GREEN ENTREPRENEURSHIP:
A ROADMAP TOWARDS SUSTAINABLE ECONOMY

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Green Entrepreneurship: A Roadmap Towards Sustainable Economy

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Green Entrepreneurship: A Roadmap Towards Sustainable Economy

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PREFACE

We are happy to introduce the present book on “Green Entrepreneurship: A Roadmap to a Sustainable Future”. This book is a collection of book chapters from faculty members and researchers from across India, Indonesia, Malaysia and Austria. The book deals with various aspects of Green Entrepreneurship, Sustainable business and Sustainable Development. The book contains chapters based on literature review, empirical studies and opinion and insights by the authors on the topic.

The editors would like to thank all the authors for contributing their chapters for the book. We hope the book will be of great value to not only to the students and researchers in the field of entrepreneurship and sustainable development but also the professionals and practitioners in the field of sustainable development and related fields.

Dr. Mohsin Shaikh

Dr. Tasya Aspiranti

ACKNOWLEDGEMENT

We would like to take this opportunity to thank all those who have contributed for the successful completion of this book.

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We would like to thank all the authors who have contributed their papers in form of book chapters for this edited volume on the topic of Green Entrepreneurship and Sustainable Development.

We would also like to thank the publishers NexGenpublications and their entire team for their excellent design and editing of the manuscript and bringing out the book in a short time period.

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AN ANALYTICAL STUDY OF GREEN BUSINESS PRACTICES IN INDIA

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ABSTRACT
This research is an attempt to explain the concept of green business practices that are adopted by some renowned companies in India. Green business is the practice of producing, using, consuming, recycling and disposing products that are less burdensome for the environment. The concept gained popularity when environmental concerns stared occupying the centre stage and ecological concerns were riding everyone's mind. During this time a new segment of consumers appeared on the timeline, these consumers are referred as green consumers, particular due to their concern for environmental issues. These consumers displayed green purchasing by adopting products that are non-toxic and have less ecological concerns. The concerns of these consumers were reciprocated by a number of leading companies that are adopting practices for protecting and preserving the flora and fauna, there by bearing the flag for sustainable development. Every business enterprises, individual organization, public companies are started the green business practices to increase the quality of environment. Green business practices are improved a lot from last decade to maintain the green environment. It helps to protect from natural disasters, pollution, diseases, etc. The study deals with the concept of green business practices, impacts, challenges, and benefits to the environment and some of practices can be followed by all the business.

Keywords: Green Business, Opportunities, Environmental problems, Product modification

INTRODUCTION
The resources on the planet are becoming scantier and human needs are insatiable. This has sparked an interest amongst the consumers to not cause harm to the environment anymore. This rocketing awareness has compelled the businesses to opt for eco-friendly practices. In a result the concept of Green Business has been developed in all domains from product design and sourcing to manufacturing. It is basically an extension of business orientation in environmental context. Businesses today are more environmental conscious which has led to the advent of an era of recyclable and eco-friendly products by adopting Green Business.

RESEARCH METHODOLOGY
The research paper is exploratory in nature and is based on secondary data. A number of research papers published in renowned journal are studied to build conceptual basis of green business. Valuable insights about the green business practices have been gathered from company's websites. Other sources include conference proceedings and reports. The objectives of this research paper are as following:

- ✓ To understand the concept and importance of green business.
- ✓ To explore the different green practices adopted by renowned companies.
- ✓ To understand the challenges that exists in applying green practices.

REVIEW OF LITERATURE
- According to Chen and Chai (2010), the world increased enormously in the last decade and the resources started shrinking. As consumers now understand the impact of their buying habits and behavior on the environment, they've started adopting various green practices like recycling, saving paper and electricity, avoiding the use of aerosols, encouraging the use of biodegradable products, use of organic and vegan food, etc.

- In a paper by Singh and Pandey (2012), it was noted that the Indian consumers were showing an increased interest in green products, and if the consumers are aware of the price, quality and features, performance and other benefits of different green products through green marketing, the use of such products will increase. Mishra and Sharma (2010) stated that Indian customers have faith in herbal and ayurvedic products, and have been using them for so many years for health and beauty purposes. There are a number of other studies that confirm that there is marked differences between the consumers beliefs and practices.
- Mukhtar Ahmad (2016) studied the green business practices and economic desires. The study is based on secondary data. The main objective of the article is to find the growth and importance of green business practices across the world.
- Muhammad Mahboob Ali, et al. (2017) stated that green business has been improving slowly and having lot of scope to improve on the work areas. The paper presents the connection among the green business management practices and increased competitiveness.
- Chukwuka and Emmanuel (2018) stated that the green business practices implementation and processes will lead to positive outcome to the organization and.

GOING GREEN IN BUSINESS

In the course of locating different green consumers, the Research and Development wings of business realised that developed countries with two out of every three consumers and developing countries with one out of every six green consumers. The environmental commitment varies with standards, expectations of producers, demand and buying power of the consumers. Green Business determines to bring the activities of production, business, consumption and disposal of goods and services within the framework of going green to eliminate harms connected to global warming, non-biodegradable solid wastes, pollutants etc. It involves efforts to generate sensitivity among marketers and consumers towards green products and services in business and consumption habits.

GOLDEN RULES oF GREEN BUSINESS PRACTICES

1. **Know you're Customer:** Make sure that the consumer is aware of and concerned about the issues that your product attempts to address, (Whirlpool learned the hard way that consumers wouldn't pay a premium for a CFC-free refrigerator because consumers dint know what CFCs were.).
2. **Educating your customers:** isn't just a matter of letting people know you're doing whatever you're doing to protect the environment, but also a matter of letting them know why it matters. Otherwise, fora significant portion of your target market, it's a case of "So what?" and your green Businesscampaign goes nowhere.
3. **Being Genuine & Transparent:** means that **a)** you are actually doing what you claim to be doing in your green Business campaign and **b)** the rest of your business policies are consistent with whatever you are doing that's environmentally friendly. Both these conditions have to be met for your business toestablish the kind of environmental credentials that will allow a green Business campaign to succeed.
4. **Reassure the Buyer:** Consumers must be made to believe that the product performs the job it's supposed to do-they won't forego product quality in the name of the environment.
5. **Consider Your Pricing:** If you're charging a premium for your product-and many environmentally preferable products cost more due to economies of scale and use of higher-quality ingredients-make sure those consumers can afford the premium and feel it's worth it.
6. **Giving your customers an opportunity to participate**: means personalizing the benefits of your environmentally friendly actions, normally through letting the customer take part in positive environmental action.

7. **Thus leading brands should recognize that consumer expectations have changed:** It is not enough for a company to green its products; consumers expect the products that they purchase pocket friendly and also to help reduce the environmental impact in their own lives too.

BENEFITS OF GREEN BUSINESS PRACTICES

It involves a wide spectrum of activities, to create an eco-friendly image of the company, to its target audience, such as:

1. Using recycled and renewable material for production.
2. Use of green energy to produce products, such as solar energy, geothermal energy and wind energy.
3. Reduce product packaging or use eco-friendly packaging.
4. Not using toxic materials, which are harmful to the environment.
5. Making products which are reusable as well as recyclable.

So, basically, green Business is all about developing and promoting products and services that fulfil customer requirements, in terms of quality, performance, affordability, availability and safety, but without causing any damage to the environment.

GREEN INITIATIVE IN BUSINESS

Wipro	Green IT	Reduction of carbon foot prints, environmental measures.
Wipro Infotech	Green Machines	Wipro Green ware desktops and laptops which reduce e-waste.
Tata Motors	Econ Friendly Showroom	Natural building, energy efficient lights.
Taj Hotel	Eco Rooms	Energy efficient mini bars, organic bed linen and napkins made from recycled paper.
Indian Railways	Digital Ticket	E-Tickets on their laptop and mobiles
HCL Info Systems	Green IT	ISO 14001 Standards, Go green participation, RoHS Laptops
LG India	Eco-friendly Products	Eco-chic including platinum coated two door refrigerator and washing machine with steam technology, 40 % less energy consumption, minimum usage of halogen or mercury.
HCL	Eco-friendly Notebook	Poly Vinyl Chloride (PVC) and other harmful chemical free,
Samsung Electronics	Eco-friendly features	LED backlight without mercury or lead, 40% less energy consumption, split ACs saving 60 % energy.
Voltas	Green Product	Air Conditioners with Energy star ratings
Panasonic India	Energy Conservation	Home appliances using sensor and control technologies
MRF Tyres	Eco friendly Product	Tubeless Tyres made from unique silica based rubber compounds for fuel efficiency

ACC Ltd	Conserve Natural Resources	'Concrete plus' manufactured out of fly ash (industrial waste)
Grassroot	Environmental friendly brand	Eco friendly & Organic fabrics
Vivanta by Taj	Earth Friendly	Follows United Nations Earth Summit endorsed by 200 countries Monitored by Green Globe.
Yes Bank	Climatic Change	First Indian signatory to the carbon Disclosure Project by documenting its Carbon Footprint

MAJOR COMPANIES ADOPTING GREEN BUSINESS PARACTICES

1. LG

LG India has been a pioneer is making electronic gadgets that are eco-friendly. Recently, it has launched a LED E60 and E90 series monitor for the Indian market. Its USP is that it consumes 40% less energy than conventional LED monitors. Also, they hardly used halogen or mercury, trying to keep down the use of hazardous materials in their products.

2. HCL

HCL is another brand that is trying to introduce eco- friendly products in the market and it has recently launched the HCL ME 40 notebooks. These notebooks do not use any polyvinyl chloride (PVC) material or other harmful chemicals and the Bureau of Energy Efficiency already given it a five star rating.

3. Haier

Eco branding is a part of Haier's new green initiative and they have launched the Eco Life Series. They have semi-automatic and automatic refrigerators and washing machines, split and window air conditioners and a lot more.

4. Samsung

Samsung India has always had a roaring range of LED TV screens and now they have come up with eco- friendly LED backlight. They use 40% less electricity have also no harmful chemicals like mercury and lead.

5. Tata Consultancy Services

TCS has a globally recognized Sustainability practice and has already topped the Newsweek's top World's Greenest Company title. It also has a global green score of 80.4% and this has mainly happened due their initiative of creating technology for agricultural and community benefits.

6. Wipro

Wipro, has not only helped in the creation of technology that helps in saving energy and preventing wastes, but its corporate headquarters in Pune is the most eco-friendly building in this sector all over India.

7. MRF Tyres

MRF has launched the ZSLK series and this is all about creating eco- friendly tubeless tyres made from unique silica- based rubber and also offers extra fuel efficiency to those who drive their vehicles.

KEY FEATURES OF GREEN BUSINESS PRACTICES

- Here some of green practices are discussed which can be followed by the business for going green;

- Using public transport or bicycle to reduce the pollution or business organization can run bus for all the staffs.
- Proper usage of electricity and turning off the systems, lights, etc.
- Avoiding water wastage and wastage water can be recycled and to be supplied for the garden.
- Paper wastage can be recycled instead of using paper going with the digital documentation.
- Creating awareness in green going to the staff for the support and creating a team for the green business practices which results in brand new ideas of the staffs and it increase the quality of the staffs and the business.
- Eliminating plastic bottles, plates, cups, etc.
- Proper separating wastage system with degradable and bio-degradable.
- Planting trees around the business environment.

PRESENT TRENDS IN GREEN BUSINESS IN INDIA

- Organizations are Perceive Environmental marketing as an Opportunity to achieve its objectives. Firms have realized that consumers prefer products that do not harm the natural environment as also the human health. Firms marketing such green products are preferred over the others not doing so and thus develop a competitive advantage, simultaneously meeting their business objectives. Organizations believe they have a moral obligation to be more socially responsible. This is in keeping with the philosophy of CSR which has been successfully adopted by many business houses to improve their corporate image. Firms in this situation can take two approaches:
- Use the fact that they are environmentally responsible as a marketing tool.
- Become responsible without prompting this fact.
- Governmental Bodies are forcing Firms to Become More Responsible. In most cases the government forces the firm to adopt policy which protects the interests of the consumers. It does so in following ways:
- Reduce production of harmful goods or by products
- Modify consumer and industry's use and /or consumption of harmful goods; or
- Ensure that all types of consumers have the ability to evaluate the environmental composition of goods.
- Competitors' Environmental Activities Pressure Firms to change their Environmental Marketing Activities. In order to get even with competitors, claim to being environmentally friendly, firms change over to green marketing. Result is green marketing percolates entire industry.
- Cost Factors Associated with Waste Disposal or Reductions in Material Usage Forces Firms to Modify their Behaviour. With cost cutting becoming part of the strategy of the firms it adopts green marketing in relation to these activities. It may pursue these as follows:
- A Firm develops a technology for reducing waste and sells it to other firms.
- A waste recycling or removal industry develops.

THE FUTURE OF GREEN BUSINESS

There are many lessons to be learned to be learned to avoid green business myopia, the short version of all this is that effective green business requires applying good business principles to

make green products desirable for consumers. The question that remains, however, is, what is green business's future? Business scholars have viewed it as a "fringe" topic, given that environmentalism's acceptance of limits and conservation does not mesh well with business's traditional axioms of "give customer what they want" and "sell as much as you can". Evidence indicates that successful green products have avoided green business myopia.

CHALLENGES

The biggest challenge in the application of green business practices is sustainability. The time taken for these practices to bear profits is long and often unpredictable as the initial stages of the implementation stages are associated with huge costs and often bring heavy expenses for the firm. The firms adopting these practices should have a long-term horizon. Secondly the efforts and patience of the firm goes unrewarded as customers look for convenience and cost advantage in patronizing the products and ignore the environmental concerns of the organization.

CONCLUSION

Green Business is an approach to protect the environment using eco-friendly marketing techniques in order to perform all business functions such as- green production using eco-friendly raw materials and methods, green packaging, etc. This approach to marketing allows a firm to act in a responsible manner and to gain the competitive advantage as well.

In order to protect the environment from degradation, it is essential for businesses to adopt green business paractices and encourage people to adopt a green lifestyle by purchasing eco-friendly products. Owing to the increasing awareness about global warming and climate change, it's the duty of every company to look for solutions to maintain ecology. The same should also be translated in the buying behaviour of the consumers who should not only be appreciative but should adopt the products and be ready to bear the associated cost, as producing environmental friendly products require a mark-up over the normal cost. Green Business practices are a vision and in the long term will not only help in reducing the costs but also improving the goodwill of the company. It also paves way towards creation of a healthy, safe and happy environment and this is the biggest gift that can be given to the future generations

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A REVIEW ON RESEARCH PUBLICATIONS ON GREEN PRODUCTS FROM 2020-2023- A BIBLIOMETRIC APPROACH

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ABSTRACT

Purpose- *This research aims to conduct a Bibliometric Analysis for the publication published on Green Products in the Scopus database, considered one of the largest databases of abstracts and citations.*

Design/Methodology/Approach- *1605 research articles were published on Green Products which are further screened using inclusion and exclusion criteria. A final sample of 473 was taken as the final sample to analyze the results of the bibliometric analysis. VOS viewer software is used to analyze the publication trend, top publications, citation analysis, co-citation analysis, and keyword analysis to understand the publication trends and research hotspots in "Green Product" research.*

Findings- *Findings of the study include publication trends, top publications, citation analysis, co-citation analysis, and keyword analysis to understand the publication trends and research hotspots in "Green Product" research. The results of the study also give us an idea of the future scope of research and collaboration in the domain of "Green Products"*

Originality- *Current study is one of its kind which gives the bibliometric indicators on the publications done on Green Product publications.*

Keywords- Green Product, Bibliometric Analysis, VOS Viewer, Green Entrepreneurship

INTRODUCTION

A green product is one that is designed to reduce its environmental impact over its entire life cycle and even when it is no longer in use. Typically, green products are distinguished by their reduction of waste and maximization of resource efficiency. Some of the characteristics of Green Products are as follows –

1. The products are grown without the use of hazardous chemicals under sanitary circumstances
2. Recyclable, reusable, and biodegradable by nature
3. Includes eco-friendly packaging
4. Utilise the fewest possible resources
5. With minimal or no carbon footprint
6. With minimal or no plastic footprint

Advantages of Going Green to the Marketers-

1. Creating green products opens the door to a brand-new market of green consumers who purchase exclusively green items and are even willing to pay more for them.
2. Currently, turning green is a significant competitive advantage in the marketplace.
3. Positive public image because when marketers involve themselves to create environment-friendly products it helps them to create their own image amongst the consumers.
4. Green businesses get a base of devoted clients that choose green products over conventional, non-environmentally friendly ones.

Disadvantages of Going Green to the Marketers-

1. Green products necessitate innovation and considerable expenditure. This increases the expense of developing the items, which causes them to be a bit more expensive than market alternatives. Typically, the price issue prevents people from purchasing the product.
2. The majority of people are still unaware of the significance and benefits of becoming green.
3. Green products necessitate the creation of novel technology. This needs substantial research and development expenditures (R&D). Not all businesses or start-ups can afford to invest this much.

As per the article published by Harvard Business Review (White et al., 2019) consumers of Green Products are elusive in nature. The article highlights the paradox faced by the organizations involved in the marketing of green products. Consumers report a positive attitude toward green products and services but they resist following the consumption of such products through their wallets. This article also highlights the five approaches which the company should consider – shaping good consumption habits, leveraging the cascading effect, listening to the heart and brain, favourable attitude towards the experiences rather than the ownership.

REVIEW OF LITERATURE

Section on the review highlights the different academic research published on Green Products.

(Song et al., 2020) investigated the effect of environmental regulation and R & D tax incentives on green product innovation from disciplinary and incentives perspectives. The findings of the study showed the U-shaped relationship between environmental regulation and green product innovation. (Abbas, 2020) investigated the total quality management and corporate green performance and analyzed how TQM impacts CGP. (Sun & Wang, 2019) investigated the purchase intention of green products by consumers using social media. The findings of the study demonstrate that attitude, subjective norms, and perceived control are the impacting factors toward purchase intention. Price consciousness of green products negatively impacts purchase intentions. (Tezer & Bodur, 2019) investigated how using a green product impacts the enjoyment of the accompanying consumption experience. (Sarkar et al., 2022) Investigated the risk associated with green product manufacturing as the return rate and the demand for the product is random and uncertain in nature. The findings of the study demonstrated that highly innovative products perform better compared to less innovative products when the dynamics of demand and supply are high. (Li et al., 2019) investigated the design of the green product with respect to supply chain initiatives and fairness concerns by comparing the optimal solutions and profit maximization. (De Silva et al., 2021) investigated the three consumption values – environmental, status, and value for money moderated the relationship between the consumer awareness of the product's green benefits and the purchase intention.

OBJECTIVES OF THE RESEARCH

1. To investigate the most influential countries, journals, the co-occurrences of the keywords, current research hotspots, and future developments on Green Products.
2. Bibliometric and visual analysis to analyze the publication on Green products in the Scopus database.

RESEARCH METHODOLOGY

A well-defined methodology is used to scan the resources from the Scopus databases which are utilized in the current study. The author has implemented the step-by-step process of selecting the appropriate bibliometric data for the analysis. The first step involves the finalization of the keyword to screen the Scopus database. The second stage includes the initial search results and demonstrating the results. The third stage of the process includes the finalization of the Inclusion and Exclusion criteria for the refinement of the initial search results. The fourth stage

is data collection, analysis and results. Table 1 presents the search syntax and the query which is used to conduct the initial search results.

Table 1- Bibliographic Data

Search Terms	Query applied	Total number of documents (Scopus)
Green product	TITLE-ABS-KEY ("Green Product") AND PUBYEAR > 2019 AND PUBYEAR < 2024 AND PUBYEAR > 2019 AND PUBYEAR < 2024	1615

Source: 'The Author'

The total number of documents screened for the query is 1615 on 25th February 2023. The complete data extracted comprises articles, review papers, books, book chapters, etc. A total of 1605 documents were screened on the basis of the following inclusion and exclusion criteria. For the final data analysis and reporting, only peer-reviewed articles and review papers are included in the data files created from the database, excluding the grey literature, conference papers, book chapters, etc. Data analysis is performed through VOS Viewer (Eck and Walkman, 2010) which is used for conducting Citation analysis and Co-citation analyses for the findings. Table 3 presents the search query to screen the final set of articles for the data analysis. Table 2 presents the inclusion and exclusion criteria to screen the filter the final set of data.

Table 2- Inclusion and Exclusion Criteria for screening the initial results

Key Word	Inclusion Criteria	Exclusion Criteria
Green Product	1. Only Articles were included in the analyses 2. Articles written only in English. 3. Articles published in the area of Business & Management	1. Grey literature – conference proceedings, data paper, reviews, and book chapters. 2. All other foreign language articles.

Source: 'The Author

Table 3- Search query and number of publication after the final refinement of the papers.

Search Terms	Query applied	Total number of documents (Scopus)
Green product	TITLE-ABS-KEY ("Green Product") AND PUBYEAR > 2019 AND PUBYEAR < 2024 AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (SUBJAREA , "BUSI")) AND (LIMIT-TO (LANGUAGE , "English")	473

RESULTS –

Results of the study is presented in two parts. First part comprises the presentation and demonstration of the bibliographic data and subject wise publication of the initial results. Second part comprises the presentation and demonstration of the publication trends, top countries publishing on Green product, top universities publishing on Green product, citation analysis and co-citation analysis and key word analysis.

SECTION 1-

Bibliographic Data – General Result Analysis

General result in section represent two types of the results one is the number of the research publication on green product in terms of document type and subject wise segregation in Scopus database. Table 4 presents the number of research publications on the basis of document type.

Table 4- General results – Bibliographic data of Green Product research in Scopus (2020-2023)

Bibliographic data	Scopus	% of Total number of documents
Articles	1368	84.71
Conference papers	121	7.49
Book Chapter	47	2.91
Review	68	4.21
Book	2	0.12
Erratum	3	0.19
Editorial	1	0.06
Note	2	0.12
Conference Review	2	0.12
Retracted	1	0.06
Total	**1615**	**100**

Data on document types of Scopus databases explain that the largest number of publications are the peer-reviewed articles, which are 1368 in numbers. This indicates the quality of data that we would be using for the insight's generation as most publications are in the category of peer reviewed articles and very less number of publications were found to contribute toward the grey literature. The most frequent type document is Articles (1368) accounting for 84.71% of the total publications. At the second position is conference papers (121) account for 7.49% of the total publications .Other document types include Book chapter (47), Review (68), Book (2), Erratum (3), editorials (1), Note (2) conference reviews (2) and retracted 1. Table 2 enlists the numbers and proportions of the various document types. All documents were downloaded on 25th Feb 2023.

Table 5- General Results – Subject wise representation of the research publication on Green Product.

Keyword Search	Subject area wise percentage	No of Documents Subject area wise
Green Product	Scopus – Business Management and Accounting	512
	Social Sciences	355
	Environmental Science	554
	Economics, Econometric and Finance	171
	Computer Science	323
	Engineering	514
	Energy	344
	Psychology	59
	Decision Sciences	132
	Mathematics	122
	Arts and Humanities	31
	Medicine	55
	Earth and Planetary Sciences	43
	Material Sciences	135
	Pharmacology, toxicology and Pharmaceutics	17
	Physics and Astronomy	39
	Agricultural and Biological Sciences	48

	Multidisciplinary	22
	Chemistry	61

Source: 'The Author'

Subject Area Wise Publications

As demonstrated in Table 5 Subject wise publications on Green Product is highest in the field of Environmental Science followed by Engineering and Business Management and Accounting. It is evident from the statistics that the maximum contribution for the research publication on Green product is from the field of Environmental Science may be due to the relevance of the Green Product with environment, positive environmental impact, and safe product from the environmental perspectives.

SECTION 2 – PERFORMANCE ANALYSIS

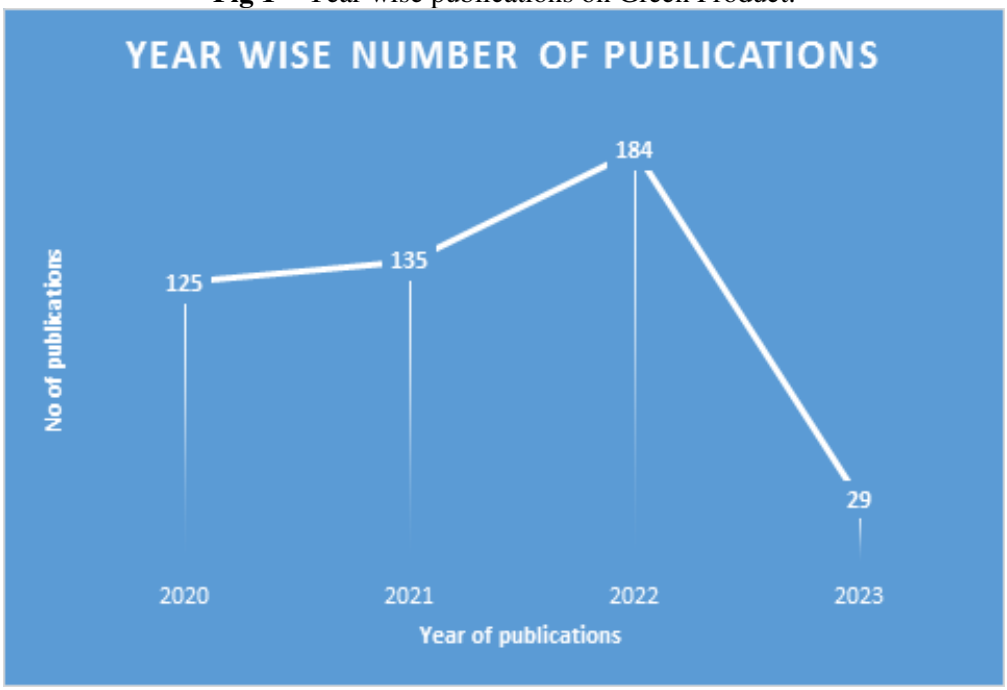
Current Status of Green Product Research Publications

The publication trend analysis of the articles published in Green Products demonstrated that the number of publications has increased since 2020. The number of publications in the year 2020 was 125 articles which increased to 184 in the year 2022, and in 2023 which is the current year the number of publications is 29 as of till date. The increase in the publication since 2002 can be attributed to the increased importance of the green perspective, and sustainability in almost all the functional areas of business. The significance of green products and their usage can also be associated with the UN sustainable development goals making the topic all the more important for academic researches and contributions.

Table 6: Publication Output Year wise

Year of Publication	Number of documents
2020	125
2021	135
2022	184
2023	29

Fig 1 – Year wise publications on Green Product.

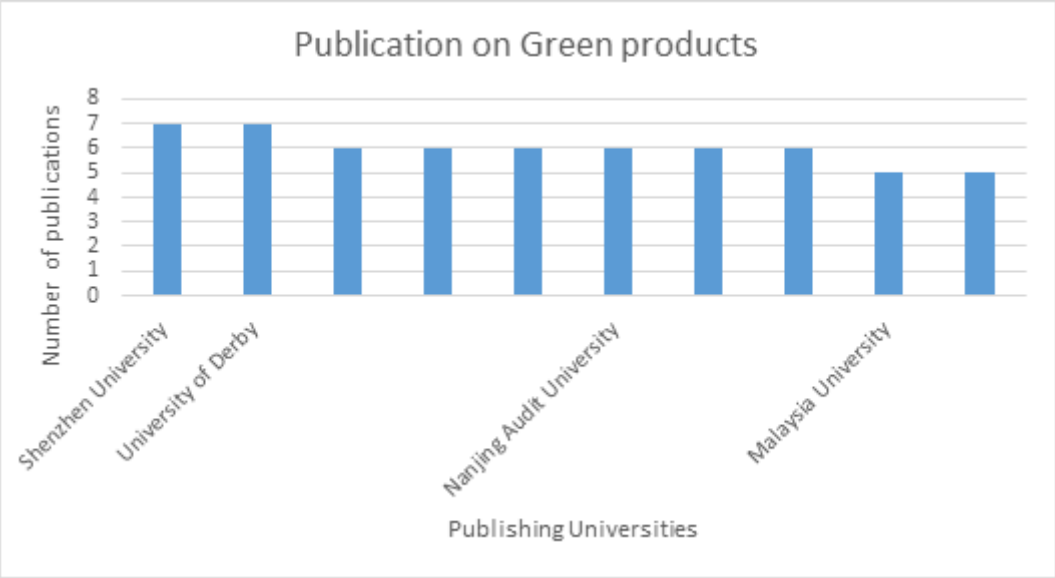


Publication of Documents by Institutions/Affiliating Universities on "Green Products"
Table 7 and Fig 2 demonstrate the publication source-wise. The Table demonstrated that the highest publication in the context of green products is published by Shenzhen University and University of Derby which is 7 in the last 3 years, followed by North-Western Polytechnic University and Beijing Institute of Technology which is 6.

Table 7: Publication Output University /Institution wise

Sr no	Affiliating Institution	Number of documents published
1	Shenzhen University	7
2	University of Derby	7
3	North-western Polytechnic University	6
4	Beijing Institute of Technology	6
5	South China University of Technology	6
6	Nanjing Audit University	6
7	OP Jindal Global University	6
8	School of Business Administration, North-eastern university	6
9	Malaysia University	5
10	Hong Kong Polytechnic University	5

Fig 2- Source wise publications on Green Products



SCIENCE MAPPING

Citation Analysis for "Green Product" Research

The number of citations, which a document or author received is evaluated as a quality indicator of the content published in the academic domain This subsection extends the discussion on Citation analysis for Authors publishing documents on " Green Products"

Citation analysis – Authors

In total there were 1275 authors who published on Green Products in peer-reviewed journals. The citation analysis was performed on 894 authors crossing the threshold of a minimum of 1 document and a minimum of 2 citations for the document.

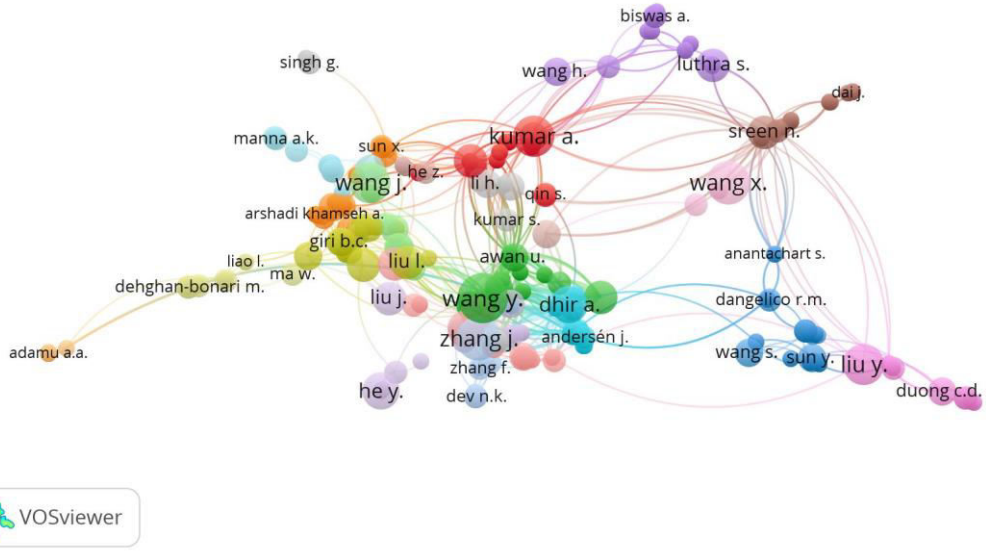
Table 8 and Fig 2 present the Citation analysis of the top 10 Authors publishing on Green products in the last 3 years from 2020 – 2023. The number of documents published by Wang Y

is the highest 9 followed by Kumar A (6) and Dhir A. (5). In terms of the number of citations, the highest number of citations is received by Wang Y. (423), followed by Wang S (269) and Qui L. (214). The average citation per document is calculated to understand the quality of publications published by the top 10 authors. So, the average citation per document is highest for Song M. who published only 1 document and scored 179 citations for the same, followed by Zhang H. published 2 documents and scored 104 citations per document which indicated the quality of publication by the respective authors though the number of publications is less.

