening this percentage from the second position. The new brand aligns with and supports the institutions of the circular economy, by striving to obtain greater value from products and their functions through the restoration of part of the design.

Structure of the Dissertation

This dissertation is divided into two chapters: one theoretical chapter whereas the second one is a practical chapter. The first chapter is titled: Theoretical Foundations. It is about the circular economy and sustainable supply chain practices. It is an overview of what it is going to be discussed in the second chapter which named: Practical Chapter. It is going to analyze the study variables in TOYOTA COMPANY through different steps.



Chapter One

Theoretical Foundations



Section one: Circular Economy & Sustainable Supply Chain

1Circular Economy

In the few last decades, circular economy engaged as reliable alternative economic concept able to cope with the Imminent global sustainability issues, created by the current unidirectional economic model, linear model (LM)¹.

1.1 The concept and the Definition of Circular Economy:

The circular economy can be considered a regenerative production-consumption system aiming at sustaining the resources extraction rates and generation rates of wastes and emissions subject to appropriate values for planetary boundaries by closing the system, reduction of its size and maintenance of the resource's value as long as possible across the system, primarily resulting in design and education, and with a potential of implementation at any scale Sullivan et al.

The circular economy has restorative and regenerative characteristics based on design and aims to keep products, components, and materials at their highest utilization and value at all times and distinguishes the technical and biological cycles Ellen MacArthur Foundation .

Some researchers defined (CE) as "a regenerative system where minimizing of resource input and waste, emission, and energy leakage takes place through slowing, narrowing, and closing the loops of material and energy". However, economic actors priorities circular economy through environmental benefits and less resource depletion and pollution. Waste released at the end of product life to the industrial web, both as material and energy flow, is one of the core principles of circular economy. There are implicit gains for social aspects in CE from the environmental enhancements and specific assumptions, such as more manual labor or fairer taxation. It seems that the idea of justice in resource utilization among generations as an implicit gain in the goals of sustainable development is also conveyed in the circular economy. Thus, policymakers highly consider CE due to waste minimization and business opportunities to develop sustainability goals. They estimate that the adoption of CE will positively help create new jobs and expect billions of new investments.

¹ The circular economy, Case studies about the Transition from the Linear Economy, MIKA SILLANPAA and CHAKER NCIBI, "Academic Press" An Imprint of Elsevier, 2019. P: 01.

So, we can say that the circular economy is a systemic approach to economic development designed to benefit society business, society and environment. It refers to the model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing...

The main concepts of Circular Economy:¹

So, we can The main concepts of Circular Economy in this four major points:

✓ **Eliminate waste and pollution**

What if waste and pollution were never created in the first place?

CE reveals and designs out the negative impacts of economic activity that cause damage to human health and natural systems. This includes the release of greenhouse gases and hazardous substances, the pollution of air, land, and water, as well as structural waste such as traffic congestion. Employment policies:

✓ **Circulate products and materials**

What if we could build an economy that uses things rather than uses them up?

CE favor activities that preserve value in the form of energy, labor, and materials. This means designing for durability, reuse, remanufacturing, and recycling to keep products, components, and materials circulating in the economy.

Circular systems make effective use of bio-based materials by encouraging many different uses for them as they cycle between the economy and natural systems.

✓ **Regenerate nature**

What if we could not only protect, but actively improve the environment?

CE avoids the use of non-renewable resources and preserves or enhances renewable ones, for instance by returning valuable nutrients to the soil to support regeneration, or using renewable energy as opposed to relying on fossil fuels.

✓ **Biological and technical material flows:**

What if biological and technical material flows were limited from the first time?

¹ Cecchin, A., Salomone, R., Deutz, P., Raggi, A., & Cutaia, L. (2021). What is in a name? The rising star of the circular economy as a resource-related concept for sustainable development. Circular Economy and Sustainability, 1(1), 83-97.

CE supports the preservation of natural resources as well as their sources. The earth is the source of minerals and wealth, as it is the home of most living things. Maintaining a clean, healthy and livable environment enhances the opportunity to maintain sustainability for future generations.

1.2 The principles of Circular Economy¹

Ghisellini cited the most common group of CE principles as the (3Rs):

- **Reducing:** The first principle of the circular economy is the principle of reduction, which is a principle that aims to reduce inputs from raw materials and primary energy, as well as waste resulting from the production process, through improving production efficiency (environmental efficiency) and consumption processes. This includes the introduction of better technologies, more quality products, less weight, simpler packaging, more efficient home appliances, a simpler lifestyle... etc.

Environmental efficiency is basically a business concept, focusing on the economic and environmental dimension of sustainability and ignoring the social dimension. Reversing the concept of "resource efficiency" which implies reducing resources and increasing economic and social well-being at the same time.

On the production side. There are two primary ways companies can increase their environmental efficiency in their production processes, which means preserving or increasing the value of products as well as reducing their environmental impacts. This is possible if fewer resources are used per unit of value produced and the largest quantity of harmful substances is compensated with less harmful substances per unit of product.

The so-called zero emission strategy seeks to maximize the value of commodities with zero or minimize environmental impacts.

- **Reusing:** The principle of reuse refers to “any process by which products or components that are not waste are used again for the same purpose for which they were designed” (EU 2008). Frankly, reusing products is a very attractive process in terms of environmental benefits because it consumes less resources, energy and labor compared to manufacturing new products from virgin materials or even recycling or disposal.

¹ Patrizia Ghisellini and Al, A review on circular economy : the expected transition to a balanced interplay of environmental and economic systems , Journal of Cleaner Production 114(2016) 11-32 Contents lists available at Science Direct Journal of Cleaner Production journal homepage : www.elsevier.com/locate/jclepro ABSTRACT 1-52.0 - S

So that the reuse of the same products without conversion or recycling contributes to avoiding the emission of harmful substances in addition to many other environmental impacts that differ according to the different manufactured items, through the LCA approach. The spread of reuse implies an increase in consumer demand for reused and recycled products, design of durable products for multiple cycles of use, as well as support for companies to favor take-back and marketing and incentives for remanufactured products. Social responsibility, which first emerged as a German proposal, is an economic tool and a modern version of the pollution pay principle, which supports the idea of circular products and materials operated by producers.

This principle states that disposal and recovery costs should be transferred to the producers and this will be a strong incentive for them to reuse, recycle or dispose of waste materials. Rather, it goes beyond this level, as Connett ¹ argue that if a product cannot be reused, recycled, or composted, then the industry should not be making it, nor should consumers be buying it. This highlights the need for a shared responsibility among all stakeholders, including consumers, to achieve more ambitious results in terms of waste collection for reuse or recycling, which the Japanese electrical equipment system imposes a coercive consumer responsibility to return products for recycling.

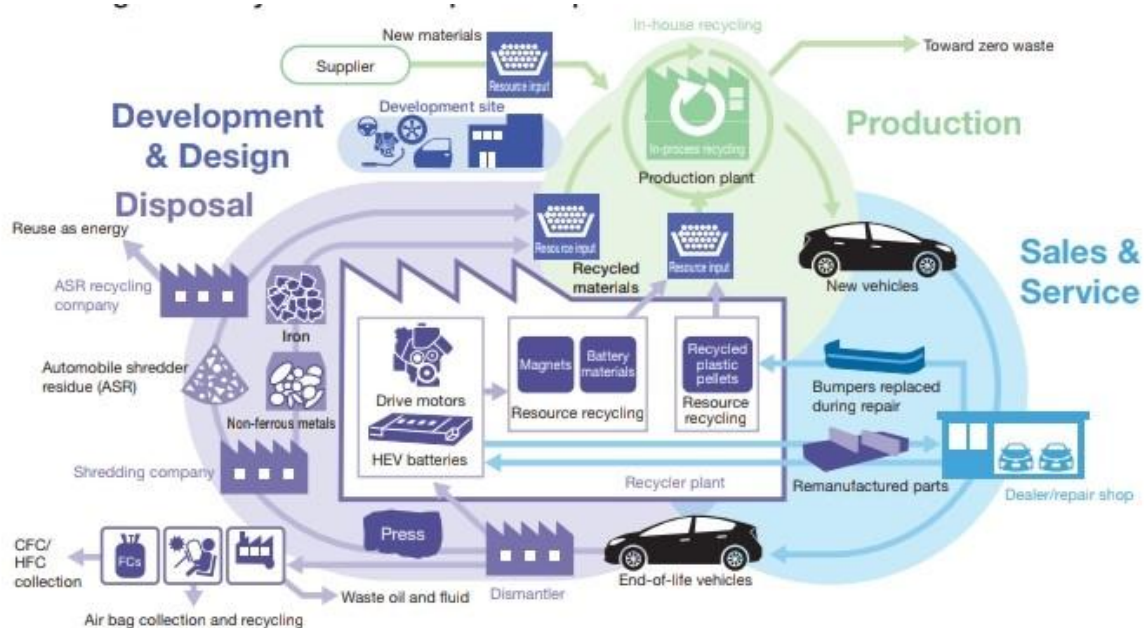
- Recycling: This principle refers to “any recovery process by which waste is reprocessed into products, materials or materials whether for original or other purposes. This includes reprocessing of organic materials but does not include energy recovery and reprocessing into materials for use as fuel or for backfill operations”, Waste recycling offers the opportunity to take advantage of resources that are still usable and reduce the amount of waste that needs to be treated and/or disposed of, thus reducing the associated environmental impact. However, if a company or community is able to recycle all of its waste, it may not be interested in reducing the amount of waste. Although the circular economy is often identified with the principle of recycling, it must be emphasized that this may be the least viable solution compared to other CE principles in terms of resource efficiency and profitability. It is limited by its nature, material complexity, and abuse. Some waste materials are recyclable up to a point or even not recyclable. For example, cellulose fibers can be recycled 4-6 times, unlike metals which have “unlimited multiple recycling”, low levels of recycling are achieved for rare earth metals as economies of scale are difficult to develop while some types of plastic waste are

¹ Connett , P. , Ercolini , R. , Lo Sciuto , P. , 2011. Rifiuti Zero una rivoluzione in corso . Dissensi Edizioni , ISBN 9788896643136.

not recyclable Due to the presence of contaminants such as ink and metals. In this regard, some authors discuss the risks associated with recycling materials and mixed materials and highlight the need to develop a globally agreed risk assessment of existing and new developed chemicals and products, excluding additional animal testing, and finally reuse, repair and remanufacturing after a local or regional and is able to avoid or reduce packaging, transportation costs and transaction costs by preserving ownership, while recycling has a global dimension and operates according to “principles of industrial production, such as economies of scale, specialization and employment of the cheapest labor.” These three principles are included, with some modifications., also in the waste hierarchy of the European Waste Directive since 1989 as well as in the United States Solid Waste Agenda

They are good ways for implementing circular economy in practice.

Fig 01: Challenge of Establishing a Recycling-based Society and Systems.



(Source: TOYOTA Motor Corporation, Sustainability Data Book)¹

¹ TOYOTA Motor Corporation, Sustainability Data Book (2022) , p: 28

1.3 The Circular Economy and the Linear Economy

The traditional linear economy pattern encourages the **take-make-dispose** scheme that maximize the uses of collected raw materials. Then, eventually disposing of them as unusable material.

During the production process, resources are not usually incorporated into the final product, and this creates a double negative impact on both the environment and climate change.

Linear economy value is created through mass production and sale of products. Because of this outline, which looks like a flat line or "Open Cycle."

The main problem that arises with this is the irrational use of available resources. Because during the production process, the resources are not fully integrated into the final product because a large proportion of them are of a non-renewable nature and by the end of the production process they are either blown or burned, and it also consumes the manual energy of the raw materials, which leads to carbon dioxide emissions. This would lead to a double negative impact on environmental and climate changes together.

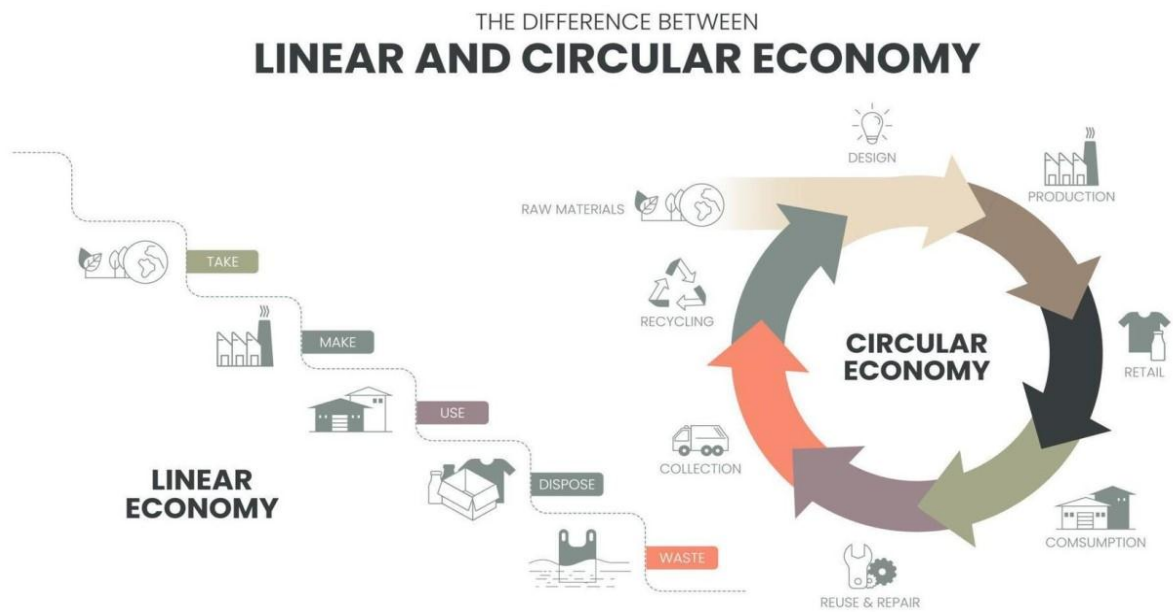
The collapse of the linear economy is also an exploitation of human beings. This system focuses on the products themselves, and the result of this equation is – mass production and consumption.

