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How to Implement a Sustainable Green Strategy

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Sustainability and Circular Economy. How to Implement a Sustainable Green Strategy

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ABSTRACT

The purpose of this study is to analyze the strategic role of sustainability and a circular economy for a green strategy. This study adopts a methodology based on primary and secondary data. There are identified and analyzed strategies and critical success factors for sustainability. The study permits the discovery of some positive strategies for improving the strategy of sustainability and circular economy strategy with good social implications.

Lo scopo di questa ricerca è di analizzare il ruolo strategico della sostenibilità e di economia circolare per una strategia ecosostenibile. Questo studio adotta una metodologia basata sia su dati primari e secondari. Sono individuate e analizzate le strategie e i fattori critici di successo ambientali sostenibili. La ricerca permette di scoprire alcune strategie positive per migliorare la strategia di sostenibilità e di economia circolare con buone implicazioni sociali.

Keywords: circular economy, green strategy, sustainability, strategic vision, environmental strategy, innovation

1 – Introduction

Sustainability and circular economy (Lacy *et al.* 2015; Porter and Kramer 2011; Scarpellini *et al.* 2020; Albelda 2011; Patten and Shin 2019; Shen *et al.* 2020; Windolph *et al.* 2014; Nguyen *et al.* 2014; Mella 2012, 2014a,b; Pilotti 2019) is an important area of research (Mirabella *et al.* 2014; CIRAIG Research Unit 2015; Gazzola and Mella 2003, 2006). The primary aim of the present research is to examine the strategy of sustainability in a contest of circular economy based on the case of Eni spa. There is a lack of research on intentional leader firms in this sector. This paper intends to fill this gap. We analyze the case of Eni Spa, whose headquarter, and laboratories are in San Donato (near Milano in Italy). Based on the past studies we develop two specific detailed research questions:

RQ1: What is the role of the strategy of sustainability and circular economy?

RQ2: What are the critical success factors of sustainability and circular economy strategy?

To answer the *first question*, we have analyzed the process of a strategy of sustainability and a circular economy based on the strategic planning of Eni. For answering the *second question*, we have outlined the critical success factors of sustainability and circular economy strategy.

The outline of the paper is as follows: the second section describes the theoretical review and the third the methodological aspects; the fourth section reports the case of Eni spa; the fifth section sum up the relevance and the discussion of the critical factors that could have led to success and the last one concludes.

2 – Theoretical background

The organizing principle for sustainability (James *et al.* 2015; Porter and Kramer 2011; Pilotti 2011, Goldratt, 1992; Chase R. and Jacobs, 1992) is sustainable development, which includes the four interconnected domains: ecology, economics, politics, and culture (Patten and Shin 2019, Mella 2012; Camagni, 1996) (see Table 1).

	NOW AND FUTURE	**PAST**		
PERIOD	**2010-2030**	**1990-2000**	**1970-1990**	**1950-60**
	CIRCULAR ECONOMY SUSTAINABILITY STRATEGIC INNOVATION VIRTUAL ORGANIZATION	Integrated control Balance scorecard approach	Stakeholder approach	Budget and Corporate Planning
FOCUS	GREEN ECONOMY: a – focus on investing in green economic activity infrastructure and skill b – eco-efficient production and responsible consumer behavior			

Tab. 1 – Strategy and evolution of main theories (Source: our elaboration James *et al*. 2015)

During the time we can notice and evolution toward sustainable manufacturing (see Figure 1) with the evolution of the criteria to manage the strategy (Zink and Geyer 2017, Burritt and Schaltegger 2012; Gibassier *et al.* 2020; Luque-Vílchez *et al.* 2019; Mayo 2011; Oduro and Haylemariam 2019; Zhuming 2011; Mitzberger *et al.* 1998; Hax and Mailuf,1991; Pilotti 2005,2011,2017,2019; Riva 2006; 2007a,b,c, 2008; Coda 1988; ; Gazzola and Mella, 2017 ;Grant 2016; Riva and Pilotti 2017, 2018a,b, 2019a,b, 2020a,b, 2021a,b; Porter 1980,1985,1989,1991; Collins, Montgomery 2005; Senge, 1999; Gazzola and Colombo 2014).