Table 8- Citation analysis Author

Sr No	Name of the Author	Number of Documents	Citations	Average citation per document
1	Wang Y.	9	423	47
2	Wang S	3	269	90
3	Qui.L	3	214	71
4	Zhang H.	2	207	104
5	Awan U.	3	197	66
6	Zhao M.	2	191	96
7	Garza- Reyes J.A.	3	180	60
8	Song M.	1	179	179
9	Kumar A.	6	163	27
10	Dhir A.	5	162	32

Fig 3 – Citation Analysis Authors

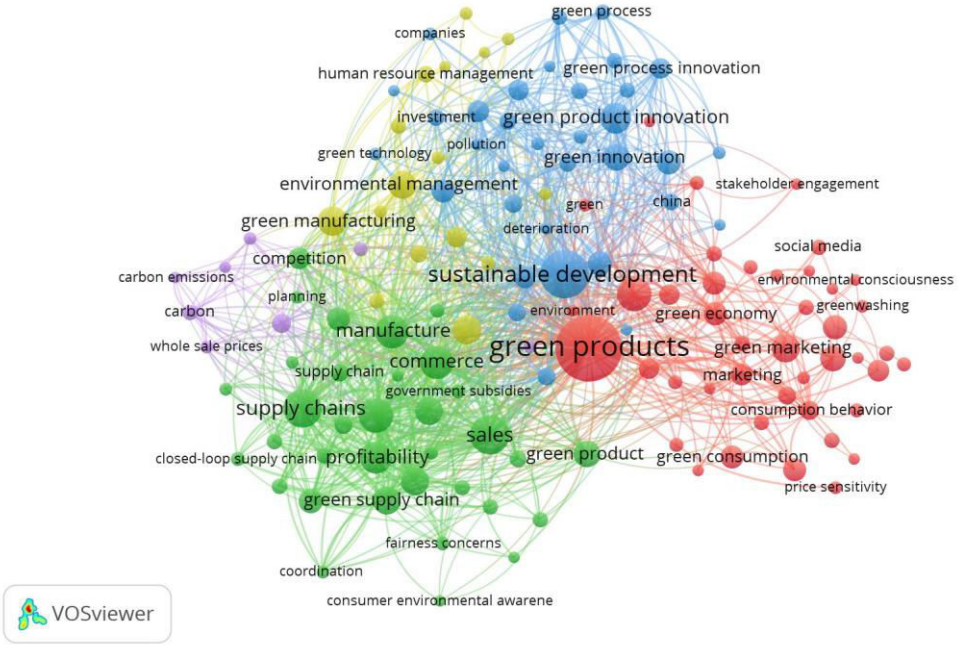


Co-Occurrences Analysis Keyword Analysis

This section of the articles presents the keyword analysis and concurrences of the keywords appearing in the publications published on Green Products. For the total number of documents screened using the inclusion and exclusion criteria, the total number of keyword present are 2611 in number. The co-occurrence analysis was done for 135 keyword that meets the minimum threshold of occurrences The keyword analysis of 135 keywords was consolidated into 5 clusters having 2658 total links and total link strength of 5849. Keyword occurrence networks

can effectively reflect the main associated areas of research providing support for further scientific research. The size of the nodes and words represents the weights of the keywords in "Green products". The keyword "Green products" has thick lines with "green product", "sustainable development", "green marketing", "consumer behavior", and "green consumption". The other prominent keyword in the documents published on green products is "sustainable development" having a strong linkage with "Green innovation", "green product innovation", "environmental management", "environmental concern", "Pollution control", and " green manufacturing".

Fig 4- Keyword Analysis



CONCLUSION

Green product consumption and production are an inevitable part of sustainable development and goals. The current study demonstrates the academic publications' details in terms of publication trends in the past three years which is on an increasing trend. The article also highlights the top institutions publishing on Green products and top authors writing and publishing in the domain of green products and sustainable development. The keyword analysis demonstrates the research hotspot in the context of Green Products which are- sustainable development, green manufacturing, consumer behavior towards green products, green innovation, etc.

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SUKUK WAQF PRODUCT DIVERSIFICATION ON MUSLIM INVESTOR LOYALTY

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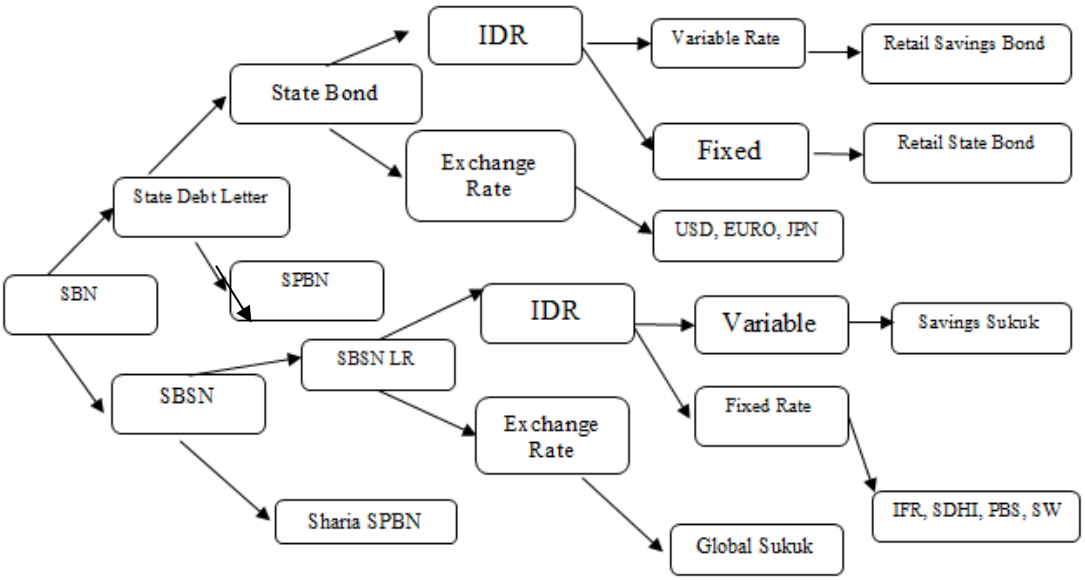
ABSTRACT
Waqf sukuk are securities that are a combination of state sukuk and waqf which are shown to empower productive waqf for socio-economic activities of the people. The issuance of waqf sukuk is shown to optimize the huge amount of waqf funds in the economy to become a variety of sustainable productive activities. The purpose of this paper is to provide an overview of the importance of product diversification to build a brand image so that it will give birth to service ability from product or service users. Understanding this concept is important in the implementation of the issuance of state sukuk which have a large captive market in Indonesia, namely Muslims. The concept of loyalty to state sukuk investors must continue to be built by the government through various efforts, namely sustainable sukuk product education so that public knowledge about state sukuk is more comprehensive, diversification of sukuk products becomes very significant in order to expand market segments both domestically and abroad as well as consistency with Islamic values. in its development. The existence of loyal state sukuk investors will accumulate development funds from the domestic market and increase the empowerment of economic actors in the low-income group.

Keywords: Sukuk waqf, Empowerment, Investor Loyalty

INTRODUCTION
The existence of state sukuk in the economy cannot be doubted. State sukuk have taken a very strategic role in the economy. State sukuk have become a pillar of infrastructure financing which cannot be fully met by the government. Since its first issuance in 2008, state sukuk have stolen the attention of many investors. State sukuk have become an alternative for Muslim communities who want to invest which is free of interest rates. Since the issuance of state sukuk in 2008 amounting to 4.7 trillion Rupiah, the trend of issuing state sukuk continues to experience very significant developments. In September 2021, there was an outstanding state sukuk of 37.16 trillion Rupiah or an increase of 690% over a period of 14 years or an average yearly increase of 49.33%. This increase was followed by various diversification of state sukuk instruments. The diversification of state sukuk includes segmentation of investors, currencies and business scale as well as the implementation contracts. The government's commitment to actively issue state sukuk indicates that the government wants to shift its dependence on external funding originating from foreign debt to funding that involves the community or the domestic market, so that independence in financing development is achieved. The purpose of writing this article is to provide an overview of the importance of diversifying state sukuk products to build a brand image so that it will give birth to service ability from product users (sukuk investors).

Development of State Sukuk Diversification
Product diversification can be interpreted a strategy to improve business performance by expanding the selection of goods or services through efforts to create new products, new markets or both such as improving the type, color, model, size, type, etc. with the aim of pursuing growth and increasing sales.Kotler and Armstrong (2001), interpret product diversification as a way to improve existing business performance by identifying opportunities to add attractive businesses that are not related to the company's current business.In the middle the rapid development of financial instruments in the capital market requires the government to

continue to innovate in the issuance of state sukuk through various diversification efforts from state sukuk in order to build the loyalty of its investors. Loyalty is a process that is formed in the long term starting from the product introduction process until consumers feel suitable and satisfaction arises with the product. In its development, every government issued a new series of state sukuk always sold out. This indicates that state sukuk already have large investors, although empirically state sukuk investors are still among muslim investors. In building loyalty other than through continuing education programs, the government needs to continue to innovate sukuk products that can provide satisfaction for its investors. The following is the diversification of state sukuk into various forms of instruments, contracts and currency values.



Source: DJPR Ministry of Finance of Indonesia

Information: SUN (State Debt Securities), SBSN (Sharia State Securities), SPBN (State Treasury) SBSN LR (Long-Term State Sharia Securities).

Investor Loyalty and Product Diversification

One product of state sukuk that has attracted a lot of attention from investors is waqf sukuk (Cash Waqf Linked Retail Sukuk or Retail CWLS). Retail CWLS is a productive waqf in the form of cash waqf in state sukuk whose rewards are channeled by Nazhir (manager of funds and waqf activities) to finance social programs and economic empowerment of the people. Retail CWLS is a form of government commitment to support the development of social investment and the development of productive waqf in Indonesia. Through Retail CWLS, the government provides facilities and conveniences for individuals and institutions to make cash waqf safely and productively and participate directly in supporting the acceleration of people's economic strength. Retail CWLS is one form of productive waqf, namely waqf that is produced or invested so as to generate profits. The profits from this waqf investment will be returned to the beneficiaries of the waqf (mauqul alaih) as alms. In its development the Retail CWLS instruments not yet integrated with government development projects like other state sukuk. Retai CWLS managed by the government based on Sharia principles, does not contain ambiguity (usury), gambling (masyir) and has received recognition from the National Sharia Council-Indonesian Ulema Council number B-0263/DSN-MUI/III/2022, dated March 25, 2022.

The Indonesian government first issued Retail CWLS on March 10, 2020 by way of private placement with a nominal value of 50,849,000,000.00 Rupiah (fifty billion eight hundred forty-nine million rupiah). In accordance with the authority given by laws and regulations in the field

of waqf, the Indonesian Waqf Board (BWI) in its position as nazhir or waqf manager has placed cash waqf funds in SBSN through a private placement mechanism. The Waqf Sukuk issued are SBSN series SW001, a period of 5 years, non-tradable, and with investment returns in the form of discounts and coupons. The discount is paid once at the beginning of the SW001 issuance transaction and will be used by BWI for asset development new waqf, namely the renovation and purchase of medical equipment to support the construction of the retina center at the Achmad Wardi Waqf Hospital located in Serang, Banten Province. Meanwhile, The coupon is paid monthly and will be used for free cataract surgery services for the poor at the same hospital, with a target number of poor people served for 5 years as many as 2,513 patients, as well as the procurement of an ambulance to reach patients who are far from the hospital. Furthermore, the waqf sukuk funds will return 100% to the waqif when the SBSN series SW001matures. Retail CWLS presence retail complement the needs of investors who want investment in endowment and temporary funds for projects to empower the people's economy in a productive manner. This moment will be one of the factors that can foster satisfaction for state sukuk investors which can have an effect on growing the level of loyalty of investors to Islamic financial instruments issued by the government.

Kertajaya (2007) explains the meaning of loyalty as a manifestation of the fundamental human need to have, support, feel safe, build attachment and create emotional attachment. Furthermore, Kotler and Keller (2009), loyalty is a deeply held commitment to buy or resupport a preferred product or service in the future even though the influence of the situation and marketing efforts has the potential to cause customers to switch. From the two definitions, it can be seen that loyalty is the highest form of devotion from a consumer to a product or service, because consumers have felt the highest satisfaction from the goods and services they consume, so that they will still be present for the product even though there are many goods and services from others producers present on the market. Griffin (1995) defines loyalty from the duration of time in which consumers are said to be loyal if they make purchases no less than twice. Loyalty is the repetition of purchasing frequency for the same brand. Ruiz-Mafe, et al. (2016) concludes loyalty as an expression of the relationship between relative attitudes towards the company/ product/ brand and purchase intention.

Business owners must know exactly which form of loyalty their business customers belong to, in order to ensure a long-term business strategy. The form of loyalty in question is in the form of transactional loyalty, social loyalty, engagement loyalty, emotional loyalty, behavioral loyalty and advocacy loyalty. Transactional loyalty is built by the company by offering goods and services with more discounts. Furthermore, social loyalty is loyalty that is built by the company by involving customers in social channels. This form of loyalty is enforced by the company by giving points to customers for providing important posts about the company. On the other hand, engagement loyalty is similar to social loyalty, namely offering rewards to customers for subscribing to the company's products and services. This method can increase the conversion rate of a company's marketing. Emotional loyalty is loyalty that is built to build emotional relationships with customers by giving rewards at special moments or providing VIP services to customers. Behavioral loyalty is a program directed at getting customers to do what the company wants them to do. Studying customer behavior patterns generally yields the best loyalty results. Finally, advocacy loyalty is loyalty that is built by giving rewards to customers when they are willing to do what the company wants on social media. This method can increase the conversion rate of a company's marketing. Emotional loyalty is loyalty that is built to build emotional relationships with customers by giving rewards at special moments or providing VIP services to customers.

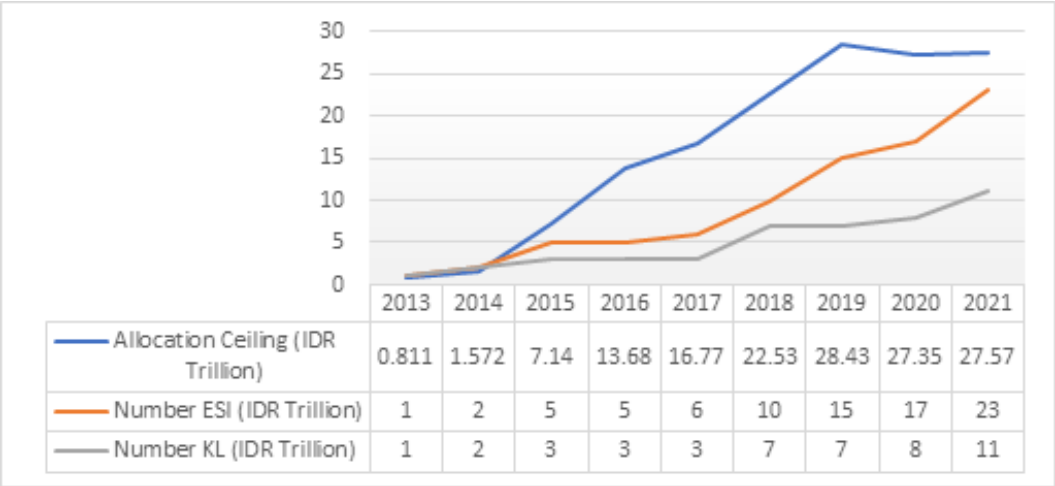
The government can use a combination of forms of loyalty in building the loyalty of sukuk investors. Emotionally, sukuk waqf investors have the same emotional bond, namely as a

Muslim who wants to make non-ribawi investments and build the economic resilience of the people through the empowerment of productive waqf. The important issue in building this loyalty is to build intensive communication with customers so that customers know exactly what products from waqf sukuk work, the working mechanism of waqf sukuk, rewards from waqf sukuk and how the profit scheme of waqf sukuk is distributed for the economic activities of the people. The selection of the form of loyalty is very important for the government to provide the most optimal results with minimum costs.

Although there are many investors who still see the return from their investment activities. But outside of the product, there are many factors that can affect customer loyalty, such as the expectations of investors from waqf sukuk products. Waqf sukuk products must meet a series of customer expectations in all aspects including the government's commitment to developing waqf sukuk that are in accordance with Islamic values, nazhir's consistency in empowering the results of waqf sukuk for the people's economy and the competitiveness of returns from waqf sukuk that can be obtained by nazhir for the economic empowerment of the people. Customer service is a tool that must be built by the government and Nazhir behind the waqf sukuk product. Customer service is as valuable as the product itself. Minimum risk and certainty of investment in the future is an attraction for investors to continue investing in waqf sukuk. In addition, personal relationships need to be established to build investor loyalty. Personal relationships between waqf sukuk investors can be built through nazhir so that individual investors (waqif) have confidence and comfort in investing in waqf sukuk. Furthermore, the government can contribute to community activities to build intensive communication with potential investors. In this case, the government must be present to support the economic empowerment of the people in order to build trust and loyalty from individual investors and the community.

Development of Building Loyalty of Sukuk Investors

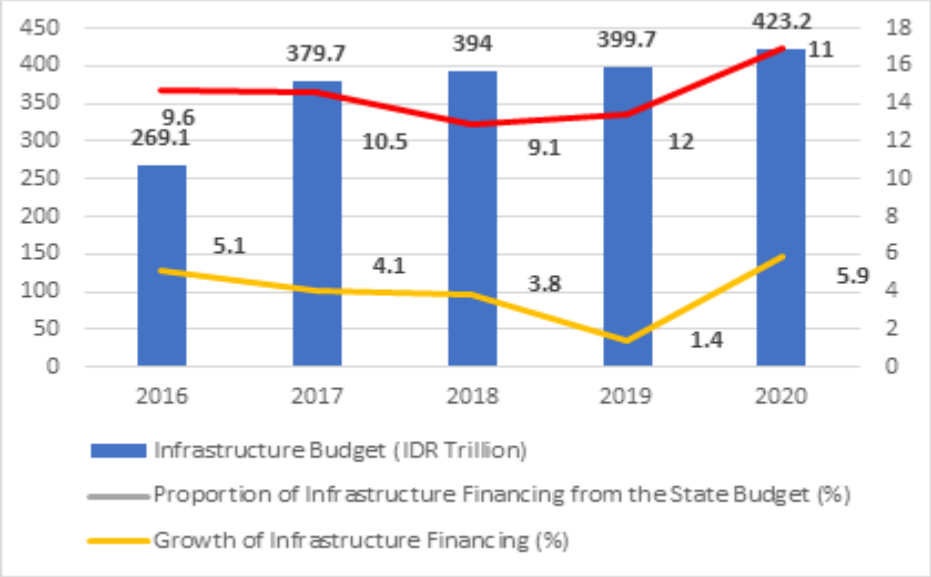
A period of time of 14 years is enough time long to build loyalty from investors to state sukuk. During this time, the government has diversified many state sukuk products to provide alternative investments for state sukuk investors. As a result of the diversification of state sukuk, the government has managed to raise very large funds for the construction of physical infrastructure which is very much needed for economic development in this country. The following is the development of the allocation of state sukuk in infrastructure development in various regions in Indonesia:



	2013	2014	2015	2016	2017	2018	2019	2020	2021
Allocation Ceiling (IDR Trillion)	0.811	1.572	7.14	13.68	16.77	22.53	28.43	27.35	27.57
Number ESI (IDR Trillion)	1	2	5	5	6	10	15	17	23
Number KL (IDR Trillion)	1	2	3	3	3	7	7	8	11

Graph 1. SBSN 2021 Project
Source: DJPR Ministry of Finance

The total financing for SBSN projects in 2013-2021 is IDR 145.84 trillion, with a total of 2,939 projects in 8 K/L and spread across 34 provinces. The main sectors to be developed are the development of the Trans Sulawesi (Parepare – Makassar) railway infrastructure, the South Java double track from Cirebon – Kroya – Solo to Madiun – Jombang – Surabaya, as well as the development of Trans Sumatra railway facilities, construction of roads, bridges, and construction of resource projects. water resources (dams, irrigation, groundwater supply and management) in various provinces, with several strategic projects such as the Holte kamp/Youtefa Bridge in Papua, the Balang Island bridge in East Kalimantan, and the national road network in Sumatra and Kalimantan; construction and development of Lecture Buildings in more than 100 universities, both within PTKIN Kemenag and PTN Kemendikbud. The issuance of state sukuk has helped ease the burden on the government budget in infrastructure financing. This can be seen from the proportion of sukuk financing in the state revenue and expenditure budget each year as shown in the following graph:



Graph 2. Infrastructure Budget Development and Infrastructure Proportion to the Indonesian State Budget

Source: Indonesian State Budget for 2020-2021

With the existence of state sukuk, the government can allocate spending for infrastructure development which continues to increase every year. In 2020, the proportion of government spending on state sukuk grew by 5.9%. From the World Competitiveness Yearbook (WCY) 2021 survey conducted by IMD, Indonesia's competitiveness is ranked 37th out of a total of 64 countries. This achievement is actually better than the previous year where Indonesia's competitiveness was in 40th position. In the Asia Pacific Region, Indonesia's position is in 11th out of 14 countries, above India and the Philippines. When viewed more specifically, Indonesia's infrastructure ranking is at 57th in 2021, lower than the 2020 ranking, which is at 55th position.

The government's good performance in infrastructure development from the issuance of state sukuk will build good public confidence in the state sukuk instrument. Sustainable product diversification accompanied by intensive product communication will build good knowledge and interest for investors and potential investors to use state sukuk products.

There are many empirical studies that have proven the power of product diversification in building product brands and customer loyalty.Yashasvi Kanodia(2020) found a significant impact of brand loyalty on product sales as well as the impact of marketing and brand strategies

on product attractiveness. Furthermore, Shao Chi Chang & Chi Feng Wang (2007) explain that product diversification has a positive effect on the performance of multinational companies and there is a relationship between international diversification variables and marketing performance with unrelated product diversification as a moderating variable. Giovanis, & Athanasopoulou (2018), concluded that the affective aspect of brand relationships has a stronger effect on price tolerance, while trust has no direct effect. Nasiru Adamu, et.al. (2011) explains that companies with high and moderate diversification have a higher Return on Total Assets, Return on Equity, and Profit Margin compared to companies that do not diversify. However, there is no difference in the performance of companies that do not diversify with companies that do diversify based on the size of Return on Total Assets, Return on Equity, Profit Margin. Research in Nigeria shows the impact of product diversification on performance in construction companies (Ramanujan and Varadarajan, 1989). Ramanujan and Varadarajan (1989) explain that the entry of a company into a new line of business activity can be through an expansion or acquisition process. Cannon and Hillebrandt, (1989) concluded that companies that will carry out business activities outside of their core business activities can go through diversification, which includes vertical and horizontal integration. Companies that diversify can also consider diversifying operational processes in several industries (Ibrahim and Kaka, 2007). Diversification increases the investment opportunities of companies which are positively correlated with opportunities to increase profits in the economic sector (Pawaskar, 1999). According to Palepu (1985) strategy diversification is an important component for the strategic management of a company, so the relationship between diversification strategy and economic performance needs to be considered by managers and academics. Market volatility causes strategic decisions regarding diversification to consider the combination of the company's strengths and the business mix, so that the company can survive in the midst of its competitors (Teo, 2002). Management literature studies by Ibrahim and Kaka (2007), Palich et al (2000) show that there is an effect of diversification on firm performance. Giovanis, et al. (2015) states that consumer loyalty is a consumer's commitment to repurchase products and services in the future, thus companies need to create a desire to buy products for repeat purchases made by consumers. Management literature studies by Ibrahim and Kaka (2007), Palich et al (2000) show that there is an effect of diversification on firm performance. Giovanis, et al. (2015) states that consumer loyalty is a consumer's commitment to repurchase products and services in the future, thus companies need to create a desire to buy products for repeat purchases made by consumers. Management literature studies by Ibrahim and Kaka (2007), Palich et al (2000) show that there is an effect of diversification on firm performance. Giovanis, et al. (2015) states that consumer loyalty is a consumer's commitment to repurchase products and services in the future, thus companies need to create a desire to buy products for repeat purchases made by consumers. Joya (2015) explains that diversification can offset the negative impact of resource volatility. If diversification is controlled then the negative impact of volatility caused by resources can be eliminated.

To maintain investor loyalty to Retail CWLS, the government issued the next series, the SWR003 series on April 11 – July 7, 2022 with a total purchase order volume of 38,253,000,000 Rupiah (thirty eight billion two hundred fifty three million rupiah). Retail CWLS series SWR003 has a tenor of 2 years and offers a fixed rate of return/coupon of 5.05% per year, of which the proceeds will be channeled to social programs/activities that have social and economic impacts on the community, such as food security programs, livestock business programs, productive economic waqf programs for MSMEs, scholarship programs, programs for the procurement of medical equipment and revitalization of inpatient rooms and public benefits. The distribution of productive waqf results from Ritail CWLS for the economic empowerment of the people is more varied than the Ritail CWLS in the first series. This development will further foster the interest of the waqif in entrusting their waqf to the nazhir. This is reflected in the emergence of orders for SWR003 from individual waqifs of 27, 38

billion Rupiah and institutional waqif of 10,87 billion Rupiah. The number of waqif SWR003 is 688 waqif, consisting of 687 individual waqif and 1 institutional waqif. The SWR003 series is a Retail CWLS series that can be ordered online (only for individual waqifs). Online orders dominate both in terms of nominal orders, which are 27,17 billion Rupiah (71.04%), and the number of waqif, which is 647 waqif (94.04%). Buyers for the SWR001 and SWR002 series are dominated by private employees with individual waqif orders (13,81 billion Rupiha or 50.44%) as well as the number of waqif (320 people or 46.58%). Meanwhile, orders from waqif who are civil servants or the Indonesian Armed Forces or Police of the Republic of Indonesia amounted to 3,84 billion Rupiah from 103 waqifs. Based on generation, Generation X waqif dominates orders with a total nominal value of 14,49 billion Rupiah came from 256 waqifs, while the largest number of waqif came from Generation Y/Millennials, which was 347 people (50.51%). The participation of Generation Y/Millennials has continued to show an increasing trend since SWR001, both in terms of nominal and number of waqif. Meanwhile, Generation Z's participation in SWR003 is 10 million Rupiah from 6 waqifs. Overall, orders for SWR003 came from 26 provinces throughout Indonesia. DKI Jakarta became the province with the largest nominal order, which was IDR 21.36 billion and the largest number of waqif, namely 183 waqifs. The Midis sector with the largest contribution both in terms of nominal orders and the number of waqifs was PT Bank Syariah Indonesia Tbk, with nominal orders were reaching 23,45 billion Rupiah (61.3%) and a total of 458 waqifs (66.57%). There were 619 new waqifs who bought SWR003, or 89.97% of the total investors. This very high portion of new investors is relatively the same as SWR002 which is 91.03%. Loyal investors of Retail CWLS as many as 12 individual waqifs with a total nominal purchase of 805 million Rupiah. Based on generation, loyal individual waqif is dominated by Generation X (Ministry of Finance, 2022).

CONCLUSIONS AND RECOMMENDATIONS

Indonesia has a loyal Muslim captive market for Sharia instrument products. Continuous education efforts about various Islamic financial instrument products as well as a strong commitment from the government will increase the market share of Islamic finance. In issuing state sukuk, the government has shown its commitment, namely by periodically issuing state sukuk and consistently diversifying state sukuk products to target all existing market segments, both corporate and individual, in domestic and foreign currencies as well as various contracts developed to adopt various interest. Although Retail CWLS products are relatively new developed by the government, they have attracted great attention from the public. This happens because the potential for waqf in the community is very large to optimize its use into various productive waqf products for the economic empowerment of the people. From the issuance of series 001-003, interest in waqif, both individual and corporate, continues to show an increasing trend with the dominance of the profession as private employees and civil servants with a distribution of 26 provinces in Indonesia.

From the existing developments, the loyalty of state sukuk investors, especially for the Retail CWLS, has begun to build and consistent efforts from the government both in upholding consistency with Islamic values, continuous education through various information channels as well as diversification and issuance of state sukuk (especially the Retail CWLS).

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MICROFINANCE EXPERIENCE AS AN INDONESIA INSTRUMENT OF POVERTY AND ECONOMIC DISPARITY REDUCTION

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ABSTRACT
Indonesia faces the problem of poverty, based on Indonesia Statistics (BPS) 26.16 million people or 9.54 percent of the total population are in the poor category as of March 2022. In March 2021, 7.50 percent of the total population was poor people in urban areas, while in rural areas, the percentage reached 12.29 percent. The BPS also found that suppressing the poverty rate in rural areas was faster than in urban areas. The World Bank finds that income inequality is a challenge for Indonesia and needs to be dealt with as countries with more equal wealth distribution tend to grow faster and more stably. The problem of the high population and economic disparities in rural and urban areas requires an integrated solution through a top-down approach in the form of formal institutional legalization by the Government to increase accessibility and minimize the risk of micro-economic actors as well as a bottom-up approach in the form of empowering people who are actively involved in the poverty reduction process. It implies the community comes out of the poverty trap in accordance with the targets of the SDGs program which is Indonesia's commitment. Micro Waqf Bank as a formal legal form of Microfinance is a solution to problems with the target segment of microeconomic actors throughout Indonesia to overcome economic disparity problems through economic strengthening and strengthening human resource capacity for sustainable prosperity.

Keywords: Microfinance, Poverty, Economic Disparity.

INTRODUCTION
Currently, 10% of the world's population lives in poverty and still struggles to meet the basic needs of life such as health, education, and access to water and sanitation. Without a significant shift away from social policies, extreme poverty will increase dramatically by 2030. (ADB, 2022). According to the commitment to achieve Sustainable Development Goals (SDGs), Indonesia has designed the SDGs program to end poverty, hunger, AIDS, discrimination against women and girls, protect the planet, and ensure that by 2030 all Indonesia people will enjoy peace and prosperity . In line with the program, Indonesia is supporting a lot of society activities related to creativity, knowhow, technology and financial resources development to achieve the SDGs targets.

The First SDGs Goals focus not only on the poor but also on services and social policies aimed at preventing poverty. The SDGs targets are extreme poverty reduction, implementation of social protection system, equal property rights, basic services, availability of technological and economic resources and strong environmental, economic and social development, mobilization of resources to alleviate poverty, and various poverty alleviation policies.

To achieve the SDGs targets, there is still a disparity as a national crucial problem are which has been going on for years. Indonesia is a country with the 4th level of disparity in the world. Indonesia poverty macro proportion trend on 15 June 2022 is 52.2% with under US$ 5.5 income per day. 10.1% of the Indonesian population lived below the national poverty line in 2021 (ADB, 2022). The percentage of Indonesian population had income under $5.5 per day is shown by Figure 1.2 below.

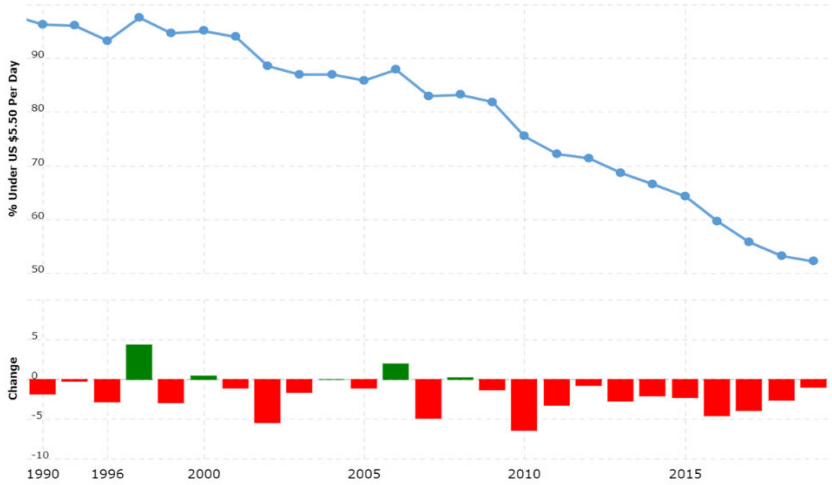

Figure 1.1 Indonesia poverty macro trends 2022
Source: World Bank, 2022.

The problem of the high poverty rate of the Indonesian population is caused by the high population growth rate. Indonesia has the growth rate of population 1.07% which is very potential human resources on one side, but it is big potential economics problem on the other side. Figure 1.2 below shows the growth rate of Indonesia population.