Whereas,(CE) is classified as an alternative to the linear economy method. Although the theory originates from the 1960s, the term first appeared in 1989. Many environmental theorists and economists have predicted the results of mass consumption and production. Meanwhile, they were developing a better and more conscious method of production.

Meanwhile, they were developing a better and more conscious production method.

So this seems to be the solution that will rid us of the bad effects of the linear economy (as shown in the Fig 01)

Fig 02: Linear and Circular Economy



Source: (licdn.com/dms/image)¹

¹ https://media.licdn.com/dms/image/D5612AQHrC3CrueyRNQ/article-cover_image-shrink_720_1280/0/1664234464929?e=2147483647&v=beta&t=EThJAg4kmIgcZsqRyJ55xOyEIlw1WR1hddkAuGmo9U.

2 Sustainable Supply Chain

Basically, this topic targets business leaders and operational managers as well as students. It attempts to describe the topic of Supply chain management in comprehensive, structured and concise manner.

2.1 Definition of Supply Chain:

The supply chain management is often difficult to understand for managers and operational managers¹:

- Difficult to understand because the supply chain management covers de numerous purchasing, supply, production, sale, management of stocks and product flows, warehouse management and transport functions.

- Difficult to understand because (SCM) often requires knowledge of many methods.

- Difficult to understand because (SCM) uses many tools: modeling and optimization system logistics networks, advanced planning and scheduling system, computer-aided maintenance management, multi-echelon stock optimization system, warehouse management system, transportation management system, e-procurement...

- Difficult to understand because (SCM) uses many abbreviations.

- Difficult to understand, finally, because (SCM)is the subject of dozens of different definitions.

If they are many publications presenting a function, a method or a tool, there is no work allowing both to acquire a global understanding of (SCM) and to know all of its functions, methods and tools.

The concept of sustainability arose from growing concerns about the depletion of natural resources for future generations. And there was no way to facilitate sustainability practices as companies (especially managers.)

Although the concept of sustainability first appeared in the Oxford English Dictionary during the second half of the twentieth century, historical accounts of the concept's emergence and development claim that it has been in use for centuries.

¹ Rémy LE MOIGNE, SUPPLY CHAIN MANAGEMENT Achat, production, logistique, transport vente, 2e édition, Dunod, 2017. Pp:3-4.

During the nineteenth century, focus shifted to coal as the most important source of energy and concern that its deposits might be depleted.

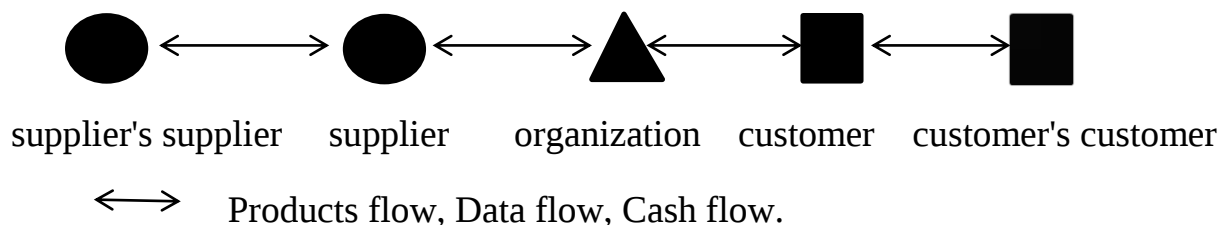
These demands often appear from consumers, governments, the media, or investors, such as organizations facing divergent interests with regard to energy consumption on the one hand, and the demand for greater transparency, which affects daily business operations.

On May 14, 2005, the following definition was published in the Official journal of the supply chain: "the set of operations necessary to deliver products or services".

Supply chain Is a network of organizations (suppliers, factories, distributors, customers, logistics service providers) who participate in the manufacture, delivery and sale of a product to a customer. This organizations exchange products, information and money with each other.

A supply chain is often presented as a chain linking the supplier's supplier to the customer's customer

Figure 03: Supply chain

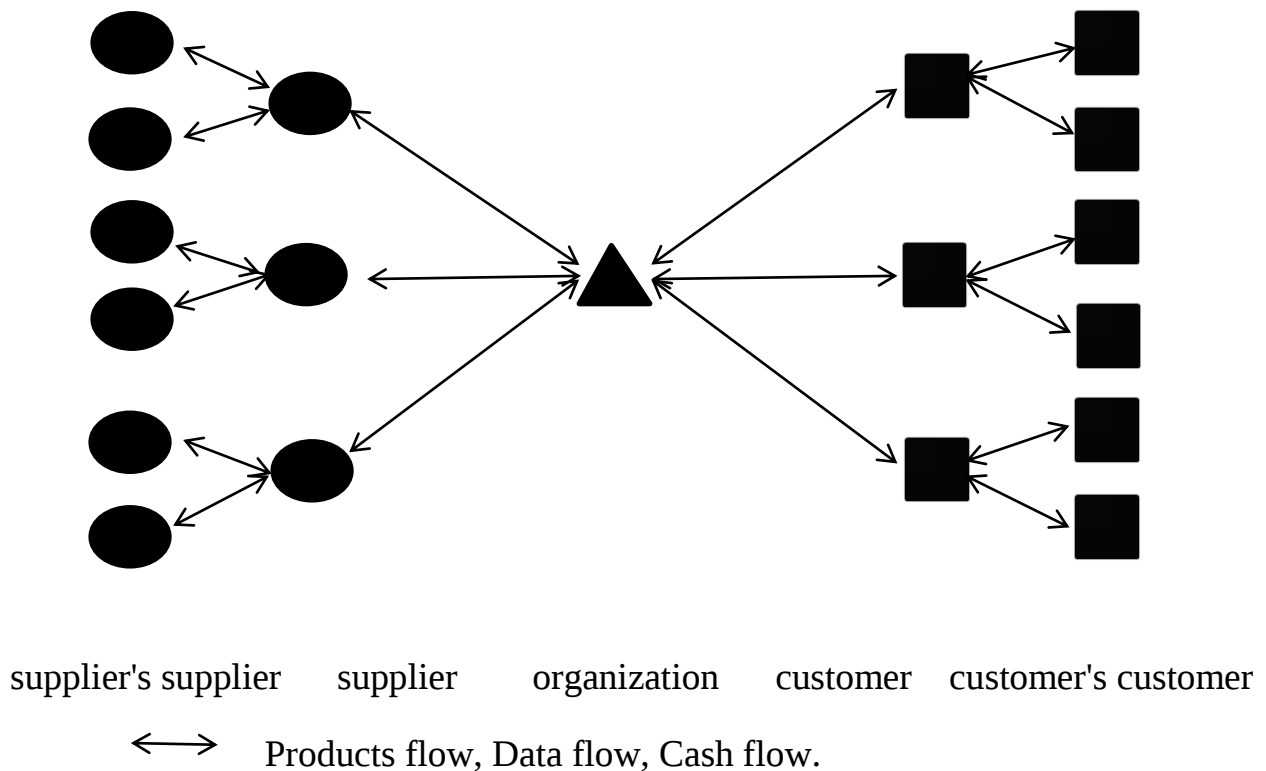


Source: (LE MOIGNE, 2017)

In fact, the supply chain has a chain in name only. It is made up of a complex network of organizations that are constantly interacting with each other,¹ as shown in Figure 02

¹ Rémy LE MOIGNE, SUPPLY. P:4.

Figure 04: Supply chain



Source: (LE MOIGNE, 2017)

1. Supply Chain Management (SCM): Is a critical function for company. It represents a very large part of costs : from 60 % to 90 % of the costs of an industrial companies . He is the main responsible for the impact of companies on the environment: the transport of goods. It has enabled many groups to gain a decisive competitive advantage.

Sustainable development Managing the processes where no exhaustion or destruction of natural resources can be found, the potential of natural systems is sustained for providing services and resources, and environmental pollution is avoided since the economy and society are dependent on it to accomplish objectives including development in economic and social aspects. Development meeting the now demands with no negative effects on the capabilities of future generations in meeting their own needs Boulding¹

¹ Maiezari, IBID, p:8

2.2 Principles of supply chain management:¹

Principle 1: Segment customers based on the service needs of distinct groups and roughly adapt the supply chain to serve these segments. Segmentation has traditionally grouped customers by industry, product or trade channel and then taken a one-size-fits-all approach to serving them, with average costs and productivity within and across segments. But segmenting customers according to their specific needs prepares the company to develop a range of services tailored to different segments. Surveys, interviews and industry research have been the traditional tools for determining key segmentation criteria. From the classical perspective, this division based on needs may result in some odd couples. The "innovators" include an industrial distributor (Grainger), a do-it-yourself retailer (Home Depot), as custom packaging and pre-shipment notice attract these greatly. Of course, customers' needs and preferences aren't everything. Service packages must turn into a profit, and many companies lack sufficient financial understanding of their customers and their own costs to gauge potential profitability. This knowledge is necessary to properly match accounts to service packages which translates into enhanced revenue through a combination of volume and/or price increases. Only in this way can companies preemptively provide customer value.

In an earlier incident, a "successful" manufacturer aggressively marketed a vendor or managed inventory to all customer segments and boosted sales. Up to here everything is perfect, but looking at a subsequent activity-based cost analysis found that one segment actually lost nine cents per case on an operating margin basis. . This is not an efficient financial management.

Most companies have a large untapped opportunity to better align their investment in a particular customer relationship with the return it generates, but companies must analyze the potential for segment production, as well as the costs and benefits of alternative service packages, to ensure a reasonable return on their investment and the most appropriate allocation of resources. To achieve and maintain the proper balance between service and productivity, most companies will need to sequentially prioritize rolling out software designed to take advantage of existing capabilities and maximize impact on customers.

¹ Anderson, D. L, D, Britt, F. Frank, & D. J, The Seven Principles of Supply Chain Management, IBID.

Principle 2: Customizing the logistics network to the service requirements and profitability of customer segments. Companies have traditionally taken a monolithic approach to logistics network design in organizing their inventory, warehouse, and transportation activities to meet a single standard. For some, the logistics network has been designed to meet the average service requirements of all customers; for others, to satisfy the toughest requirements of a single customer Segment.¹

Neither approach can achieve superior asset utilization or accommodate the segment specific logistics necessary for excellent supply chain management. In many industries, especially such commodity industries as fine paper, tailoring distribution assets to meet individual logistics requirements is a greater source of differentiation for a manufacturer than the actual products, which are largely undifferentiated. One paper company found radically different customer service demands in two key segments—large publishers with long lead times and small regional printers needing delivery within 24 hours. To serve both segments well and achieve profitable growth, the manufacturer designed a multi-level logistics network with three full-stocking distribution centers and 46 quick-response cross-docks, stocking only fast moving items, located near the regional printers. Return on assets and revenues improved substantially thanks to the new inventory deployment strategy, supported by outsourcing of management of the quick response centers and the transportation activities. This example highlights several key characteristics of segment specific services. The logistics network probably will be more complex, involving alliances with third-party logistics providers, and will certainly have to be more flexible than the traditional network. As a result, fundamental changes in the mission, number, location, and ownership structure of warehouses are typically necessary. Finally, the network will require more robust logistics planning enabled by “real-time” decision support tools that can handle flow through distribution and more time-sensitive approaches to managing transportation .

Principle 3:² Listen to market signals and align demand planning accordingly across the supply chain, ensuring consistent forecasts and optimal resource allocation. Forecasting has historically proceeded silo by silo, with multiple departments independently creating forecasts for the same products—all using their own assumptions, measures, and level of detail. Many consult the marketplace

¹¹ Anderson, D. L, D, Britt, F. Frank, & D. J, The Seven Principles of Supply Chain Management, IBID.