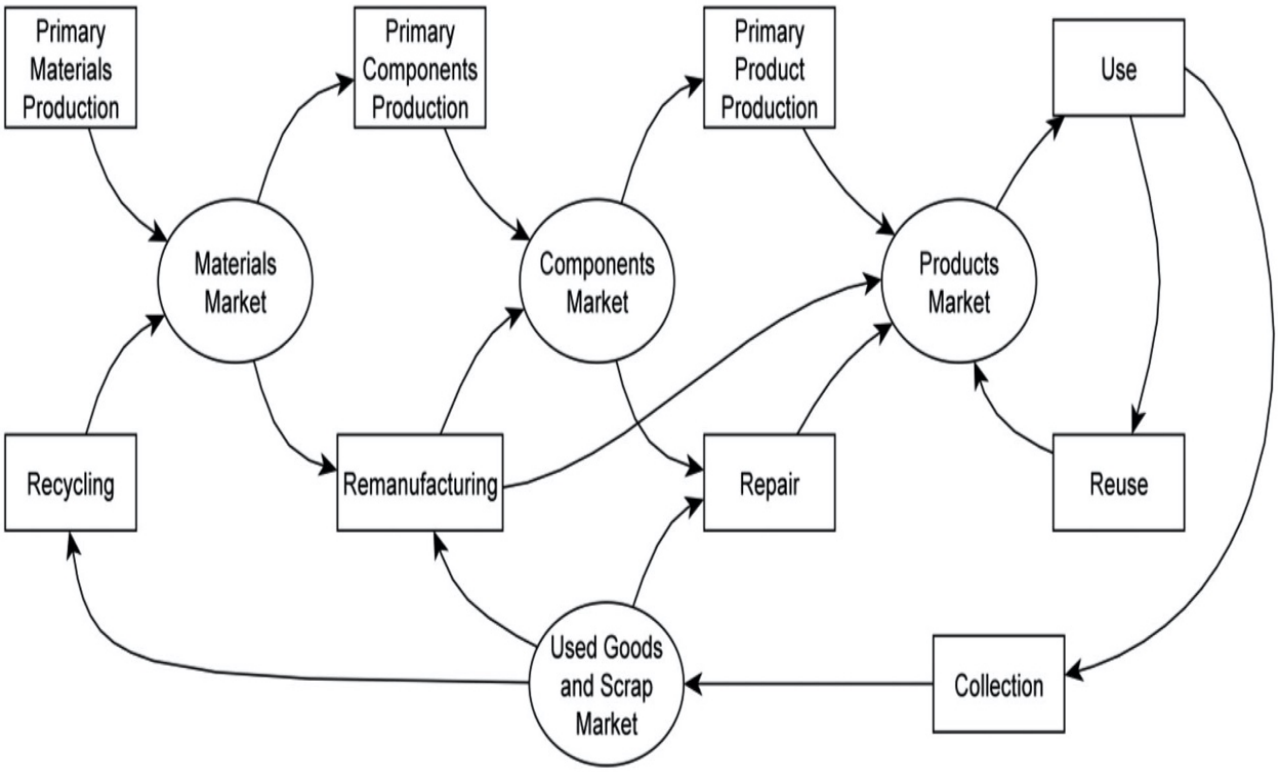


Fig. 1 – The circular economy framework (Source: elaboration from Zink and Geyer 2017)

Some studies analyze how to improve many areas and processes in the enterprise with the integration of green sustainability strategy (see Table 2).

1.	JOURNAL	PAPERS	CITATION	H index
2.	Journal of Cleaner Production	43	1134	16
3.	Resources Conservation and Recycling	26	539	12
4.	Sustainability (Switzerland)	20	246	9
5.	Science of the Total Environment	18	202	9
6.	Waste Management	18	212	8
7.	Waste Management and Research	10	78	5
8.	Bioresource Technology	9	381	7
9.	Environmental Engineering and Management Journal	7	15	1
10.	E3s Web of Conferences	6	7	2
11.	Energies	6	9	2
12.	Top Conference Series: Earth and Environmental Science	6	6	1
13.	Renewable and Sustainable Energy Reviews	6	63	4
14.	Environmental Science and Pollution Research	5	47	4
15.	International Multidisciplinary Scientific Geo conference Surveying Geology and Mining Ecology Management	5	0	0
16.	ACS Sustainable Chemistry and Engineering	4	24	2

Tab. 2 –Main Journal and publication on circular economy 2007-2020 (Source: our elaboration from Scopus database and Negrete- Cardoso *et al.* 2021)

Relevant publications are some papers that focus on circular economy (see Table 3) and sustainability.