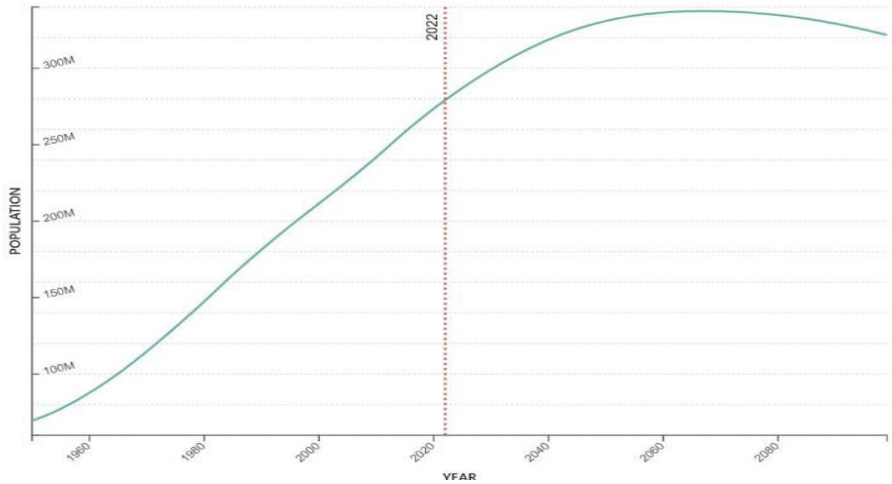

Figure 1.2 Indonesia population growth rate
Source: United Nations – World Population Prospects, 2022.

Indonesia population is 278,990,067 based on projections of the latest United Nations data in 2022. According to Classical Economists, population and technology will drive economic growth. However, the current condition of population growth follows a geometric progression that moves much faster than technological advances that follow arithmetic progression, thus disrupting development growth. Heady and Hodge (2009) support this theory, that there is a relationship between population growth and economic output growth. In another study it was found that economic growth in high-income countries tends to be slow, due to slow population growth. (Baker, Delong, & Krugman, 2005). Other studies have found that population growth is a problem because of the world's limited natural resources, therefore reducing population growth in the long term is an alternative policy option. (Linden, 2017). Population growth has an impact on several factors such as the age structure of the country's population, international migration, economic inequality and the size of the working age.

Although there is little empirical evidence regarding the direct impact of population growth on economic welfare, however, there is more empirical evidence regarding the indirect impact of population growth on economic welfare. First, rapid population growth can reduce growth in per capita income and economic welfare, which tends to increase poverty levels. Second, a dense population, rapid population growth can reduce land ownership and can increase poverty. High population growth has a negative impact on children's health, educational opportunities and the welfare of future generations. (Ahlburg, Dennis A. (1987).

Some neoclassical economists explain that there are 3 stages of model transition in Western Europe (Oded and Weil (1999). The first stage is Malthusian, the second is Post Malthusian and the third is Modern. In the Malthusian stage, technological development takes place very slowly, therefore income increases and the population progresses very slowly. In the Post Malthusian stage, the rate of growth of income acceleration is still positively correlated with an increase in population. The rationale is that when income increases, there is an increase in living standards. Improved health and welfare will reduce the death rate, although with a constant birth rate, then there is a positive relationship between economic growth and population acceleration (Mallick, Ghani, 2005).

The problem of poverty due to increased population growth is exacerbated by problems in urban and rural geographic areas. Most of the rural areas in developing countries are still not a priority for development, so there is a gap in the level of welfare in urban and rural areas. Worldwide, there are 109 poor countries with 1.3 billion people living in poverty, of which 21.7 percent of the people live in acute multidimensional poverty. About 84 percent (1.1 billion) live in rural areas, and 16 percent (about 209 million) live in urban areas. (UNDP 2021).

Based on Indonesia Statistics (BPS) 26.16 million people or 9.54 percent of the total population are in the poor category as of March 2022. In March 2021, 7.50 percent of the total population was poor people in urban areas. While in rural areas, the percentage reached 12.29 percent. The BPS also found that suppressing the poverty rate in rural areas was faster than in urban areas. The World Bank finds that income inequality is a challenge for Indonesia and needs to be dealt with as countries with more equal wealth distribution tend to grow faster and more stably. This problem is due to the difficulty of reducing poverty in rural areas that do not have proper infrastructure. (Yumi Wilson, 2018).

The high economic disparity in rural areas compared to urban areas will jeopardize economic, social and political stability. Various studies conducted by the World Bank show that countries with a more even distribution of welfare tend to experience faster and more stable growth than countries with high disparities. Piketty (2015) explains that if the rate of return to capital is greater than the rate of economic growth, it will have an impact on injustice. A larger gap in capital ownership will have an impact on an uneven level of economic growth and have the potential to increase social problems in the community.

Overcoming economic disparities in rural areas cannot be easily done through a top-down government program approach without paying attention to the culture of the local rural community. The rural poor also need financial services including savings, loans, transfers, insurance, and deposits even in small amounts by taking into account the elements of risk and security. Through financial services, the rural poor can minimize risk compared to saving money at home. Microfinance Institution as a financial service institution is the right solution, because it is very flexible and compatible with rural communities, which can take the form of credit associations, financial cooperatives, rural banks, non-government organizations, and agricultural development banks (IFAD, 2008). Microfinance in various developing countries is used as an instrument for poverty reduction. The problem in this article isHow does microfinance solve the problem of poverty in Indonesia with high population growth and economic disparities in rural areas with urban areas?

2.1 Microfinance as An Instrument of Poverty Reduction

Blank et.al (2015) see that poverty theory can be classified into economic theory, sociological theory, psychological theory, anthropological theory, and political perspective theory. Referring to Blank et.al (2015) and Jung and Smith (2007), the economic theory of poverty is caused by an underdeveloped economy, lack of human capital development, dysfunctional markets, political and social forces, individual behavior characteristics and individual choices, and dependence on welfare. or poverty traps. Sameti, et al. (2012) stated that poverty can be classified based on the main individual, cultural, structural and environmental factors.

According to Cepparuol, Cuestas and Intartaglia (2016), the development of financial institutions has a significant and positive value to poverty reduction. There are estimates that show that the development of financial institutions has a positive and significant effect on poverty reduction. It was also found that the development of financial institutions aimed at the poor was less effective when the poor already had other, more powerful institutions.Rewilak (2017) states that financial assistance and access to physical facilities greatly support the reduction in the proportion of the poor.Shaffer (2008) explains that an unfair income mechanism system has an impact on the community's economy, human capital formation, structural elements, contradictions in capitalism, cultural elements in society and geographic location.

Microfinance systems that are effective and efficient in developing countries can reduce poverty levels, especially for the rural poor. Through easy access to financial institutions, farmers in rural areas can easily obtain agricultural inputs such as seeds, fertilizers, insecticides, irrigation systems and various supporting services that can increase agricultural productivity. Through access to financial institutions, more and more rural poor people invest in micro and small scale businesses and industries, and micro and small entrepreneurs will develop their businesses with the assumption that the government provides various physical and non-physical infrastructures to support businesses in rural areas. (Juanah, Momoh,Hochschule Wismar (2005).

Microfinance institution is the terminology used for institutions that provide microfinance services. Microfinance institutions offer financial services to serve the community which include savings, insurance, health and individual services. Microfinance institutions are services that can be profit-oriented or non-profit-oriented. Microfinance institutions are devoted to financial institutions, under microfinance organizations, which are committed to working as financial inclusion institutions. Microfinance institutions are also defined as institutions whose main business is microfinance services such as deposits, loans, lending services, money transfers and insurance to poor and low-income households and their businesses.

Microfinance Institutions are known as service providers for the poor with the main services being credit and savings, although insurance and other payment services are provided by other parties. (Sriram, Upadhyayula (2003). Based on this definition, non-governmental organizations (NGOs) can be considered as Microfinance Institutions, if their core activity is to improve the quality of life of their members (Sriram, Upadhyayula (2004) and Microfinance institutions as instruments to reduce the level of poverty (Langelett (2002).

Chomen (2021) study binary logistic regression to identify the key determinants of the increase in income shows that the level of education, voluntary savings and use of loans from microfinance institutions contribute positively and significantly to the increase in income. From the results of the study, it is known that there is an increase in the standard of living of the community after becoming a member of a microfinance institution. Microfinance institutions have an impact on sustainable finance and poverty reduction in the long term (Javid and Abrar, (2015)

2.2 Microfinance as An Instrument of Poverty Reduction in Indonesia

The problem of poverty in Indonesia, which is characterized by a high population and socio-economic disparities in urban and rural areas, requires an integrated solution so that it is not temporary but sustainable to reduce poverty levels in accordance with the objectives of the Sustainable Development Goals as Indonesia's commitment. Development disparities that occur in Indonesia are indicated in terms of per capita income, quality of human resources, availability of transportation facilities and infrastructure, energy and telecommunications, social services, health, education and access to financial institutions (Daryanto, 2003). The decrease in economic disparity in rural areas compared to urban areas will encourage faster and more stable growth.

Thus the solution to the problem of reducing poverty and economic disparity is directed to a program that can reach rural communities in the form of a program to improve the quality of human resources, so as to improve welfare through community empowerment carried out at the initiative of the community. Good quality human resources in an area as the basic capital to carry out sustainable economic development that is independent and independent does not depend on external parties, so that development initiatives are directed to meet community needs in accordance with community priorities, not external parties. People can get out of the poverty trap because of strong human capital, have the power to choose, have strong market and social functions (Jung and Smith, (2007). People with good quality human resources will get out of poverty economically, socially, psychologically, anthropological and have political power (Blank et.al, (2015), in addition to having a fair income mechanism system and fair human capital formation (Shaffer, (2008).

The right program is a combination of socio-economic improvement in the form of infrastructure (Wilson, (2018), as well as improving the quality of human resources so that the rural poor have the strength of human capital, the choice to work independently, a strong economic community, low risk and secure among them. Based on empirical data in most developing countries, microfinance is the right solution to meet the needs of institutional infrastructure development and human resource development. The very flexible form of microfinance institutions in the form of cooperatives, rural banks, non-government organizations and agriculturel development banks will provide flexibility for rural communities to develop socially, economically and human capital.

Indonesia has started the microfinance movement formally from the institutional side through the government regulation Law Number 21 of 2011.According to Law Number 21 of 2011, the Indonesian Financial Service Authority (OJK) has to improve financial access for the wider community, in order to support government programs to address the problems of poverty and income inequality, especially for the Indonesian people, who are mostly Muslims. Indonesia economics needs sufficient financial sources. The access of the urban and rural poor to financial institutions from economic actors is a very important supporting factor to alleviate poverty, so that they can access sources of capital for business continuity. Financial Service Authority Indonesia (OJK) facilitates establishing of Micro Waqf Bank with a platform Sharia Microfinance Institutions.

Indonesia government wants to provide a space for the low economy, those who want to borrow but do not have collateral, Indonesia government builds a Micro Waqf Bank. Actually goes to banks in general right there must be administration, collateral, guarantees. It is the problem for small communities to fulfill all of the procedure. No more rigid procedure for the poor community once they are connected to Micro Waqf Bank as a Indonesia Sharia Microfinance Institutions.

The government wants to pay special attention to small communities which formally cannot be given a loan or financing by other formal financial institutions. Micro Waqf Bank has the purpose to empower the surrounding community Muslim environment through the establishment of institutions sharia-based microfinance (Microfinance institution / Micro Waqf Bank) with pattern accompaniment.

Related to the Islamic community as the majority of the Indonesian population, Micro Waqf Bank has an objective to maximize the role of Islamic boarding school in the program empowerment of the productive poor, build and strengthen socio-economic institutions of the Islamic boarding school for the environment around Islamic boarding schools in the form of Microfinance Islamic Financial Institution professionally, accountable, and independent through Community Business Group growth Around the Indonesian Islamic Boarding School.

In the form of Service Cooperatives for its legal institution, Micro Waqf Bank is permitted as Islamic Micro Finance Institution which is legalized by Indonesia government and regulated by Financial Service Authority. With the target of financing customers are productive poor people who are unable to access formal financial institutions, Micro Waqf Bank business model present as an incubator to get preparing customers for the sector formal financial institutions such as Islamic Banking, Financing Institutions Sharia, Sharia Ventures and institutions finance with a similar structure. The operations of Micro Waqf Bank is shown by the figure 2.1 below.

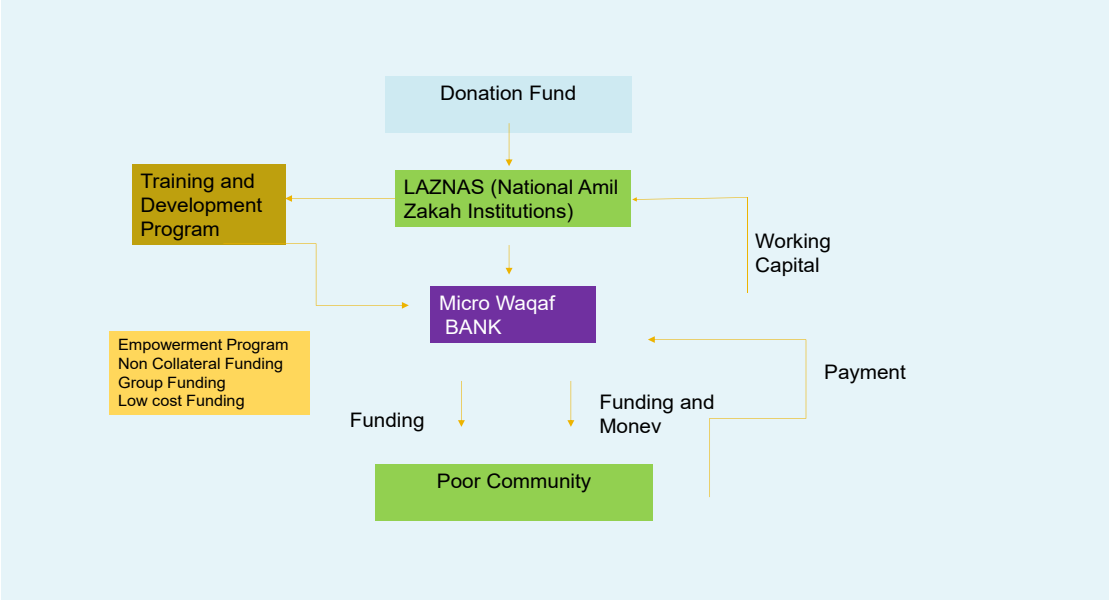

Figure 2.1 Micro Waqf Bank Operations
Source: Financial Service Authority, 2019

According to the mechanism of the organization which is shown in the figure, Micro Waqf Bank is related indirectly with the funder who is delivering the donation fund. To achieve the intended goal, the source of funds comes from funds social activities, both from corporate CSR and personal donations. The existence of donations from donors plays an important role in implementing the Micro Bank Waqf business model. A funder is a person or group of people who have a concern more in terms of empowering the productive poor as well as efforts to poverty alleviation efforts in Indonesia.

LAZNAZ as National Amil Zakah Institutions which is bridging with the funder and directly with the poor community. Founded with the aim of optimizing potential and collecting ZIS funds (Zakat, Infaq, Sadaqah) and other social donations by target muzakki/individual and

corporate donors. Muzaki are muslims or business entities who have an obligation to pay zakat, are not slaves, are free, have wealth in a specified amount according to certain conditions (Indonesia Regulation, Law No. 23, 2011) (Rais, 2009).).In the activities of managing and distributing funds to ashnaf mustahik, LAZNAS underlies the program to support and empower the potential of the mustahik. Mustahik has the opportunity and is able to compete a better standard of living.

The poor community is a micro business group consisting of poor individuals who run the nano or micro business who has no access to the formal financial institutions. The poor is the group who has the ability to meet basic needs for his survival, has been running the productive business, the will and spirit to work and commitment to participate in the empowerment program. Table 2.1 shows the number of outstanding loans from Bank Waqf Micro spread across all provinces in Indonesia.

Table 2.1 Outstanding Financing Inconesia Micro Waqf Bank

	Outstanding Financing Micro Waqf (in Billion IDR)			
PROVINCE/ Year	2019	2020	2021	2022
Aceh	64.8	136.1	190.6	225.4
North Sumatra	85.4	124	82	111.6
West Sumatra	357.3	440.1	483.1	369.4
Riau	386.3	296.5	353.5	483.1
Jambi	97	237.7	234.2	236.2
South Sumatra	6	52	145.7	159.5
Lampung	211.5	274	115.6	184.2
West Java	1600	1300	1700	1400
Middle Java	2400	2200	2500	2500
Yogyakarta	789.2	8861	900	1200
East Java	3500	3000	3200	4100
Banten	1000	606.2	748.7	1000
West Nusa Tenggara	240.9	573.7	675.5	348.9
South Kalimantan	22.9	185	239.4	194.7
East Kalimantan	126	132.2	138.3	21.6
South Sulawesi	92	76.3	147.8	147.8
Maluku	112.2	189.7	119.8	217.6
Papua	26.7	66.9	107.1	145.1

Source: Indonesia Financial Service Authority, 2022

Supported by Nation Amil Zakah Institution, Micro Waqf Bank provides a training and development program in the form of Empowerment Program, socialization of Islamic Microfinance Institution Empowerment, non collateral, non deposit, low margin, free interest and low price funding for the poor community. The poor community has been mentored, educated on business development, discipline, cohesiveness, solidarity and religious concepts, and also has an obligation to make a payment by low profit-sharing scheme to the Micro Waqf

Bank for all of the funding which has already received. The education provided is not only for strengthening management skills for increasing business competence but also for strengthening human capital skills for quality human resources, psychologically independent, taking initiative and being independent in making choices to get out of poverty traps.

3. CONCLUSION

Microfinance is a solution for Indonesia as a developing country that has a high population with high socio-economic disparities between people in rural areas and in urban areas. Microfinance

solutions through empowering Muslim communities in various parts of Indonesia will minimize socio-economic disparities and are oriented towards strengthening the economy and strengthening human resources, so that people can get out of economic poverty and human capital. Jung and Smith (2007), Blank et.al (2015), Shaffer (2008), (Wilson, 2018), (Daryanto, 2003). Freedom from economic poverty and human capital will produce an independent society for sustainable prosperity. Microfinance through Bank Waqf Mikro Indonesia is a combination of top-down and bottom-up poverty reduction approaches. The top-down approach is in the form of security and safety support from the government to the community in the form of formal legal institutions that will facilitate accessibility and minimize the risk of micro-economic actors with their business environment. The bottom-up approach is a community initiative to be actively involved in poverty reduction programs with the strength of the human resources owned by the community.

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GREEN HUMAN RESOURCE MANAGEMENT VS. EMPLOYEE BEHAVIOUR

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ABSTRACT
Behavior leads to actions and manners shown by individuals with themselves or in environment they live-in including environment around and physical environment. Green HRM is the integration of environmental management into HRM, which refers to behavior of every employee to adopt sustainable practices and increase and spread awareness, commitments and implementation of green practices towards sustainability. Green HRM is environment friendly leading to better employee efficiencies, low production cost and high level of employee engagement. Green HRM facilitates employee's completion of insole green tasks and elicit employee to contribute to green activities with motivation and adopting and maintaining green behavior at the work place.

Keywords: Green HRM, Sustainability, Behavior, Employee engagement, environment, awarness.

INTRODUCTION
GHRM is a new rising concept and can be defined as: ''using Human Resource Management (HRM) practices to reinforce environmental sustainable practices and increase employee's commitment on the issues of environmental sustainability''

From last decades many organizations are trying at their best to adopt green practices which are environment friendly and sustainable. It's now the need of time to keep proactive approach towards environmental sustainability across the globe. An organization is making efforts to implement green practices with an objective that, only green HRM can improve and sustain employee behavior.

From past few years environmental awareness became a significant concept for organizations. Green Human Resource Management necessarily play a vital role in making organizations more sustainable resultantly it helps at improving the social and ecological performance of organizations. Even though GHRM awareness is growing there is still a need for research on how to make the organizations more sustainable and 'green' whilst benefitting the organizations in terms of changing employee's behavior.

To make GHRM a more sensitive concept it is important for researchers to analyze and keep their conclusions open for debate. Still there is a scope to do much more in this area and need of cross sectional studies to increase the concept of implementation of green practices in an organizations. This study also has practical relevance, as it offers insights for making decisions concerning whether to implement GHRM and if so which practices can be used. Also, this paper highlights the relevance and importance of enforcement of GHRM, which could result in having more 'green' organizations which in turn has relevance for the sustainable environment. Further, this study emphasizes the right use of HRM to make organizations 'green' and therefore the acknowledgement of the added value of HRM in organizations can increase impacting on employees behavior.

This paper aims to shed light on adoption of green HRM practices to have a desirable impact on employee's behavior.

LITERATURE REVIEW
Green HRM involves addressing the organizations carbon foot print by cutting down on usage

of papers reducing unwanted travel, print, written communication etc. Researchers have proves that many organizations are greening their processes with an aim to gain competitive advantage over others specifically to have a impact on employees behavior.

GHRM plays a vital role in fostering environmental performance of employees specifically, it examines the impact of GHRM practices on employee's behaviors (task related and voluntary) with organizational identification as a mediator and employee personal environmental values. GHRM significantly proved voluntary change in employee's behavior. Organizational identification significantly meditated the effect whereas environmental values failed to moderate the relationship between GHRM and employee's green behavior. The study signifies the role of HRM in achieving environmental sustainability and emphasizes on the urgent need to embed sustainability dimension into HR system to achieve goals which are sustainable in nature.

Even though the amount of literature regarding GHRM is growing, still there is a scope to proceed a step ahead, such as the lack of research on the impact of environmental management on selection criteria and the impact of GHRM on financial performance and well-being of employees (Renwick, Redman, & Maguire, 2013). Additionally, Kiron et al. (2012) mentioned that many organizations still facing difficulties in identifying sustainability which may be conversant to their business processes.

"Go Green and Green Human Resource Management"

Going green means preserving and maintaining the natural resources for better tomorrow. For organizations go green means curtailing expenses and turning it into profit by taking various measures and adopting green practices. For going green it needs to keep enthusiastic approach towards environmental management and sustainability. if we can look at the changes that happens to environment during the existing crucial time of COVID-19 we experienced that success of an organization is depends upon its economical value which is possible by reducing ecological footprints and understanding importance of social, ecological and environmental factors.

by virtue of various researches on "advantages of green practices" we are observing that organizations are adopting environmental management systems such practices are termed as "green management" which talks about protection of eco system and environmental management strategies for measuring environmental aspects . This approach of green human resource management leading to change in employee behavior towards adoption of environment friendly green management practices with an objective of using green tools to enlarge social and economic benefits which ultimately helps in achieving harmony between green environment and employee behavior.

"**GREEN PRACTICES"**

For observing change in employee behavior It is important for an organization to make it ecological, economical and sustainable, to do this it is essential for an organization to adopt and implement green practices. Some of the green practices broadly adopted and implemented with the help and cooperation of employees by various organizations are as mentioned below.

1. Conversion of office and building as energy efficient
2. Online employee recruitment and selection
3. Development of vermin fertilizer
4. Reduction in carbon footprint
5. Proper disposal of solid waste

6. Proper disposal of E-waste

7. Recycling of waste material

8. Online employee's training

9. Online employee training

10. Green printing

11. Green payroll

12. Flexi work

13. E-filing

OBJECTIVES

1. To understand the change in employee behavior by adoption of Green Human Resource Management Systems

2. To highlight the impact of environmental awareness on employees behavior

3. To find out measures available for development of environment friendly atmosphere by use of Green Human Resource Management Systems and

4. To inspire employees to protect ecology, environment and society by molding their behavior towards Green Human Resource Management

METHODOLOGY

The study is primarily based upon the secondary data. To complete the study topic related details are collected from different data base, websites and other resources. A systematic descriptive analysis was then done to arrive at conclusions and recommendations.

HYPOTHESIS

1. Eco friendly atmosphere has a correlation with employee's behavior.

2. GHRM and positive employee behavior helps in building brand image of an organization.

Case Processing Summary

		N	%
Cases	Valid	100	100.0
	Excluded[a]	0	.0
	Total	100	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.866	4

Reliability statistics indicate the value of Cronbach's alpha is .866(86.60%). Value more than .70 or higher is considered reliable.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.717[a]	.514	.504	.59643

a. Predictors: (Constant), BM_S, HRM

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36.495	2	18.247	51.297	.000[b]
	Residual	34.505	97	.356		
	Total	71.000	99			

a. Dependent Variable: CHNG_MNG

b. Predictors: (Constant), BM_S, HRM

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.320	.271		4.871	.000
	HRM	.223	.071	.271	3.152	.002
	BM_S	.415	.068	.528	6.148	.000

a. Dependent Variable: CHNG_MNG

The tables of regression analysis in indicating p value is 0.000. Consequently if the value of pis less than 0.05 i.e. 0.05>0.000 then the relation between dependent and independent is positive. In said hypothesis researcher have considered, Eco friendly atmosphere has a correlation with employee's behavior.

DATA COLLECTION

1. Green Human Resource Management Function & Processes

The professionals working in human resource department plays a vital role in transforming the organization culture including implementation of green policy into practice and can create a green and sustainable culture within the organization. Therefore, such green practices help in fulfillment of green objectives and in achieving an organization goal throughout the HRM process from recruitment to retirement of an employee. Factors' coming in between recruitment to retirement contributes for developing and implementing green principles and practices with the help of employee's positive behavior.

2. Employee's Participation in Adoption & Implementation of Green Human Resource Practices

Characteristics and perspectives differ from individual to individual. therefore, when these people comes together by way of joining an organization, it becomes the mixture of employees with different attitude, behavior, characteristics & perspectives, naturally they adopt and follow different practices with different behavior in their everyday life causing different effects on the organization working, culture as well as environment . Some may follow the practices which results into degradation of environment or becoming environment friendly. Employees who are energetic, strategic, ethical, and involved themselves in understanding environmental management fundamentals can present more desirable, pleasant and effective environment in an organization by changing the co-employees behavior.

For development of effective green management, that results into successful improvement in environmental management systems or in framing policies at the work place needs active participation in green initiatives. Employee participation is crucially influenced by identifying values; awareness, behavior and actual reap recognized by the employees, society and stakeholders.

3. GOVERNMENT INITIATIVES

Government has make stringent rules by amending the environment related laws, focusing on more tree plantation programs, taking steps ahead to convert non-agricultural land into agricultural land, banned on manufacturing of single use plastic products, save water, use of solar energy, paperless offices, conversion of diesel/petrol vehicles into electronics segregation of solid waste as "Ola Kachra and Sukha Kachra" etc. for its easy disposal and reuse.

India's PM Hon. Narendra Modi said at the UN Climate Action Summit "We must accept that if we have to tackle the climate crisis, what we are doing today isn't enough. What we need is a global behavioral change" He also urges world leaders to act immediately to protect the environment.

"Earth is issuing a chilling cry: Stop..Time is running out. But it is not too late."

(UN secy-general Antonio Guterres)

"How dare you. You have stolen my dreams and my childhood with your empty words. We will not let you get away with this. Right now is where we draw the line."

(Greta Thunberg, 16 year old climate activist, to world leaders)

To protect environment Government of India had made applicable many laws to Industries and other sectors, some of the laws are as mentioned below:

- The Water(Prevention & Control of Pollution)Act,1974 (As amended in 1978 & 1988)
- The Air(Prevention & Control of Pollution)Act,1981(Amended in 1987)
- The Environment (Protection) Act, 1986.
- The National Environment Tribunal Act, 1995.
- National Green Tribunal Act, 2010.

4. India Green Manufacturing Challenge (IGMC) Initiatives

Organizations which participate in green management competitions are assessed by the authorized agency "India Green manufacturing Challenge (IGMC)" which is an awarding platform for organizations. Renowned organizations in India had been honored at "India Green manufacturing Challenge (IGMC)". This organization appeals industry for setting SMART goals in green initiatives which will raise awareness and inspire other industries to join activities relating to green initiatives, ultimately developing a GHRM.

Being "green "is great for the planet, it strengthen the organizations brand, makes an organization economical, motivates and inspired employees.

To make a continual progress it is essential for an organization to asses' impact of employees behavior on environmental aspects and to identify areas for improvement viz; scope for wastage reduction, recycling of waste, water conservation, use of less energy etc.

FINDINGS

Researchers have shown that, adoption and implementation of green human resource management develops constructive relationship between employee's behavior in an organization, human resource management and environment.

Organizations have numerous reasons to adopt and implement green human resource management practices that will prove beneficial for an organization and in changing their employee's behavior.

It is said by the entrepreneur that "takes my factories, buildings and money etc. except the employees as with the help of people we will create the empire again". This indicates

employees and their behavior are valuable and important asset for an organization as the combination of both can rebuild the empire.

GHRM practices helps in improving employee's positive behavioral change, morale and resultantly to save ecology and environment that will be beneficial for both the organization and employees.

Organizations which are not aware about green human resource practices, its concept, and policies may lose their talent or innovative employees, just because of absence of motivation and changing their employee's behavior.

Organizations that have implemented green practices developed their brand as an eco-friendly organization and thus offering socially responsible incentives which is nothing but an outcome of change in their employee's behavior.

Most of the employees are aware about eco friendly practices adopted by some organizations. Such organizations think about survival of future generations, due to this ethical reason only employee's think positive and changes their behavior to do something good for such organizations

Employees those who can understand the importance of environment protection and its advantages like to work with organizations which are implementing green human resource management practices.

In the race of attracting most creative and innovative employees, organizations are trying to attract the talented and potential employees by providing environmental friendly culture and practices viz;

(1) GE has painted it selves in green.

(2) Post Covid-19 Google and other IT sectors advised their employees to work from home

(3) Post covid-19 many companies have decided to have e-recruitment process in place

(4) Hewlett Packard as a brand mark using green packaging and integrating designs.

Many organizations have convert themselves as energy efficient by use of technology, innovative practices like preferring energy efficient windows and doors which decreases heating and cooling costs, water conservations system, low flow toilet to reduce water usage etc.

Many organizations are recycling and using a long-lasting green product which helps in reducing the amount of energy.

CONCLUSION

The aim and objectives of the paper is to explore the importance of green HRM practices that, can help employees in changing their behavior and organization to understand the scope of Green Human Resource Management in right perspective and spirit, in view of this from above information and interpretation it concludes that,

2.If employees behavior does not change towards adoption of green practices and environmental degradation if not controlled will have a negative impact on future generations

3. Lot many measures are available for development & expansion of Green Human Resource Management by bringing change in employees behavior.

4. Human resource managers should necessarily take initiatives in adoption of Green Human Resource Management and thereby positive change in employee's behavior.

Organizations like Tata Steel, Akzonobel, Wipro, Veolia Water, Clapo India, RICOH, Microsoft, and Infosys are taking measure which has an impact on development of people and expansion in the area of green HRM.

Effective implementation of green HRM helps employees and employers to learn and enjoy many things either from work life or private life resultantly they will attracts towards green environment.

Green HRM practices if implemented rigorously, consistently and honestly would result in attracting individuals to an organization and reduction in environmental degradation.

Creation of green awareness among employees by implementing Green programme and practices can help in

i) Reducing environmental degradation.

ii) Retain the resources for future generation

iii) Motivate and inspire employees

Green HRM efforts results in increased efficiencies, sustainable use of resources, less wastage, improved attitude, work life, employee performance and retention, whereas change in employees behavior helps in maintaining harmonies industrial relations

SUGGESTIONS

Change in employees behavior towards green human resource management certainly useful for organizations, ecology, environment and society, but from the experience of general peoples behavior towards applications of safety instructions and equipments during existing COVID-19 pandemic and increase in cases of corona victims it seems there are challenges in adopting and maintaining green human resource and bringing change in employees behavior, which can be in following manners-

1. To change employee's behavior is a long time process

2. To choose or select a real talent by using green recruitment and selection

3. It's a transformation process and thus possible only if every employee will change his behavior positively towards adoption of green practices.

4. There will be different levels of motivation depends upon attitude of an employee thus it will take a long time to bring desired change.

5. There are no specific tools to measure effectiveness of green human resource practices in employee's behavioral change.