² Anderson, D. L; and others, IBID.

only informally, and few involve their major suppliers in the process. The functional orientation of many companies has just made things worse, allowing sales forecasts to envision growing demand while manufacturing second-guesses how much product the market actually wants. Such independent, self-centered forecasting is incompatible with excellent supply chain management, as one manufacturer of photographic imaging found. This manufacturer nicknamed the warehouse “the accordion” because it had to cope with a production operation that stuck to a stable schedule, while the revenue-focused sales force routinely triggered cyclical demand by offering deep discounts at the end of each quarter. The manufacturer realized the need to implement a cross-functional planning process, supported by demand planning software. Initial results were dismaying. Sales volume dropped sharply, as excess inventory had to be consumed by the market place. But today, the company enjoys lower inventory and warehousing costs and much greater ability to maintain price levels and limit discounting. Like all the best sales and operations planning (S&OP), this process recognizes the needs and objectives of each functional group but bases final operational decisions on overall profit potential. Excellent supply chain management, in fact, calls for S&OP that transcends company boundaries to involve every link of the supply chain (from the supplier’s supplier to the customer’s customer) in developing forecasts collaboratively and then maintaining the required capacity across the operations. Channel-wide S&OP can detect early warning signals of demand lurking in customer promotions, ordering patterns, restocking algorithms, takes into account vendor and carrier capabilities, capacity rather than constraints¹

The difference that cross supply chain planning has made for one manufacturer of laboratory products, uneven distributor demands unsynchronized with actual end-user demand made real inventory needs impossible to predict and forced high inventory levels that still failed to prevent out-of-stocks. Distributors began sharing information on actual (and fairly stable) end-user demand with the manufacturer, and the manufacturer began managing inventory for the distributors. This coordination of manufacturing scheduling and inventory deployment decisions paid off handsomely, improving fill rates, asset turns, and cost metrics for all concerned .

Principle 4: Differentiate product closer to the customer and speed conversion across the supply chain. Manufacturers have traditionally based production goals on projections of the demand for finished goods and have stockpiled inventory to offset forecasting errors. These manufacturers tend to view lead times in the

¹ Anderson, D. L; and others, IBID.

system as fixed, with only a finite window of time in which to convert materials into products that meet customer requirements.

While even such traditionalists can make progress in cutting costs through set-up reduction, cellular manufacturing, and just-in-time techniques, great potential remains in less traditional strategies such as mass customization. For example, manufacturers striving to meet individual customer needs efficiently through strategies such as mass customization are discovering the value of postponement. They are delaying product differentiation to the last possible moment and thus overcoming the problem described by one manager of a health and beauty care products warehouse: “With the proliferation of packaging requirements from major retailers, our number of SKUs (stock keeping units) has exploded. We have situations daily where we backorder one retailer, like Wal-Mart, on an item that is identical to an in-stock item, except for its packaging. Sometimes we even tear boxes apart and repackage by hand!” solving this problem can be achieved by determining the point at which a standard bracket turned into multiple SKUs. This point came when the bracket had to be packaged 16 ways to meet particular customer requirements. The manufacturer further concluded that overall demand for these brackets is relatively stable and easy to forecast, while demand for the 16 SKUs is much more volatile. The solution: make brackets in the factory but package them at the distribution center, within the customer order cycle. This strategy improved asset utilization by cutting inventory levels by more than 50 percent. Realizing that time really is money, many manufacturers are questioning the conventional wisdom that leads times in the supply chain are fixed. They are strengthening their ability to react to market signals by compressing lead times along the supply chain, speeding the conversion from raw materials to finished products tailored to customer requirements. This approach enhances their flexibility to make product configuration decisions much closer to the moment demand occurs. The key to just-in-time product differentiation is to locate the leverage point in the manufacturing process where the product is unalterably configured to meet a single requirement and to assess options, such a postponement, modularized design, or modification of manufacturing processes, that can increase flexibility. In addition, manufacturers must challenge cycle times: Can the leverage point be pushed closer to actual demand to maximize the manufacturer’s flexibility in responding to emerging customer demand¹?

¹ Anderson, & others. Retrieved from <https://www.scmr.com/>. (2023, 04 11)

Principle 5: Manage sources of supply strategically to reduce the total cost of owning materials and services. Determined to pay as low a price as possible for materials, manufacturers have not traditionally cultivated warm relationships with suppliers. In the words of one general manager: “The best approach to supply is to have as many players as possible fighting for their piece of the pie that’s when you get the best pricing.” Excellent supply chain management requires a more enlightened mindset recognizing, as a more progressive manufacturer did: “Our supplier’s costs are in effect our costs. If we force our supplier to provide 90 days of consigned material when 30 days are sufficient, the cost of that inventory will find its way back into the supplier’s price to us since it increases his cost structure.” While manufacturers should place high demands on suppliers, they should also realize that partners must share the goal of reducing costs across the supply chain in order to lower prices in the marketplace and enhance margins. The logical extension of this thinking is gain-sharing arrangements to reward everyone who contributes to the greater profitability. Some companies are not yet ready for such progressive thinking because they lack the fundamental prerequisite. That is, a sound knowledge of all their commodity costs, not only for direct materials but also for maintenance, repair, and operating supplies, plus the dollars spent on utilities, travel, temps, and virtually everything else. This fact-based knowledge is the essential foundation for determining the best way of acquiring every kind of material and service the company buys. With their marketplace position and industry structure in mind, manufacturers can then consider how to approach suppliers soliciting short-term competitive bids, entering into long-term contracts and strategic supplier relationships, outsourcing, or integrating vertically. Excellent supply chain management calls for creativity and flexibility.¹

Principle 6: Developing a supply chain-wide technology strategy that supports multiple levels of decision making rather than giving a clear view of the flow of products, services, and information. To sustain reengineered business processes, many progressive companies have been replacing inflexible, poorly integrated systems with enterprise-wide systems. Yet too many of these companies will find themselves victims of the powerful new transactional systems they put in place. Unfortunately, many leading-edge information systems can capture reams of data but cannot easily translate it into actionable intelligence that can enhance real-world operations. As one logistics manager with a brand-new system said: “I’ve got three feet of reports with every detail imaginable, but it doesn’t tell me how to run my business.” This manager needs to build an information technology system that integrates capabilities of three essential kinds. For the short term, the system

¹ Anderson, D. L; and others, IBID.

must be able to handle day-to-day transactions and electronic commerce across the supply chain and thus help align supply and demand by sharing information on orders and daily scheduling. From a mid-term perspective, the system must facilitate planning and decision making, supporting the demand and shipment planning and master production scheduling needed to allocate resources efficiently. To add long-term value, the system must enable strategic analysis by providing tools, such as an integrated network model, that synthesize data for use in high-level “what-if” scenario planning to help managers evaluate plants, distribution centers, suppliers, and third-party service alternatives. Despite making huge investments in technology, few companies are acquiring this full complement of capabilities. Today’s enterprise wide systems remain enterprise-bound, unable to share across the supply chain the information that channel partners must have to achieve mutual success .

Ironically, the information that most companies require most urgently to enhance supply chain management resides outside of their own systems, and few companies are adequately connected to obtain the necessary information. Electronic connectivity creates opportunities to change the supply chain fundamentally from slashing transaction costs through electronic handling of orders, invoices, and payments to shrinking inventories through vendor-managed inventory programs.¹

Principle 7: Is to adopt channel-spanning performance metrics to measure collective success in reaching the end-user effectively and efficiently. Excellent supply chain managers have a different view than most companies who often adopt solutions through many functionally oriented procedures , adopting measures that apply to every link in the supply chain and include both service and financial metrics.

- First, they evaluate the service in terms of the ideal arrangement: extends across the supply chain, as it should be the incremental measurement of performance, and viewing performance from the customer's appropriate perspective.
- Second, determine the true profitability of service by determining the actual costs and revenues of the activities required to service the account, specially a key one. Many concenter this as a revelation, since traditional cost measures rely on corporate accounting systems that allocate overhead evenly across accounts. Such measures do not differentiate, for example, an account that requires a multi-

¹ Anderson, D. L; and others, IBID.

functional account team, small daily shipments, or special packaging. Tending to mask the real costs of the supply chain focusing on cost type rather than the cost of activities by traditional accounting, and ignoring the degree of control anyone has (or lacks) over the cost drivers. Deriving maximum benefit from activity-based costing requires sophisticated information technology, specifically a data warehouse. Because the general ledger organizes data according to a chart of accounts, it obscures the information needed for activity-based costing. By maintaining data in discrete units, the warehouse provides ready access to this information. To facilitate channel-spanning performance measurement, many companies are developing common report cards.

These report cards help keep partners working toward the same goals by building deep understanding of what each company brings to the partnership and showing how to leverage their complementary assets and skills to the alliance's greatest advantage. The willingness to ignore traditional company boundaries in pursuit of such synergies often marks the first step toward a "pay-for-performance" environment.¹

2.3 Sustainable development and circular economy relations:²

The concept of circular economy has attracted prominent interest since 1990 due to its innovative look at the association of industry with the environment, focusing on improving the long-term sustainability of production and consumption processes. Although the relationship between circular economy (CE) and sustainability is still unclear, some researchers declare CE is a critical element of sustainable development and an effective solution to transform towards a sustainable system with the advent of the circular economy (CE), traditional supply networks are being replaced with circular supply chains, which have better sustainability results. There are similarities between CE and sustainability:

- Both conceptions prominence intra- and intergenerational obligations stimulated by environmental hazards and prompt the importance of increasing agency and public deliberation based on the coexisting pathways for development.
- Besides accentuating problems, sharing a crucial global outlook on a cosmic scale, guiding the pertinence of coordination and responsibilities between multiple agents are held in common in both concepts.

¹ Anderson, D. L; and others, IBID.

² Maiezari, IBID, p:8

In addition, there are differences between these two notions:

- Sustainability aims to benefit the environment, society, and economy, while (CE) benefits the economy and the environment.

It appears they mutually go hand in hand in guaranteeing future needs will not be hurt because of the opinion of that the recyclability of products is an instrument that can promote (CE); further resource consumption is the most critical tool to promote sustainability. With the growth of pressures on global environment, a shift to (CE) is regarded as an alternative to conserve the environment and create new means of economic growth as well as increase awareness of the public of ecology. Boulding defined the circular economy system as a prerequisite for maintaining the sustainability of human life on earth.

The circular economy is a sustainable development initiative aimed to reduce the societal production-consumption systems' linear material, and energy across flows through the application of materials cycles, renewable, and cascade-type energy flows to the linear system

Circular economy is essential for preserving economic growth in a sustainable way.

Circularity is necessary for sustainable system, but it is not a sufficient condition.¹

¹ Maiezari, IBID, p:8

Section Two: Literature Review

This section is broadly concerned with the overview of the literature surrounding the topic of sustainable supply chain practices. The primary aim of it is to review the relevant literature to provide the theoretical background regarding the research phenomenon. Previous studies related to the subject, which used various qualitative and quantitative approaches, were selected and arranged chronologically as follows:

1. (Wu & Pagell, 2011): To address the question: How can firms reconcile short-term financial success with long-term environmental sustainability when making supply chain decisions in the face of uncertainty? they use theory-building through case studies in this study. They outline five sets of hypotheses that describe how leaders in green supply chain management make decisions and strike a balance between immediate and long-term goals. They also identify four environmental postures that assist in explaining the choices made by businesses when addressing strategic trade-offs among the triple-bottom-economic, line's environmental, and social components.
2. (Ahi & Searcy, 2013) This paper's goal is to locate and evaluate existing definitions of sustainable supply chain management (SCM) and green supply chain management (GSCM) (SSCM). There were 12 definitions for SSCM and a total of 22 definitions for GSCM. Two distinct sets of key attributes for business sustainability (i.e., economic, environmental, social, stakeholder, volunteer, resilience, and long-term focuses) and SCM (i.e., flow, coordination, stakeholder, relationship, value, efficiency, and performance focuses) were proposed in order to analyze the definitions that had been identified. The two proposed sets of important qualities and the discovered definitions were compared. The analysis demonstrates that definitions for GSCM placed a stronger emphasis on the environmental, flow, and coordination foci, and were generally more narrowly focused than those for SSCM. It is stated that SSCM is really an extension of GSCM, even though some definitions of SSCM show significant overlap with definitions of GSCM. At least half of the suggested core business sustainability and SCM criteria were covered by many selected definitions. But neither GSCM nor SSCM had a comprehensive definition that could be found. A revised definition of SSCM is suggested to address this problem.
3. (Govindan, Jafarian, Khodaverdi, & Devika, 2014): This study suggests a multi-objective optimization model for distribution across a network of supply chains for perishable foods that incorporates sustainability into decision-

making (SCN). In order to optimize economic and environmental goals in a perishable food SCN, it proposes a two-echelon location-routing issue with time-windows (2E-LRPTW). Aiming to maximize the volume of goods transported to lower stages and routes at each level, 2E-LRPTW aims to identify the quantity and position of facilities. Additionally, it strives to lower network-wide expenses brought on by carbon footprint and greenhouse gas emissions. The suggested methodology uses a brand-new multi-objective hybrid strategy termed MHPV, which combines two well-known multi-objective algorithms, namely multi-objective particle swarm optimization (MOPSO) and modified multi-objective variable neighborhood search (AMOVNS). When compared to standard evolutionary algorithms based on metaheuristics, MHPV compares crowding distance to two leader selection procedures (LSP) techniques, namely Grids and LSP (i.e. MOGA, NRGa and NSGA-II). Results show that the hybrid technique produces better results than other approaches and that the crowding distance method for LSP performs better than the previous Grids method.