	AUTHORS	DATE	JOURNAL	FOCUS	Citations	Citations for Year
1	Pan S-Y	2015	Journal of Cleaner Production	Supply chain Option for waste to energy option	223	32
2	Malinau-skaite J.	2017	Energy	Survey to reconvert waste in energy in municipal manager	218	44
3	Nizami As.	2017	Bioresource Technology	Focus on enabling circular economy in developing countries	168	34
4	Lacy P.	2016	Waste to Wealth: The Circular Economy Advantage	Circular economy	161	27
5	Singh J.	2016	Journal of Cleaner Production	Circular economy and Waste management	146	24
6	Hu J.	2011	Journal of Cleaner Production	Circular economy	141	13
7	Haupt M.	2017	Journal of Industrial Ecology	Circular economy	99	20
8	Huysman S.	2017	Resources Conservation and Recycling	Circular economy	98	20
9	Tisserant A.	2017	Journal of Industrial Ecology	Circular economy and solid waste	97	19
10	Liguori R.	2016	Bioresource Technology	Circular economy and waste biorefinery	93	16

Tab. 3 – Main publication on circular economy 2007-2020 base on citation Scopus database
(Source: our elaboration from Scopus database and Negrete- Cardoso *et al.* 2021)

The focus of many types of research is to discover how to apply the global principle (integration of social, economic, and environmental factors) in concrete practices for the firms in the ecosystem system. This research intends to give a contribution to this important and relevant problem.

3 – Methodology

We base our study on the case of ENI (with headquarter in San Donato near Milano in the north of Italy). Eni can be considered an interesting case also because:

a) Eni Spa is the largest Italian company with a market capitalization of US$ 36.40 billion as of 31 December 2021:

b) it won the Corporate Social Responsibility Award from Foreign Policy association in 2015 (Glaser and Strauss, 1967) (Eisenhardt, 1989) and also the prize Oscar del Bilancio in 2018 from FERPI Federazione Relazione Pubbliche Italiane and Borsa Italiana and Bocconi University;

c) it creates the international Eni award for encouraging better use of energy sources.

We analyze the case based on the previous literature using a procedure in some steps, shown in Table 4).

PHASE	**(1) LITTERATURE REVIEWS**	**(2) ANALYSE SYNTHESIS**	**(3) COLLECT DATA**	**(4) DATA ANALYSIS**	**(5) SYNTHESIS**
TARGET /AIM	LITERARY REVIEW OF RESEARCH QUESTIONS (RQ1 AND RQ2) *Q1: What is the role of the strategy of sustainability and circular economy?* *Q2: What are the critical success factors of sustainability and circular economy strategy?*	DEVELOP FIRST VERSION RESEARCH MODEL	DEEP ANALYSIS	DISCUSSION AND INTERPRET AND ANALYZE THE DATA	DEVELOP A SECOND VERSION OF THE MODEL
ACTION	**Identification** of main relevant resource and concepts	**Develop** basic general framework and interview guide	**Understand** the secondary data an and conduct interview	**Create** a general framework	**Theorize** prepositions and concepts

Tab. 4 – Phases of research steps (Source: our elaboration from Glaser and Strauss, 1967; Eisenhardt, 1989)

About secondary data, we study a set of data and documents (see Table 5).

MAIN SECONDARY DATA	**FOCUS**
SUSTAINABILITY REPORT ENI 2018-2019-2020 with application Gri Index (Sustainability Report Standard) (*source: ENI)*	on sustainability strategy
STRATEGIC PLAN 2019-2022, ENI SPA (*source: ENI)*	on strategic plan
ENI CARBON NEUTRALITY BY 2050 (*source: ENI)*	on ecological solution
ENI FINANCIAL REPORT 2015-2016-2017-2018-2019-2020-2021 (*source: ENI*)	on strategy

SUSTAINABILITY REPORT ENI REWIND 2018 (*source: ENI rewind)*	on sustainability
PERFORMANCE OF SUSTAINABILITY 2018 2019 (*source: ENI)*	on sustainability

Tab. 5 – Eni secondary data used in this research (Source: our elaboration)

Regarding primary data, we collect data and information by contact and interviewees with the experts (see Table 6) about the areas of researches (see Table 7).

Expert about sector	9 interviews
Member of Public administration	1 interview

Tab. 6 – Interviewees (Source: our elaboration)

The method of case study is used because it permits to underline the main innovations and the strategy during the time.