RECOMMENDATIONS

- Everyone should adopt the green practices as the everybody's life including future generations is depended upon it.
- Human Resource Department professionals should focus on greening the business considering its an social responsibility.
- Each employee in an organization shall commit to contribute their efforts and ideas to the deliverance of their organization.
- By means of green HRM each member of the organization shall help management and human resource department to reduce employee carbon footprint.
- Everyone shall make efforts for sustainable use of resources, less wastage, improved attitude and work life,

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YOUTH ENTREPRENEURSHIP- UNLEASHING THE POTENTIAL OF YOUTH

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ABSTRACT

Entrepreneurship, both as a career option and economy developer has emerged as a strong tool to boost self-confidence and economic empowerment. Owing to its underlying benefits and advantages, many people especially youth is considering entrepreneurship as a viable career option where regular job opportunities fail to satisfy the needs and expectations of aspiring youth of both the developed and the developing societies. It not only provides employment to the entrepreneurs themselves but also to others who get employed in their undertakings. It spreads the desire for achievement, independence and progress among individuals. It boosts creativity as entrepreneurs are likely to come up with ideas and opportunities that have not been traditionally explored and implemented. Not just the creativity, it provides entrepreneurs with a chance to unveil their talent that they otherwise would have been unaware of.

Entrepreneurship has become an important subject of investment and thus governments are taking all the possible steps to strengthen its base in economy. However, as we say, it's easier said than done. The process of entrepreneurship from the day of inception of idea is a long one having its own share of problems and challenges. The lack of resources, knowledge, accurate information, legal complications and negative societal environment makes the process more tedious and painful. These problems discourage many young individuals from taking up the opportunity due to fear of losing and falling in financial crunch and thus for this reason it becomes important to comprehend the subject from youth perspective and list all the vulnerable areas.

Youth's natural outlook for innovation and change make young people well suited for entrepreneurship provided the community can give youth the right support to overcome their challenges. A country's economic development benefits from youth entrepreneurship in terms of employment creation, product and service innovation, market competition, community revitalization, and income generation.

Unleashing the potential of young women and men as drivers of job creation and economic growth is not only desirable but critical for sustainable development.

The study based on secondary data also throws a light on the challenges faced by youth entrepreneurs and steps that should be undertaken to tackle these challenges efficiently and

encourage young individuals to start their ventures. The paper aims to provide suggestions that would help boost youth entrepreneurship and its impact for India.

Keywords: Entrepreneurship, Youth Entrepreneurship, Employment creation, community revitalization.

INTRODUCTION

Youth Entrepreneurship and self-employment provide economic opportunities for the world's largest- ever population of young women and men to create more and better jobs in the private sector. One possible way to address youth unemployment is to support young people in creating their own businesses. They have the interest and potential to become self-employed. Youth are more likely to have a preference for self-employment than adults.

Despite having a preference for self-employment, few youth are able to sustain themselves in self- employment. Young entrepreneurs, SMEs and young firms are often more dynamic than large firms where employment growth is concerned. Yet, with a growing number of young people entering the labour market and limited opportunities for job creation, unemployment and disengagement are threatening sustainable development and social stability, and may cause people to migrate in search of jobs. In fact, unemployment figures understate the true extent of the challenges in the youth labour market. More than 160 million young people in emerging and developing countries are working, but living in extreme or moderate poverty. When young people acquire the skills and economic opportunities to realize their potential, this demographic dividend can help stimulate youth-led job creation.

Challenges Facing Youth Entrepreneurship

There is a need address the critical challenges that the youth encounter in their drive for entrepreneurship and self-employment. The main challenges are:

- Lack of role models or family support: Because of the inhibitions associated with entrepreneurship and its success rate many youth entrepreneurs find it difficult to gain family support. Absence of role models magnifies the difficulty for the first generation entrepreneurs who have to rely solely on their instinct. Also, high poverty rates make paid employment a better and more secure option for many Indian parents because of high risk and high capital investment linked with entrepreneurship.
- Higher Environmental Uncertainty: Entrepreneurial firms differ from established firms in the sense that entrepreneurial firms are younger and face more environmental uncertainty (Stinchcombe, 1965). The new firms face certain challenges because of their youth characteristic. Welsh and White (1981) highlight their two important characteristics- high environment uncertainty and youth which make them different from their established counterparts.
- Lack of broad knowledge base: Because of their low experience and youth characteristic, these firms normally lack data making it harder for them to implement pricing strategies and foresee market trends (Romanelli, 1989). Talking specifically, these firms struggle because they are focused more on establishing roles, structures, and processes that are feasible for all employees. Also, in the beginning, the young firm lacks understanding of pre-defined roles and relationships.
- Lack of reputation in the market: Because of their newness, the young entrepreneurs and their establishments lack market reputation which makes it difficult for them to stand against big competitors and create relationships (Gruber 2004).
- Lack of financial and human resources: Smallness and newness is also accompanied by scarcity of financial and human resources (Aldrich & Auster, 1986; Carson et. al., 1995). Lack of investors and personal finances stop them from exploring big opportunities or undertake creative projects. Also not many skilled professionals are willing to work with newly created ventures because of their uncertainty and inability to pay packages that are at par with market rates.
- Difficulty to understand pricing mechanisms: Pricing being the only function that generates revenue for an enterprise needs to be given utmost priority. However, many of the youth entrepreneurs find themselves stuck in the dilemma of earning profits or generating customer base and therefore usually end up with the case of over or under pricing (Reuber and Fischer, 2005). If they keep a low price, they risk their margins and if they keep the price level too high they risk their potential and actual customers. Therefore strategizing pricing becomes the key issue for these entrepreneurs.

- Lack of enabling policy, regulatory and institutional environments, including high registration costs for businesses, cumbersome administrative procedures, obstructive taxation and legal systems, and discriminatory policies and practices, including negative misconceptions about the entrepreneurial skills of differently abled groups.
- Lack of awareness of potential for entrepreneurship among role models results in a lack of encouragement or even negative social attitudes.
- Education and training programmes generally do not do enough to nurture entrepreneurial attitudes and skills.
- Lack of prior work and entrepreneurship experience is a major determinant to business start-up and entrepreneurship performance.
- Fewer financial resources and difficulty obtaining external finance, including debt finance, hampers business start-up.
- Limited business networks and business-related social capital have consequences for business start-up and obtaining legitimacy.
- Market barriers, including a bias in financial markets away from supporting youth-owned businesses and 'discrimination' in product markets. Weak entrepreneurial eco-systems compounded by inhibitory attitudes to entrepreneurship within societies, fear of failure, limited entrepreneurship and networking opportunities, a lack of platforms to foster the commitment of entrepreneurs and their exchange and transfer of knowledge, and limited access to markets
- Limited access to finance and investment opportunities, due to a minimum capital requirement, the lack of collateral, higher risk profile and consequent reluctance of financial institutions to lend money;
- Limited skills and knowledge transfer, which continues to hinder young entrepreneurs from being "fit for purpose" and establishing their own businesses, gaining access to technology, developing entrepreneurial skills and pursuing their education.

The Initiatives are Likely to Increase the Rate Of Startup Activity In India. to Truly Realise The Benefits, Following Steps Must Be Undertaken

- Government should frame policies to appreciate entrepreneurial efforts and provide educational and financial support to the young aspiring entrepreneurs.
- Entrepreneurship education should be made a part of college curriculum to teach youth about the aspects and prospects of entrepreneurship.
- Big and established entrepreneurs should come forward to help young entrepreneurs and teach them through their experience. Networking between big and young entrepreneurs should be encouraged as a part of social activity.
- Tax incentives and relaxations in the form of subsidies can help entrepreneurs keep running and growing. Reducing the tax burden would help them use their profits for securing required technology and resources. Also this would make them concentrate on their operating mechanisms rather than worrying about their tax liabilities.
- Campaigns should be run not just to boost entrepreneurial spirit but also to bring about a change in social environment. It is equally important to change the attitude of the society about the entrepreneurship.
- Training centres, skill imparting institutes and business incubators should be opened in rural areas to provide knowledge to their youth. Opening these centres in rural areas would

also provide an opportunity to women of these areas to gain training who otherwise find it difficult to travel to cities for gaining practical education. This is necessary to harness the talent of youth of rural areas and remove regional disparities.

- ❖ Young future generation needs to be given not only the basic skills and technical know-how but also the right attitude and behavioural skills to come up with innovative solutions.

Creating and Enabling Youth Entrepreneurship

The scale and quality of entrepreneurship education and skills development, coaching and mentoring must be improved. Youth would be assisted by education and training providers in reducing existing skills mismatches and ensuring that curricula respond to existing market demand by including and enhancing technical, vocational, business, digital and soft skills components. It would foster the provision of guidance and business-specific advice to young entrepreneurs through close collaboration between business associations, coaches, mentors and industry experts. A particular focus would be placed on combining technical and entrepreneurial skills development activities.

Online and offline platforms, networks, hubs and communities will be strengthened to provide support services specific to youth, to facilitate the exchange of knowledge and to build business relationships. Peer-to-peer support will be of particular importance for young entrepreneurs, by tapping into their resourcefulness and harnessing their potential in identifying the needs of their peers and the challenges that they face.

Facilitating Access to Markets, Networks, Knowledge And Skills

Bringing young entrepreneurs and youth-led enterprises into local, regional and global value chains increases their access to markets, generates new business opportunities and encourages positive spillover effects in technology and information.

Appropriate skills development, particularly in the areas of vocational training, entrepreneur ship skills and technical skills, helps equip young women and men with the skills that they need to pursue entrepreneurial activities. Skills development can be achieved through train-the-trainers programmes, the provision of toolkits for skills development, initiatives in partnership with the private sector and by integrating entrepreneur ship into higher education curricula.

Evidence from India shows that business counseling and assistance has had a significant and immediate impact on the business activity of young entrepreneurs.

Information and communication technologies (ICTs) can significantly support young women and men in realizing entrepreneurial opportunities, by enabling young people to acquire useful skills, including financial, entrepreneurial and digital literacy skills, and increasing their exposure to clusters and access to markets. The use of mobile phones has proved to be an important business tool, especially for young entrepreneurs in rural areas, as it allows them to grow their business, through improvements in marketing, the location of customers and communication, and through time savings, in addition to improved information and connectivity.

IMPROVED ACCESS TO FINANCE

1. Increase availability of financial services specifically targeted at young people the development and delivery of financial services tailored to the needs of young entrepreneurs should be promoted. By strengthening the capacity of financial institutions and service providers, young entrepreneurs would have at their disposal financing mechanisms that overcome challenges such as limited collateral, high risks and high costs of financing.

2. Increase access to finance for young entrepreneurs through innovative financial mechanisms the initiative will actively encourage the linking of young entrepreneurs with various financing

opportunities, including crowdfunding, peer-to-peer mechanisms and impact investments. By capitalizing on ICTs, young entrepreneurs will have much better access to finance with increased information and new ways of realizing investment opportunities.

3. Equip young entrepreneurs with financial capabilities financial capabilities, which combine the attitude, knowledge, skills and self-sufficiency needed to make informed financial decisions, at both the enterprise and the household level, would be developed through customized training and capacity-building programmes for young entrepreneurs.

Promoting an Inclusive Environment for Entrepreneurship

Innovative approaches to promoting access to networks should focus on partnerships with youth associations and business organizations, including business associations, professional networks, chambers of commerce and new types of entities like business incubators, co-working spaces, accelerators, and entrepreneur communities and hubs.

Engaging the private sector and young people in the promotion of youth entrepreneurship Business incubators and accelerators are increasingly recognized as support mechanisms for young entrepreneurs to start and grow their businesses. These structures can have a variety of different forms, ranging from physical institutions and virtual platforms, to combined approaches. Their focus can be sector-specific (such as incubators in the ICT and agri-business sectors).

CONCLUSION

Looking at the sustainability issues of youth entrepreneurs, there have been tremendous efforts undertaken by the Indian government to boost entrepreneurship and encourage young entrepreneurs. Various initiatives in the form of introduction of Make in India (2014), Startup India (2015) and Digital India (2015) campaigns have been launched to strengthen manufacturing sector, make funding easier and connect rural areas by developing their digital infrastructure. These initiatives are expected to boost the confidence of entrepreneurs and make government services available in all areas. The initiatives are likely to increase the rate of startup activity in India.

It is important to create an environment that is suitable to youth entrepreneurship, where there will be a scope to experiment, to innovate and to learn, where failure is accepted and success is honoured, where there are no inhibitions as to the sustainability of start-ups, where young individuals are respected for giving ideas, where even the big entrepreneurs find it a privilege to support young ones.

Thus, Youth Entrepreneurship is that one tool which can save any nation from the alarming issues like high unemployment, poverty and stagnation.

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SUSTAINABILITY PRACTICES AND SUSTAINABLE ORGANIZATIONAL PERFORMANCE: A SYSTEMATIC REVIEW AND FUTURE POTENTIAL

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ABSTRACT
Over a decade, corporate sectors are more committed and involved in incorporating environmental, social and governance activities much related to the concept of sustainability. The paper aims to analyse the concerned literatures to find out the various dimensions of sustainability practices and its relationship with perceived organizational performance in VUCA world. The study used systematic literature review method to analyse the current state of research in sustainability domain. A Total of 78 top tier journal were selected for review. The majority of the research confirmed that linkage between sustainability practices and perceived organizational performance. Furthermore, review narrow down with corporate social responsibility indicates the social dimension of sustainability in comparison to environmental and social dimensions. Sustainability dimensions provides better opportunity to organizations to meet customer requirements and gain better competitive advantage specifically in developing countries. The study recommends more research and validation on this domain to understand the relationship between sustainability dimensions and perceived organizational performance.

Keywords: corporate sustainability; financial performance; sustainability practices; sustainability impact; economical sustainability; environmental sustainability; social sustainability; corporate social performance; corporate environmental performance

1.INTRODUCTION
Nowadays the organization are giving much consideration to sustainability dimensions rather than just putting superficially in annual reports (Adams and Narayanan, 2007). Stakeholders are increasingly seeking disclosures, not just on companies' financial matters but also on environmental and social practices (Ernst and Young, 2002; KPMG, 2005). Though the practices of sustainability is still in nascent stage and no consensus on its definition (Bebbington, 2001) and alternative reporting terminology – corporate social responsibility (CSR), sustainable development, triple bottom line, non-financial and environmental, social and governance (ESG) – sometimes being used interchangeably. Various national and international bodies now stress on reporting non-financial parameters that should be reported. These bodies includes Global Reporting Initiative (GRI) (2006), Accountability (Adams and Narayanan, 2007) and the Sustainability Integrated Guidelines for Management (SIGMA) project (SIGMA Guidelines, 2008) among others. Organizations are focusing on developing corporate strategies which brings environment and social perspectives prominent which is going to be lead strategies in future markets (Busse,2016). Failure to meet sustainability parameters government used to take regulatory actions to alleviate the environmental and social harm, a situation basically resisted by business organizations.

Sustainability can be referred as "development which meets the needs of the present without compromising the ability of future generations to meet their own needs" (WECD,1987). The IUCN publication Caring for the Earth (1991) provided an alternative definition of sustainability "to improve the quality of life while living within the carrying capacity of living ecosystems." All the definitions have common view that sustainable development only possible by expanding financial bottom line to triple bottom line that incorporates social environmental perspective of corporate performance. It can be debated that there is utmost need to acquire a sustainability license to operate as well as its more customary regulatory license. The criteria for the 'award' of the former are far more intangible than the latter and pertain to track record and demonstrated

intent. Moreover, sustainability underlines the significance of building the capacity to explain performance from various stakeholders' perspectives such as local communities, natural resources holders and others.

The extensive body of literature still struggling in understanding relationship of perceived organizational Performance with corporate sustainability indicators (Borget et al,2020). The reason for lacking in universality of the concept is may be presence of wide range of industries and various forms of business following different parameters for achieving performance. Therefor a comprehensive accumulation of knowledge is greatly required at this junction in the progress of the concept in literatures.

Two competing theories attempt to describe the impact of sustainability on corporate financial performance: value creating and value destroying (yazici,2020). The value-creation approach theorizes that firm risk is reduced with the adoption of environmental and social responsibility. In contrast, the value-destruction theory predicts that companies engaged in environmental and social responsibility. Other theories such as resource-based view also stipulates that a firm having unique competency can be strategically exploited to gain competitive advantage leading to perceived organizational performance (Ajibo & Ajibo et al,2019). According to stakeholder theory, fulfilling the requirements of stakeholders (environmental or social) contributes to financial performance (Groschl et al,2019). Consequently, presence of mixed results on this relationship, some researchers still argue on generalization and unidirectional relationship applicable to all which may not true in all context and situations.

Mostly reviews focus on single or two dimensions of sustainability or all three dimensions such as the present study capture all three dimensions (environment, social and economic) comprehensively (Nijhof et al,2019). Most recent literature that reviews all dimensions appear in 2012 and onwards (Goyal et al). earlier studies only examine relationship between sustainability and financial performance in context of firm, managerial and industrial characteristics. No study attempt to consider all three dimensions and their influence on perceived organizational performance. The study also emphasizes on the progress of literature in the subject of association between corporate social responsibility and its impact on perceived organizational performance.

Moreover, the study helps in establishing structure for future research on this domain, by offering a much needed synthesis of current literatures which includes shortcomings, opportunities, advancement in concept to reach out the universal conclusion. Publications were selected from literatures using the method of content analysis. The review incorporates context, time, industry trend and country need while taking the sustainability parameters during examination of corporate performance. The study tends to specify that whether an extensive strategic change in the direction of corporate sustainability in business organizations requires defining their role and limits as a determinant of sustainability transformations.

2.METHODOLOGY

The study adopted systematic review method to delineate the research patterns and future avenues in relation to human resource management and artificial intelligence. A systematic approach was chosen as it has the potential to enhance the quality of the review by using clear and replicable method to analyse significant contributions in this area. The study followed four steps during systematic review 1. Paper acquisitions 2. Paper selection 3. Descriptive analysis and 4. Content analysis suggested by Centobelli, Cerchione, and Esposito (2019). The review encompasses data-base of top HRM Journals, international business and information management journals and after critically examine or synthesize of extant research following four method approach 32 articles were finally selected for review.

To analyse the relevance of papers to fulfil the purpose of review, basically the study followed two methods (Cooke et al., 2017). Initially, the study focused on academic articles published in 36 premium journals in area of sustainability and sustainable organizational performance, The basic reason for including theses academic journals is to build foundation of research study pertaining to continuous technological advancement and updates in management information system (Van Geffen et al., 2013). During the selection process we restricted our research to only full length and peer reviewed publications in English language (Sheehan et al., 2010). Both conceptual and empirical papers were included in review process. For gaining better understanding of the topic, time frame criteria were not considered for the data collection process (Andresen & Bergholt, 2017), therefore papers published till 2022 were included in study.

By using different combination of keywords such as sustainability, sustainable performance, sustainability practices, corporate social responsibility, etc, we found 4352 articles relevant to study. After analysing abstract and titles 152 potentially relevant articles selected and finally screening of full text paper only 78 papers were selected for review process. It is essential to recognize that study might not include all relevant study articles in relation to topic because of unavailability of data base or human error.

3. SUSTAINABILITY AND SUSTAINABILITY INDICATORS

Defining sustainability is a very complex phenomenon. In the report of WCED (also known as Brundtland Commission), "Our common future", holds the key statement of sustainable development, which defined "Sustainable development" as the development which meets the needs of the present without compromising the ability of the future generations to meet their own needs" (UNWCED, 1987). This definition marked the beginning of realising the concept in terms of the political economy and established the content and the structure of the present debate (Kirkby, 1995). This concept of sustainability as explained by the Brundtland report was later picked up by various nations independently no matter being it a developed or developing country to make improvements in the concepts as mentioned by the Brundtland report (Mebratu, 1996). The conceptual definition of the Brundtland commission contained two key concepts:

- The concept of "needs", in particular the essential needs of the world's poor, to which overriding priority should be given.
- The notion that the environment's capacity to meet existing and future needs is constrained by the state of technology and social organisation.

By doing so, the commissioned outlined the strong linkage between poverty alleviation, environmental improvement and maintaining social equitability through the growth of sustainable economic growth.

In the organisational context, sustainability as defined by Hockerts (1999) is also coined around the concept of UNWCED report, sustainability is any state of the business in which it meets the needs of its stakeholders without compromising its ability also to meet their needs in the future. A company has to ensure that is operations are sustainable in regard to its economic, social and environmental performance".

Organisational performance is a concept used for measuring the performance of an organisation (Hofer, 1983). Thus, the overall term "Sustainable organisational performance" is a concept used for measuring sustainable performance of an organisation (Hubbard 2009). Based on all these concepts it can be concluded that all the terms mentioned in the studies such as "sustainability", "sustainable development" and "sustainable organisational performance" are equivalent and the factors used for measuring "SOP" are economic factors, environmental and social factors.

According to Kello (2007), SOP is a framework that helps organisations to become better high performing organisations (HPO). It is different to the Taylorism's, bureaucratic approach. SOP and HPO share a number of properties. The most crucial among these is the necessity to adapt to the setting in which organisations conduct their operations. Thus, in similar context, SOP as defined by Maleic et al., (2012) is "the organisation that looks for the maintenance of its high-performance level with respect to economic, environmental and social contribution over the long time". Successful organizations sustain their performance in the face of both internal and external challenges over time, rather than simply achieving high performance levels over the short term or during good economic periods.

Components of SOP: According to Hubbard (2009), businesses generally evaluate their sustainability performance in terms of the three sustainability pillars: economic, social and environmental performance. Economic performance refers to various methods an organisation adopts to achieve its economic objectives of development and earnings in order to competitive in the existing market. Economic objectives are achieved with the help of economic performance indicators. These economic sustainability performance indicators might be both monetary as well as non-monetary indicators (Cohen et al., 2012). However, the social performance refers to the extent to which organisations engage themselves in providing internal and external social benefits to its stakeholders such as employees and suppliers in a way to increase its moral and legal responsibilities (Reich, 1998; Hollender, 2004; Bansal, 2005). Last but not least, environmental performance refers to the activities undertaken by the organisations to reduce the harmful environmental impacts (i.e. land, water, air and energy) for future age groups (Paille et al., 2014).

4. CORPORATE SUSTAINABILITY

To make the corporate sustainability a part of the organization, it should be linked with trustworthy operational and logistic system(Mangla et al,2019). Integrating corporate governance systems may generate equal opportunities for businesses by consolidating financial and economic networking. Corporate sustainability transforms the public thinking, employee and their networking which may validate the company actions or practices. Sustainability standards act as robust analytical tool for evaluation and prevention of erroneous decision making. For firms to deal with sustainability in their operational operations, corporate sustainability assessment is crucial. Due to its competitive advantage and potential to lower the risks associated with climate change, sustainability development is essential for improving production processes in the industrial industry.

5. DRIVERS OF SUSTAINABILITY INDICATORS

A number of factors and drivers were identified both at macro (global) and micro (project) level to address the sustainable development. The development and adoption of indicator schemes are generally encouraged at the global level, while project-specific drivers motivate project managers and employees to ensure that such indicators convey real benefits to business, government, and local communities. Drivers can be classified on the basis of relevant stakeholder (workers, company, shareholders, regional, national & international regulators) and special interest group related to manifested issues (NGO, financial community, intermediate & final consumers).

Global Level Drivers (Macro)	Project Level Drivers (Micro)
Globalisation	Stakeholder Expectations
Voice of Society	Local community development
Voluntary Codes of Conduct	Corporate policy and practice
Action Groups	Local reputation management
Regulation, Conditions of Finance	Global reputation management
Supply-Chain Pressures	Government development plans
Industry Peer Pressure	Regulations
Internal Pressures	Conditions of finance
Environmental Change	Voluntary code of conduct

6. ENVIRONMENTAL MANAGEMENT SYSTEM

Organizations that integrate environmental management systems into their integrated management systems (Ikram et al,2019) outperform those that do not by virtue of their higher corporate performance. Corporate green initiatives could address issues relating to a natural setting. Low-carbon innovations are linked to corporate green performance, in which businesses adopt cutting-edge technologies to create products, operations, or management initiatives, reducing the serious environmental problems brought on by organisational activities. Environmental management systems improve both corporate sustainability and corporate business, providing firms with a practical means of boosting both short- and long-term corporate sustainability. Organizations should strive to achieve regional economic benefits, adhere to environmental rules of practise, and safeguard the local ecology while considering sustainability management for continued prosperity and growth (Liu et al, 2019).

In addition to aiming to achieve the intensification of market capitalization goals, the concept of sustainability tackles the preservation and protection of society and the environment for future generations (Usar et al,2019). Companies of all sizes that may have diverse motives for implementing sustainable strategies or processes might take advantage of low-carbon advances. The availability of a sustainable environment combines advancements that result in green products. The adoption of sustainable business practises in firms is sparked by corporate ethics. Investments in social and environmental sustainability often meet regulatory and stakeholder needs. Organizational sustainability initiatives are related to strategic choices. Strong companies are driven structurally and strategically by the socioenvironmental component (Ozbekler,2020). Companies should set up creative operational patterns for resources and processes, and improve business circumstances through social and environmental initiatives.

Corporate environmental initiatives may give businesses a competitive edge. The development of knowledge, innovation, and breakthroughs may be facilitated by organisational strengths and practises that strengthen both internal value systems and external infrastructure and environments (Madsen,2020). The environmental perspective can be broken down into Raw Materials, Emissions, Wastes, Energy, and Transportation. The selection of specific indicator from each group would be based on the type, complexity of the plant process or combination of both, stakeholder requirement and national & international regulatory mandates. he relationship between corporate environmental initiatives and sustainable competitive advantage can be moderated by stakeholders. Corporate environmental initiatives may be redesigned so that they produce a sustained competitive advantage by implementing an appropriate strategy and organisational components. The networks and larger contexts in which organisations function are influenced by business pattern elements acting cooperatively and reciprocally.

7. SOCIAL IMPACT ASSESSMENT

The creation of the social impact assessment procedure can be advantageously combined with a public participation and conflict management programme. SIA and public participation both grew out of principles that prioritised putting people before profit. Public participation demands changed the SIA technique such that it now emphasises the human, live community rather than just data, statistics, and forecasts.

The GRI seeks to establish a common framework for enterprise-level reporting on the linked aspects of sustainability: environmental, economic and social. It adopted the following hierarchy for organising and presenting information in sustainability reports:

• Category: i.e., general class or grouping of issues of stakeholder concern (e.g., labour practices, local economic impacts).

• Aspect: i.e., specific issue about which information is to be reported (e.g., child labour practices, corporate giving to host communities).

• Indicator: i.e., the most precise measures of performance during a reporting period (e.g., adherence to an international child labour standard, monetary contributions per year to host communities).

8. SUSTAINABILITY REPORTING

Although reporting on sustainability is important for organisational communication, it does not vouch for the effective use of sustainable practises (Bomheuer,2020). Disparities in internal and external corporate governance systems, which lack extensive necessary regulation and auditing, make mismatches in alternatives for corporate sustainability reporting (yazici et al 2020) and the related and intrinsic corporate sustainability performance clear. The progress of effective corporate governance depends on board capital, which is a crucial component of governance procedures that helps firms improve their sustainability reporting practises and performance (Ngu et al,2019). Reporting and control should be linked for a successful progression in the direction of corporate sustainability. Without implementing proper control mechanisms on their path to sustainability, businesses who have a sustainability report ready for use imperil their efforts. By accepting ongoing executive compensation frameworks, systematic financial reporting, and adaptable financial decision-making patterns by including intangibles, businesses may include environmental and sustainable practises into their permanent financial decision-making plan. Clarifying corporate governance facets that could affect the decision for sustainability reporting is made possible by the environmentally sensitive properties of some corporate governance determinants in connection to sustainable concerns. Proposals for improved corporate governance may save agency costs and increase long-term corporate transparency. Reduced costs from efficient resource usage, increased revenues, risk management, and intangible assets provide business sustainability. Companies are encouraged to absorb sustainable disclosures together with existing sustainability reporting practises by adopting integrated reporting (Divaio, et al,2020).

9. IMPACT OF SUSTAINABILITY PRACTICES ON CORPORATE FINANCIAL PERFORMANCE

The board composition, knowledge gaps, strategies and resources, rivalry, and market patterns have the most effects on an organization's sustainability performance (Gouda eta al,2020) Sustainable manufacturing processes are advantageous for businesses, as they may reduce costs and improve quality in a variety of circumstances. Sustainability performance acts as a mediator in the relationship between sustainable endeavours and operational success. Optimization of sustainability performance is required for organisational change. Companies' sustainability performance is influenced by strategic directions about the nexus between business and society.

The goal of achieving better corporate sustainability performance should incorporate operational and economic factors (Cagno et al,2019). Performance assessment systems and the indicators they are linked to need to be solid with regard to sustainability issues, scalable to organisations of all sizes, and convenient to use internal resources. They also need to be able to take on sustainability pillars and their relationships. Knowledge management is what drives stringent external collaboration advancements, data technology-supported operations adoption, and capital growth within organisations. Corporate financial success and corporate sustainability are positively correlated. For productive organisations, sustainability plans are more expensive, which results in weaker investment incentives. The relationship between management skill and financial success is accelerated by a sustainability plan, but the relationship between operational competence and financial performance is hampered.

10. DISCUSSION

For firms to deal with sustainability in their operational operations, corporate sustainability assessment is crucial. Stakeholders want businesses to develop sustainability initiatives and make sure their supply chains operate ethically. Environmental management systems improve company performance and corporate sustainability. Organizational success and viability depend on the environmental component of corporate sustainability.

In order to achieve organisational change management, organisations should consider adopting sustainability. Sustainable suggestions are strategic choices that demand proper integration into businesses' action-oriented strategy. The production and consumption paradigms alter society and the environment while imposing demands on and obstacles for organisations. The local ecology should be protected as organisations work to achieve regional economic benefits and follow environmental best practises. Corporate sustainability performance may be positively influenced by adequate environmental measures. Modern technologies influence the viability of the economy.

11. CONCLUSION

Substantial study has recently examined whether corporate governance procedures, structures, and performance influence the corporate environmental sustainability and its impact on organisational performance. Organizational corporate sustainability performance involves measurement and assessment methods, metrics, and tools that are integrated into a comprehensive system for evaluating organisational sustainability performance. Corporate green success can be correlated with low-carbon emissions. Corporate sustainability performance is favourably correlated with environmentally friendly practices. Companies may reduce the negative social and environmental effects of their operations by adopting sustainable innovation techniques. Organizations should integrate sustainability within their management levels and administrative divisions. The effectiveness of sustainability initiatives is strengthened by project management capabilities.

The inferences made from the aforementioned studies show that corporate governance systems of firms builds operational environmental sustainability indicators through the implementation of sustainable corporate governance principles and operational practises. Through improved production methods, sustainability development can enhance the performance of the manufacturing industry. The key element of sustained organisational development is strategy. Businesses should be clear about their commitment to sustainability with reference to corporate ethics, stakeholder management, and environmental concerns. The performance of an organization's sustainability efforts may be determined by social and environmental constraints. Outstanding sustainability and financial success are made possible by coherent company governance.

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DIGITAL AGRICULTURE: WHAT'S AHEAD?

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ABSTRACT
Digital agriculture, or precision farming, identifies spatial and temporal variations within fields for optimal productivity and profitability, sustainability, and conservation of land resources by minimizing production costs. Broadly defined as an information and technology-based farm management system to analyze, manage. Growing environmental awareness among the general public is driving the need to change agricultural management practices to sustainably protect natural resources such as water, air and soil quality while maintaining economic benefits. It is Using inputs (such as fertilizers and pesticides) in the right amount, at the right time and in the right place. This type of administration is commonly known as "site-specific administration". Increasing productivity of the world's food supply in recent decades has relied increasingly on expanding irrigation systems, with more than a third of the world's food requiring irrigation for production. Overall, market-based global competition in agricultural commodities challenges the economic viability of traditional agricultural systems and requires the development of new and dynamic production systems.

Keywords: Digital agriculture, hi-tech agriculture, sustainability, future

INTRODUCTION
Digital agriculture is an approach that uses precise amounts of inputs to achieve higher average yields compared to traditional farming techniques. Therefore, we use the key elements of information, technology and management to optimize production, increase production efficiency, improve product quality, improve plant chemical usage efficiency, save energy and save the environment. A comprehensive system to protect digital agriculture is therefore an attractive concept whose principles naturally lead to the expectation that agricultural inputs can be used more effectively, resulting in improved profits and environmentally sustainable production. Today's digital agriculture developments can provide tomorrow's green farming technology. For smallholder farmers, especially in developing countries, digital agriculture promises significant yield increases while requiring minimal external inputs. These variations may result from management practices, soil properties, and/or environmental characteristics. Due to the large size of the and the yearly lease changes for the operating area, it is difficult to keep track of field conditions. Therefore, the entire farm should be divided into smaller farm units of 50 cents or less. Digital agriculture offers the potential to automate and simplify information collection and analysis. This allows management decisions to be made in smaller areas within a larger field and implemented quickly.