4. (Silvestre, 2015): This study examines how supply chain sustainability might be implemented and managed in these contexts in an effort to close this gap. A thorough case study of the Brazilian upstream oil and gas industry supply chain was utilized to generate theories regarding supply chains that function in developing environments. This work offers four significant discoveries and additions to the supply chain literature by drawing on institutional theory, evolutionary theory, complexity theory, organizational learning, innovation, and strategy literatures. First, it demonstrates that developing a sustainable supply chain is a journey where trajectory and time are important. Given that supply chain sustainability paths are evolutionary. This study emphasizes how supply chains develop and change just like enterprises do. Second, despite the trend toward globalization, this research shows that natural resource-based supply chains are frequently more regionally constrained and vulnerable to local societal demands than other supply chains. Third, this paper contributes to the literature on supply chains by arguing that supply chains in developing and emerging economies face additional challenges to sustainability, which increase complexity and uncertainty because of the presence of extremely turbulent business environments and institutional gaps. These variables also lessen the slope of supply chains' sustainability trajectories and impede supply chain learning and innovation. Finally, this study adds to the body of knowledge by asserting that because of these environments' high levels of complexity and uncertainty, focal companies are even more crucial in managing the escalating ambiguity, encouraging supply chain learning, and

fostering innovation toward supply chains' improved sustainability performance.

5. (Koberg & Longoni, 2019): The primary components of sustainable supply chain management in international supply chains will be summarized in this article. To accomplish this, they carry out a thorough, systematic review of the literature on sustainable supply chain management in international supply chains and use structured content analysis on the *cited articles, which span 15 years of research and were published in English-language, peer-reviewed journals. By highlighting configurations and governance mechanisms as essential components of sustainable supply chain management in international supply chains and summarizing their connection to sustainability results, the research makes a contribution. Overall arrangements characterized by a stronger bond between the focal company and its multi-tier suppliers, whether they are managed in-house or by outside parties, are rising trends that are thought to better serve sustainability development and present a number of potential areas for further study. By offering managers of focal enterprises with global supply chains guidance on how to improve sustainable outcomes in their supply chains, the research also contributes to practice.
6. (Bag, Wood, Xu, Dhamija, & Kayikci, 2020) : This study bases its evaluation of BDA capacity as an operational excellence strategy for enhancing sustainable supply chain performance on the dynamic capability theory. they conducted a poll of mining executives in South Africa's developing economy, and they got 520 responses (47% response rate). To analyze the data, they employed PLS-SEM, or Partial Least Squares Structural Equation Modelling. The results demonstrate that management competencies for big data analytics have a strong and significant impact on the creation of innovative green products and the success of sustainable supply chains. Employee development and sustainable supply chain results are significantly impacted by big data analytics talent capabilities, albeit with a less strong impact. Sustainable supply chain performance is impacted by innovation and learning performance, and supply chain innovation plays a significant moderating influence. The study's contribution is the identification of two methods through which managers can enhance mining sector sustainable supply chain results using big data analytics capabilities.
7. (Bui, Tsai, Tseng, Tan, Yu, & Lim, 2021) :This paper provides a data-driven literature review on the trends in ambidexterity and disruption in sustainable supply chain management. The critical assessment highlights geographic and historical tendencies in the literature. On 273 keywords and 22 indicators obtained based on the evaluation of the experts, a hybrid of data-driven

analytical methodology based on content and bibliometric analyses, fuzzy Delphi method, entropy weight method, and fuzzy decision-making trial and evaluation laboratory is employed. Supply chain agility, supply chain coordination, supply chain financing, supply chain flexibility, supply chain resilience, and sustainability are considered to be the most crucial indicators. When compared to one another, the regions exhibit various trends. Africa, Latin America, and the Caribbean are the regions that most need improvement, whereas Europe and North America exhibit distinct concerns with supply chain network design. This review's primary contribution is the identification of the knowledge frontier, which is followed by a discussion of the possibilities for further research and actual industry use.

8. (Kouhizadeh, Saberi, & Sarkis, 2021): In this study, adoption hurdles for blockchain are examined using the force field theory and the technology-organization-environment framework. A thorough assessment of the obstacles to using blockchain technology to manage sustainable supply chains is given using a variety of literature streams on technology, organizational practices, and sustainability. The supply chain, organizational, and environmental frameworks are used to explore the hurdles, together with input from academics and business professionals. The Decision-Making Trial and Evaluation Laboratory (DEMATEL) tool is then used to assess the data. According to the findings, supply chain and technological hurdles are the most important ones for both academics and business experts. They also look at how academics and practitioners perceive the barriers differently and similarly. This exploratory study uncovers intriguing differences in relative importance and relationships among obstacles that must be overcome both conceptually and practically if blockchain technology is to be further adopted and disseminated in a sustainable supply chain setting. It also prepares the ground for theoretical deductions about how blockchain technology is applied in environmentally friendly supply chains. This exploratory investigation leads to a number of research ideas and directions.
9. (Khan, Yu, Golpira, Sharif, & Mardani, 2021): In the last sixteen years, 362 research papers have been published in reputable peer-reviewed publications. This study undertakes a meta-analysis and systematic review of those papers (2004e2019). The drivers and barriers of the sustainable supply chain, the adopted multi-criteria decision-making techniques, the number of research papers published each year, the names of journals and publishers, and the classification of articles based on research design and method were all used to organize the reviewed literature in the current study. This study provides a current overview of recent advancements, upcoming trends, and research gaps

in the area of SSCM. The results demonstrate that MCDM (Multiple-Criteria Decision Making) based research methodologies and firm-level studies have dominated the field. In order to uncover novel connections, researchers must also use effective algorithms, sophisticated economic modeling, and macro-level (national and regional) investigations.



Chapter Two

Applied Study- TOYOTA COMPANY company-



Chapter Two : Applied Study- TOYOTA company-

Section one: Theoretical framework methods

1 Theoretical framework for the Content Analysis method

Content analysis was introduced in the early 40's within political science, analyses of political propaganda, social psychology, journalism and communications research¹.

Content Analysis has been adopted in increasingly way as a technique for scrutinising text connection in social sciences. In fact, it has been widely used as a technique to investigate several researches .

1.1 Definition Content analysis:

Content analysis is a viable way to thematise consumer experiences. Content analysis, can be defined as “an approach to documents that emphasizes the role of the investigator in the construction of the meaning of and in texts” . Content analysis underlines the development of categories from the data and recognizes the importance of understanding the meaning of the context where the analyzed items appeared. Quantitative content analysis seeks to “quantify content in terms of predetermined categories and in a systematic and replicable manner”².

Qualitative content analysis is also systematic and analytic but less rigid than quantitative content analysis, and the researcher constantly revises the themes or categories by moving “back and forth between conceptualization, data collection, analysis, and interpretation”³

Content Analysis studies:

- 1) vary in execution and reporting.
- 2) have a tendency towards methodological vagueness.
- 3) do not apply content analysis as a sole method.

¹ Kassarian, H. H. (1977). Content analysis in consumer research. *Journal of consumer research*, 4(1), pp: 8-18.

² Bell, E., Bryman, A., & Harley, B. (2022). *Business research methods*. Oxford university press. pp: 281-511- 595.

³ May Kristin Vespestad; Anne Clanc. (2021). Exploring the use of content analysis methodology in consumer research. pp : 3-5.

4) are versatile. The study can also serve as point of departure for novice researchers wishing to engage with content analysis research.

- content analysis should be objective, systematic and quantitative,

- To analyze data qualitatively and at the same time quantify the data.

- * Approaches.

Content analysis can be carried out in a deductive or inductive way, and can reveal different aspects of the content.

A deductive approach would often be used to test a theory in diverse situations or to collate categories in various time-frames. Inductive analysis is a process of discovery where findings emerge through the analyst's interaction with the data¹.

An inductive approach can be used in cases that are fragmented and where there is a need for exploration, or where there is a lack of studies on the phenomenon in question.

Despite the versatility of content analysis, critiques has claimed it is an overly simplistic method.

- * Danger of missing the context.

Following Bardin for content analysis, the form of grouping used was derived from the author's inference and interpretation. Also, it was considered the importance of understanding the meaning of the context in which the analyzed items appeared. For analysis, discussion, and interpretation, the dimensions of CSR, the stages of the cosmetics life cycle, and the DfS principles were used as guidelines.

- * Objective.

According to Kassarian², content analysis should be objective, systematic and quantitative, on the other hand, criticises the focus on objectivity and manifest content, as content analysis should allow for a person's interpretation and meaning of the text or data³.

¹ May Kristin Vespestad; Anne Clanc. IBID. pp :4-5.

² Kassarian, H. H. (1977). Content analysis in consumer research. Journal of consumer research, 4(1), 8-18.

³ <https://doi.org/10.1016/j.spc.2021.12.002>.

1.2 The Content Analysis methodology:

The Four Information Research Information Analysis Approach This methodology is frequently used in the methodology which consists of four remarkable steps: ¹

- Step 1: Material Gathering: Selecting the material to be collected and the unit of analysis is decided;
- Step 2: Descriptive analysis;
- Step 3. Category selection: The structural nature including the main topics of the analysis and the analytical categories detailed by searching for each structural are identified in the identification of collected materials;
- Step Four: Evaluation of the materials: Analyzing the meaning of the research in the structural and analytical categories to identify issues that are relevant to some of the findings.

¹ Brandenburg, M., Govindan, K., Sarkis, J., & Seuring, S. (2014). Quantitative models for sustainable supply chain management: Developments and directions. European journal of operational research, (2), p:302.

2 Theoretical framework for the Thematic Analysis method

Thematic analysis is a widely used method of qualitative data analysis, It is a useful and accessible tool for qualitative researchers, but it is often misunderstood and thus complicates its use and acceptance among researchers, this is due to inaccuracies in how it is described and confusion regarding the philosophical underpinnings of the method, which is why the term is often misapplied.

In this part of research, we'll work to highlight thematic analysis whether it is a powerful, flexible and appropriate method for qualitative analysis or no, in order to facilitate researchers at all levels of expertise to conduct thematic analysis in a serious and thoughtful manner¹.

2.1 Definition Thematic analysis:

Thematic analysis is defined as “a method for identifying, analyzing, and reporting patterns (themes) within data”, and a theme “captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set”².

Thematic analysis is employed to explore TOYOTA company perception towards the role of CE in basic and advanced practices of the sustainable supply chain that serve to enrich and advance literature in some area. Thematic analysis, which is a powerful method for analyzing qualitative data, is appropriate for seeking to understand a set of experiences, thoughts, or behaviors across a data set

- The theoretical thematic analysis is analyzed by coding under specific questions and It covers major topics:
 - (1) conceptualization
 - (2) positive factors.
 - (3) negative factors.

¹ (Michelle E Kiger, Thematic analysis of qualitative data: AMEE Guide No. 131, Thematic analysis of qualitative data: AMEE Guide No. 131, Michelle E Kiger 1 2, Lara Varpio 1 2, Affil2020).

² Hotel general managers' brand love: A thematic analysis with general managers in the U.S. Yao-Chin Wanga, Han Chenb,*, Bill Ryanc, Courtney Troxteld, Mackenzie Cvard, Journal of Hospitality and Tourism Management. Published by Elsevier Ltd. journal homepage: www.elsevier.com/locate/jhtm onbehalfofCAUTHE-

2.2 The Thematic Analysis methodology:

-) Six phases were followed in the thematic analysis for the topics:

We describe the most commonly used six-step framework for conducting thematic analysis. Then, we will talk about the advantages of this method with an alert to the risks that must be avoided when using thematic analysis

(1) Familiarization¹: raters should familiarize themselves with collected data. Getting to know the data is the first step. Before we start analyzing individual items, It's too important to get a thorough overview of all the data we already collected. This might involve reading through the text, transcribing audio, taking initial notes, and looking generally through the data to get familiar with it.

(2) generate initial codes: the second step called " Coding", It is too important step, here we need to code our data. That means highlighting sections of our text (either phrases or sentences) and coming up with shorthand labels as “codes” to describe their content². For example by highlighting the main various phrases in different colors referring to different codes. Each code describes an idea or a feeling expressed in that part of the text.

At this step, we need to be thorough: we make check through the transcript of every report and we try to highlight everything seems to be relevant or potentially interesting. We can keep adding new codes when it is necessary, in addition to highlight all the sentences and phrases that match these codes.