1) **What is the *role of the strategy* of sustainability and circular economy in Eni spa?**	- strategic guidelines - system of control - priorities - activity-project - metrics - sustainable manufacturing
2) **What are the *critical success factors* of sustainability and circular economy strategy of Eni?**	- the best practices - history - innovation -waste management - safety - low carbon strategy

Tab. 7 – Main issues covering during the interviews (Source: our elaboration from Eni 2018a,b,c; 2019a,b,c; 2020a,b; 2021)

4 – The case of Eni

4.1 –The history of the company

In 1952 Enrico Mattei, the charismatic leader of Eni, decided to build the quartier of san Donato called Metanopoli based on the principles of environmental sustainability and efficiency; the planning vision of Mattei is based on the models of some important industrial cities of the United States. Eni spa is one more important company for the capitalization of any Italian company (Borsa Italia 2021; Ratti *et al.* 2015; Perrone 1995; Grant 2016) (see Table 8).

Phase	Time	Milestones	Focus	Focus market	Product	Green strategy and Crs
1	**1953 1970**	**Company Founded by Enrico Mattei (died in 1962 27 October)**	Starting point Production of the energy sector	internal	Acquire and commercialization of oil and derivates	**Classic line system and for project Mass production**
2	**1970-1990**	**Consolidate its position in the international market**	Important collaboration with Algeria, Egypt, Nigeria, Nigeria, Tunisia	internal	Infrastructure for transporting natural gas over long distance	**Focus on innovation quality management and quality**
3	**1990 2000**	**Acquisition of important participation and international acquisition and new exploration**	In 1992 Eni enter in Italian and New York Stock Exchange Collaboration with Russia to import the Russian Gas in Europa	open	Diversification	**Quality Management**
4	**2000-2010**	**Globalization**	Important gas discovery in Mamba	international	Development of HPC4 and HPC5 to fast Exploit of oil and gas reservation Photovoltaic production	**Lean Management TPS Robots**
5	**2010-2021**	**Diversification Global market and production**	2014 New plan for the refineries into biorefineries 2016 Progetto Italia to create new renewable sources production palm	global	Best practice sharing	**Create new renewable sources production palm Green and sustainable**

Tab. 8 – The evolution of the strategy and system of production in Eni (Our elaboration from Eni 2018a,b,c; 2019a,b,c; 2020a,b; 2021)

4.2 – Eni's Laboratories in San Donato specialized in research and development for the oil and gas sector (Metanopoli)

San Donato is a little city near Milan in the north of Italy. In November 2014 Eni and San Donato city signed an accord for developing innovative initiatives (Belussi and Hervás-Oliver 2016; De Lotto 2008), to permit to be the first truly smart city, in Italy and thus enable residents and workers to move comfortably and sustainably, to benefit from innovative services In the city are located. Eni is a global company with an international strategy (see Table 9)

The strategic vision of Mattei Enrico, was for the firm Eni to become a global, international oil and gas company; he developed an important strategic vision; but he, important head of Agip (Azienda Generali Italiana Petrolio), died in a plane crash in 1962. (Collins and Montgomery, 2005; Grant 2016, Covey 1999; Porter 1989, Riva and Pilotti 2019 a,b; 2020). Now Eni is an international global company.

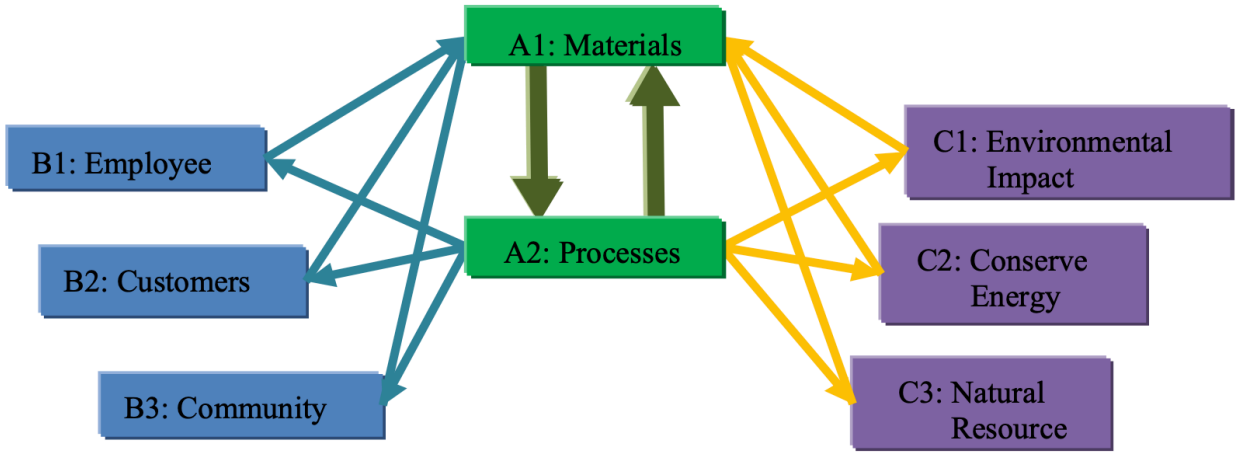
ENI SPA			FOCUS
Operating countries			68
Employers			31,000
Operating profit (2020)			1.9 bln
STRATEGY	**I) A LOW IMPACT FUTURE**	**II) ALL-ROUND EXCELLENT**	**III) CREATING VALUE AND GROWTH**
FOCUS	AN INTEGRATED STRATEGY FOR AN ENERGY TRANSITION TOWARDS A MORE SUSTAINABLE LOW-CARBON FUTURE.	Respect people, the environment, safety, transparency, and human rights in its work. Promote the abilities and talents of the individual and respect diversity	The relationships of trust we build in the countries in which we operate are what makes our approach distinctive. Eni works with local authorities and other relevant bodies to foster social and economic development in the area.
STRATEGY	PROTECTING THE ENVIRONMENT AND DEFENDING PEOPLE'S HEALTH	Eni sees its people as its most important stakeholder's internal expertise, a heritage that is built with time and dedication and that increases its value in the long term. they are the the key element that allows us to strive for ever-more ambitious targets.	Respected people, the environment and safety in our work