Although the adoption of digital agriculture is widespread in developed countries, it is still firmly entrenched in India, largely due to unique land tenure structures, poor infrastructure, lack of farmers' risk-taking, and socio-economic and demographic conditions. I have not. The purpose of this paper is to propose measures for domestic implementation of this new technology, with emphasis on a systematic approach to its operationalization.

LITERATURE REVIEW
Ashish Mishra, 2003, stated in his research paper "Operationalization of Precision Farming in India" that Agriculture remains the cornerstone of the Indian economy. In the coming years, precision agriculture could help Indian farmers reap the fruits of cutting-edge technology

without compromising the quality of their land or produce. Adopting such new technology would trigger the techno-green revolution that is needed now in India.

Pinaki Mondal and Manisha Basu, 2008, explained in her study named "adoption of digital agriculture technologies in India and in some developing countries: scope, present status and strategies" that the scope, status and strategies of PA implementation in India and some developing countries were reviewed. A variety of diverse application areas are discussed, including small farms, cash crops, and plantation crops. Three components have been identified as part of an overall PA adoption strategy in developing countries: 'single PA technology', 'PA technology package' and 'integrated PA technology'.

V. C. Patil, 2014, explained in his research paper "Relevance of Precision Farming to Indian Agriculture" In an era of rising input costs, falling commodity prices and environmental concerns, farmers and government agencies are looking for new ways to increase resource efficiency, reduce costs and promote sustainable agriculture. increase. Precision agriculture technology looks promising as a future agricultural tool, but its effective use in Indian agriculture has yet to be realized.

V. M. Abdul Hakkim, 2016, studied in his research paper "Precision Farming: The Future of Indian Agriculture" Precision Farming uses a systems approach to provide new solutions to today's farming problems, including: B. The need to balance productivity and environmental concerns. It is based on advanced information technology. This includes describing and modeling soil and plant species variability, and integrating agricultural practices to meet site-specific needs. It aims to increase economic yields and reduce agricultural energy use and environmental impact.

Burak Ozdogan and Anıl Gacar, 2017, stated in their research paper named "digital agriculture practices in the context of agriculture 4.0" that Government support is strategically important. In this context, the development of an action plan for digital agriculture and the support of this strategy with appropriate policies and implementations, as in EU countries and the US, will enable the expansion of the vision of agricultural production in Turkey. Enriching university curricula and other education options can also accelerate the digital transition by empowering young farmers in digital farming applications.

Victor Mokaya, 2019, explained in his study "Future of Precision Agriculture in India using Machine learning and Artificial Intelligence" that Technological advances and government initiatives to promote precision farming through subsidies, relief, tax exemptions and other incentives for farmers will greatly attract investments. The move therefore contributes to a conscious effort to protect growth and sustainability for future generations.

Kadambini Katke, 2019, stated in her research paper named "Digital Agriculture Adoption: Challenges of Indian Agriculture" Strategies for adopting precision technology are slowly driving technology penetration and widespread adoption. It takes time to change the way Indian farmers farm. Appropriate technology must advance for the social and economic well-being of farming communities and more generally for the global food needs of the next few years.

Abhishek Beriya, 2020, explained in his research paper "Digital Agriculture: Challenges and Possibilities in India" that reducing technology costs, easy-to-use wearable hardware, pay-as-you-go rental models, supporting policies and harnessing the power of farmer collectives are critical to the success of digital agriculture in India.

E.V.S. Prakasa Rao, 2022, studied in her research paper "Digital Agriculture – A Future Disruption in India" that the future of digital agriculture will bring some fundamental changes. For example, farmers are becoming administrators and knowledge partners for his, agronomists are becoming data analysts, AgTech companies are becoming technology enablers for his, and governments are becoming digital infrastructure facilitators.

OBJECTIVES

1) To study the feasibility of digital farming technology in India.
2) To analyze the cost and benefit in terms of Indian farmer's income-expenditure.
3) To study how well and easily Indian farmers can handle digital farming technology.

METHODOLOGY

This paper is primarily based on secondary data drawn from various literature sources, including various research papers, newspaper articles, and papers. Some data were provided in his by the Indian and Maharashtra governments and the Ministry of Agriculture website. Annual report of Ministry of Agriculture and Agriculture Welfare, referred to understand the environment and conditions of agriculture in India. Reading newspapers gave me information about the government's commitment to the welfare of farmers

DIGITAL AGRICULTURE

As expected, the agritech sector is changing like any other, evolving into a knowledge-intensive enterprise. This change has transformed traditional production systems into modern, productive and innovative systems (Andrade-SanchezandHeun 2010). Recently, farmers have experienced that non-production management activities also lead to new paradigms, in which more interaction with environmental factors is required (Sørense et al., 2010). The modern and near future farming concept means: Water saving agriculture, intelligent agriculture, high quality, high efficiency and green agriculture. Digital farming is the most effective and necessary approach to achieving all these transformations (Yane 2010).

They. (2010) describes digital agriculture as an implementation of the concept of a "digital world" he proposed in the 1990s, while the concept of "precision agriculture" emphasizes agricultural production processes. Digital farming means using computer and communication technology to make farming more profitable and sustainable. Digital agriculture, along with the widespread use of advanced and relevant data-intensive computing technologies, also known as the industry 4.0 revolution, is bringing new opportunities to agriculture. Digital farming tools that can be used in all farming and livestock systems enable optimized, accurate, timely and customer-specific use of information in resource management, creating a leveraged effect in agricultural implementations (van ES et Al. 2016; Deichmann et al. 2016). According to a report produced by GIFS (2015), less than 20% of her agricultural regions worldwide are farmed with digital farming technology.

A closer look at the definitions of farming 4.0, digital farming, precision farming, and smart farming above reveals that these are overlapping concepts, and it is difficult to come up with distinct definitions. Combining Precision Agriculture and Smart Agriculture constitutes digital agriculture. Concepts in the field of agriculture 4.0 and 5.0, AI in agriculture also forms digital farming. Sticking to this overarching definition of digital agriculture, this white paper covers all aspects and concepts of precision agriculture, smart agriculture, the use of ICT in agricultural augmentation, and the use of AI and robotics in agriculture.

(Source: Burak Ozdogan1, Anıl Gacar 2 digital agriculture practices in the context of agriculture 4.0)

DATA ACQUISITION

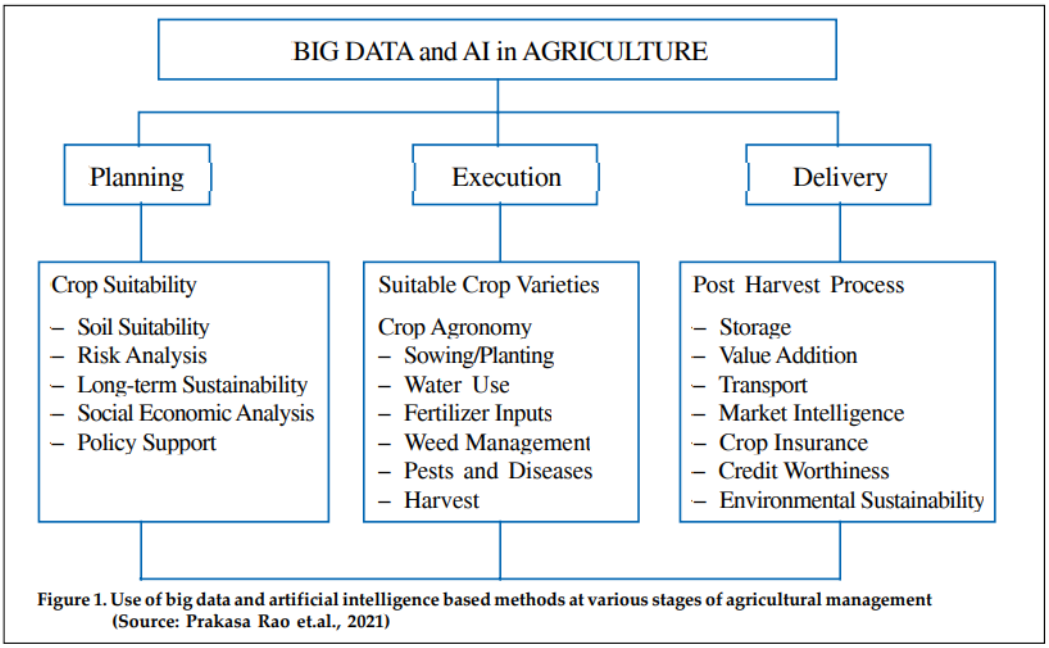

Figure 1. Use of big data and artificial intelligence based methods at various stages of agricultural management (Source: Prakasa Rao et.al., 2021)

Small holder digital farming requires field-level solutions. New technologies for field data collection with more frequent data and minimal manual error include IoT-based sensor systems that closely monitor crop parameters, thermal imaging, and environmental conditions. These sensor systems are connected to a wireless sensor network (WSN) and aggregated at a central location. Modern networks are bi-directional, collecting data from distributed sensors and controlling sensor activity. WSN-connected IoT provides a basic framework for high-density data collection. B. Microclimate (temperature, relative humidity, precipitation, wind speed, solar radiation, etc.), soil and crop parameters. It helps solve critical problems on the crop, weather and soil continuum. B. Early detection or prediction of biotic and abiotic stresses in crops (Ramesh et al., 2020; Prakasa Rao et al., 2021).

(Source: E. V. S. Prakasa Rao, Digital Agriculture: A future disruption in India)

TOOLS AND EQUIPMENT

Global Positioning System (GPS)

GPS is a network of satellite-based navigation systems that help users record location information (latitude, longitude, and altitude) with an accuracy of 100 to 0.01 meters. Using GPS, farmers can pinpoint the exact location of field information such as soil type, pest infestation, weed infestation, water holes, boundaries, and obstacles. It has an automatic control system with a light or sound conduction panel (DGPS), antenna and receiver. GPS satellites emit signals that allow GPS receivers to calculate their position. The system enables 4,444 farmers to reliably locate their fields so that inputs (seeds, fertilizers, pesticides, herbicides, irrigation water) are distributed to single fields based on performance criteria and previous inputs. can be applied to.

Sensor Technology

Measures moisture, vegetation, temperature, texture, structure, physical properties, moisture, nutrient levels, vapor, air and more using a variety of technologies including electromagnetic, conductivity, photoelectric and ultrasonic. Remote sensing data is used to identify crop types, identify stress conditions, identify pests and weeds, and monitor drought, soil, and crop conditions. Sensors can collect vast amounts of data without laboratory analysis.

Geographic Information System (GIS)

This system includes the hardware, software, and processes that support the compilation, storage, retrieval, and analysis of attribute and location data for cartography. A GIS links the information in one place so you can extrapolate as needed. Computational GIS maps differ from traditional maps in that they contain different layers of information (yields, soil survey maps, precipitation, plants, soil nutrients, pests, etc.). GIS is a type of computerized map, but its real purpose is to analyze text and geography using statistical and spatial techniques. Agricultural GIS databases can provide information on field topography, soil types, surface drainage, underground drainage, soil surveys, irrigation, chemical usage rates, and yields. After analyzing, this information is used to understand the relationships between the various elements that influence the culture of a particular place.

Grid Soil Sampling and Variable Rate Fertilization (VRT)

Variable Rate (VRT) technology is automatic and applicable to many farms. The VRT system determines the supply rate of agricultural inputs depending on the soil type specified in soil map. Information inferred from GIS can control processes such as seeding, fertilizer and pesticide application, herbicide selection, and variable rate application at the right place at the right time. VRT is probably the most widely used PFS technique in the United States. Grid soil sampling uses the same principles as soil sampling but increases the intensity of sampling. Soil samples collected on a systematic grid also contain location information that allows data mapping. The goal of grid soil sampling is a map of nutrient requirements, a so-called application map. Multiple areas of a field may be sampled that fall within the same yield range, soil color, etc., and therefore within the same zone.

Crop Management

Satellite data enables farmers to better understand the changing soil conditions and topography that affect crop performance in the field. Farmers can therefore precisely control production factors such as seeds, fertilizers, pesticides, herbicides and water management to increase yield and efficiency.

Soil and Crop Sensors

Sensor technology is an important part of precision agriculture technology and the use of sensor technology to provide information on soil properties and crop fertility/water status is widely reported. Comprehensive list of current sensors and desirable features for new sensors developed in the future.

Rate Controller

A rate controller is a device designed to control the dosage of chemicals such as liquid or granular fertilizers and pesticides. These speed controls monitor tractor/sprayer speed across the field, as well as material flow and pressure (if liquid), and make real-time feed adjustments to apply the target speed. Rate controllers have been available for some time and are often used as standalone systems.

Precision Irrigation Pressure Systems

A recent development was released for commercial use in sprinkler irrigation by controlling sprinkler movement with a GPS-based controller. In addition to motion control, wireless communication and sensor technology has been developed to monitor soil and environmental conditions as well as operating parameters (flow and pressure) of irrigation machinery to improve water application efficiency and crop utilization. These technologies have great potential, but need further development before they can be put to practical use.

Software

Applying precision agriculture technology often requires the use of software to perform a variety of tasks such as: The most common are software for creating maps (yields, soils, etc.).

Software for filtering collected data. Software for creating variable rate application maps (e.g., Fertilizer, Lime, Chemicals); Software for overlaying different maps. and software that provides advanced geostatistical capabilities.

Yield Guard

Yield Guard is a combination of several components. These components typically include several different sensors and sensors, such as data storage devices, user interfaces (displays and keypads), and a working computer located in the combine cab that controls the integration and interaction of these components. Contains other components. The sensors measure the mass or volume of the particle flow (particle flow sensor), separator velocity, drive velocity, and particles. For grain, yield is continuously recorded by measuring the force as the grain stream impinges on the sensitive plates of the combine's Clean Grain Elevator.

Precision Agriculture in the Fruit and Vegetable Sector and the Viticulture

Sector In the fruit and vegetable sector, the recent rapid adoption of machine vision techniques has enabled growers to classify products, monitor food quality and safety, and develop automated systems. can now record parameters related to product quality. These include color, size, shape, external defects, sugar content, acidity, and other internal characteristics. In addition, it may be possible to track field operations such as chemical spraying and fertilizer application to provide complete fruit and vegetable processing instructions.

Precision Animal Farming (PLF)

Precision Animal Farming (PLF) is defined as the management of animal production using precision animal husbandry principles and techniques. Processes amenable to precision animal husbandry approaches include animal growth, milk and egg production, disease detection and monitoring, and aspects related to animal behavior and the physical environment such as the thermal microenvironment and emissions of gaseous pollutants. It is included. Systems include milk monitoring to help check fat and microbial levels to indicate possible infections, new robotic feeding systems, weighing systems, robotic vacuum cleaners, feed pushers, and other farming aids such as It is included. B. Imaging systems to avoid direct contact with animals. New data monitoring systemon feed and water intake can be used for early detection of infection and is readily available.

(Source: V. M. Abdul Hakkim, Precision Farming: The Future of Indian Agriculture)

Table 2. Leading states in India who adopted Digital Agriculture since 2018

Sr. No	States	Year				
		2018	2019	2020	2021	2022
1.	Maharashtra	8	11	14	19	29
2.	Kerela	7	10	14	20	26
3.	Tamil Nādu	7	9	13	16	20
4.	Karnataka	9	13	18	22	26
5.	Gujrat	6	10	13	16	21
6.	Andhra Pradesh	8	11	15	18	23
7.	Sikkim	5	9	12	15	19

(*Source*: Survey of India brand equity foundation in2020) (Data in Percentage)

Above table 2. shows that feasibility of digital agriculture is increasing as farmers are approaching towards it since 2018. Thus, it is proved that demand for digital agriculture is increasing. And it is also sustainable as farmers approaching towards it as it good for advancement of farming and to the point application of inputs.

Implementing digital farming for smallholder farmers in India and scaling and deploying it to regional or agroclimatic farms will be successful when the following actions are implemented:

Low-cost technology: At all-India level, the average monthly income per farmer household was INR 10,220 in the 2019-20 agricultural year. Locally developed, low-cost technology is therefore a very attractive solution.

Portable Hardware: The Indian market is ripe for plug-and-play hardware as most farms are small. Farmland leasing is also a common practice in various agricultural arrangements, allowing farmers to move from one piece of land that is in harvest to another. Therefore, a farmer would be better off investing in her mobile device in this situation.

Lack of knowledge about government subsidies – Financing farmers can help drive adoption of agricultural techniques (Vaiene et al., 2009). Government of India's Finance Initiative to Adopt ICT is slowly gaining momentum. A number of programs and policies have been developed to facilitate the recruitment process. However, there is little communication with the target framer.

Agricultural Machinery and Equipment Aggregation, Rental, and Sharing Platforms: Lack of financial resources and small farm plots make equipment rental and sharing an attractive alternative to direct purchases, and digital platforms with equipment rental and sharing services. is a basic requirement.

With the establishment of the Farmers Producer Organization (FPO), there is great potential for digital farming from the upstream (inputs and production processes) to the downstream (value chain including post-harvest and food processing) of the agricultural value chain. India. Farmers, the production and marketing of their products are integrated in these FPOs. FPO is ideal for accelerating the adoption of precision and smart agriculture. H. Any technology within digital agriculture as it provides a larger land that can be used for technology adoption.

FPO also provides affordable and accessible technology for small farmers, ensuring win-win results for all involved. FPO not only acts as an aggregator of inputs and outputs, but also enables economies of scale and enhances bargaining power for member farmers. E-commerce sales can be promoted according to local and national requirements and requirements.

(Source: https://timesofindia.indiatimes.com/)

In recent years, India has seen a growing number of agritech start-ups that not only make technology more accessible but also help improve the lives of these farmers.

1. Ninjacart
2. WayCool
3. AgroStar
4. DeHaat
5. Stellapps
6. Bijak
7. CropIn Technology
8. EM3 AgriServices
9. Intello Labs
10. Aibono

(Source: https://www.prakati.in/top-10-agritech-startups-helping-indian-farmers/)

Above companies help farmers in digital agriculture by renting the technology and tools to farmers and by setup system in farm and help the farmers in easy handling of the technology. And by provide the accurate data to the farmers.

In August 2019, Cisco developed the Agricultural Digital Infrastructure (ADI) solution to improve farming and knowledge sharing. This ADI could play an important role in the data pool being created by the USDA as part of the National Agri Stack. Pilot projects for this initiative will be implemented in Kaitar (Haryana) and Morena (Madhya Pradesh).

Launched in February 2020, the Jio Agri (JioKrishi) platform digitizes the agricultural ecosystem and empowers farmers along the entire value chain. Core capabilities of the platform use standalone application data to provide advice, while advanced capabilities use data from a variety of sources to feed data into AI/ML algorithms to provide accurate, personalized advice to do. Pilot projects for this initiative will take place in Jalna and Nashik (Maharashtra).

Using a digital crop monitoring platform built on ITC's e-Choupal 4.0 digital platform, TC transforms traditional general crop-level advice into personalized, site-specific crop advice for farmers, they suggested creating a personalized "site-specific crop advisory" service. Pilot projects for this initiative will take place in Sehor and Vidisha (Madhya Pradesh).

The Ministry of Agriculture and Agricultural Welfare Has Developed A Major Digital Application to Facilitate Technology Adoption by Farmers.

National Agricultural Market (eNAM): - A commerce portal that links existing Agricultural Market Committee (APMC) mandis to create a unified national agricultural market. eNAM helps farmers sell their produce without the interference of brokers and middlemen by generating a competitive return on their investment.

Direct Benefit Transfer (DBT) Central Agri Portal: - Launched in January 2013, the DBT Agri Portal is an integrated central portal for agricultural programs across the country. This portal helps farmers to introduce modern agricultural machinery through state subsidies.

(Source: Beriya, Abhishek, Digital Agriculture: Challenges and Possibilities in India, https:// fsii.in/ digital-agriculture-in-india/)

Why are Farmers Embracing Digital Transformation?

Over the past five years, several factors have caused this to happen. It didn't happen overnight. After affordable high-speed internet access became available, many farmers turned to mobile app solutions for farming, and today we have reached the tipping point of mass access.

At the same time, the agricultural solutions offered by agritech companies are also evolving, offering real-time agricultural intelligence, data- and technology-driven impactful solutions that address multiple variability in soil, weather, irrigation, and more. The results are also visible to local farmers, leading to their trust in such agricultural solutions.

(Source: https://fsii.in/digital-agriculture-in-india/)

Comparing the growth rate of tomatoes and brinjal, which are actively cultivated in Maharashtra, there was a range as follows.

Table 3: Comparison table for farming with precision agriculture

Precision Agriculture comparison table	Difference in output	Difference in output due to technology	Difference in output due to inputs
With PA	62.85%	32.70%	29.13%
Without PA	27.15%	19.46%	6.67%
Margin difference	34.73%	12.22%	21.42%

(*Source*: Victor Mokaya 2019, Future of Precision Agriculture in India using Machine learning and Artificial Intelligence)

Therefore, the results obtained above show that there is great flexibility when precision agriculture can be applied to other vegetables and other crops.

FINDINGS

- Feasibility of digital farming technology in India is towards a positive direction. As we see digital agriculture has ample of advantages and great potential.
- Digital agriculture technology is quite costly but there are various companies in the market stated above which provides these types of solutions at lower cost and give full support towards it.
- So, farmers can easily take services from such players in the market which will be cost effective for the farmers and economically beneficial for them.
- And such companies also provide the trainings on how to operate and deal with such technologies.
- Precision Farming uses a systems approach to provide new solutions to today's farming problems, including: B. The need to balance productivity with environmental concerns. It is based on advanced information technology. This includes describing and modeling soil and plant species variability, and integrating agricultural practices to meet site-specific needs. Intended to increase economic yields and reduce agricultural energy use and environmental impact

CONCLUSION

Agritech companies can play a key role in providing farmers with advanced technologies such as IoT, artificial intelligence/machine learning, and agricultural drones for unmanned aerial surveys. Indian agriculture and related sectors show great interest in adopting the latest technology. However, the affordability of technology, ease of system maintenance, supportive government policies, ease of access and operation may make or break the success of digital farming in India. A holistic ecological approach to India's agricultural sector is in the national interest to achieve goals such as doubling farmers' incomes and promoting sustainable development. Digital agriculture in India will therefore require a multi-stakeholder approach with the government playing a key role. Increased income from digital technology is being recognized as an opportunity for farmers, industry and governments. Increase efficiency across agricultural production processes and value chains. The use of digital technology is being developed in a variety of areas, including networks of IoT devices and data-generating sensors, image recognition for inspecting and classifying plants and goods, and AI applications.

Digital agriculture has created an opportunity to transform traditional agriculture into green and sustainable agriculture through sound resource use and management. Even if used differently than in Europe and North America, PAs that optimize yields with minimal inputs and reduce environmental impacts can help developing countries meet sustainability challenges. A fundamental goal of is urgently needed. Rapid socioeconomic changes in some developing countries are creating new opportunities for the application of digital agriculture. In some developing countries, the impact of dramatic changes on economic development, poverty reduction, energy consumption and urbanization will be devastating. Applying balanced soft and hard digital agriculture techniques based on the needs of country-specific socio-economic conditions makes digital agriculture suitable not only for developed countries but also for developing countries, bridging the gap between developed countries. can serve as a tool for reducing the and the rest.

With rising input costs, falling commodity prices, and growing environmental concerns, farmers and government agencies are looking for new ways to increase resource efficiency, reduce costs, and advocate for sustainable agriculture. Digital agriculture technology looks promising as a future agricultural tool, but its effective use in Indian agriculture has yet to be realized.

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GREEN ENTREPRENEURSHIP IN INDIA - A STEERING FOR THE SUSTAINABLE ECONOMIC DEVELOPMENT

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ABSTRACT
India is one of the leading and growing economies of the world. While it is hosting G20 in the year 2023, it is also a strong advocator for Climate Change. Entrepreneurship has grass root level spirits among the Citizens of India. Given the fact that Climate Change has thrown huge pervasive issue towards the whole world, India is also joining hands in promoting Sustainable Development and fostering Economic Growth. Therefore, a more profound approach in dealing with Environmental issues particularly related to Businesses has brought a very important need for promotion Green Entrepreneurship. In this Chapter, we discuss about the future of Green Entrepreneurship in India and its importance in building a resilient and sustainable development of the Indian Economy. Greener and Eco- friendly future for all the Innovative techniques and methods shall enable economic development with a more harmonious synchronisation with the nature. Entrepreneurship backed with green techniques and methods align with the United Nations Sustainable Development Goals in furnishing a multi - faceted system sustaining ecological balance and economic development in proper tandem.

INTRODUCTION
Green - Greener and a way Greener lifestyle is what the UN is opting for in its policy framework. However, Entrepreneurs are competing for garnering more returns but at what cost? Alas, it is at the staggering cost of emitting harmful toxicants and at the sacrifice of a cohesive environment. It's not possible to curb the businesses profit running mechanism which would slow down the economy. Similarly, it's not possible to earn profits at the cost of the Environmental damage. A combination where businesses are run in a profitable manner and at the same time focussing on the eco - friendly way of bringing out Entrepreneurship techniques and goals is what Green Entrepreneurship all about.

What Green Entrepreneurship is not?
Notwithstanding the Misconceptions, Green Entrepreneurship is not about cutting down profits for Environmental benefit. It is in fact, a more inclusive way to benefit Entrepreneurs in an eco - friendly way. Green Entrepreneurship is not mutually exclusive with the Corporate Goals of wealth maximization but it is an unique and cohesive way of Entrepreneurship which is in compatible with United Nations Sustainable Development Goals Framework. Green Entrepreneurship sets eye on a future which greener, more sustainable, more resilient and most importantly promotes innovations and creativity in the best possible light.

Why Green Entrepreneurship is needed?
There are many factors enabling Green Entrepreneurship. In fact, the very realisation that the Earth Resources are very finite but the population and economic needs are ever expanding makes it highly compelling to co-exist in a comparatively much greener framework.

As a common blueprint and a global call to action, the United Nations (2015) has defined 17 Sustainable Development Goals (SDGs), which now form the cornerstones for their sustainable development agenda. The fact that innovation and entrepreneurship are explicitly mentioned in four of these SDGs highlights their relevance to sustainable development. Entrepreneurs, who discover, create, innovate, and eventually exploit opportunities, are believed to drive economic growth and be agents for solving environmental and human challenges **(Dean and McMullen, 2007; Hall et al., 2010; Shepherd and Patzelt, 2011).**

Customers in the modern times are getting awareness about an eco - friendly environment which makes them highly critical of modern businesses practices which deteriorate the environment. Therefore, an eco - friendly way of doing business is much preferred by the consumers themselves. Until now, Climate change has been addressed in many meetings by the UN but the fact that we are facing huge Climate Change issues and severe threats about it getting affected severely points out intriguing need to make some structural changes in basic Entrepreneurs issues ultimately leading to an eco - friendly lifestyle

Green Entrepreneurship - Making way for the Future?

Future is filled with hopes if smart visions are laid down. Looking ahead, Green Entrepreneurship is paving way and making way for a promising future. The fact of the matter is it builds an unique opportunity for the Innovators and Entrepreneurs to strike the perfect balance between reducing cost through greener techniques and achieving sustainable returns from greater competitive advantage and ethical considerations.

Empirical evidence suggests, however, that not all of the three pillars of sustainable development seem to benefit from entrepreneurial activity. While the positive macroeconomic impacts of entrepreneurship are well proven and described in several literature reviews (e.g., Neumann, 2021 Urbano et al., 2019; van Praag and Versloot, 2007), The recent stream of empirical studies on the macro-level social and environmental impacts of entrepreneurship reveals a more heterogeneous picture: entrepreneurship is positively related to poverty reduction (Rupasingha and Goetz, 2013). In the upcoming times , more push is inclined towards Green Entrepreneurship with the help of Artificial Intelligence techniques cutting through a more robust mechanism to materialize Economic Development, Entrepreneurial Growth, Technological Advancement and Environmental preservation.

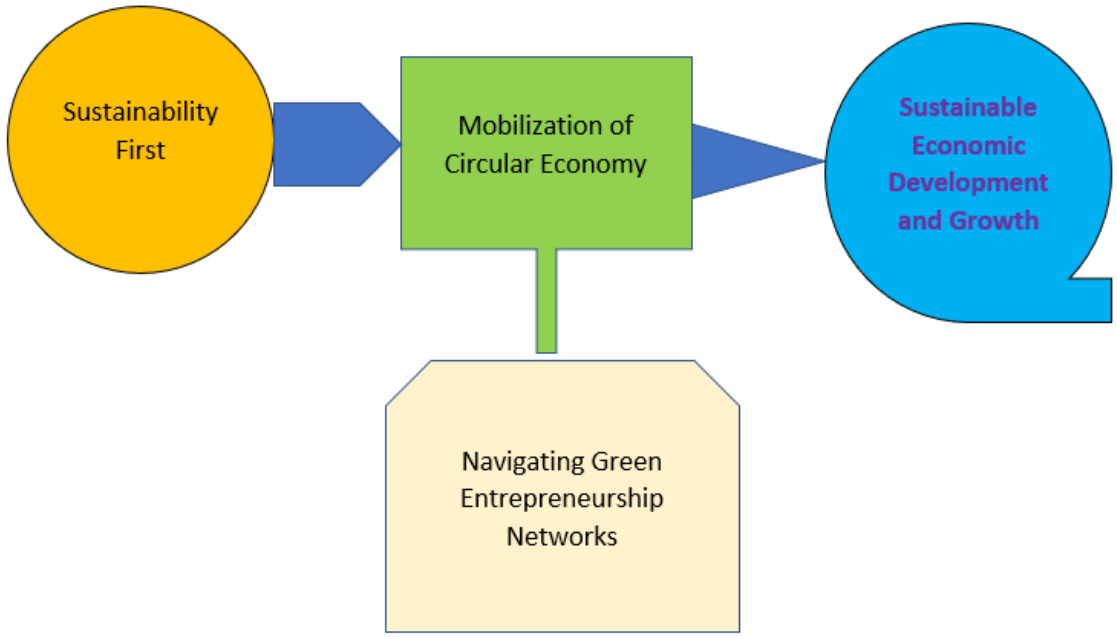
Green Entrepreneurship in India - A Glimpse:

Most of the India's soul resides in rural area. Manifestation with the nature has long been India's core values and part of spiritual enlightenment. Urbanization ofcourse, has drifted India's reliance and comparability with Greener pastures but Entrepreneurial Intentions to align with greener economy has transformed India's outlook from "Becoming Green" to "Being Greener" Realisation.

In the current times, India is aiming for Net Zero Emissions and the businesses and ventures established in India are focussing on eco - business models. India's SMEs have rooted for Sustainability models and embarked a system which aims for Green Innovations by concentrating on transparency, reusability, digitising e - waste, bio - fuel and energy efficiency. Efforts are made to manage water waste in a manner which provides better supporting mechanisms to dispose harmful pesticides. According to the Confederation of Indian Industry (CII), India's 42.5 million SMEs employ over 40 per cent of the country's workforce and generate roughly 30 per cent of GDP.

What constitutes an Ideal Green Entrepreneurship Model?

Green Entrepreneurship Model constitutes the very basis for a Greener Economy. First and foremost, the enterprise goes green when it is aiming at Sustainability First and Profit Next. Ethical Considerations and Societal Welfare backed with "Collective Consciousness" and healthy competitive spirits embedded in green Innovations determines the base of a green model. Ensuring Profitability by reducing costs of manufacturing and enhancing revenue prospects by mobilizing a circular economic enterprise forms an ideal constituent for the Greener Economy. Navigation of Green Entrepreneurship Networks and catering to the policies of the Government and availing green incentives for progressive and far reaching impactful economic - Environmental revitalization captivates an ideal Green Entrepreneurship Model.



CONCLUSION

Green Entrepreneurship precepts the best of the best innovations in an eco - friendly framework to lead the pathway for a Sustainable yet profitable networks of added values. Recycling, Value Added Composition, Ethical Standards, Eco- friendly operational prospects preserving Environment and economic prosperity are values incorporating Circular Economic models required for Green Entrepreneurship. Artificial Intelligence techniques could revamp Green Entrepreneurship in and out to an entire new plethora.