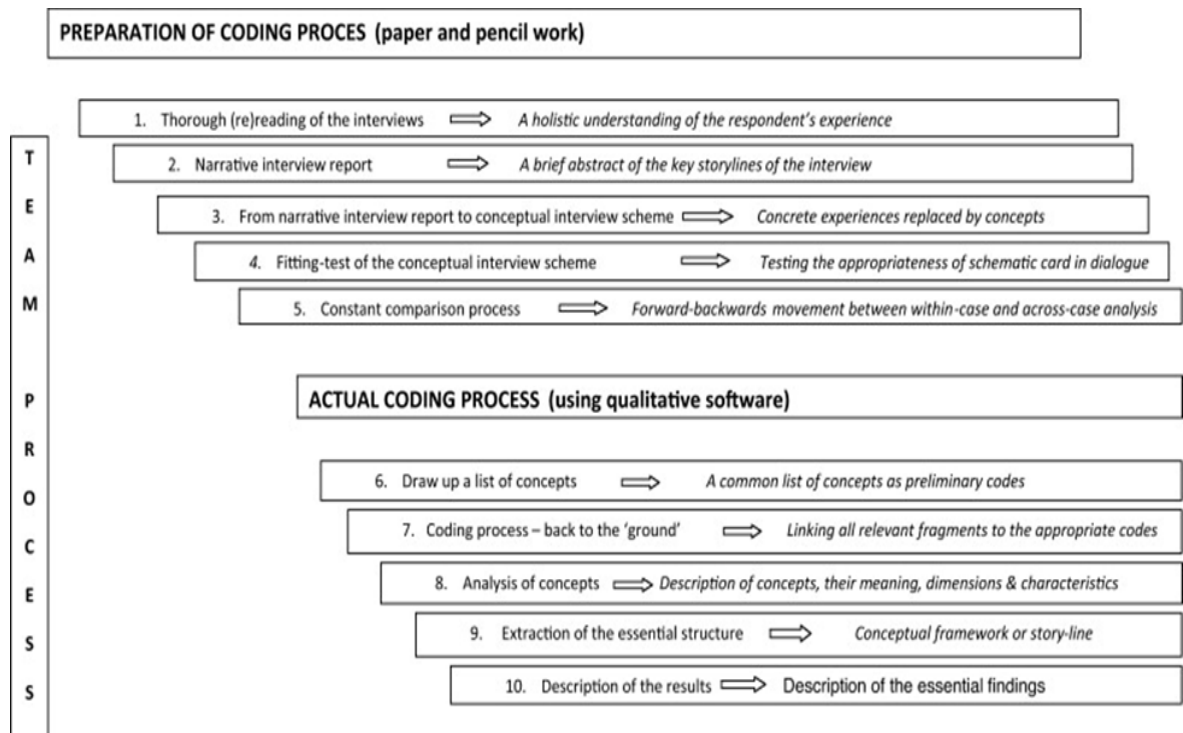
After we've been through the prior step, we collate all the data together into groups identified by code. These codes help us to take a condensed overview of the main points and common meanings that recur throughout the data³.

¹Siteweb on; <https://www.scribbr.com/methodology/thematic-analysis/#:~:text=There%20are%20various%20approaches%20to,naming%20themes%2C%20and%20writing%20up.>

² Caulfield, J. (2022, November 25). How to Do Thematic Analysis | Step-by-Step Guide & Examples.Scribbr.RetrievedApril18,2023, from <https://www.scribbr.com/methodology/thematic-analysis/>

³ (Michelle E Kiger, Thematic analysis of qualitative data: AMEE Guide No. 131, Thematic analysis of qualitative data: AMEE Guide No. 131,Michelle E Kiger 1 2, Lara Varpio 1 2, Affil2020)

Fig 05: The coding process



(3) Search for themes (review themes): At this third step, we look over the codes that we've created and identifying patterns among them. Then, we start coming up with themes. those which are generally broader than codes.

In many times, you'll find that a single theme can combine several codes.

At this stage, too, we might observe that some of our codes are not relevant enough or too vague or not relevant enough, so it is expected that they can be discarded.

While other codes might become themes in their own right. Again, according to what we're trying to discover we'll find that what we decide will vary. We want to create potential themes that can give us something helpful about the data for our aims.

We outline what thematic analysis is, positioning it in relation to other methods of qualitative analysis, and describe when it is appropriate to use the method under a variety of epistemological frameworks. We also provide a detailed definition of a theme, because this term is often misapplied. Then, we describe the most commonly used six-step framework for conducting thematic analysis, from our own research we use examples to illustrate each step. Finally,

we alert researchers to pitfalls to avoid when using this sort of analysis after discussing advantages and disadvantages of this method.

(4) Reviewing themes: At this level, we have to make sure that our themes are accurate representations and useful of the data. We have to return to the data set and compare our themes against it, whether we miss anything? Are these themes really exist in the data? What can we add or change in order to make our themes work better?

If we face problems with our themes, we might revise them, combine them, discard them or even create new other ones: whatever makes them more useful and accurate.

(5) defining and naming themes: Now you have your final list of themes, it's time to name and define every one of them.

Defining themes contains formulating what we mean by each theme in specific way, and discovering how it helps us understand the data.

Naming themes refers to using a succinct and easily understandable name for each theme.

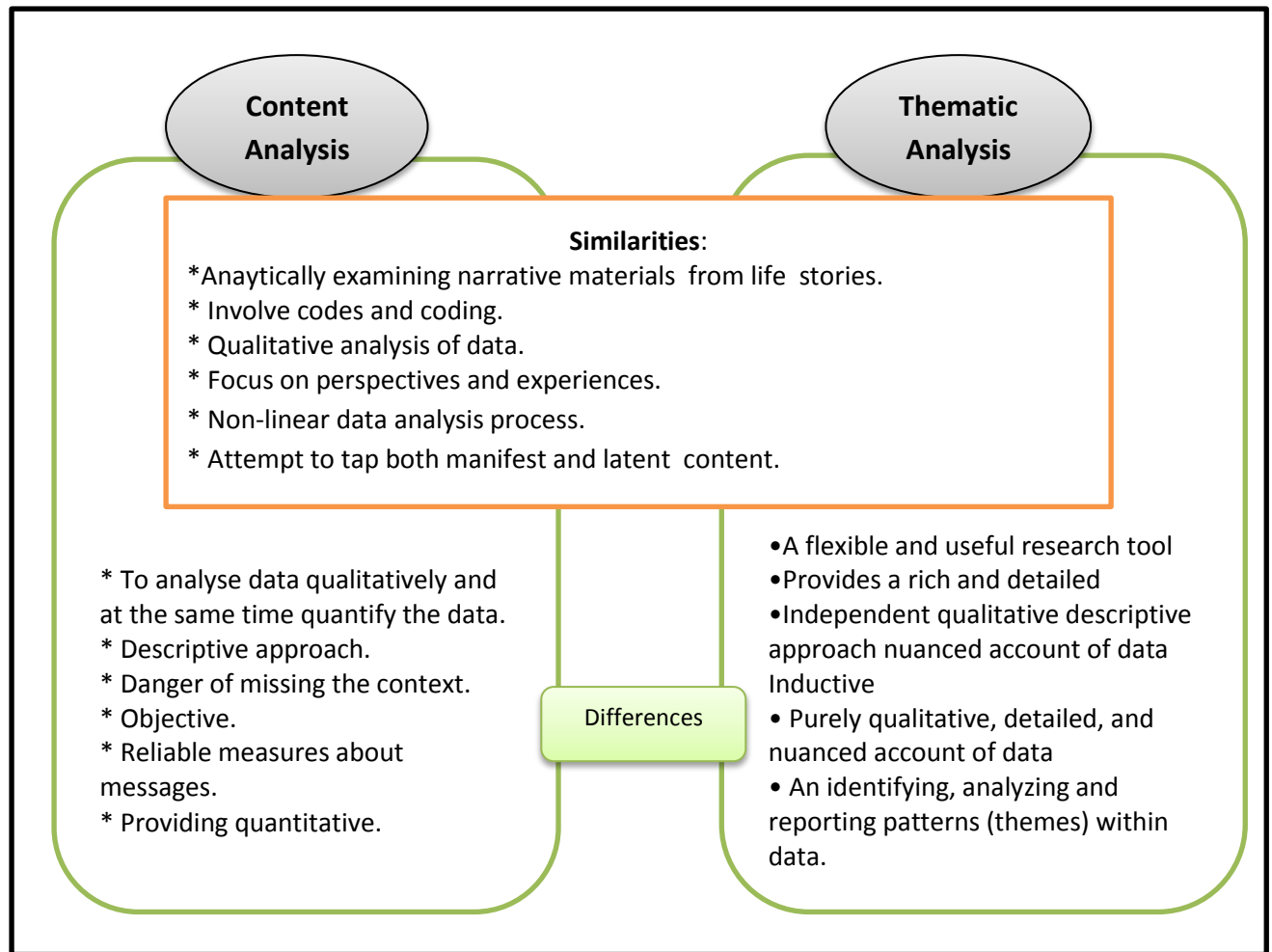
(6) produce the report: Finally it is the writing stage, now we're going to write down the results and outputs of the data analysis we did. Like all academic texts, writing up a thematic analysis means writing an introduction to establish our research question, goals and approach.

We should also include a methodology part, contains the description of how we collected the data (either through reports like us, or through other means) and explaining how this thematic analysis itself was carried out.

In this method, usually, The results or findings section address each theme in turn. We mention how often the themes come up and what is their meanings, using evidences like examples from our data. Finally, our conclusion should explain the main takeaways and explains how this analysis has answered our research question¹.

¹ Caulfield, J, previous reference.

Fig 06: Thematic Analysis and Content Analysis comparison review



(Source: NVivo output Mirzaei & Shokouhyar, 2022)

The reasons for using qualitative analysis:¹

The Uses of qualitative analysis, methods and qualitative analysis.

- 1)- The nature of the subject of the study, behavioral topics, leader behavior, conflict management, consumer behavior, successful entrepreneur, behavioral finance, etc.
- 2)- Study methodology: pragmatic paradigm (mixed research) .
- 3) - The shortcomings that occurred in the study tools: especially the harsh criticism directed at the questionnaire: because it may not reach reliable results,

¹ د/ خليل شرقي، الندوة التكوينية الافتراضية حول التحليل النوعي (الكيفي) باستخدام برنامج NVivo14، مجلة أبحاث كمية ونوعية في العلوم الاقتصادية والإدارية، جامعة أم البواقي (2020).

and the results may be wrong. Also, some phenomena are not originally measured by the questionnaire (there is no freedom in closed questions, and this is one of the shortcomings of the questionnaire). There is no freedom in closed questions.

4) Publication in classified journals: requires the use of mixed forms. Web of science, scopus, EBSCO...

Section two: The CASE STUDY:

This practical part of the thesis will analyze the elements of supply chain based on Sustainability Data Book of TOYOTA company.

1. Generals

a. Why TOYOTA company?

The TOYOTA company Production System (TPS) has become a well-known philosophy, technology, and management tools, which were learned by many companies to achieve continuous improvement on production.

According to TOYOTA company, the main reason that helps it to achieve continuous the heart of this system is human development, and it supports the elements of Total Quality Management from the perspectives of people's needs (not only the customers', but also the employees').

Tracking the ranking of top-selling car brands in the World since 2010, we have always seen the leader TOYOTA company leading the scene. Furthermore, in 2022 it holds 11.5% market share with sales at 7.53 million¹. Indeed, the Japanese rely on one- brand strategy with a little diversification in, which is focusing on just one single brand the most powerful line-up in the world, while other manufacturers have diversified their focus on several brands thinking that they will cover large segment of customers, TOYOTA company deals just with Lexus in the luxury segment and Daihatsu in the small, low-cost vehicles.

In short, The adoption of six principles can serve as a guide for organizations to eliminate the concept of waste and maximize the usefulness of products by transferring the material as input in another chain [26]. The ReSOLVE method provides primary and secondary metrics for adopting practices that emphasize Regeneration, Sharing, Optimization, Looping, Virtualization, and Exchange². Seeking to remove as much value as possible from products and their components through a restorative and regenerative system from the design, can allow organizations align themselves with circular economy .

Many companies ,such as TOYOTA company, have already adopted part of these principles and are transforming their customers' lives positively, minimizing social and environmental impacts . Greener Cars' rankings of the Greenest cars provide the list of the top eco-friendly cars. Based on an environmental damage

¹ (<https://www.focus2move.com/world-cars-brand-ranking/>, 2022)

² (Sustainable Supply Chain Management in the Route for a Circular Economy)

index, which reflects the cost to human health from air pollution associated with vehicle manufacturing and disposal, the production and distribution of fuel or electricity, and vehicle tailpipes.