Tab. 9 – Integration of methodologies in Eni (Source: our elaboration from Eni 2018a,b,c; 2019a,b,c; 2020a,b; 2021)

4.3 - Develop and measure metrics for low impact strategy

In Eni spa is important the ability to create the general conditions for *low impact strategy* (see Figure 2). A definition of a metric of sustainable manufacturing permits to control the process of the circular economy.

Based on respect for people, the environment, safety, transparency, and human rights. Eni's strategy for the circular economy (Stahel 2010; Naustdalslid 2014) involves innovation throughout the value chain. These factors permit also measuring Eni's green sourcing performance.



Metrics in Sustainable Manufacturing:
- A1 -A2: Cost, productivity, inventory, efficiency,
- A1 -C1: Ecological footprint, pollution (air, water, land), and...
- A1 -C2: Mechanical and thermal energy, energy consumption ...
- A1 -C3: Recyclability, extrusion of materials, reuse of materials,
- A1 -B1: Safety, automation,
- A1 -B2: Function, time, quality, personalization, service...
- A1 -B3: Reputation, popularity, Logistics, plant layout, job market,

Manufacturing Activities:
- A1 -A2: Planning, scheduling, controlling,...
- A2 -C1: Waste management
- A2 -C2: Reduce, recycle, redesign...
- A2 -C3: Reduce, recover, and recycle,...
- A2 -B1: Ergonomics, training, automation,...
- A2 -B2: Make to Order, leasing, rental, ...
- A2-B3: Infrastructure, construction, training,...

Fig. 2 – Metric for measure the low impact strategy (source: elaboration from Zuming 2011)

5 – Discussion and managerial implication

5.1 – Objective, aim, actions, implementation, and results of circular strategy in Eni

Eni increased commitment to renewables is expected in 2018-2021, with an investment in profitable projects of around €1.2 billion and a potential installed capacity of around 1 GW. By 2021 Eni has a global strategy for the renewable energy business, through a distinctive model based on 3Rs (reduction, reuse, and recycling (see Table 10).

Eni guarantees operational sustainability through a business model geared towards innovation and the achievement of long-term objectives. Eni has a deep commitment to reducing its carbon footprint. For controlling the evolution is important is a clear definition of strategy by a map of the processes on the main strategies. For Eni they are a low impact future, all-around strategy, creating value and growth. The aim is to understand the evolution and the gaps from the performance targets, reviewing and monitoring results (Khanna *et al.* 1998).

MAIN TARGET	AIM	ACTION	IMPLEMENTATION	RESULTS
CIRCULAR ECONOMY: all production should follow the 3rs:	1) Preserve and enhance natural capital 2) Optimize resource yields by circulating products, components 3) Foster system effectiveness	Use as little physical resources as possible to reduce the pressure on the natural system Make sure that when reuse is impossible the products can be easily and effectively, repaired and recycled More sustainable relationship between humans and nature.	Capability to implement and manage projects, Managing complex projects; Integrated organic growth, Cooperation with Eni's Research and development function	In 2017 alone, 800 tons of waste vegetable oil was collected, recovered, and processed for use either as lubricants or energy. Additional actions Eni uses to increase business in biofuels, biobased chemicals, and new energy.