The onus lies on entrepreneurs to preserve environmental biodiversity in tandem with profit based mechanism by way of afforestation, cleaner technology upgradation, organic farming, energy efficiency solutions, rain water harvesting, e - waste management as sustainable measures within the entrepreneurship framework. Sustainability alone doesn't help in promoting Entrepreneurship and cleaner Environment. Sustainability, Usability, Generativity, Re-cyclic Potentiality and Effective Revamping of the Circular Transient Entrepreneurship cuts through the Modern Era of Entrepreneurship footholds.

'The Entrepreneurs Need Not Go Green but They Have to Become Greener for A Sustainable Future."

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GREEN HUMAN RESOURCES MANAGEMENT PRACTICE: GREEN BEHAVIOR FROM ISLAMIC PERSPECTIVE

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ABSTRACT

The implementation of green behavior on employee is an initiative to comprehensively address various environmental problems. This chapter focuses on the factors that are the stimulus for creating environmentally friendly behavior among employees in practical green human resource management on various Indonesian industries, especially from Islamic perspective. The Green Human Resource Management (GHRM) concept is an implication of GHRM rules, green practices, and green philosophies on environmental management and awareness in employees about environmental responsibility. The Green Five Model is a taxonomy for understanding the many types of environmental behaviors that people engage in their lives. This model consists of avoiding harm, working sustainably, preserving, influencing others, and taking initiative, which is used to identify employees' green behavior. Islamic perspective on this model shows that it is aligned with Muslim's role as khalifah (vicegerent) of Allah in earth. Islam provides basic guidelines that are really detailed concepts of ethics and social behavior which is conclude that the concept of green behavior has a significant role in Islam. A good commitment from leaders towards maintaining a work environment can set a good example for employees and design environmentally friendly work patterns for employees. In addition, company programs aimed at implementing environmentally friendly business activities will optimize green behavior in daily activities. Therefore, organizations need to design awareness raising programs needed so that they can form green behavior patterns.

Keywords: green behavior, green human resources management, Islamic perspective

INTRODUCTION

The 2030 Sustainable Development Agenda which was adopted by all United Nation member states – developed and developing countries, aims to end poverty and other deprivations. Indonesia particularly has Sustainable National Development, which is an effort to increase prosperity and welfare for all aspects of the society, nation, and state in the long term. Yuliawati, et.al. (2017) states that sustainable development has three main pillars – economic, social, and environmental.

Currently, Indonesia has a quite worrying environmental quality. The 2022 Environmental Performance Index (EPI) shows, out of 180 countries Indonesia's environmental quality is ranked 164 with score of 28,20. On the first rank Demark sat with score of 77,90. There is a large gap between these scores. Compared to other ASEAN countries, Indonesia is still far behind in term of environmental performance. The following data is environmental performance score for ASEAN countries based on the 2022 Environmental Performance Index (EPI).

Table 1: South-East Asia Environmental Quality Data

No.	Country	Rank	Score
1	Singapore	44	50,90
2	Brunei Darussalam	71	45,70
3	Thailand	108	38,10
4	Timor-Leste	129	35,10
5	Malaysia	130	35,00
6	Laos	149	30,70
7	Cambodia	154	30,10
8	Philippines	158	28,90
9	Indonesia	164	28,20
10	Viet Nam	178	20,10
11	Myanmar	179	19,40

Rani (2018) states that one thing that causes low quality of the environment is human resources who do not acquaint the concept of environmentally friendly behavior, that also shown by in the lack of green human resources management practices in the industry.

Green Human resource refers to the use of every employee interface to promote sustainable practices and increase employee awareness and commitment to sustainability issues (Gayathri, 2013). Currently, various industries are starting to adjust environmentally friendly concepts in all their activities, including human resource management. Unfortunately, the factors for green behavior among employees in green human resource management practices on various Indonesian industries are still relatively unexplored.

Therefore, research is needed to identify the implementation of environmentally friendly behavior in companies, especially on comprehensive human resources study, and related to factors that encourage people creating environmentally friendly behavior in companies, especially from Islamic perspective.

Green Human Resources Management

The concept of Green Human Resource Management (GHRM) first appeared in the 1990s and began to be accepted and used globally in the 2000s (Lee in Jabbar and Abid, 2015). GHRM is

an implication of green philosophies, green HRM rules, and green practices in environmental management and also build employee's awareness about environmental responsibility.

Green human resource management is also defined as the use of HR management policies to support the sustainable use of resources in organizations and, usually to assist environmental sustainability goals (Rani and Mishra, 2014). The term Green HRM is most often used to refer to management policies and practices that are concerned with the workforce as well as the company's wider environmental agenda.

The issue of concern for the environment is currently being increasingly discussed in organizations, especially when they interact with customers and workers. Employees are often seen as a driving force for organizations to address environmental issues (Jabbar, 2015). Therefore, forward-thinking businesses must prioritize the concept of Green Human Resource Management to be applied. GHRM is an eco-friendly initiative to promote higher levels of employee engagement, better work efficiency, and lower costs (Rani & Mishra, 2014).

Shaikh (2010) states that GHRM will have an important role in the industry to support environmental related issues. GHRM will also help employees and the public realize the need to use natural resources sparingly and support the use of environmentally friendly products. This awareness will help organizations to create an energy efficient workplace (Assyofa, 2020).

The low implementation of GHRM in Indonesia indicaating low environmental awareness. There are still many companies and organizations in Indonesia that have not realized the importance of implementing environmentally friendly concepts in their activities. The low level of environmentally friendly behavior in the work area is shown by energy-intensive activities. The Ministry of Energy and Mineral Resources of the Republic of Indonesia in its publication states that 80% of energy waste is caused by the human factor (ESDM, 2011). From these publications, we can see that energy wastage still occurs in office centers, and it appears that environmentally friendly behavior has not been realized by many employees and is the basis for the need for the implementation of environmentally friendly human resource management (GHRM).

Jain (2009) stated that the Green HRM scheme can help organizations to find various ways to keep their best talent while saving costs. The involvement of all members of the organization to make the organization environmentally friendly is required in this concept. The parctice of Green

HRM can be carried out in daily activities among employees at work. Mandip (2012) states that Green HRM practices should be derived into the HR process, like recruitment, selection, training, compensation etc. So it will support the organization in creating Green HRM through the HR process.

Boudreau and Ramstad (2005) suggests it is human resources that serve as a measure of behavior, attitudes, knowledge, and motivation related to employee sustainability and can influence the behavior of other employees. Therefore, organizations can leverage HRM to effectively convey and implement green policies (Renwick et. al., 2013).

Green Behavior

Chou (2014) said that environmentally friendly behavior among employees is pro-social and from a pragmatic point of view, green behavior in workplace routines should include green behavior in-roles and extra-roles (Ramus&Killmer, 2007), since both forms of behavior will contribute to organizational outcomes through value creation.

Awareness of environmental ethics is a trigger for implementing environmentally friendly behavior (green behavior) (Agus & Lieli, 2017). Increasing environmental problems are a moral problem, and the problem of human behavior towards the environment is not purely a technical problem (Keraf, 2010). Keraf further stated that the focus of environmental ethics is how humans should act or how human behavior should be towards the environment.

In Agus & Lieli (2017) research stated that green behavior on GHRM practices in an organization can be defined into 3 groups: (a) motivation to behave environmentally friendly, (b) implementation of environmentally friendly behavior in HRM and (c) the impact of environmentally friendly behavior in HR management. These are the factors that shape environmentally friendly behavior according to Agus & Lieli (2017):

a. Law or government regulation. Green behavior is formed by coercive rules or regulations such as government regulations. Basically, law is made to regulate human action. If the government has implemented strict laws or regulations including sanctions given in the event of a violation, then employees who work for an organization will always apply these rules.

b. Environmental awareness. The biggest factor that motivates employees to make the environment sustainable and not cause pollution to the environment is the worsening environmental conditions.

c. Leader commitment. A good commitment from leaders towards maintaining a work environment can set a good example for employees and design environmentally friendly work patterns for employees.

d. Organization's vision & mission. Employees will always be willing to help the company or organization where they work to achieve the company's vision and mission. The company's vision and mission that leads to the implementation of environmentally friendly business activities will shape green behavior in employees.

e. Organizational policies. Organizational Policy is a factor that is binding and should be followed by all employees in the organization. Policies, written or unwritten, will always be implemented by employees and in the long term will form a culture of environmentally friendly behavior among employees.

f. Technological provision. Advanced technology must be owned by organizations that implement green human resource management practices so that they can form green behavior patterns. Technology can help many activities within the organization in order to maintain environmental sustainability. For example, the use of information technology in exchanging information makes employees no longer waste paper.

g. Adequate facilities. An activity within the company can be carried out and run well if it is supported by adequate facilities and infrastructure. Green behavior in employees can also arise from organizational commitment in providing appropriate facilities and infrastructure.

h. Organizational programs. If the organization has a special program related to maintaining the work environment, it can trigger green behavior in employees. For example, an award giving program for the branch office with the most environmentally friendly programs.

i. Employee recruitment. If the recruitment process in the organization is in accordance with green human resource management values, it can drive green behavior in employees from the beginning of the process of joining into an organization. Employees who previously had a certain work pattern can be reformed or improved.

j. Employee training. Organizations need to design required employee training and development programs so that employees understand why green behavior needs to be instilled and practiced contextually in their daily activities.

k. Performance appraisal. When employee performance appraisals are carried out by the organization have already integrated the points regarding efforts to protect the environment and are held periodically, so that employees highly motivated and desired to protect the environment.

l. Compensation. It is one of the motivating factors for a person to do his job well. Providing adequate compensation can motivate employees wanting to do more in order to maintain the workplace environment and establish green behavior.

Based on research results conducted by Assyofa (2020) the dominant factor of the 12 factors above, that form green behavior in GHRM practices in banking sector employees in Indonesia is environmental awareness. This shows that the biggest motivating factor for an employee to have green behavior comes from within oneself, namely awareness of the importance of protecting the environment.

Green Human Resources Management From Islamic Perspective

Previous research has discussed two fundamental sides and different point of view on human behavior – western views and Islamic thought (Khan et. al., 2010). Humans behave based on a combination of past learning and experience. In other words, western and Islamic cultural values are completely different from one another. Therefore, human resource practices and business operations are managed according to existing local norms (Ali et al., 2020).

Environmentally friendly behavior is an action that does not cause a negative impact on the surrounding environment or can be interpreted as an action that does not damage the surrounding environment. Environmentally friendly behavior also aims to preserve the earth so that the earth remains sustainable, the surrounding environment remains clean, neat, beautiful, and comfortable, and most importantly makes the human body healthy. Humans were created by Allah and sent down to earth as khalifah (vicegerent) whose job is to seek welfare and well-being of other living beings on earth and will be held accountable. Humans are given distinct advantages over the entire creation; God gives mankind maintenance of all sources of life and natural resources. The use of natural resources, according to Islam, is a sacred mandate that is instilled in mankind.

Islam provides basic guidelines for Muslims as a way of life. In this case, there are very detailed concepts of social behavior and ethics which allow us to conclude that the concept of green behavior plays a significant role in Islam (Daud, et.al., 2020). In Islamic teachings, there are elements of environmental sustainability (green) which are mentioned in various surah (chapter) in the Qur'an and from the sunnah (teaching) the beloved Prophet Muhammad S.A.W (Zawawi, et.al., 2014).

Islam as a comprehensive religion teaches some rules for everyone, including employees. Islam teaches that humans should respect fellow humans, plants, animals, and elements such as earth, air, soil, and water. Islamic scriptures fully discuss the importance of environmental health as a human rights issue and how declining environmental conditions endanger human rights (Amoli, 2002).

The term green behavior, which is now known, has even been recommended in Islam, Muslims are taught not to waste anything, as stated in the Qur'an (Al-Qur'an 17:27).

“Surely the wasteful are ˹like˺ brothers to the devils. And the Devil is ever ungrateful to his Lord.”

Based on the Green Five Taxonomy Model by Ones and Dilchert (2012), Daud et.al (2020) then compared it with an Islamic perspective. The Green Five Model is a taxonomy for understanding the many types of environmental behaviors that people engage in in their lives—at work, at home, and in society. This model consists of work sustainably, avoiding harm, influencing others, preserving, and taking initiative, which is used to identify employees' green behavior.

Table 2: Green Five Taxonomy Model

Green Taxonomy	Explanation	Islamic View
Work Sustainably	Behavior that facilitates the work process and the resulting product becomes more sustainable.	Responsibility and mutual respect value.
Avoiding Harm	Behaviors that help protect and improve ecosystems from the industry and business's harmful effects	Protect and preserve nature & environment.
	(McConnaughy, 2014).	
Conserving	Actions that help conserve resources and reduce waste.	Control and manage existing resources
Influencing Others	Associated with educating, imparting knowledge, and helping others improve their behavior.	Da'wah: Sharing knowledge, educating, persuading people.
Taking Initiative	Encourage and promote environmentally friendly behaviors.	Da'wah: promoting the value of ethic in

Islam has provided comprehensive guidelines for all areas of human life. Siyavooshi, et.al, (2018), confirms previous studies on the influence of religion, as a main component of green behavior. One of the reasons for ignoring green behavior is the lack of awareness of religious injunctions regarding protection of environment. In line with this, Islam has an important role in preserving the environment, even though the basis for behavior is clear, but the practice of green behavior in the workplace is still lacking (Azis, et.al., 2018).

Therefore, management has role to create awareness among employees and devise strategies to enhance green behavior and corporate social responsibility at an organizational level in a competitive business world (Iqbal, et. al., 2018). The implementation of green behavior among workers is an initiative to comprehensively address various environmental problems. This is a purpose of human development where every employee is responsible for their every action and thus will encourage a harmonious work culture within an organization (Othman, 2010). Harmony is important to produce highly productive and motivated workers and of course beneficial to the organization (Daud, 2020).

CONCLUSION

Various studies show the result that companies must carry out relevant environmental practices to help employees commit and demonstrate environmentally friendly behavior. Employees' contribution to green practices can generate a sense of pride within them, resulting in an increase in their organization's environmental performance. The impact goes beyond just economic benefits, it also changes culture, human behavior, and personal qualities to become more responsible, equitable and accountable.

Muslims believe standing against mistreatment which will lead to non-green compliance by humans, as this is clearly evil and irresponsible. Obtaining individual and organizational performance in Islamic views and perspective are not only based on materialism, but also through success in changing individual character positively so that it benefits anyone in business, including other makhluk (creation) of Allah – animals and nature.

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PERSONALISATION OF ISLAMIC KNOWLEDGE MANAGEMENT PRACTICES IN DEVELOPING INSANIAH VALUE FOR SELECTED AT-RISK YOUTH GROUPS IN MALAYSIA: A LITERATURE REVIEW

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ABSTRACT

In Islamic perspectives, the believer's experience of the Hereafter is determined by his actions. The Quran describes humankind as a fragile creature made of dust from the same earth they walk upon. The existence of the human being is like a coin that comes fashioned with two sides: a human is made in the best mold, fashioned with the breath of God's spirit, and on the other hand, a fragile creature. As fragile creatures, the knowledge dimensions of humans are challenged by their level of experience in anxiety, forgetfulness, ungratefulness, and vulnerability. As set in this chapter, the Islamic knowledge management practices address the management of knowledge of dimensions of human resides among fragile individuals that are selected at-risk youth groups. This chapter aims to model insaniah value as one of the core strategies to build good conduct while personalizing Islamic knowledge management practices in discovering, creating, and applying knowledge addressing the fragile nature of at-risk youth. Al-Ghazali (2017) in his Sufism approach, was analyzed the literature to offer and shed light on managing knowledge related to human spiritual levels, and faith-based dimensions, which are often overlooked. The insaniah value model will be an efficient and effective guide with knowledge of human beings is managed in a more personalized manner. Therefore, the chapter offers cutting-edge research and a practical contribution to knowledge discovery, creation, and application in the contemporary developments of human capital.

Keywords: Knowledge Management Practices, youth-at-risk, Al-Ghazali, spirituality, Islamic, Malaysia.

1 INTRODUCTION

Managing knowledge for the betterment and positive youth development in the modern Islamic perspectives appears to be undertravelled. For example, managing knowledge discovery, creation, and application of knowledge related to mental health is in paramount need of innovative and subtlety approaches. Mental health issues appear to be one of the many risky behaviors that young people are experiencing in Malaysia and also around the globe. According to World Health Organisation in 2022, 50% of mental health problems begin before age 14 and 75% start in their 20s (Bernama, 2023). Statistics from the 2019 National Health and Morbidity Survey in Malaysia indicated that some 424,000 children are struggling with mental health problems. These are the potential youth groups who will become at-risk in Malaysia. In this chapter, the youth is defined as being at risk when associated with one or multiple risk factors. Thus, the consequences among young people could be the physical and psychological problems associated with social issues. Youths are potentially at risk when their problems influence several people around them.

In Malaysia, social issues associated with youth-at-risk cut across a wide range of conditions that affect individuals. For example, gangsterism, juvenile delinquency, mental and physical disabilities, and drug, alcohol, and other substance abuse adversely affect the community or people within a society, which may lead to mental health issues. From the Islamic perspective, building a good character provides an alternative model for a significant number of this category of may have experienced anxiety, forgetfulness, ungratefulness, and vulnerability, leading to mental health. In order to give access risk youth to better personal well-being and productivity and at the ,same time safeguard the maslahah of the society, Al-Ghazali, through his model of

Sufism appears to offer a sound and innovative approach to counter social issues by understanding the core concept of knowledge and ways to manage this nature of knowledge. In this context, Al-Ghazali's concept of knowledge appears to be an essential part of this Chapter. However, as there is an abundance of literature arguing about the true meaning of knowledge, this Chapter will only cover personal knowledge management practices on the role of 'aql which denotes intellect.

While in modern and contemporary science, knowledge management practices have been rooted in the work of Nonaka and Takeuchi (1995), Nonaka and Toyama (2003), Nonaka, Toyama, and Konno (1998), Nonaka, Toyama, and Nagata (2000); along with other scholars, Davenport and Prusak (1998); Polanyi (1966), Alavi and Leidner (2001), Kasim (2008), Zeleny (2006), to name few. The focus of interest in this Chapter is on the work of Al-Ghazali's (2017) perspectives. Although Al-Ghazali (2017) and the modern perspectives such as Nonaka and Takeuchi (1995) are from two different schools of thought and science disciplines, both offer the same objectives in safeguarding knowledge management. In the light of assessing the ontological and Sufism perspective, the concept of data and knowledge will be revisited. This chapter also explores ways to personalize Islamic knowledge management practices that measure the knowledge of personal well-being and productivity among selected at-risk youths. A literature review was conducted on Al-Ghazali (2017) in his Sufism approach to offer and shed light on the spiritual and faith-based dimensions which are often overlooked. In addition, modeling insaniah value is at the core of strategies to build good conduct, and spiritual and faith-based dimensions while personalizing Islamic knowledge management practices in discovering, creating, and applying knowledge.

Research integrating KMP, and the nature of knowledge as resides in the Sufism perspective, along with its influence to combat and manage knowledge discovery, creation, and application to tackle youth-at-risk issues and the extent to which personalized knowledge is managed, is still scant. Integrating modern personalized KMP and Islamic schools of thought also appeared to be infrequently researched. Though many have found some relationships between the KMP and various performances, be it at the individual and organizational levels (Sanchez, 2005; Sanchez, 1997; Sohrabi & Abedin, 2005; Adnan Jamaludin & Khairul Mizan, 2005). In this chapter, the objectives are briefly present the ideology of Al-Ghazali (2017) in the Sufism approach and to evaluate if knowledge associated with youth-at-risk issues and problems can offer a new viewpoint addressing Sufism and personalized Islamic KMP.

2 METHODOLOGY

In this chapter, an extensive literature review was conducted to answer the chapter's objectives. Thus, a systematic review process is being expedited to with limited databases searches. As social issues are escalating among youth who in turn have the potential to become youth at-risk groups in Malaysia, a rapid approach to reviewing evidence was associated with the context of the COVID-19 pandemic. Several studies written in the Malay and English languages, published from 2014 onwards which included 15-25 years, were explored from the online ProQuest Dissertation database, engaging the manuscripts of Doctoral and Master's theses. This chapter aims to integrate multiple disciplines such as the broader perspective of positive youth development studies and management, behavioral science, knowledge management, and Sufism, as illustrated in Figure 1.

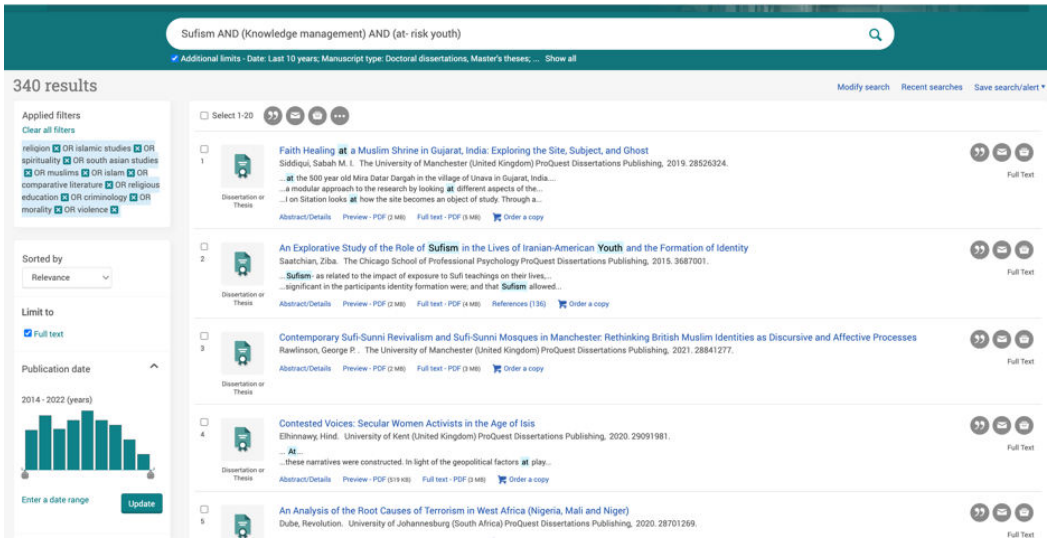

Figure 1. the ProQuest Dissertation with the manuscripts of Doctoral and Master's theses

Hence, in gaining the meaning of successful management of knowledge and creating a model of insaniah value for selected at-risk groups, the role of personalization of Islamic KMP as one of the strategic resources in the 21st century will promote human values that are forward-looking with the provision of managing each aspect to discover, create, and apply knowledge. For this to happen, there is a need to revisit the role of personalized Islamic KMP in the contemporary perspectives using the Sufism approach by Al-Ghazali (2017).

Figure 2 displays the keywords such as "Sufism," "Knowledge Management" and "at-risk youth" to capture empirical works from 2014 to 2022. The results projected 714 research were conducted. However, despite the abundance of research accomplished associating these variables, the evaluation of Islamic KMP was limited. This was evidenced in the result yielding only four studies that associate "youth social issues" and "Al-Ghazali" perspectives, as exhibited in Figure 3.

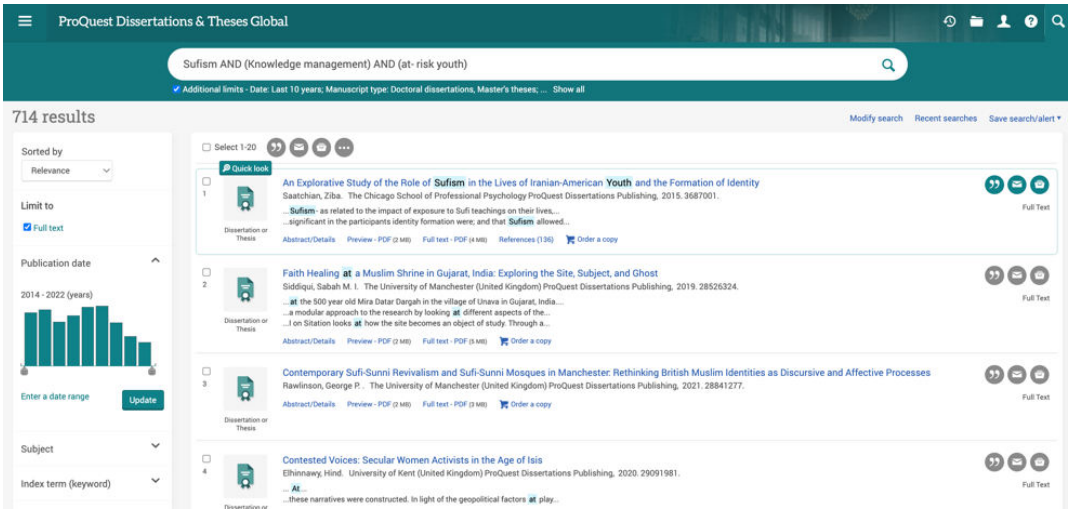

Figure 2. The keywords on "Sufism," "Knowledge Management" and "at-risk youth."

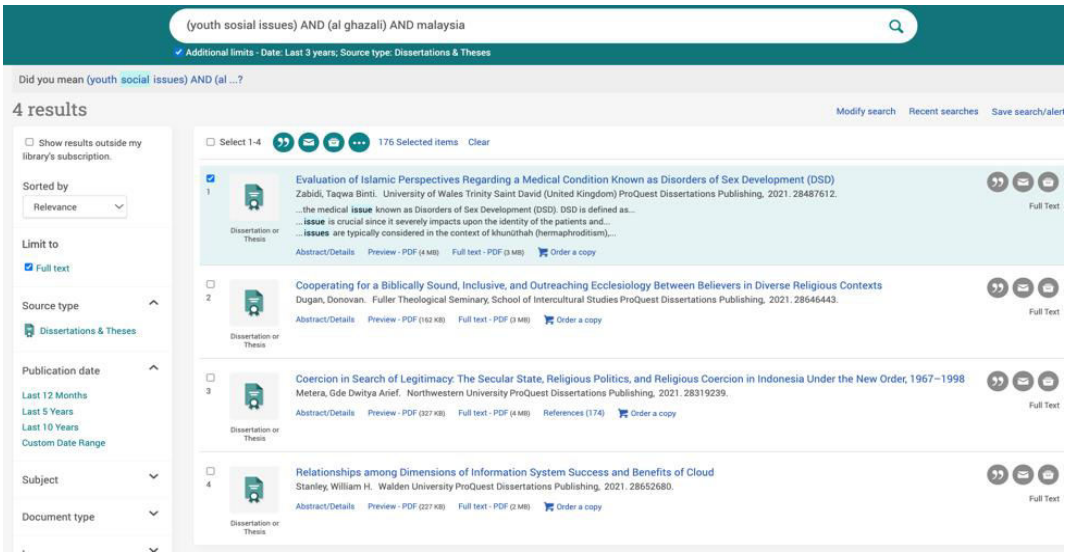

Figure 3. The keywords on "youth social issues" and "Al-Ghazali."

Next, Figure 4 illustrates the association between the keywords of "knowledge conversion," "Nonaka & Takeuchi" and "youth issues." Publications were scoped and filtered among related applicable contexts such as the discovery in management, education, explicit knowledge, higher education, and competitive advantage. Only 42 past studies were found with different angles of approach and framework.

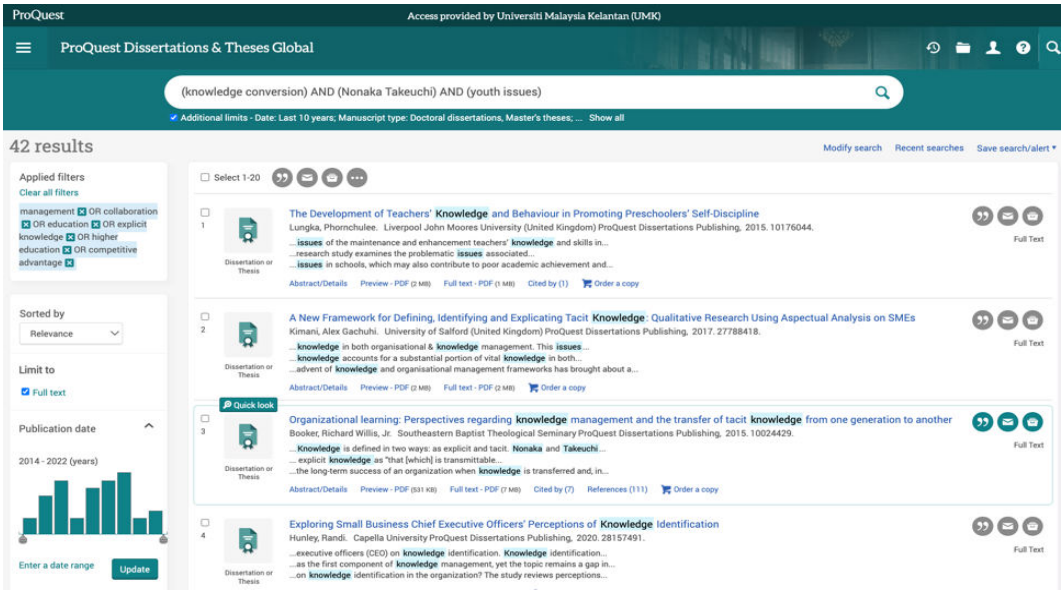

Figure 4. The keywords on "knowledge conversion," "Nonaka & Takeuchi" and "youth issues"

3 LITERATURE REVIEW

3.1 Al-Ghazali's Concept of Knowledge

Al-Ghazali's first definition of knowledge is related to the essence of cognition (ma'rifah). Knowledge can also be defined as identifying an object known as it really is ('ala ma huwa bih). If the owner of the knowledge is able to act and deliver knowledge in an orderly fashion, knowledge is called a quality (wasf). Knowledge from different perspectives appears to be treated as an image of an individual in the mirror of the intellect ('aql). According to Asari (1993) who wrote Al-Ghazali's initial interpretation of knowledge was:

"There is no meaning to knowledge except that of its being an image... that arrives in the soul, which conforms to that which is an image in sense perception, namely, the object known."

Al-Ghazali (2017) Despite many having argued that knowledge can be defined in multiple ways due to its nature of subtlety, and level of complexity, Al-Ghazali offers a different perspective. Asari (1993) concluded that Al-Ghazali's definition is through division (taqsïm) and illustration (mithal), as he wrote in the Ihya Ilmuddin, Fatihah, and, in a more general way in al-Munqidh.

The process of acquiring knowledge according to Sufism's way involves different activities. In one of Ghazalï's popular books, al-Munqidh, managing knowledge appears to be intrinsically rooted in one's journey to get closer to God. This chapter is guiding readers to understand ways in managing personalized knowledge in accordance with the traditions of the Prophetic model, the Prophet of Islam (SAW), and in the light of the Quran, the revealed book of Islam.

As summarized in Table 1, Al-Ghazali's concept of knowledge offers three stages. The first stage relates to the inspirational optimistic message of Islam and flows in the understanding of knowledge on cleansing the heart from anything but God. Young people may have experience conflicts with family, the extreme stress of learning at schools, financial trouble, and unexpected illness which can manifest themselves in ways one may not anticipate. Building a strong connection with God can only be accomplished only after having the ability to exercise complete control over the qualities of the heart. Al-Ghazali pondered his perspective on knowledge which plays a key role in founding the social and moral edifice of Islam. Thus, the qualities of the heart lie in the way one is able to comprehend levels of heart purifications, adopt virtues and shun vices, observe good manners, and discharge obligations to others.

Next, the second stage, as indicated in Table 1, when young people are guided on ways to remembering God, then they will be taking away all forms of evil and forbidden acts. Thus, moral excellence, that state of quality of being good, righteousness, piety, humanness, generosity, kindness, honesty and integrity will be their characters. The good quality of characters denotes that the heart is being filled with the remembrance of God. As Asari (1993) claimed:

"This leads to a condition in which one experiences complete annihilation in God (al-fana' bil-ku! liyah fi Allah), when the heart becomes fully purified with a very high degree of preparedness and receptivity. When this condition is reached the spiritual realm becomes accessible, and one may see the angels, and the spirit of the prophets, and listen to and learn from them.

Asari (1993), Finally, as summarized in Table 1, Asari (1993) claimed that the merit of knowledge (ilm) is based on the heart's purity, preparedness, and receptivity, one might receive, through inspiration (ilham), what al-Ghazalï calls "the knowledge from on high (al-'ilm al·laduni) or "the divine knowledge (al-'ilm al·rabbëmÎ)." Apart from the knowledge of the prophets that come through revelation (wahyu), this is the highest knowledge one might have in this world." According to Quran, the man has many justifications for his actions but he knows what he is. This knowledge, 'he knows what he is' in fact human conscience which Almighty God has given to everyone.