TOYOTA company Prius Prime is one of the best-selling hybrids, As the most eco-friendly car of 2022. In this ranking TOYOTA company has two more cars: TOYOTA company Corolla Hybrid and TOYOTA company Camry Hybrid LE in 8th and 10th positions.¹

b. COMPANY BACKGROUND

TOYOTA, as a company, regarded as one of the world's largest auto manufacturers and widely recognized for its quality of products and production systems, can be traced back to 1867, while the inventor and a tinkerer, Sakichi Toyoda was born in a small village in present Kosai, Shizuoka, Japan. In 1926, he started Toyoda Automatic Loom Works, the parent firm of the TOYOTA company Group. Nevertheless, Toyoda's car operations were placed in the hands of his son, Kiichiro Toyoda. It was the year of 1937 that TOYOTA Motor Co. was established as an independent and separate company.

Since the first TOYOTA Crown models imported in the USA in 1957, TOYOTA company started its international business. In the early 1960s, TOYOTA was sold in Europe. In addition, the company increased its business rapidly in the 60's and 70's, and during the years between 1962 and 1972 it produced vehicles domestically from 1 million to 10 million.²

The essence of success for TOYOTA company was its astounding quality reputation with continuous process improvements. The company first caught the world's attention in the 1980s, when it became clear that there was something special about Japanese quality and efficiency. During the 1990s, TOYOTA company began to branch out from producing mostly compact cars by adding many larger and more luxurious vehicles to its lineup. Furthermore, today TOYOTA company is far more profitable than any other auto manufacturer with global vehicle sales of over six million cars per year in 170 countries.

- A. Resources: The resources of this literature review are books, journals, conference proceedings, reports, and web pages;
- B. Software Researchers proceed with the literature review using NVivo 14 Plus qualitative data software;

¹ <https://greencars.org/news/press-releases/plug-and-gas-hybrids-top-greencars%E2%80%99>

² TOYOTA Motor Corporation, Sustainability Data Book (2022)

C. Analysis The query of data processing obtains the most visible to conduct a research entitled "Applying a thematic analysis in identifying the role of circular economy in sustainable supply chain-TOYOTA company Case study-"

The questions presented in the first section will be addressed in this section. According to the findings.

c. Data collection:

In our collection of data sources that will be analyzed in this research, we relied on two rapports which are: *public rapports* and *Sustainable Data Book* of TOYOTA company that published on TOYOTA MOTOR CORPORATION.

d. The tool of analyzing:

In order to achieve our research, we used NVivo14 as the most appropriate software program in this analysis. At least that is what we thought. Qualitative / qualitative analysis (combined with content analysis).

Qualitative analysis methodology:

It has four stages:

a) - Analyzing the content : Finding out what the previous studies focused on and what are the gaps that were not covered, and therefore are open research projects that the researcher can work on.

b) - Theoretical literature, using it to set terminology and develop theoretical literature in a professional manner.

c) - Analysis of secondary data, reports, records, field studies for a company or an organization.

d) - Primary data analysis: report evidence and its aftermath in the qualitative analysis project. Videos. When can we use qualitative analysis and qualitative research methods?

One of its characteristics is non-adherence to a specific approach. The quantitative approach can be used, quantitative analysis or qualitative analysis can be used. The last is the best advantage of mixed analysis. It maximizes the benefit from the positives of quantitative analysis and the positives of qualitative analysis, and access to very strong results and fewer negatives.

Here, it uses different methods of measurement and data collection, and it is free to do so, to compare what was collected in the data and what is recorded in the theoretical side.

Qualitative analysis software

The famous programs for qualitative analysis in scientific research

- "What are the Top Qualitative Data Analysis Software?"

NVivo, ATLAS.ti, Provalis Research Text Analytics Software, Quirkos, MAXQDA, Dedoose, Raven's Eye, Qiqqa, webQDA, HyperRESEARCH, Transana, F4analyse, Annotations, Datagrav are some of the Top Qualitative Data Analysis Software".¹

Within these programs, there are three famous programs among specialists and senior international researchers.

The NVivo14 program will be used in analyzing the data of this study. It is a program developed by the international developer of qualitative research programs QSR INTERNATIONAL, it is a program that supports qualitative research, as it allows collecting, organizing and analyzing the content of reports, group discussions, surveys, audio files, social media and web pages. It is a powerful software that helps researcher to manage data, manage ideas, query data, visualize data, report from data.

In its latest version, The NVivo14 program will give you the opportunity for a free trial period of 14 days. The new addition that distinguishes this version compared to previous versions is network analysis.

It is characterized as an expert program, it has many exclusive features and advantages over other software. Among its advantages:

- Supports many languages, including Arabic and most of the widely used foreign languages.
- Deals with social networks easily.
- supports network analysis.

It handles several different types of files: written, digital content, photos, videos...etc such as:

- Guide Field reports and studies.

¹ د/ خليل شريقي، مرجع سابق.

- Websites and web pages especially Ncapture activation.
- Videos: It also analyzes the content of videos.
- Pictures: Analyze pictures, especially written pictures.

Three: Steps to conduct a qualitative analysis using NVivo14 , the program used in the study:

- The first stage: collecting qualitative data (creating the project), importing the data.
- The second stage: data coding. (There are two types of coding: manual coding and automatic coding). The program auto- forms the codes according to what was mentioned in the data and variables that were given a great weight in the study.
- The third stage: extraction of results and analysis (so that it is rich and has a different meaning) .

Data analysis in this type generally depends on the strength of the researcher in interrogating things that cannot appear to any researcher and may be read from multiple angles whenever the researchers differ (depends on the researchers': efficiency, effectiveness and speed).

Interpretation in this program requires/demands a very strong theoretical construction rather than a huge knowledge of all research terms by researchers'.

Fourth: Approaches and results of qualitative analysis by using the NVivo14 program. There are four approaches:

- The lexical approach.
- Linguistic approach.
- The thematic approach.
- Cognitive cartographies.¹

¹ Addition: : That help to test the study model, therefore, to compare what was collected in the data and what is recorded in the theoretical side

2. Results and Discussion:

▪ Analyzing the results of 2021:

Focusing on the results based on TOYOTA MOTOR CORPORATION, TOYOTA company topped the rankings as the best-selling company in 2022. So, how did it manage to achieve this a year, and what are its goals that it pursued a year before ago or more than that?

As a part of its policies, TOYOTA company has supported 27 projects of NPOs and other non-profit organizations and groups addressing climate change and biodiversity (17 in Japan alone, and 10 in other regions).

- Initiatives through GPSNR:

- In July 2019: TOYOTA company Participated in the "GPSNR" .
- Then, in September 2021: It announced the Policy for "SNRP".
- In 2022: In response to the questions requested by the "GPSNR" regarding.

The status of implementation of this policy, information is being collected in cooperation with suppliers in order to reply by the end of next December.

▪ Discussion the result of research falls into describing the plan, input, classify, code, and query.

A .Plan: Activities of this stage are :

(1- Planning the codes. In our research we have only notes, by using NVivo14, it refers to the process of gathering related material into containers called nodes. If a node is open, there are all the references in the project coded to that node.

(2 -Collecting source: The source of references from reports, PDF documents, videos web pages were essential, input them to the program, including file attachments.

. files that contain attachments are entered into external files stored in NVivo14.

B .Input: The first stage is input references, by importing from The program can be done for samples that have attachments or not. files that contain attachments are entered into external Files stored in NVivo14 is entered into External. Sources

can be imported manually, for example, PDF documents, reports, videos and websites (or automatically)¹.

C .Classification: By default, attribute values are Unassigned and Not Applicable. However, the attribute value can be used to easily identify each sample, namely Qualitative, Quantitative, or Mixed. To assign an attribute value to each reference can be done by specifying a value in the column, located at the far right of the table in Detail View. Then, the resources were divided into categories, .

D .Coding: After entering the data into NVivo14, the next step was coding. Code here is a word or phrase that summarizes or captures the essence of a piece of data. Coding is an analytical process for categorizing data.

Make nodes:

Then, with NVivo14, the nodes planned are usually based on topics.

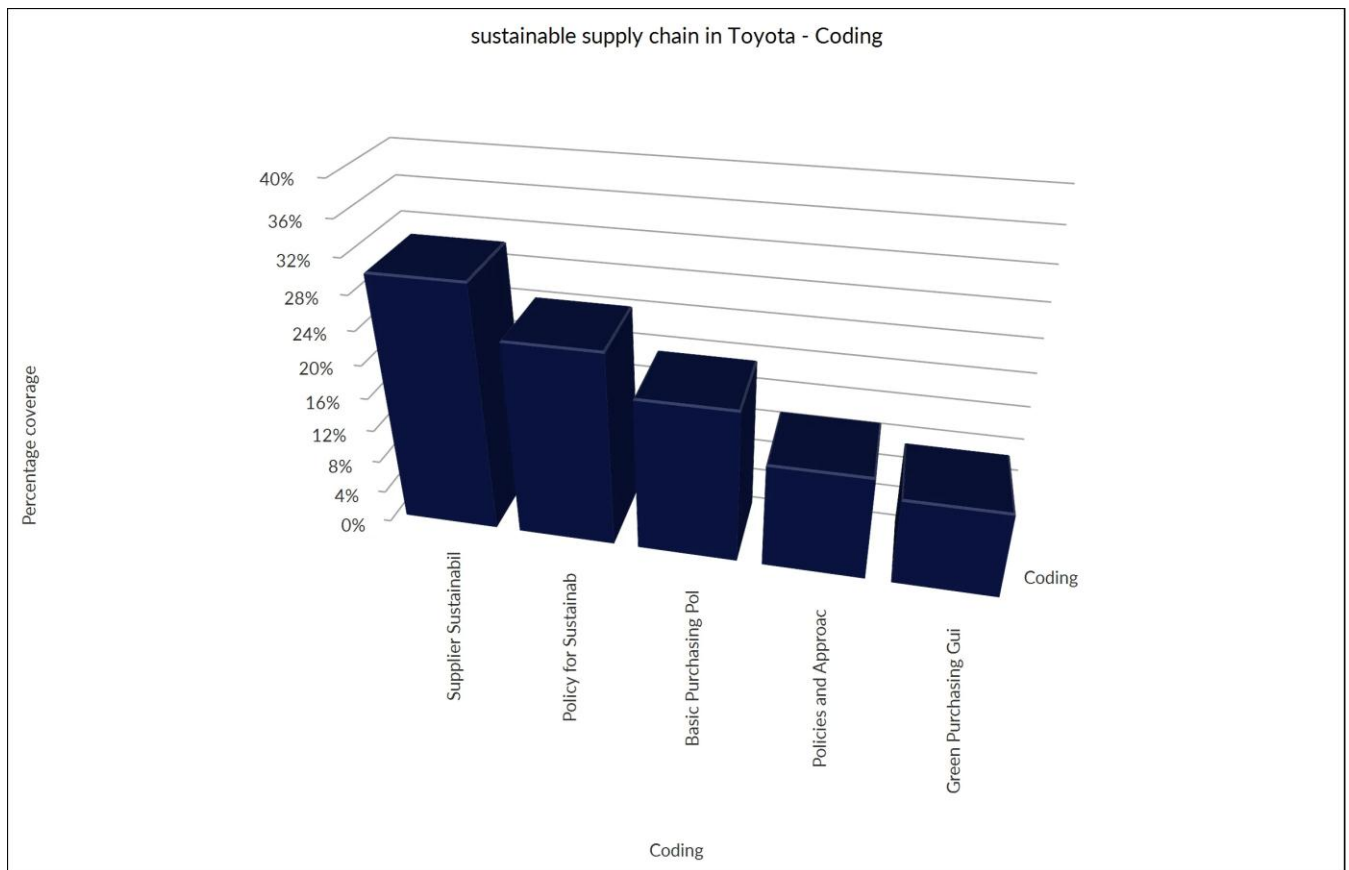
¹ (Authorized licensed use limited to: Consortium - Algeria (CERIST). Downloaded on May 27, 2022)

Analyzing of supply chain on Sustainability Data Book of TOYOTA company:

For this part of the research, we will rely on the TOYOTA company Sustainability Data Book, which is available on its official website. as a basic reference in our analysis of the company's policies in analyzing its supply chain.

The Activity of sustainable element supply chain of TOYOTA company in 2022:

Fig 07: Analyzing of supply chain on Sustainability(Recurring Columns)



(Source: NVivo output)

Semantics Analysis of **Repeated** Columns:

In the above figure, different columns appear, representing the basic nodes of the study and which we extracted according to the program

They are actually the same values that were converted to the first table that is put into the search below. The difference is that there the analysis was done in the language of numbers, but here the analysis relied entirely on representation in a graphic way.

In order to avoid repetition and tautology at the core of the analysis, we will be content with just one analysis, which is the table analysis, and it will include the two results together.

Table 01: Percentage coverage.