Tab. 10 – Circular economy strategy in Eni: main strategy (Source: elaboration from Eni 2018a,b,c; 2019a,b,c; 2020a,b; 2021)

5.2 – Definition of a set of KPIs

The process of implementation of Eni strategy of sustainability and circular economy is divided into several stages (see Table 11):

a) to develop a shared vision (social, economic, and environmental strategy);

b) to establish challenging goals;

c) to obtain strategic feedback and learning.

5.3 – Target and results in circular economy in Eni

The strategy of the circular economy in Eni (Eni 2018a,b,c; 2019a,b,c; 2020a,b; 2021) is based on waste reduction, reuse, and recycling to perform the EU target for recycling 70% of packaging waste by 2030; there are also recycling targets for specific packaging materials (paper and cardboard: 85 % ferrous metals: 80 %; aluminum: 60 %; glass: 75 %; plastic: 55 %; wood: 30 %).

The Eni intends to develop a sustainable manufacturing system and strategy of manufacturing and reverse manufacturing based on 3Rs strategy (Reuse, Reduce, Recycle) (see Figure 3).

AREA	AIMS REDUCTION WASTE	FOCUS	GREEN IMPACT
Emission Energy efficiency People Knowledge Management Health Safety	Overproduction Unnecessary inventory Transport Unnecessary motion Defects Inappropriate processing Waiting Lost people potential	Carbon Efficiency Index Energy Consumption Training, Equal Opportunities Participant In The Knowledge Employees In A Health Service Program The Total Recordable Injury Rate	Unnecessary use of raw materials Excessive use of space and cost Energy usage oin transports and co2 Energy and consumption Waste of raw materials and energy Unnecessary energy and raw materials Waste of energy and time

Tab 11 – Main sustainable strategy in Eni (Source: our elaboration from Eni 2018a,b,c; 2019a,b,c; 2020a,b; 2021)