Human conscience is just like a lamp which is enkindled in every human mind and this nature of knowledge guides the man about what is right and what is wrong and what is good and what is evil. According to Chaudry (2006), one is treated as a good man, if the people say that he is good. The merit of knowledge or ilm is all about connectivity that God has given to everyone who is able to discover, create and apply the excellence of 'aql as it rests upon the excellence of knowledge which is in itself excellent.

Table 1. Al-Ghazali's Concept of Knowledge

Stage	Concept of Knowledge
Stage 1	cleansing the heart from anything but God
Stage 2	filling the heart with remembrance of God
Stage 3	the merit of knowledge (ilm)

3.2Personalised Islamic Knowledge Management Practices

There appears to be a great number of empirical studies associating the contemporary aspect of Knowledge Management Practices (KMP) on performance of individual and organization. However, associating KMP in the perspectives of personalization and how it can deepen faith appears to be limited. The concept of success lies on the Islam's criterion to judge who is successful and its level of support towards excellence in knowledge. The contemporary perspectives treat a person successful when one is materially more wealthy, powerful and exercise a strong will and power. Spirituality aspects offer a unique way of throwing a person to balance his connection with God. When the merit of knowledge offer excellence in one's life, the connection with God is getting stronger and spills over into an individual's belief system. The merit of knowledge leads to a success thoughts and emotions, thus impacting spiritually and helps individuals establishes worship of One God and spends in the way of God, perform all the practices, rituals and acts as prescribed by Islam.

The work of Awad and Sultan (2022) draw a picture of the man who is successful in the sight of Islam when he is able to rediscover the lens of growth and healing in managing the concept of success. Though Awad and Sultan (2022) focus on ways to manage knowledge among young people who experienced trauma and are emotionally distressed, the context appears to be relevant to position youth at risk to endure Islamic way of patterns, beliefs and ability to manage this nature of knowledge (Salleh, 1996; Asari, 1993).

Personalizing ways how to manage Islamic KMP offers a greater appreciation of life. In line with al-Ghazali in support of the excellence of knowledge, he concluded that the discussion of the problem is that knowledge is the basis of happiness (al-sa'adah) in the present world and in the world to come. Asari (1993) further claimed that happiness is the most excellent thing that can be attained by men, it follows that knowledge is also excellent. He arrives at this conclusion after going through a series of premises. He begins by stating that something precious and desired fall into either what is desired for its own inherent value. or what is desired as a means to achieve something else, or what is desired for both.

Ultimately, the greater spiritual development is all about the success that Allah gives to everyone who believes in Allah, in Prophets Muhammad (SAW) and in other prophets, in the Quran and Allah's other revealed books and in the Day of Judgement and Hereafter. Thus, happiness in the world to come is more desired than money because the former is sought for its own intrinsic value while the latter is sought as a means to gain something else Asari (1993). ln the case of knowledge, Al-Ghazali says:

"Know that knowledge is excellent in itself, without consideration of the thing known, so that even the knowledge of sorcery is excellent in itself, even though it be futile."

Al-Ghazali (2017), Asari (1993) argued that in addition to being excellent intrinsically, knowledge is also important for it facilitates one to achieve the most valuable thing, that is, endless happiness (al-sa'adah al-abadivah), and no one will attain this happiness without obeying the orders of God or without doing good deeds ('aman).

4 CONCLUSIONS

In conclusion, the link between the systematic way of managing Islamic KMP and faith-based doubts is important in many ways. Revisiting what has been prescribed by Islam and rewiring

one's response to ways of managing Islamic knowledge can strengthen faith and have a profound effect on the positive development of every human being, including the spiritual part of ourselves.

However, as debated by scholars, no one can know what is good or evil without knowledge. Islamic perspective on managing this nature of knowledge, such as obeying God and doing good deeds requires the possession of knowledge. This means that eternal happiness can be achieved only through having knowledge. Al-Ghazali also points out that in the present world, knowledge presents its owner with honor, influence over those in power, and many other things which add to its merit. Accordingly, al-Ghazali puts knowledge as the basis of any other thing and views it as the most excellent thing.

In managing and personalizing Islamic KMP, there are several classifications of knowledge. Firstly, attaining eternal happiness means that knowledge is followed by good actions that lead one to that happiness. For example, the conduct of the Prophet Muhammad (SAW) is a model for a Muslim. The Quran calls his conduct very sublime and great. The title of al-Sadiq which means the truthful and al-Ameen (the trustworthy) exhibit excellent conduct and is a great factor in winning the hearts of the people to Islam.

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GREEN FINANCE POLICY IN INDONESIA: LITERATURE REVIEW

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ABSTRACT

The phenomenon of environmental damage is an important concern for several countries. Globally, scholars and practitioners are becoming increasingly interested in determining the interaction between finance and environmental sustainability. The method used is a theoretical study of Green Financing indicators and standards applied by the Indonesian government

The findings of this study will help policymakers to understand the green finance concept and its associated variables, which need to be considered when adopting and implementing green finance. The others we can compare with the international green finance concept and the National Green concept. In addition, the Indonesian government's commitment to the Paris Agreement through efforts of Sustainable Finance Roadmap Phase I (2015-2019) and Phase II (2021-2025). Indonesia Green Taxonomy is composed of the Indonesian Financial Services Authority (OJK), through the Integrated Financial Services Sector Policy Group (GKKT) and related work units, in collaboration with eight following ministries. But the fact that there are still violations of business people in environmental pollution, demolition of green land, pollution and so on, it is necessary for the government to touch the hearts of business people and parties involved in green financing about religious advice not to do damage on the face of the earth. Therefore, in making green financing policies, it is necessary to participate in the Ministry of Religion in shaping the character of each party/businessman because Religion can play a vital role in this mission to protect the environment.

Keyword: Green Finance, Green Environment, Indonesian Financial Services Authority (OJK)

INTRODUCING

The industrialization of societies without regard to environmental issues and the increase in the population of the planet has caused the global economy's dependence on fossil fuels and, as a result, excessive pollution of the planet's environment Considering the need for human life to solve the environmental threats formed during the past decades, the concept of a green economy and energy transition is proposed as a belief accepted by most experts. Both concepts of green economy and energy transition rely on the principle of reducing the non-renewable world economy on fossil fuels (an essential factor in carbon dioxide emissions), and the ultimate goal of both concepts is to replace renewable energies instead of non-renewable energies. (Sun et al., 2023)

Without realizing it, the environment actually contributes significantly to the company's business, but on the other hand, sometimes business also has a negative impact on the environment and usually leads to environmental damage. In essence, if many companies operate, it will provide more benefits for the community around the company or for the public. The existence of the company also helps the surrounding economy and can open new jobs, environmental impacts that are often faced by the company's business activities include water

pollution, air pollution, and untreated production waste and many more1. The following is one of the damages caused by the activities of a company called PT Kamarga Kurnia Textile Industri (PT KKTI) is a company engaged in the textile industry. This company is located in the Cimahi area of West Java, located

the company is also 1 not far from the Citarum river. In this case, the Ministry of Environment and Marine Affairs (KKLH) sued PT Kamarga Kurnia Textile Industri (PT KKTI) related to waste pollution in the Citarum Watershed (DAS). In 2019, the Ministry of Environment and Marine Affairs won a case that sued PT Kamarga Kurnia TextiledIndustri (PT KKTI) at the Bale Bandung District Court. In this decision, PT Kamarga Kurnia Textile Industri (PTgKKTI) must pay a fine as compensation of Rp. 4.25dMilyar, this compensation is lower than the claim that has been filed by KKLH, which is Rp. 18.2 billion. The lawsuit received by PT Kamarga Kurnia Textile Industri (PT KKTI) was carried out due to the absence of seriousness in the management of wastewater and B3 waste. This poorly treated wastewater is directly discharged in the Citarum River Basin without prior management. The impact of the company's untreated waste causes many losses in the form of economy, cleanliness, damage to river ecosystems. Communities around the company and in the watershed (DAS) have also complained a lot about changes in water sources that have become unclean and yellow, especially with the citarum river water turning black. The number of complaints felt by the community is the basis for the Ministry of Environment and Marine Affairs to see firsthand the state of the Citarum Watershed (DAS) and prosecute other parties who pollute the environment either civilly or criminally. (Fitriana Dewi & Susilowati Lantip, 2021)

Based on the above background so The need to reduce harm to the environment, caused by fossil fuel emissions, has led to calls for divestment from fossil fuel activities, and a shift to investing in low-carbon projects and activities that protect the environment in a sustainable way (Bergman, 2018; Cleveland and Reibstein, 2015).

The ratification of the Paris Agreement, through Law Number 16 of 2016, has required all relevant countries including Indonesia to present their commitment on the efforts to reduce greenhouse gas (GHG) emissions. Indonesia has committed to reducing GHG by 41% with international assistance or 29% with business as usual, which is submitted through the Nationally Determined Contribution (NDC). In addition, OJK supports the government's commitment to the Paris Agreement through efforts of Sustainable Finance Roadmap Phase I (2015-2019) and Phase II (2021-2025). (Otoritas Jasa Keuangan, 2022) To achieve the Paris Agreement objective and the COP26 mandate, a lot of financial resources need to be mobilized (Ozili, 2022)The critical need for environmental sustainability also drew the financial community under its ambit. These uncertainties gave rise to a new concept called 'Green Finance'.(Sarma & Roy, 2021), Green finance is a vital link between the financial and environmental industries and critical financial innovation in the quest for environmental conservation.(Fu & Irfan, 2022) Green finance is a phenomenon that combines the world of finance and business with environmentally friendly behavior. Green finance is an arena for many participants, including individual and business consumers, producers, investors and financial lenders However, in practice, green finance is a wider lens including more than investments, as defined by Bloomberg New Energy Finance and others.(Azhgaliyeva & Liddle, 2020), The research results show that: (1) The development level of green finance and the quality of the ecological environment in the Yangtze River Economic Belt have improved between 2011 and 2020. (2) The development of green finance has a significant positive impact on the quality of the ecological environment in the Yangtze River Economic Belt (Diaz-Rainey et al., 2023a) Therefore, proponents of a green economy have proposed 'green finance' as a viable solution to meet the financing needs of individuals, corporations and governments involved in projects and activities that preserve the environment(Ozili, 2022)In the aspect of Loans (Afridi et al.,

2021)The results revealed that green loans are less risky investments. Further, the findings also provide useful information to managers who look to grow their business loans and minimize default risk.

OVERVIEW OF GREEN FINANCE IN INDONESIA AND OTHER ASEAN COUNTRIES

Table 3 provides descriptive statistics for individual countries. Among ASEAN members, the country of Brunei Darussalam emits the most CO2 per capita, with a 40.322% increase since 2012. Singapore and Malaysia produce significant CO2 emissions in 2020, with per capita emissions at 8.941 and 7.982 metric tons. On the other hand, Singapore saw a 25.317% decrease in CO2 emissions during the same period. Malaysia's CO2 emissions have risen by 39.545% since 1990. In Thailand, Vietnam, and Indonesia, CO2 emissions have also increased. Cambodia and Vietnam saw the greatest increases in CO2 emissions between 2012 and 2019. The country's CO2 emissions are still below the average for all ASEAN economies, despite the country's economic growth.

Brunei Darussalam is ASEAN's most energy-efficient country. There has been a 30.308% increase in Brunei Darussalam's kg of oil equivalent per capita consumption since 2012. Energy consumption in Singapore is currently the second-highest in the ASEAN region. Energy consumption in Singapore has decreased between 2012 and 2019, indicating that renewable and cleaner energy sources are better for the economy and the environment. The economies of Malaysia and Thailand are both using a lot of energy to grow. Compared to 2012, Malaysia's energy consumption has increased by 37.092%. Between 2012 and 2019, Thailand's energy consumption increased by more than 67%. Among the ASEAN nations, Cambodia uses the least energy. The Philippines' use of energy decreased by 3.732%. Cambodia and Vietnam have made the most progress among the ASEAN countries regarding green finance. In 2012, only 5.987% of Cambodia's GDP was attributed to financial development; by 2019, that number had risen to 99.986%, a gain of 1570.051%. A remarkable increase of more than 240% was seen in the share of financial development in Vietnam's GDP from 2012 to 2019, rising from 39.290% to 133.923%. Malaysia's financial development has increased by 5.405% since 2001, which is not encouraging for the country's prospects for economic growth. Financial development has slowed in Brunei Darussalam by more than 27%, indicating that a weak financial sector has hindered the country's economic growth and development. Though financial development in Indonesia improved from 2012 to 2019, the country still holds one of ASEAN's lowest positions. According to country-specific data, the ASEAN region's FDI statistics are mixed at best. FDI fell in all ASEAN economies except for Cambodia, Vietnam, and Brunei Darussalam from 2012 to 2019. There was a 52.445% drop in Indonesia's FDI index,

(Fu & Irfan, 2022) investigates the influence of green finance and financial development on environmental sustainability and growth in ASEAN economies from 2012 to 2019.

TABLE 3 | Description of statistics (Country-specific).

Country	Variables	2012	2019	% Change
Brunei Darussalam	GF	13.253	18.597	40.32%
	GDP	6492.724	8460.589	30.31%
	RDI	53.633	38.784	−27.686%
	CO2	108.718	110.197	1.36%
	FDI	36171.81	30717.95	−15.077%
Cambodia	GF	0.181	0.566	212.71%
	GDP	276.504	406.173	46.90%
	RDI	5.987	99.986	1570.05%
	CO2	113.743	126.342	11.08%
	FDI	453.969	1374.579	202.79%
Indonesia	GF	1.375	1.956	42.25%
	GDP	742.97	872.424	17.42%
	RDI	18.155	33.154	82.62%
	CO2	69.793	33.19	−52.445%
	FDI	2191.574	3756.907	71.43%
Malaysia	GF	5.72	7.982	39.55%
	GDP	2145.964	2941.948	37.09%
	RDI	127.232	134.11	5.41%
	CO2	203.364	116.503	−42.712%
	FDI	6890.364	10616.85	54.08%
Philippines	GF	0.891	1.14	27.95%
	GDP	480.604	462.667	−3.732%
	RDI	36.265	51.89	43.09%
	CO2	84.9	58.174	−31.479%
	FDI	1683.316	3269.671	94.24%
Singapore	GF	11.972	8.941	−25.317%
	GDP	5145.886	5007.888	−2.681%
	RDI	115.018	132.678	15.35%
	CO2	349.292	320.563	−8.224%
	FDI	32597.64	58056.81	78.10%
Thailand	GF	2.906	4.12	41.78%
	GDP	1170.744	1958.152	67.26%
	RDI	93.078	125.033	34.33%
	CO2	120.268	97.929	−18.574%
	FDI	3544.442	6199.191	74.90%
Vietnam	GF	0.757	2.002	164.46%
	GDP	379.546	663.076	74.70%
	RDI	39.29	133.923	240.86%
	CO2	111.955	209.323	86.97%
	FDI	804.198	2655.768	230.24%

Authors' calculations from the World Development Indicator's data.

Source:(Fu & Irfan, 2022)

Green finance has the potential to make a significant difference in the environment, society and for climate change mitigation, but many challenges abound such as the lack of awareness about green finance, inconsistent definitions of green finance, lack of policy coordination for green financing, inconsistent policies, and lack of profitable incentives to investors and financial institutions who are willing to invest in climate change mitigation(Ozili, 2022), Various financial institutions, international initiatives, standard setters, and regulatory bodies have developed their own approaches to green finance. The diversity of approaches and definitions across the financial sector makes it difficult to assess overall progress. This is further constrained by data availability, which limits the rigor of the analysis of existing green finance flows. A comparison of the current supply of private sector green finance and the global demand by country would allow for the development of clear action points to close any gaps. Building on the work of the Group of 20 (G20) Green Finance Study Group, the IFC Climate Policy team has developed a new approach to assess and track green finance, focusing on the banking sector, to understand the current status of green lending and provide recommendations on how to better align different approaches to measuring green finance. This will allow for analysis on a broader scale, which could result in better policies to mobilize additional green finance.

Government Development Efforts Towards Green Finance in Indonesia

Related to the government's efforts to support green financing so Indonesia Green Taxonomy composed by the Indonesian Financial Services Authority (OJK), through Integrated Financial Services Sector Policy Group (GKKT) and related work units, in collaboration with eight following ministries:

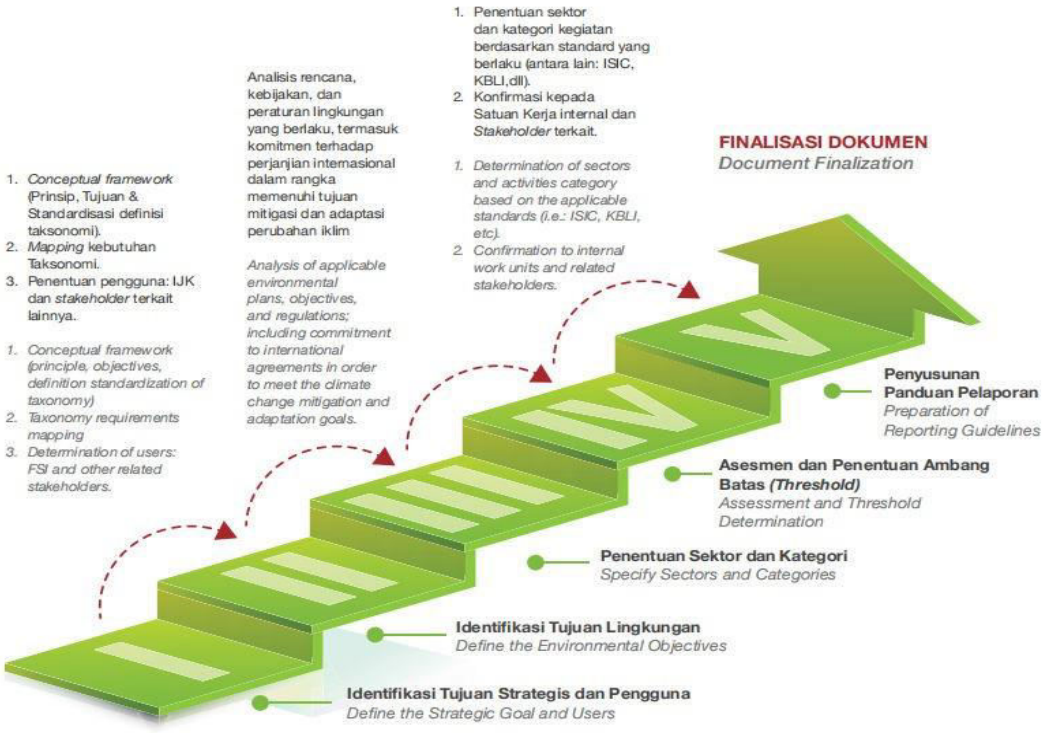
1. Ministry of Environment and Forestry (KLHK);
2. Ministry of Industry (Kemenperin);
3. Ministry of Marine Affairs and Fisheries (KKP);
4. Ministry of Energy and Mineral Resources (ESDM);
5. Ministry of Transportation (Kemenhub);
6. Ministry of Agriculture (Kementan);
7. Ministry of Tourism and Creatif Economy (Kemenparekraf); and
8. Ministry of Public Works and Housing (PUPR). Various parties were involved in providing inputs for the Indonesia Green Taxonomy

Edition 1.0, including: 1. Related Ministries/Institutions; Coordinating Ministry for Maritime and Investments Affairs; Ministry of National Development Planning (PPN/BAPPENAS); Fiscal Policy Agency Ministry of Finance; and Bank Indonesia. 2. Financial Services Industry (FSI 3.Academic/research and development institutions; Bali Center for Sustainable Finance (BCSF) – Udayana University; Faculty of Economics and Business, Gadjah Mada University; the SDGs Center – Padjajaran University (UNPAD); Trisakti Sustainability Center (TSC) – Trisakti University; Research Center for Climate Change (RCCC) – University of Indonesia; Indonesia's Banking Development Institute (LPPI); and Perbanas Institute. 4. International institutions; U.S. Agency for International Development (USAID); International Finance Corporation (IFC); and Organisation for Economic Co-operation and Development (OECD).

5. Non-Governmental Organizations; WWF Indonesia, the Sustainable Trade Initiative (YIDH); Greenpeace Indonesia; PRAKARSA Group - Coordinator of the ResponsiBank Indonesia Coalition; Transformasi untuk Keadilan (TuK) Indonesia; The Indonesian

Forum for Environment (WALHI); and Indonesian Center for Environmental Law (ICEL).

Financial Services Authority Regulation No. 60/PJOK/04/2017 concerning the Issuance and Requirements of Environmentally Sound Debt Securities (Green Bond) and Financial Services Authority Regulation Number 51/POJK.03/2017 concerning the Implementation of Sustainable Finance for Financial Services Institutions, Issuers, and Public Companies is a reference in the implementation of Green Finance in Indonesia coupled with the Explanation in the Review-Local-Value-Chain-Downstream-and-Industry-Green.aspx page 95 explains that Currently, Indonesia's green transition is relatively lagging behind compared to the other country, Based on the Global Green Economy Index™ (GGEI)5 issued by Dual Citizen, Indonesia is ranked 154 out of 160 countries, even becoming the lowest among ASEAN countries in 2022. Similar facts issued by MIT Technology Review Insights (2021) 5 GGEI issued by Dual Citizen, calculated based on 18 indicators divided into 4 dimensions, namely climate change, & social equity; sector decarbonization; Markets & Investment; and environmental health. Through The Green Future Index 2021 which includes Indonesia in the Climate Laggards group, which is a group of countries with efforts to improve ecosystems in the context of relatively slow climate improvement. The acceleration of the transition in the manufacturing industry sector in Indonesia can be encouraged through energy efficiency, the use of clean energy, and New and Renewable Energy (EBT). This is inseparable from energy use in Indonesia is still dominated by fossil-based fuels. Based on the publication of the Ministry of Energy and Mineral Resources (ESDM) (2021), the portion of NRE in the national energy mix in 2021, reached 11.5%. This figure is targeted to reach 23% by 2025 and 31% by 2030. Compared to fossil energy, NRE produces much lower emissions. For example, emissions from Solar Photovoltaics (Solar PV) are only 85 tons of CO2e/GWh, much lower than fossil fuels, such as coal which reaches 888 tons of CO2e/GWh. So far, energy transition efforts have succeeded in improving the performance of reducing carbon emissions in Indonesia. In 2021, Indonesia succeeded in reducing the level of carbon emissions to 69.5 million tons of CO2, exceeding the target of 67 million tons of CO2. Going forward, the transition to NRE is estimated to be 96 to be accelerated to meet the NDC target of supporting NZE by 2050, The concern for protecting environment should start from an individual by imbibing ethics in one's self which can go a long way in reducing carbon footprint and for a responsible consumerism. But, our ethics and moral standards are deep rooted in our religion, customs and culture. Religion has a strong impact on an individual than any other influencing factor.(Beig Faseeh Amin & Nika Fayaz Ahmad, 2021) There is a strong bond between environment and religion as religion has a considerable influences on the environment in a positive manner. Many world religions also propagate the thought that abuse and exploitation of nature for immediate gain is unjust, immoral, and unethical (Dwivedi, 1993).(Beig Faseeh Amin & Nika Fayaz Ahmad, 2021).



Gambar 1. Tahapan Pengembangan Taksonomi Hijau/*Figure 1. Stages in Developing Green Taxonomy*
Sumber: *Developing a National Green Taxonomy: A World Bank Guide* - World Bank Group, 2020
Source: Developing a National Green Taxonomy: A World Bank Guide – World Bank Group, 2020

S*ource* (Otoritas Jasa Keuangan (OJK), 2022)

The Urgency of Green Taxonomy

1. The Need for Standardization of Green Definition and Criteria (Otoritas Jasa Keuangan, 2022), Financial sector plays an important role in facilitating and accelerating the transition towards green economy1 through a low-carbon economy2. This is due to the role of the financial market, in providing capital to economic activities, which can have both positive and negative impacts on the environment.

The Indonesia Green Taxonomy (hereinafter referred as "Green Taxonomy") publication is essential as it provides FSS with a better understanding on the classification of green activities. By classifying green activities of a financial product and/or service, Green Taxonomy is expected to facilitate the reporting and periodic monitoring needs in implementing credit or finance allocation into green sector.

2. The Need For Periodic Monitoring on The Allocation of Credit/Financing/Investment To Green Sector

In general, there are two monitoring approaches, namely mandatory and voluntary. A mandatory approach ensures that a regular and consistent reporting can be achieved by regulators in order to identify the source and use of funding to support the green sector. On the other hand, the voluntary approach allows FSS to determine the scope and frequency of reporting, for example in form of regular or annual disclosure.

The Green Taxonomy structure should provide useful references for FSS in preparing their report or disclosure. Both mandatory and voluntary approaches will be implemented effectively depending on each country's conditions.

3. The Need For Refined Reporting Conducted By The Financial Services Industry

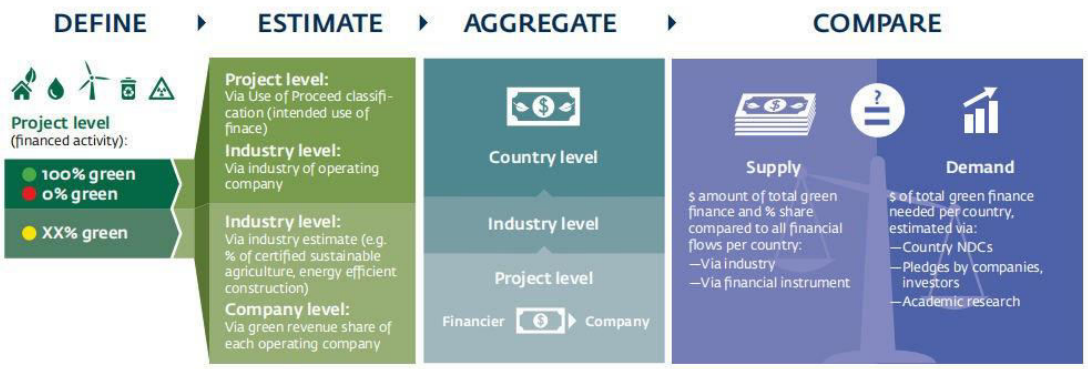
To most national FSS, environmental considerations within their business processes are still viewed as relatively new. As such, the Green Taxonomy is formulated as a guideline for FSS in allocating their financing, as well as their green portfolio record-keeping. As an effort to prevent greenwashing in reporting by FSS, it is hoped that the standard setting for upcoming reporting will not be much different from the previous reporting standards. Efforts to improve the understanding, both on FSS and the public, regarding green financial products and/or services need to be continuously improved, to support the process of checks and balances. The improved understanding as intended can be implemented through the issuance of guidelines, capacity-building programs, as well as effective communication strategies.

Efforts to improve Green Financing is closely related to business financing to achieve profit benefits and social responsibility to the environment, growth, sustainability, and blessings. In Indonesia, regulations on Green Finance have been made by Bank Indonesia and the Financial Services Authority (OJK), but still need stricter supervision, so it can be a barrier for entrepreneurs in managing their finances to be willing to incur costs related to waste management. which has caused environmental pollution. The next thing that needs to be improved is to touch the Religion and religion of the businessmen so that it has the character of Green Entrepreneur.(Fitriana Dewi & Susilowati Lantip, 2021)So, it needs more than laws to protect the environment and such religion can play a vital role in this mission to protect the environment can see the Benchmark that one of the green finances has been successful in creating green finance carried out in China.,(Diaz-Rainey et al., 2023b)are as follows :

1) The government should focus on supporting green energy, green consumption, and green investment. Firstly, enterprises should be encouraged to use green energy, and the selection of enterprises using green energy should be carried out regularly.

2) Green financial projects can effectively promote regional green technological innovation and promote green financial development, so to further support the development of green finance and encourage the research and development of innovative green technologies we need to promote more long-term investment development, such as green equity investment, to finance the operation of green projects better. We also need to promote innovation in how green credit is secured and collateralized and increase the proportion of green credit in total loans to promote the development of green finance.

3) Firstly, the government should set up objective and scientific green financial evaluation systems for enterprises involved in environmental protection, resource conservation, and clean energy, and give policies and resources to the corresponding enterprises, such as adjusting rediscounting and refinancing policies to expand the green financial business. Secondly, disclosure standards should be unified for financial products such as green credit and green investment to avoid unnecessary losses to investors caused by different disclosure standards. In addition, the green financial regulatory system should be improved. (Diaz-Rainey et al., 2023a), In Partnerhip with German Corporation, giz and International Finance Corporation (SilviaJansen, n.d.-a), This bottom-up methodology first defines what is “green” at a project level, based on the intended use of the investment in the real economy, through the application of estimates for the respective green share per project. It then aggregates the numbers at an industry and country level. These results can be compared to green finance needs to identify gaps and action points. There are many challenges to implementing this approach, including the lack of consistency in the definition of green and other relevant data points, such as sector classifications across available datasets.



Source **:**(SilviaJansen, n.d.-b)

OJK, together with other ASEAN members, has been actively involved in the formulation of ASEAN Taxonomy document through the ASEAN Taxonomy Board (ATB).11 Currently ASEAN, through ATB, has released the ASEAN Taxonomy for Sustainable Finance –Similar to the European Union, ASEAN Taxonomy for Sustainable Finance will be used as a common guideline on sustainable finance within ASEAN region to meet international standards, as well as specific ASEAN needs.

Tabel 2. Klasifikasi Pada Taksonomi Hijau — *Table 2. Classification in Green Taxonomy*

Kategori/*Category*	Penjelasan/*Explanation*
Hijau *(do no significant harm, apply minimum safeguard, provide positive Impact to the environment and align with the environmental objective of the taxonomy).* ***Green*** *(do no significant harm apply minimum safeguard, provide positive Impact to the Environment and align with the environmental objective of the taxonomy).*	Kegiatan usaha yang melindungi, memperbaiki, dan meningkatkan kualitas atas perlindungan dan pengelolaan lingkungan hidup, serta mitigasi dan adaptasi perubahan iklim serta mematuhi standar tata kelola yang ditetapkan pemerintah dan menerapkan praktik terbaik di tingkat nasional ataupun tingkat internasional. *Business activities that protect, restore, and improve the quality of environmental protection and management, as well as climate change mitigation and adaptation, and comply with the governance standards by government, and apply best practices at both the national and international level.*
Kuning *(do no significant harm).* ***Yellow*** *(do no significant harm).*	Kegiatan usaha yang memenuhi beberapa kriteria/ambang batas hijau. Penentuan manfaat kegiatan usaha ini terhadap perlindungan dan pengelolaan lingkungan masih harus ditetapkan melalui pengukuran serta dukungan praktik terbaik lainnya. *Determination of business benefits for environmental protection and management must still be conducted through measurement and support of other best practices.*
Merah *(Harmful activities).* ***Red*** *(Harmful activities).*	Kegiatan usaha tidak memenuhi kriteria/ambang batas kuning dan/atau hijau. *The business activities do not meet the yellow and/or green criteria/ threshold.*

Sumber: Taksonomi Hijau 2021 / *Source: Green Taxonomy 2021*

CONCLUSIONS AND RECOMMENDATIONS

The development and tracking of green finance activities is gaining momentum. However, current data availability limits the rigor of the analysis of existing green finance flows. Definitions and tracking are most advanced in the bond market and could serve as an example for other areas. For banking, loan tracking processes need to be improved and institutional investors need to implement clear decision-making criteria. To get a full picture of green finance, we need to track "green" at the level of each project. Cooperation between market players on the following action points is crucial.

We should therefore promote the development of green finance through the government guiding social capital into green industries, optimizing the allocation of green financial resources, and reducing capital investment in high-pollution and high-emission enterprises.