N	Coding	Percentage coverage
01	Basic Purchasing Policies	18.91%
02	Green Purchasing Guidelines	10.72%
03	Policies and Approaches to Responsible Mineral Sourcing	12.92%
04	Policy for Sustainable Natural Rubber Procurement	23.90%
05	Supplier Sustainability Guidelines	30.06%

(Source: NVivo output)

As we mentioned before, we transfer our data into nodes, not themes or codes as follows:

The sustainability fundamental policy of today contains the following supply chain elements¹

- Green Purchasing Guidelines Procurement with a Percentage coverage of 10.72%:²

Green Purchasing Policy

Implementation of the Green Purchasing Guidelines

- Ask all tier 1 suppliers, including new suppliers, to implement basic initiatives based on the TOYOTA COMPANY Green Purchasing Guidelines (the “guidelines”), and also deploy and enlighten the guidelines to all tier 2 and subsequent suppliers so that the guidelines will take root.
- Ask through the guidelines that initiatives be taken toward reducing the environmental footprint at each company’s production plants and throughout

¹ TOYOTA Motor Corporation, Sustainability Data Book (2022) , p: 07.

² TOYOTA Motor Corporation, Sustainability Data Book (2022) , p: 20.

the product life cycle, and that related legal compliance be ensured.

* Prioritizing the purchase of parts, materials, equipment and services with a low environmental footprint when manufacturing products

- Overseas Practices related to the Green Purchasing Policy
- Ask the purchasing base in each region to implement the guidelines in line with local conditions and make continuous efforts.

- Policies and Approaches to Responsible Mineral Sourcing Procurement with a Percentage coverage of 12.92%:¹

Environmental Due Diligence at the Time of Purchasing

- Policies and Approaches to Responsible Mineral Sourcing
- Established the Policies and Approaches to Responsible Mineral Sourcing in accordance with the OECD guidance to take into account the impact

on local societies by the procurement of minerals that may cause social problems regarding human rights and environment.

- Due Diligence Policy

- Identify and assess risks in the supply chain together with suppliers, and if any risk is identified, implement appropriate measures that will lead to the mitigation of the risk.

- 6 OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-affected and High-risk Areas

- Responsible Mineral Procurement

- TOYOTA COMPANY has formulated its Policies and Approaches to Responsible Mineral Sourcing based on the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-affected and High-risk Areas. Based on these policies, TOYOTA COMPANY has been implementing measures to avoid human rights issues, such as child labor and forced labor.

¹ TOYOTA Motor Corporation, Sustainability Data Book (2022) , p: 62.

- Basic Purchasing Policies Procurement with a Percentage coverage of 18.91%:¹

Supplier Hotline

TOYOTA company greatly cares about the rights and safety of its suppliers, it has therefore, created a hotline for them to allow them to report any action violating environmental laws, regulations, or business manners that may contained in the supply chain in accordance with TOYOTA company Basic Purchasing Policies and the TOYOTA company Code of Conduct. its Basic Purchasing Policies.

TOYOTA company cooperates with its consolidated subsidiaries in order to prevent information leak.²

Initiatives Related to Our Basic Purchasing Policies

•According to its Implementation of Basic Purchasing Policies worldwide TOYOTA company renounces all kinds of racial or ethnic discrimination and deals with all dealers across the world, through global rights

TOYOTA COMPANY's Basic Purchasing Policies:

1- TOYOTA COMPANY is open and fair to any and all suppliers:

Regardless of nationality, size, or whether they have done business with us before. We evaluate suppliers by quality, technological capabilities, and reliability in delivering the required quantities on time, and their efforts in addressing social responsibilities, such as environmental issues.³

2- Mutual Benet Based on Mutual Trust

We develop mutual benet in long-term relationships. To foster trust, we engage in close communication with suppliers.

3- Localization with Good Corporate Citizenship

TOYOTA company aims to contribute to the local society and be a good corporate citizen by – actively- procuring from local suppliers, including parts, materials, tools, equipment and other materials.

¹ TOYOTA Motor Corporation, Sustainability Data Book (2022) , p: 73.

² TOYOTA Motor Corporation, Sustainability Data Book (2022) , p: 82.

³ TOYOTA Motor Corporation, Sustainability Data Book (2022) , p: 71

- Policy for Sustainable Natural Rubber Procurement with a Percentage coverage of 23.90%:¹

Promote biodiversity conservation activities based on the TOYOTA COMPANY Policy on Harmony with Nature and the Policy for Sustainable Natural Rubber Procurement toward the building of a sustainable society in harmony with nature. Policy for Sustainable Natural Rubber Procurement

- TOYOTA COMPANY proceeds to eliminate deforestation and ecosystem conversion from our supply chains.

- Believing that protection of forests and other natural ecosystems is critical for maintaining biodiversity, combating climate change, and sustaining livelihoods, we have formulated the Policy for Sustainable Natural Rubber Procurement for natural rubber used in cars.

- This policy features the following:

- Being aligned with the Policy Framework that was adopted in a September 2020 resolution by the General Assembly of the Global Platform for Sustainable Natural Rubber (GPSNR), of which TOYOTA COMPANY is a member

- Respecting the principles and guidelines laid out in the UN Guiding Principles for Business and Human Rights and the ILO fundamental conventions

- Supplier Sustainability Guidelines Procurement with a Percentage coverage of 30.06%:²

Compliance with the Guidelines

- Referred to the possibility that if we do not observe improvement after the occurrence of a supplier's violation of the guidelines, such as non-compliance with laws and regulations, the transactional relationship may be subject to review.

- Already informed tier 1 suppliers of these points by including them in the Supplier Sustainability Guidelines (revised in 2021). Engagement with Business Partners (Supply Chain Due Diligence)

¹ TOYOTA Motor Corporation, Sustainability Data Book (2022) , p: 33

² TOYOTA Motor Corporation, Sustainability Data Book (2022) , p: 72

- Supplier Sustainability Guidelines includes a requirement for suppliers to ensure thorough compliance with laws and regulations, and to respect Human Rights.

- TOYOTA COMPANY works together with suppliers on risk monitoring, tracking and remediation, which then also allows for guidance and support for potentially affected stakeholders.

- Methods for working with suppliers include:
 - Direct collaboration with Tier 1 suppliers and group companies.
 - Collaboration with other stakeholders for Tier 2 suppliers and deeper.

Dissemination within the company

- The policy was disseminated to all employees through the internal Human Rights training contents.

*Education Related to Human Rights

- Support and training were provided to specific divisions like Purchasing, Sales and Business Planning in order to integrate Human Rights within policies and processes.

*- Example : This has so far led to the incorporation of specific Human Rights statements within TOYOTA COMPANY's Supplier Sustainability Guidelines,

Dealer Basic Contracts, and into the new business planning guidelines.

Sharing TOYOTA COMPANY Supplier Sustainability Guidelines

- Importance of sustainability initiatives is communicated towards suppliers with a request that suppliers carry out their business activities in line with the Sustainability Guidelines (established in 2009, last revision in November 2021).

- Revisions in 2021: Sections related to the environment and human rights were expanded to reflect the increasing importance of environmental and human rights issues.

- Over 90% of TOYOTA COMPANY's suppliers in Japan have added their legal representative sign to the list of suppliers that support the purpose of the Guidelines (as of July 2022).

- The Guidelines clearly indicate that suppliers in Tier-1 must expand the implementation of the Guidelines to suppliers in Tier-2 and beyond in order to disseminate these principles throughout the supply chain.

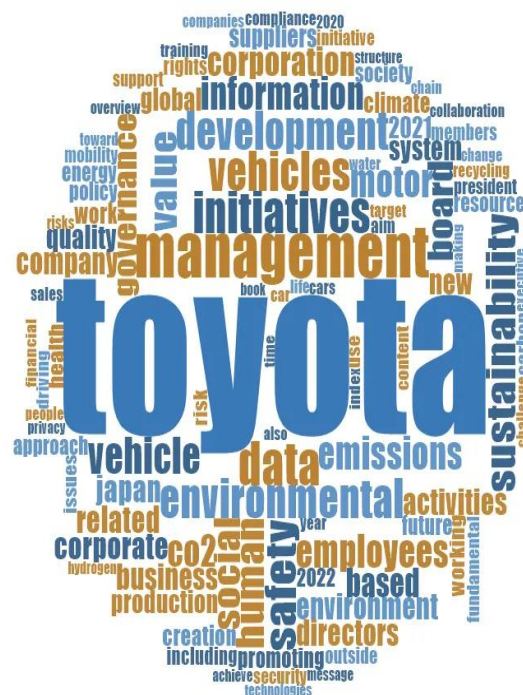
- The Guidelines have also been implemented globally to overseas suppliers through regional purchasing divisions.

sustainability fundamental policy of today contains the following elements

1) - Word Frequency Query:

Usually, this allowed researchers to determine the number of times the selected item appears. Seeing how many words appear could help identify themes and concepts. Word clouds of Word Frequency Query Figures (as shown in Fig. 5)

Fig 08: The word cloud

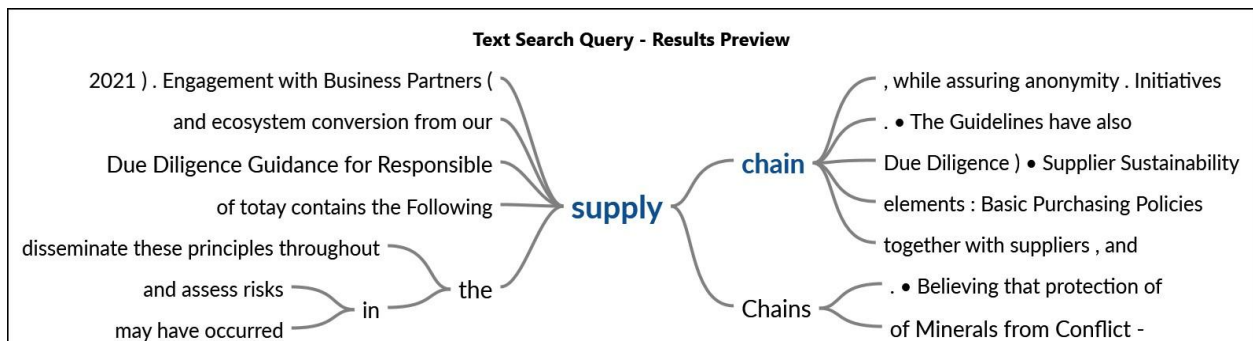


(Source: NVivo output)

In the word cloud above, word analysis shows that word frequency is related to the relative weight of words in company policies. So, that the greater the relative weight of the word, it will appear in the cloud, and this means that it is classified within the words associated with the general restrictions of TOYOTA company. For example, we can say that the frequency of the following words: mining, initiatives, sustainability, in the word cloud TOYOTA company is directly proportional to their relative weight in the company's policies. After, TOYOTA COMPANY attaches great importance to these general restrictions: management, sustainability, and safety. Then, to a lesser extent, we find that it pays relatively less attention to each of: security, surroundings, and initiatives. Then, less attention to each of: users, information

This confirms that the interpretation of the repetition of words in the cloud is due to the size of its relative weight, which reflects its importance and the extent of its impact on the studied phenomenon (TOYOTA COMPANY Company), and that, of course, is according to what was mentioned in the general restrictions of the company.

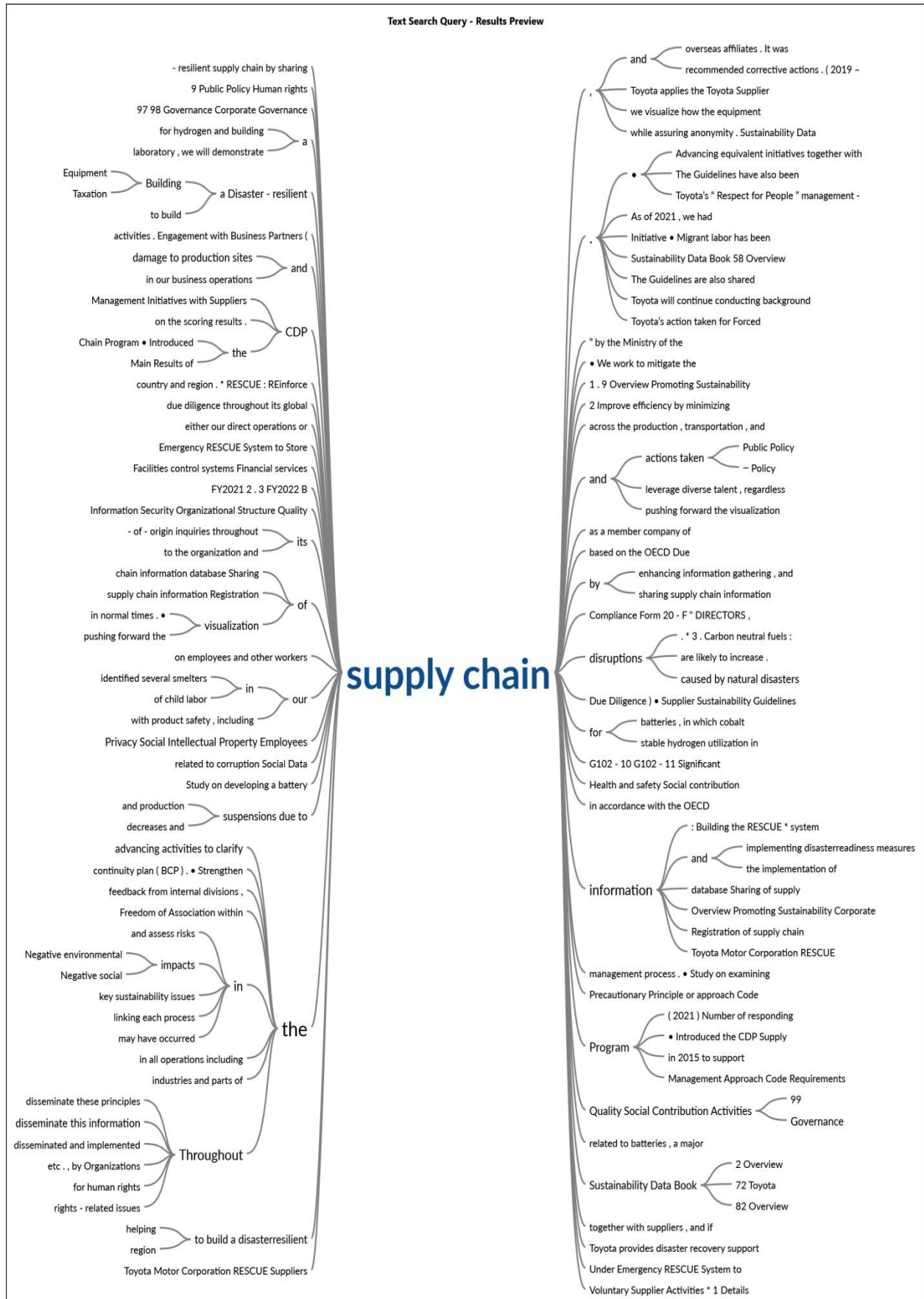
Fig 10: Example of test search auery results 1