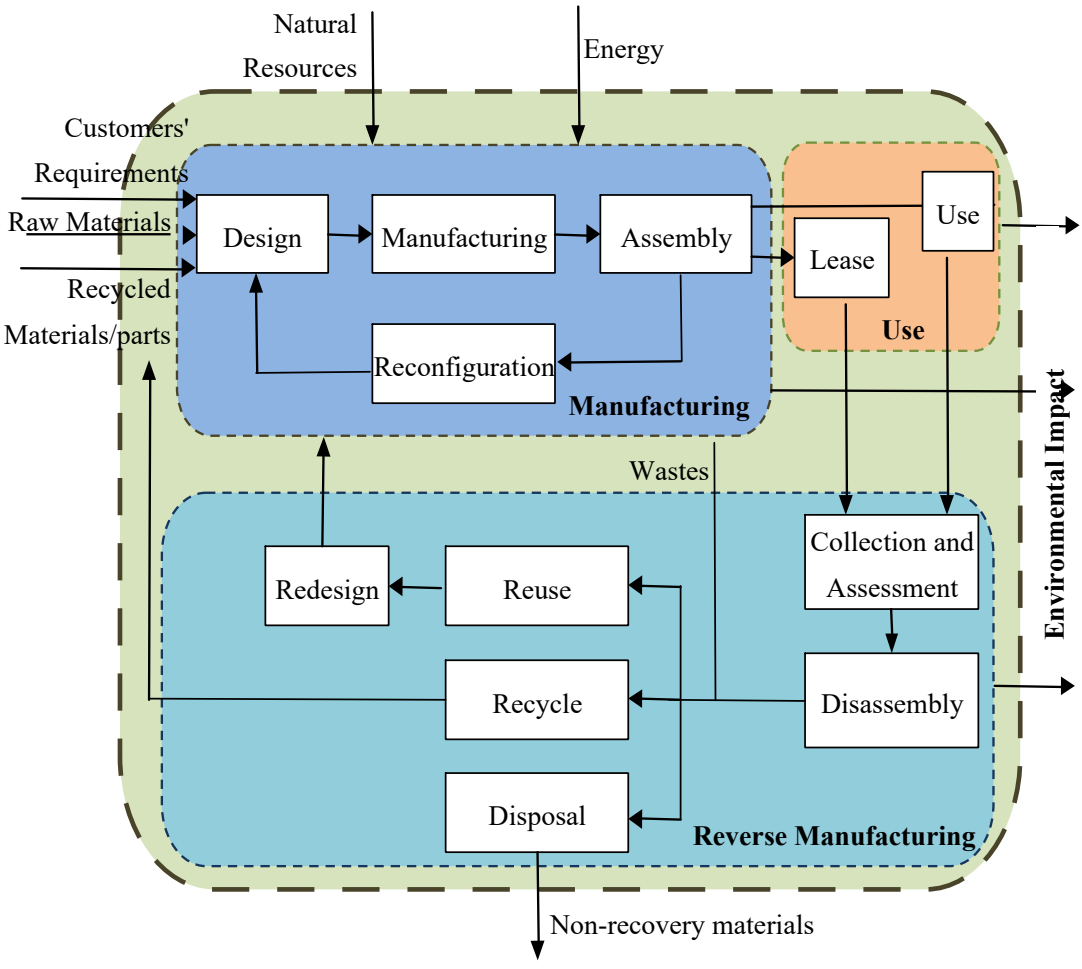


Fig. 3 – Sustainable Manufacturing System and strategy of manufacturing and reverse manufacturing for 3Rs (Reuse, Reduce, Recycle) (source elaboration from Zuming 2011)

The environmental strategy is based on KPI indicators: socio-economic aspects, air, water, soil and urban settlement, nature, landscape and biodiversity, potential risks Also, relevant are the comparisons with the benchmark (actual, objective, desirable) (Camp 1989; Keehley et a.1996).

The implication of Eni strategy is to understand how a long-term vision is important for the company (Coda 1988, Riva 2007, Pilotti 2019, Riva and Pilotti 2019 a,b, 2020) The Eni case can be a model for other firms for the integration of strategy, ecology, technology, and management. It has many advantages of this global strategy in the long-range (Covey 1999) because it can innovate and improve the "best practices" (Riva and Pilotti 2017b, 2018b) in the territorial contest of the San Donato.

6 – Conclusion

6.1 – The role of strategy

Eni spa is an interesting case of the application of a strategy for sustainability and a circular economy.

> *FOR WHAT CONCERNS THE FIRST QUESTION*: "*What is the role of the strategy of sustainability and circular ?*",

we discover:

a - FIRST, de-carbonization is main Eni's objective is to achieve net-zero emissions in its upstream business by 2030 (minimize direct upstream CO2 emissions). Eni spa uses a circular approach to maximize the use of waste as feedstock and to extend the lives of industrial sites. The strategy is to follow some recycling targets (see Table 12).

	MAIN STRATEGIC PRIORITY	ACTIONS
1	**Ecological, regenerative design**	Product and system to regenerate itself and its surroundings (like a plant that grows and reproduces)
2	**Performance economy**	Create long-lasting products
3	**Blue economy**	Redesigning industrial processes
4	**Cradle to cradle (c2c).**	Renewable energy
5	**Nature for inspiration**	Understanding that to create a better world
6	**Industrial ecology**	Both at the macro and micro levels of the economic system
7	**Natural capitalism**	Business and environmental interests align
8	**Waste reduction**	Quality of processes
9	**Reuse**	Control the process
10	**Recycling**	Improving and redesigning industrial processes

Tab. 12 – Ten main strategic priority and critical success factor in Eni factors (Source: our elaboration from Eni 2018a,b,c; 2019a,b,c; 2020a,b; 2021)

b - SECOND, Eni invests in a system that optimizes the production *(fast, efficient, responsible)* (see Table 13) of goods by reducing the exploitation and disposal of resources; Eni also launched many research projects to transform chemical elements into biomass that can be reused in industry and society. integration of business across the value chain and digitalization based on culture**.** among the critical elements in the implementation of Eni's strategy, are sustainable growth and respects and protects human rights under the U.N. Guiding Principles on Business and Human Rights and the OECD Guidelines for Multinational Enterprises, both published in 2011.

AREA OF IMPROVEMENT	STRATEGY FOR FAST, EFFICIENT, RESPONSIBLE PRODUCTION	CONTROL MAIN KPIs
A	**Optimizes waste management and The production**	Time, cost quality
B	**Emission**	Carbon efficiency index
C	**Energy efficiency**	Energy consumption
D	**People**	Training, equal opportunities
E	**Knowledge management**	Participant in the knowledge community
F	**Health**	Employees in a health service program
G	**Safety**	The total recordable injury rate

Tab 13 – Main sustainable KPIs in ENI for fast, efficient, responsible production factors
(Source: our elaboration from Eni 2018a,b,c; 2019a,b,c; 2020a,b; 2021)

c - THIRD, these results of the first question are in part consistent with previous research and theory (Scarpellini *et al.* 2020; Albelda 2011; Mella and Gazzola 2003, 2006, 2013; Burritt and Schaltegger 2012; Gibassier *et al.* 2020; Luque-Vílchez *et al.* 2019; Patten and Shin 2019; Shen *et al.* 2020; Windolph *et al.* 2014; Porter and Kramer 2011; Nguyen *et al.* 2014; Lacy *et al.* 2015; James *et al.* 2015, Bertalanffy 1968; Macomber 2013; Pilotti 2011, 2017; Riva 2007; Riva and Pilotti 2020).