(Source: NVivo output)

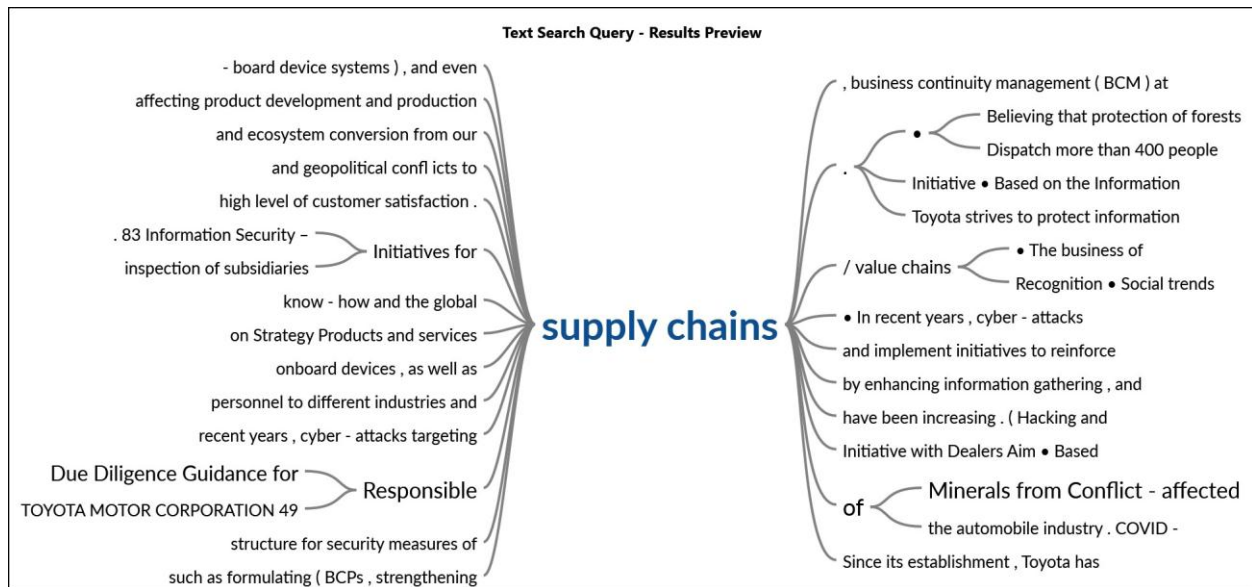
According this result, we can say that both supply and supply chains are mentioned in TOYOTA Guidelines, this refers to the importance of any one of them . We can say - also- that TOYOTA Motor Corporation focuses on them as a part of its support for Sustainability .

Fig 11: Example of test search query results



(Source: NVivo output)

Fig 12: Example of test search query results 3



(Source: NVivo14 output)

Word tree analysis

The analysis shows the relationships of which the studied word is a part, in order to examine the relationships in their sources and branches, and to study the impact of all of these, mainly on the general policies of the company under study.

The greater the branching, the greater this indicator of the fertility of the term and its importance to decision makers and policy makers to the general public in the corporate charter. vice versa.

The more divergent the origins, the more this indicates the diversity in the nodes that are relevant to the causes of the term studied.

In our study, the repetition of some terms shows their importance:

For example the importance of: distribution, information and software in the supply chain

Fig 13: Example of test search query results 4



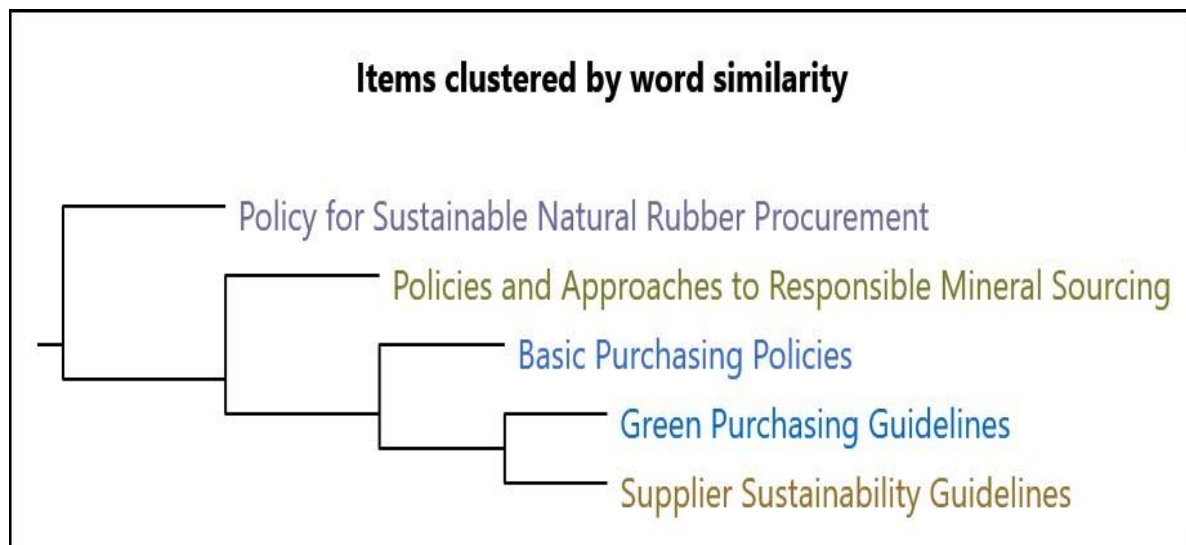
(Source: NVivo14 output)

The figure above shows that Responsible supply chains has significance in both two public reports: *Sustainable Data Book* of TOYOTA company and in TOYOTA MOTOR CORPORATION, thus we can say that they are important.

We can also read from the same analysis that Brother is mainly focused on minerals from conflict-affected-affected.

Analysis of linkage policies

Fig 14: Example of test search query results 5



(Source: NVivo output)

The figure shows the analysis of interactions between different nodes. There appears to be an interaction between green procurement guidelines and supplier sustainability guidelines. Green Procurement Guidelines or Supplier Sustainability Guidelines together with Core Procurement Policies, while there is no interaction between Green Procurement Guidelines alone or Supplier Sustainability Guidelines alone with Core Procurement Policies.

In the same way we can detect a new interaction between the interaction of the previous group with Policies and Approaches to Responsible Mineral Sourcing.

Again, in the same way we can detect a new interaction between the previous one with Policy for Sustainable Natural Rubber Procurement.

Table02: Pearson correlation coefficient.

Code A	Code B	Pearson correlation coefficient
Supplier Sustainability Guidelines	Green Purchasing Guidelines	0.404137
Supplier Sustainability Guidelines	Basic Purchasing Policies	0.265615
Green Purchasing Guidelines	Basic Purchasing Policies	0.226833
Policies and Approaches to Responsible Mineral Sourcing	Basic Purchasing Policies	0.081905
Supplier Sustainability Guidelines	Policies and Approaches to Responsible Mineral Sourcing	0.068322
Policies and Approaches to Responsible Mineral Sourcing	Green Purchasing Guidelines	0.00528
Policy for Sustainable Natural Rubber Procurement	Green Purchasing Guidelines	-0.001323
Supplier Sustainability Guidelines	Policy for Sustainable Natural Rubber Procurement	-0.007938
Policy for Sustainable Natural Rubber Procurement	Policies and Approaches to Responsible Mineral Sourcing	-0.026056
Policy for Sustainable Natural Rubber Procurement	Basic Purchasing Policies	-0.060676

(Source: NVivo14 output)

Correlation coefficient analysis of the text as in the above table yielded mixed results, some with positive results, others negative,

The values of the correlation coefficient show the extent of the correlation between the two variables: a and b.

From the values, we find that the correlation between the nodes has different proportions. It immediately appears that the highest value is between the first variable Supplier Sustainability Guidelines and the second variable Green Procurement Guidelines in proportion. This means that there is a strong correlation between the two variables and that the interactions between them are greater than any interaction between any other variables in the group.

In the immediate next degree, we find the second correlation coefficient value between: supplier sustainability guidelines as a first variable and basic procurement policies as a second variable.

In the third place, we find, as the first variable, the green purchase instructions and among the basic purchase policies as the second variable, with nearly half the value of the highest percentage in the table.

And so on until we reach the sixth value and at the lowest correlation coefficient between the green purchase instructions as a second variable, which is the last positive value that appeared in the table.

In our case, having some relationships with negative values, which appeared four times may be normal, because all the symbols in this table actually belong to one component.

Conclusion

Analyzing using NVivo14 was considerably shorter and huge than using a traditional manual method. Using the manual method needs more time to locate and prepare documents, then producing and editing references. According to the analysis which made between September 2022 and May 2023, we found the relations of words or themes. After the Word Frequency Query, the most appeared word was: supply chain. And also, there was a relation between the concepts of sustainable supply chain and circular economy.

There are gaps in previous research, but further research can develop the role of circular economy in sustainable supply chain in TOYOTA company.



Conclusion



The supply chain is a loop that begins and ends with the customer. All materials, finished products, information and deals flow through this loop. It is also a moving network of facilities for all companies with their different and contradictory goals. It is used as a description of all the interrelated elements and processes needed to ensure the right quantity, at the right time, and at the lowest possible cost. Thus, supply chain management represents a mixture of science and art in order to achieve improvement in the way the company obtains the raw materials necessary for production. Or providing or delivering the service or shipping it to the workers.

The present study represents the issue of exploring sustainable supply chain practices under context of Automotive manufacturing industry. In addition, its relationship with circular economy. As it has been mentioned before, Content analysis and Thematic analysis which represent the two parts of the mixed Methodology is used to conduct the present research. Each has its uses and drawbacks. Content analysis is used to give a clear overview about the subject of the study. Also, the thematic analysis will be used to examine the relation between their variables.

This part of study draws forth the primary contributions of the study as well as the most important managerial implications resulting from the research findings. It also revisits the research objectives and submitted questions that discussed, and suggestions for potential future research directions are made. The study formulated main research question and tree sub research question following:

- **What impact does the implementation of sustainable supply chain?**
- **RQ1:** What are the components of TOYOTA COMPANY's company sustainable supply chain?
- **RQ2:** What is the important implementation of sustainable supply chain in TOYOTA COMPANY?
- **RQ3:** Which factors endogenous and exogenous to TOYOTA COMPANY need to be in place for implement sustainable supply chain practices

Based on the empirical results, in this study, thematic analysis and Content analysis are used and are performed by using NVivo 14 software. The final report furnished one themes, five principal nodes are: (1) Basic Purchasing Policies, (2) Policies and Approaches to Responsible Mineral Sourcing, (3) Green Purchasing Guidelines, (4) Supplier Sustainability Guidelines, and (5) Policy for Sustainable Natural Rubber Procurement. These five principal nodes are the components of

sustainable supply chain practices in TOYOTA COMPANY company. At the same time these five are the important implementation and factors endogenous and exogenous influencing TOYOTA COMPANY's sustainable supply chain practices.

The findings broadly provide opportunities for further research. In addition, the outcomes elicited within this research open up several future research avenues, providing further research directions. In light of this, the following areas for future work are central :

- Verifying the existence of competitive pressures within sustainable supply chain practices ;
- Developing and validating a set of relevant measures for the social performance dimension consistent with the SSCM context ;
- Examining other company in the some market and other markets or different country.

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