6.2 – The main critical success factors

FOR WHAT CONCERNS THE SECOND QUESTION: "What are the critical success factors of a sustainability and circular economy strategy?",

we discover:

a – FIRST, the main critical success factors (see Table 14) in Eni of sustainability and circular economy strategy are (Knight and Jenkins 2009): focused on green businesses: bio-fuels; biobased-chemicals-new energy. The model of system dynamics is relevant for studying the evolution during the period (Senge 1990,1999). The circular economy is based on main ideas.

	CRITICAL SUCCESS FACTORS	TARGET/AIM/IMPLEMENTATION
1	**Innovation**	innovation and committed to acquiring cutting-edge technical skills
2	**Operational excellence**	minimizing risks and creating opportunities along the entire value cycle
3	**Integrity**	carry out our daily activities with responsibility respecting internal and external regulations
4	**Promotion of development**	favor an inclusive development that can generate shared and lasting value in all territories.
5	**Transparency**	committed to being engaged in continuous dialogue with our counterparts,
6	**Teamwork and collaboration**	work with passion, believe in team spirit, and value everyone's skills. recognize collaboration
7	**Protection of human rights**	operate with respect for human dignity and Human Rights
8	**Good work environment**	ensure an inclusive work environment that values uniqueness and diversity.
9	**Focus on corporate social responsibility**	reducing environmental impact and being attentive to the needs and expectations of our stakeholders.
10	**Focus on saving energy source**	work to support efficient and sustainable access to energy resources

Tab. 14 – ENI Spa Strategy and important critical success factors (Source: our elaboration from Eni 2018a,b,c; 2019a,b,c; 2020a,b; 2021)

b – SECOND, Eni spa focuses its supply chain (see Table 15) to drive and encourage the adoption of principles about a model of maximizing-resources-minimizing-waste.

c – THIRD, these results are consistent with previous research and theory (Scarpellini et al. 2020; Albelda 2011; Luque-Vílchez et al. 2019; Burritt and Schaltegger 2012; Gibassier et al. 2020; Porter and Kramer 2011; Nguyen et al. 2014; Lacy et al. 2015; James et al. 2015, Bertalanffy 1968; Macomber 2013; Pilotti 2011; Eni 2019; Gazzola and Mella 2003; Covey 1999; Riva and Pilotti 2019 a,b; Mella 2012,2014 a, b; 2018).

6.3 – Original contribution, limits, and future research

The ENI has developed a strategy based on quality and constant improvement of main KPIs based on the 3R strategy (*reduction, reuse, and recycling*).

The *original contribution* of this paper (highlights) and the production of new knowledge in the field are:

I) the original description and analysis of the strategy sustainable of Eni;

II) to give a new practical framework for strategic implementation of sustainable strategy in long-range; a key role in the deployment of new technologies for sustainability;

III)) there are several strategic vision and control tools that, although with some limitations, can be used by other company.

The *limit* of this study is to analyze only the case of Eni. Future research can study other cases of success and the impact in different contexts and the relationship between strategy and sustainability. In summary, Eni gives a particular example of a firm that improves persistently based on a long-term vision for a green economy.

SUPPLY CHAIN STRATEGY	TARGET
Energy use the consumption and impact on water resources, waste reduction, reuse and recycling (circular economy);	Efficiency
Innovation in finding a new source of energy	Technology Deployment:
Reduce emissions in the atmosphere	Strategy for De-carbonization
Use of natural resources land management (reduction, contamination, and impoverishment;	Integration:
Earnings and Free Cash Flow growth (rigorous financial discipline for finding opportunities and generating value for shareholders).	Cost-saving
Collaboration Alliance	Partners for the circular economy

Tab. 15 – ENI Spa Strategy and important critical success factors (Source: our elaboration from Eni 2018a,b,c; 2019a,b,c; 2020a,b; 2021)

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