But the fact that there are still violations by business people in environmental pollution, demolition of green land, pollution, and so on, it is necessary for the government to touch the hearts of business people and parties involved in green financing about religious advice not to do damage on the face of the earth. Therefore, in making green financing policies, it is necessary to participate in the Ministry of Religion in shaping the character of each party/businessman

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STUDY OF IMPACT OF PACKAGING ON WASTE GENERATION AND ITS EFFECT ON GREEN ENVIRONMENTAL SUSTAINABILITY WITH REFERENCE TO FOOD AND BEVERAGE PACKAGING

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ABSTRACT
Packaging has an increasingly essential role to play in preserving the value invested in products by ensuring that they can deliver their designed service with minimum wastage. Food contact materials that deliver more units of service with increasingly fewer inputs of energy and materials, and increasingly fewer negative social, economic and environmental impacts, e.g., from emission of wastes, will be more sustainable both in the food processing machines of the industrial system and as packaging for food. Buzz words, whether bio, nano, degradable, or whatever comes next, must be critically examined per unit of service delivered to determine if, over the whole life cycle of the products to which they are applied, energy and resource use are minimised, pollution is reduced (not relocated), ecological benefits are created, and social and economic well-being are increased. Only when this caution is applied can a new solution be described as more sustainable.

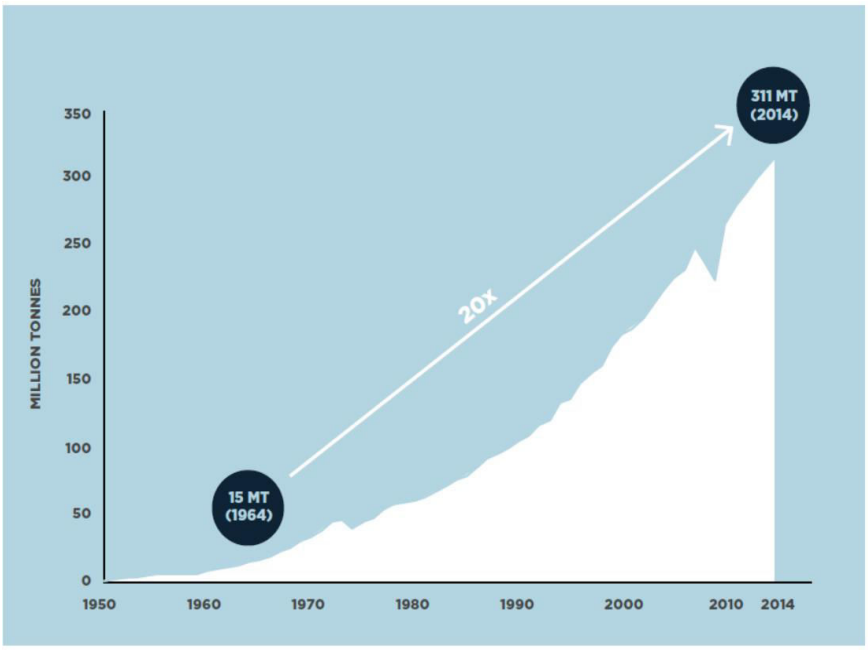
In this study, researcher will investigate how consumers living in India, understand the environmental sustainability of different kinds of packaging for food products based on an online survey and qualitative interviews and we will also determine the benefits of sustainable food packaging vs traditional food packaging and why we must emphasis on adopting the sustainable food packaging in coming future.

Keywords: Packaging, Food waste, sustainability, Consumers perception, LCA

1. INTRODUCTION
The environmental impact of packages has been found to be relatively small compared with the food items they contain. Furthermore, from the environmental and operational point of view, the most significant task of the package is to protect the product, which is important to acknowledge in the packaging design process. This study introduces a guiding framework for designing sustainable food packaging. In this approach, the entire life cycle of the product–package combination is taken into consideration and comparative analysis of traditional vs sustainable food packaging is done. The emphasis is on the prevention of food losses in packaging design as a major environmental criterion. Consideration of the properties of both the package and the product itself when designing the final package will lead to a better end result with smaller product losses and environmental impacts. By using different assessment methods in the different stages of the packaging design, the sustainability of the package can be enhanced. The decision making of the packaging designer is facilitated with methods that are introduced step by step and in a certain order that will also allow for corrective measures through back-loops in the design process. The purpose is to integrate sustainability aspects at all stages firmly into the design process

2. LITERATURE REVIEW
According to a report by "Ellen Mac Arthur Foundation" Plastics and plastic packaging are an integral and important part of the global economy. Plastics production has surged over the past 50 years, from 15 million tonnes in 1964 to 311 million tonnes in 2014, and is expected to double again over the next 20 years, as plastics come to serve increasingly many applications. Plastic packaging, the focus of this report, is and will remain the largest application; currently,

packaging represents 26% of the total volume of plastics used. Plastic packaging not only delivers direct economic benefits, but can also contribute to increased levels of resource productivity — for instance, plastic packaging can reduce food waste by extending shelf life and can reduce fuel consumption for transportation by bringing packaging weight down.



Note: Production from virgin fossil-based feedstock only (does not include bio-based, greenhouse gas-based or recycled feedstock).

Source: PlasticsEurope, *Plastics – the Facts 2013* (2013); PlasticsEurope, *Plastics – the Facts 2015* (2015).

Figure 1: Growth in Global Plastics Production 1950–2014 (Ellen Macarthur foundation report)

2.1Packaging Waste and Environmental Sustainability of Food and Beverage Packaging

The frequency of purchases combined with high production volumes of consumer products mean that 43 consumers buy large amounts of packaging, estimated as 207 million tonnes globally with a value of 384.44 billion USD each year (EMF, 2013). Global packaging production is expected to increase significantly in the 45 near future, as a consequence of both demographic and macroeconomic trends. By 2030, three billion new 46 consumers are expected to enter the global middle class, equal to a 160% increase compared to 2009 47 (OECD, 2011). These consumers will consume more in general, and they will switch from buying loose, 48 unbranded products (such as groceries at the local market) to buying manufactured, packaged goods. 49 According to estimates by the Ellen MacArthur Foundation (EMF), this will lead to a 47% increase in 50 packaging (by weight) in emerging markets by 2025 compared to 2012 (EMF, 2013).

From a societal point of view, the role of packaging is controversial. Food packaging can enable safe and 52 efficient supply of products and minimise the environmental impacts of producing, transporting, using and 53 disposing of food products (Varghese et al., 2012). On the other hand, packaging in general is a major 54 contributor to municipal solid waste (MSW), representing around 31 wt.% of MSW at the European level 55 (EEA, 2013). In the context of the EU Action Plan for Circular Economy released at the end of 2015 (EC, 56 2015), new ambitious goals for material recycling rates have been set. According to the new legislative 57 rules amending Directive 94/62/EC on packaging and packaging waste approved on by EU Member states 58 on May 2018 “no later than 31 December 2025 a minimum of 65 % by weight of all packaging waste will be 59 recycled” (European Union, 2018). The different packaging materials (including food packaging) have very 60 different recycling rates, e.g. in

Denmark in 2012 almost all glass was recycled (97.7%wt.), meanwhile only 61 29.4% of plastic packaging had a second life with the rest mainly sent to incineration with energy recovery 62 (Miljøstyrelsen, 2015). For paper and metal, the recycling rates were 76.5% and 51.8%, respectively. 63 According to the Danish Environmental Protection Agency, 895,000 tons of packaging material were used in 64 2012 in Denmark, which equals 160 kg per person (Miljøstyrelsen, 2015).

2.2Consumer Perception of Packaging

Even though packaging can have a positive environmental effect, as it prolongs the lifetime of products and 76 prevents food waste, consumers tend to think of food and beverage packaging as something negative 77 (WRAP, 2013). Many studies have been performed on consumers´ perception of packaging, e.g. Ampuero 78 and Vila (2006), Gelici-Zeko et al. (2013), but only few have looked at the environmental sustainability 79 perception of food and beverage packaging. The first investigation of consumers´ environmental perception 80 of beverage containers was conducted by Van Dam & van Trijp (1994). They concluded that Dutch 81 consumers perceived glass packaging and, to a lesser extent, paper packaging as environmentally friendly, 82 whereas tin, plastic and carton containers were perceived as the least sustainable options. This picture was 83 confirmed in a later study by van Dam (1996), who investigated the product characteristics that constitute 84 the perceived sustainability (e.g. material type, size) and concluded that consumers judge environmental 85 sustainability mainly based on material type and possibility of re-use. More recently, Lindh et al. (2015) 86 conducted a study among Swedish consumers, confirming that consumers' environmental perception of 87 food packaging is mainly grounded in material considerations. Their main findings are that paper-based 88 packaging is perceived as the most sustainable and plastic and metal as the least ones. Korhonen et al. 89 (2015) performed a wide, cross-continental study among University students in Europe, Latin America, 90 North America, and Asia on attitudes towards packaging and perception of packaging materials on several 91 aspects, including sustainability. The study revealed that paper and carton are perceived as the most pro-92 environmental materials. Moreover, cultural differences among countries emerged, especially for the 93 perception of plastics, aluminium and tin: in countries with developed recycling systems, such as Denmark, 94 pro-environmental packaging was perceived as recyclable or made of recycled content (Korhonen et al., 95 2015).

2.3Life Cycle Assessment of Beverage Packaging

Previous studies LCA is a suitable tool to compare different types of packaging that serve the same purpose as it compares the products assessed against only each other. LCA is based on product system results in relation to each other rather than their impacts overall; it can only show if something is 'better' or 'worse' than another. LCA is guided by two International Organization for Standardization (ISO) standards, ISO 14044:2006 and ISO 14040:2006, and for an LCA to be deemed valid by other practitioners, it should adhere to these standards (Bjørn et al., 2018c). LCA is often considered when the sustainability of a product or process or measurement of how 'environmentally friendly' something is needed. A number of studies have used LCA to review the environmental impacts of drinks packaging, with some focusing just on plastics packaging, or on specific types of beverages such as carbonated drinks or milk (Amienyo et al., 2013; Romero-Hernández et al., 2009). Many LCAs have been conducted on beverage packaging, some by companies on behalf of beverage packaging producers and others by academics. Almost all follow the ISO standards for LCA and many assess glass and PET bottles due to their use across different beverages. The majority of LCAs that have assessed beverage packaging concluded that glass is the most impactful beverage packaging regardless of the other packaging types involved (Amienyo et al., 2013; Franklin Associates, 2009; Jelse et al., 2009; Meyhoff Fry et al., 2010; Saleh, 2016). Amienyo et al, (2013), noted that glass had the highest global warming potential (GWP) compared with aluminium cans and PET bottles and

concluded that the PET bottle was the least impactful of the three. PET and HDPE bottles' assessed impacts vary across recent LCAs, however they are consistently presented as less impactful than glass and more impactful than composite packaging such as milk cartons (Franklin Associates, 2009; Jelse et al., 2009; Meyhoff Fry et al., 2010). A report by Franklin Associates (2009) concluded that aluminium cans are more impactful than PET bottles as they have higher energy demands, higher solid waste generation and greenhouse gas emissions. However, the report also noted that aluminium can manufacture uses less fossil fuels than PET bottle manufacture due to the widespread use of hydropower in primary aluminium smelters (Franklin Associates, 2009). This highlights the importance of correctly allocating energy sources within LCAs e.g. the work of Saleh (2016), based in Palestine, reported drastically different values than the Franklin Associates (2009) study based in America. Data must be suitable for the country of study.

3 OBJECTIVE OF THE STUDY

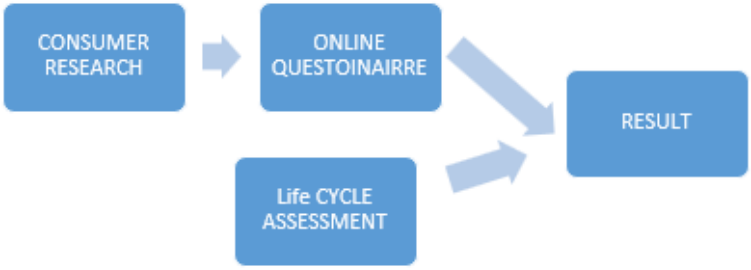
To our knowledge, only one previous study (Steenis et al., 2017) has compared the perceived environmental sustainability of food packaging (namely tomato soup) with the scientifically assessed environmental sustainability performances quantified through LCA. However, such knowledge on what consumers perceive as environmentally sustainable as well as on their understanding of product labels is a key enabler for strategic decision making in the context of circular economy, both for sustainable packaging design and for green purchase strategies. This study addresses a specific and broader category of food packaging, namely liquid food packaging. For beverages and liquid food more generally indeed the necessity of packaging cannot be questioned by consumers. Moreover, the relative environmental impact of the packaging compared to the content is much higher for beverages and liquid food products than for other types of food. We conducted an exploratory study with a aim: (i) to investigate how consumers living in India perceive the environmental sustainability of liquid food packaging and how much they know about eco-labels and waste management therefore we formulated hypothesis:

Ho: Indian consumers are aware about sustainable food packaging and waste management

Ha: Indian consumers are not aware about sustainable food packaging and waste management

4 METHODOLOGY

The research design was structured in two parts, adopting both quantitative and qualitative methods for the consumer research part and quantitative methods for the environmental sustainability assessment, as represented in Figure 1, which shows the linkage with research questions. The analysis of the perception and knowledge of Indian consumers has been performed through an on-line survey and 100 qualitative interviews (section 2.1). The assessment of the environmental sustainability of liquid food packaging was performed through quantification of the potential environmental impacts of a selection of packaging by means of a streamlined LCA tool (section 2.2), complemented with the findings from a literature review of published LCA studies in the field (section 2.3). A procedure to compare the results from consumer research and LCA has been developed and implemented (section 2.4).



- **METHODOLOGY ADAPTED (PART 2)**

from reliable sources such as existing LCA databases, peer-reviewed literature and scientific reports, and collated in a Microsoft Excel spreadsheet. The results of the LCA were compared within each drinks category to identify if there is a packaging type that has fewer environmental impacts than plastics. The study used ISO 14044:2006 and ISO14040:2006 standards as a framework.

- **LIFE CYCLE ASSESSMENT STAGES**

The four stages for LCA are outlined below; whilst they are separate stages many inform the others and there can be adjustment throughout the process (Mathews et al, 2018). Goal and Scope Definition: ISO 14044:2006 states that the goal must be clearly defined with four statements needed in key areas.

1) Intended application;

2) Reason for carrying out study;

3) Audience;

4) If the results are used in publicly released comparative assertions.

- **The scope** consists of several qualitative and quantitative pieces of information that define what is and is not included in the study, the parameters of the study and which product systems were studied. Information such as the functional unit is decided upon in this stage.
- **Inventory Analysis**: Collection and documentation of data gathered in accordance to the needs of the goal and scope. Data is collected, validated, allocated to its associated processes and some data often has to be converted to the functional unit, it was aggregated for the analysis, in this study it was stored in Microsoft Excel. For the inventory analysis product systems were collated within open LCA, a product system includes all the gathered data involved in the product's life cycle organised in such a way that it can then be used in the LCA.
- **A product system** includes the processes for the inputs and outputs of the system, for example for a plastic bottle petroleum must be extracted, so the process to extract the petroleum would be included in the product system with the petroleum as the 'flow' into the next process.
- **Impact Assessment**: This is the stage where the study moved beyond individual flows and processes and assessed that the impacts of the product system were in accordance to the goal and scope. Impact categories were chosen that were relevant to the goal and scope of the study and the choices must be justified. ISO14040:2006 states that these impact categories must be listed explicitly in the study. Using openLCA the life cycle impact assessments were generated for each category, this stage was largely automated and involved ensuring that all data was correct, impact categories were correctly chosen and that there were no technological errors (Rosenbaum et al., 2018). It was in this stage that data was assessed for the impacts of each product system for each impact category.
- It is important to understand through this stage and the interpretation stage that what the life cycle impact analysis shows is potential or theoretical impacts. To meet the ISO Standards for LCAs there were three mandatory steps for the life cycle impact assessment stage: i. Selection of impact categories, indicators and characterisation modules, this step is completed by choosing from existing LCIA methods. ii. Classification of the LCI results, assigning them to impact categories based on what their known impacts are, this is typically done by the software automatically. iii. Characterisation of the results, the software will quantify how much each of the inventory flows are contributing to the impact categories.

Interpretation: The ISO standard gives less in terms of guidance on this stage, but the aim of the interpretation stage is to examine the results to be able to report any findings, recommendations or conclusions (see Discussion). The optional weighting and normalisation step of LCA was not preformed. Weighting is controversial because unless the LCA has a specific purpose, such as examining impacts on human health, it can be difficult to justify what weight impacts could have in relation to each other. This study will not use weighting, mainly as it limits a study's ability to be used as a comparative piece of work and justification for specific weighting is highly subjective (Bettens and Bagard, 2016; Jelse et al., 2009).

5. ANALYSIS OF DATA COLLECTED

- The sample size of the data collected was n=102
- The participants in the Survey were mostly student that is almost **82%**

Are you familiar with sustainable food packaging concept?
Table 3.1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	1.0	1.0	1.0
	Aware	50	49.0	49.0	50.0
	Fully aware	7	6.9	6.9	56.9
	Not really	6	5.9	5.9	62.7
	Somewhat aware	38	37.3	37.3	100.0
	Total	102	100.0	100.0	

Table 5.1

Interpretation of Table 5.1

- Among all the participants in the survey **50 % of people that is** 50 people were aware about sustainable food packaging concept.

Age * Are you familiar with sustainable food packaging concept? Crosstabulation
Count

		Are you familiar with sustainable food packaging concept?				
		Aware	Fully aware	Not really	Somewhat aware	Total
Age	19.0	0	0	0	1	1
	20.0	0	0	0	1	1
	21.0	1	1	1	3	6
	22.0	5	0	1	9	15
	23.0	2	2	0	3	7
	24.0	14	2	2	7	25
	25.0	16	2	0	6	24
	26.0	5	0	1	2	8
	27.0	2	0	0	4	6
	28.0	1	0	0	1	2
	29.0	3	0	1	0	4
	31.0	1	0	0	0	1
	46.0	0	0	0	1	1
Total		50	7	6	38	101

Table 5.2

Interpretation of Table 5.2

Out of 101 people total 88 people that is around **87.12 %** are somewhat aware about the sustainable food packaging.

- **The age group of 22 years to 25 years is most aware about sustainable food packaging.**
- **HYPOTHESES TESTING**

(Ha: Indian consumers are Aware about sustainable food packaging and waste management)

((H0 Indian consumers are not Aware about sustainable food packaging and waste management)

One-Sample Statistics				
	N	**Mean**	**Std. Deviation**	**Std. Error Mean**
Age	101	24.505	3.0187	.3004

One-Sample Test						
	Test Value = 0					
	T	**df**	**Sig. (2-tailed)**	**Mean Difference**	**95% Confidence Interval of the Difference**	
					Lower	**Upper**
Age	81.582	100	.000	24.5050	23.909	25.101

- **Here Sigma Value (0.0005) Is Less Than Alpha Value (0.05),Hence We Reject "Null Hypothesis".**

According to you what is the most sustainable option for liquid food packaging for ex: Milk, Oil (You can select multiple options)					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid		1	1.0	1.0	1.0
	Corrugated Box	2	2.0	2.0	2.9
	Glass container	18	17.6	17.6	20.6
	Paper carton	6	5.9	5.9	26.5
	Recycled plastic	43	42.2	42.2	68.6
	Tetra pack	32	31.4	31.4	100.0
	Total	102	100.0	100.0	

Table 5.3

Interpretation of Table 5.3

- According to the consumer "**Recycled plastics"** is the most sustainable option for liquid food packaging
- After Recycled plastic "**Tetra pack is the most sustainable option for** liquid food packaging

6. RESULTS OF THE LCA ASSESSMENT

The results of all three categories showed clear differences in each beverage packaging's impact within each CML impact category. All three drinks categories had glass bottles as one of the packaging types and in all three the virgin glass bottle had the highest impacts in most CML categories, with PET bottles showing maximum indicators in the two beverage categories in which it was present. When showing the data in graphical form, the maximum indicator has a value of 100% and each other product's indicator is shown relative to the maximum indicator. To ascertain which beverage packaging types in each beverage category were the most impactful, each beverage packaging was ranked for each impact category, with the initial table showing the ranks and an additional table showing the collated results. The lowest scoring beverage packaging is the most impactful in that category. Whilst it is often easy to see from the maximum indicators that are the most impactful in a category, how the other categories relate to

each other in a cumulative fashion can be harder to define. Using these ranked scores, the most impactful and least impactful beverage packaging types overall for each category were quantified. These scores were used to identify which packaging types were most impactful across categories.

7. CONCLUSIONS

- In general, there is good consistency in what different respondents perceive across the product groups. The overall picture is that **Tetra pack** is regarded as the most sustainable packaging material. **RECYCLED PLASTICS, Glass containers** are perceived negatively, and laminated carton is also perceived rather negative, though more mixed. The respondents display great faith in the sustainability of the three new packaging innovations included in the survey.
- The perception of the consumers regarding different material for packaging nearly matches the findings and results of Life cycle assessment analysis of these materials
- The awareness among the consumers in India has increased over the years.
- This study aimed to contribute to filling the gap on the link between consumer research and LCA by investigating how – in the case of liquid food packaging – well-educated young Indian consumers perceive the environmental sustainability of such products, to what extent do they know about the meaning of eco-labels on packaging, and how their perception compares with what can be concluded from LCA studies.

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THE ROLE OF INTELLIGENT TECHNIQUES FOR SUSTAINABLE DEVELOPMENT IN THE ENERGY SECTOR

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ABSTRACT
This chapter discusses the impact of intelligence technology on achieving sustainable development goals. It defines sustainable development as meeting present needs without compromising future generations' ability to meet their own needs. Intelligence technology is increasingly being utilized in various sectors such as water management, health, education, agriculture, and energy. The chapter examines the positive and negative effects of intelligence technology on sustainable development and highlights the need for proper legislation and regulation to ensure transparency, accountability, safety, and ethical standards. The author also emphasizes how intelligence technology may improve the efficiency and dependability of power generation in smart cities and efficiently integrate renewable energy into smart networks. The chapter comes to the conclusion that using intelligence techniques to promote sustainable development is feasible, but care must be made to assure its long-term efficacy and ethical standards.

1. SUSTAINABLE DEVELOPMENT
Sustainable development is a critical concept that balances environmental, sociological, and economic concerns in the pursuit of a higher standard of living. The World Environment and Development Commission, established by the United Nations General Assembly, provides a preliminary discussion on sustainable development, defining it as "development that meets current needs without jeopardizing the ability of future generations to meet their own needs." Sustainable development encompasses four dimensions: society, environment, culture, and economics, all intertwined without being separated [1].

Various processes and ways are used to achieve sustainable development, including sustainable agriculture and forestry, sustainable production and consumption, good governance, research and technology transfer, education and training, among others. Education for Sustainable Development has been incorporated into a number of global frameworks and norms relating to key aspects of sustainable development. Intelligence practices and sustainability are two new technologies and organizational innovations that are influenced or influenced by increasing productivity and ensuring long-term productivity. Intelligence technology has the potential to make a significant contribution to organizational and social stability, as well as to its limitations. Reduced set-up time, less time, less labor and material costs, better product flexibility, higher productivity, and enhanced customization are all possible from an economic standpoint. Intelligence technology also reduces energy and resource consumption by finding and analyzing data from industrial and supply chain activities, which is good for the environment [2].

However, there are obstacles and limitations to the implementation of intelligence technology in sustainability. Some of these limitations include low employment, information security concerns, data complexity, electronic waste, and poor quality. Therefore, it is crucial to explore the relationship between intelligence technology and environmental sustainability. Businesses are embracing sustainability to address stakeholder concerns and expectations. The United Nations Sustainable Development Goals (SDGs) provide a common framework and goals for enterprises, regions, and governments to pursue sustainable development, despite their

shortcomings [3]. The SDGs include poverty alleviation, job creation and economic growth, industry, innovation and infrastructure, reduced inequality, eliminating hunger, promoting better health and well-being, providing quality education, promoting gender equality, promoting peace, justice and building strong institutions, clean water and sanitation, cheap and clean energy, sustainable cities and communities, responsible use and production, climate action, underwater life, and land life.

Intelligence technology contributes to achieving these SDGs by reducing carbon footprint through data-driven and verifiable assessments. It help to reduce waste and CO2 emissions, and contribute to achieving environmental impact qualities such as clean water and sanitation, cheap and clean energy, and sustainable cities and communities [4]. Sustainable development is a critical concept that balances environmental, sociological, and economic concerns in the pursuit of a higher standard of living. Intelligence technology has the potential to make a significant contribution to organizational and social stability, as well as to environmental sustainability. However, there are obstacles and limitations to the implementation of intelligence technology in sustainability, which must be addressed. By exploring the relationship between intelligence technology and the SDGs, It achieve a more sustainable future for all.

1.1 Operational Criteria for Sustainable Development

Operational Criteria for Sustainable Development must be based on three operational requirements, as depicted in Fig.1. To evaluate any objective, three precautions should be taken into account. Firstly, economic objectives should not be pursued at the cost of environmental and social concerns. Secondly, environmental benefits should not be increased if economic and social constraints are not met. Lastly, social benefits should not be increased if economic and environmental constraints are not met. These criteria should be utilized to ensure the pursuit of sustainable development while keeping a balance between economic, environmental, and social objectives.

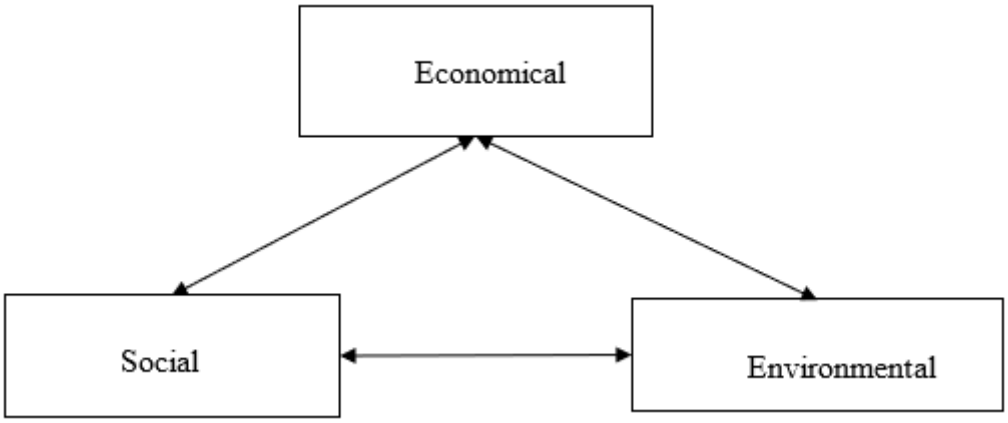

Fig 1. Criteria for Sustainable Development

1.2 Influencing Factors for Sustainable Development

Sustainable development consists of consumption, production, and distribution, and each component plays a vital role in ensuring a sustainable future for our planet. However, consumption, in particular, is a crucial factor that needs to be examined closely. The current patterns of consumption are leading to the exploitation of natural resources beyond their limits, resulting in a significant impact on the environment. The five compelling reasons for examining consumption patterns and how they are influence sustainable development.

The first reason is that environmental efficiency alone is not sufficient to meet the increasing demand for natural resources. The focus should be on reducing consumption rather than relying

solely on eco-efficiency. Strong environmental regulations and policy frameworks need to be implemented to reflect the extent of environmental damage caused by current practices. It is important to understand that financial efficiency is not enough to ensure sustainability; it is essential to reduce consumption to achieve a sustainable future.

The second reason is that consumption patterns reflect the demand side of policy issues. Valuable resources such as water and energy are being wasted due to increasing demand in response to falling prices. This leads to a vicious circle of waste and pollution. Understanding consumption patterns is possible to help us address these issues by reducing demand for such resources, thereby minimizing waste and pollution.

The third reason is that consumption patterns reflect the basic requirements of people. It is crucial to consider what is being consumed, whether essential commodities or luxury goods, as it determines if consumption patterns align with people's fundamental needs. Sustainable development requires consumption patterns that prioritize people's basic requirements while minimizing environmental impact.

The fourth reason is that consumption patterns reveal the impact of environmental degradation on the poor. Poor people, who use fewer resources, are most vulnerable to the effects of environmental degradation. Polluted water and air, agricultural chemicals, and solid waste have a direct impact on the health of the poor, particularly those living in urban slums where pollution levels are highest. Thus, it is crucial to consider the impact of consumption patterns on the poor and vulnerable segments of society.

The fifth reason is that consumption patterns reveal the link between economic progress, meeting basic needs, and human ambition. GDP growth in a country may not translate into an improvement in people's living standards. Production and consumption habits focused on luxury goods and increasing economic rewards at the expense of environmental and social benefits are detrimental to sustainable development. However, if the focus is on meeting the basic needs of people, GDP growth contribute positively to sustainable development.

In conclusion, consumption patterns are a crucial factor in sustainable development. By examining consumption patterns, It reduce demand for natural resources, minimize waste and pollution, prioritize people's basic requirements, protect the poor and vulnerable segments of society, and link economic progress to sustainable development. Governments, policymakers, and individuals need to adopt a sustainable approach to consumption, production, and distribution to ensure a sustainable future for our planet.

2. INTELLIGENCE TECHNIQUES

Intelligence techniques, such as artificial intelligence and machine learning, have the potential to impact various areas, including productivity, equality and inclusion, and environmental sustainability. While the effects of intelligence techniques on sustainable development can be both positive and negative, there is a critical research gap in understanding how intelligence affects the ability to achieve all 17 Sustainable Development Goals (SDGs) by 2030. Intelligent techniques, which automate tasks related to human thought using algorithms that mimic human learning and comprehension, are the most promising intelligence. The increasing availability of large data sets and advancements in computing have paved the way for the development of advanced machine learning algorithms and techniques that solve problems in various areas of sustainable development.

However, the responsible use of intelligent techniques is crucial for its positive impact on sustainable development. For instance, machine learning algorithms can be used in child-growth monitors to detect malnutrition and collect data more efficiently. In areas with limited internet connectivity, processing data and algorithms locally on smart phones can improve privacy

protections. Intelligent techniques also have the potential to predict risks and opportunities, identify patterns and relationships, and improve knowledge and situational awareness [6]. Furthermore, new types of intelligent technique impact assessment and prediction are on the rise, which can help maximize impact and identify the best solutions for sustainable development. Intelligent techniques pave the way for new types of smart service delivery, humanitarian and environmental solutions, and revenue streams.

It is important to note that the impact of intelligence techniques on sustainable development is not without its challenges. One major concern is the potential displacement of jobs as automation takes over certain tasks. It is also essential to ensure that the use of intelligent techniques does not perpetuate biases and inequalities in society. Therefore, it is vital to develop ethical guidelines and regulations that ensure the responsible use of intelligent techniques. The impact of intelligence techniques on sustainable development is significant and will continue to shape various areas. The responsible use of intelligent techniques can improve knowledge, situational awareness, and predict risks and opportunities. However, it is crucial to consider the potential negative impacts, such as job displacement and perpetuation of biases, and develop ethical guidelines and regulations to ensure the responsible use of intelligent techniques for sustainable development [7].

3. END USE APPLICATION

The use of intelligent techniques has become widespread and has the potential to impact various areas such as productivity, equality and inclusion, and environmental impact. In the field of sustainable development, it has been shown to have both positive and negative effects. The fulfillment of all 17 objectives and 169 goals identified in the 2030 Sustainable Development Agenda is affected by how intelligent techniques either enable or prevent the achievement of these goals. To meet these goals by 2030, development practitioners must use intelligent techniques responsibly.

End use application of intelligent techniques has helped individuals and communities improve their skills and abilities by facilitating peer-to-peer information exchange and distance learning. In addition, new intelligent technique applications will improve the agility and efficiency of interventions by automating them, freeing human operators to focus on more difficult tasks. For instance, machine learning evaluates large amounts of data in a fraction of the time it takes a person to do so and then proposes actions based on the results. Intelligent techniques have the potential to predict risks and opportunities by identifying patterns and relationships, which improves knowledge and situational awareness.

Responsible use of intelligent techniques is critical to achieving development goals, but it requires careful consideration of potential negative externalities and barriers. One of the challenges is the lack of high-quality training data, which lead to bias, discrimination, and erroneous conclusions. To address this issue, development practitioners need to purchase data collection technology or collaborate with data-holding or data-generating partners to obtain data that is diverse and representative. Incorporating ethical criteria into machine learning algorithms is another important consideration to avoid potential adverse development projects. Failure to do so could lead to a reduction in low-skilled jobs as organizations become more efficient.

Furthermore, development practitioners play a crucial role in ensuring that the shift to more use of intelligent technique approaches is inclusive. While an intelligent technique helps to increase productivity and efficiency, they must be developed in a way that is responsible and fair. For instance, poor road conditions are a safety hazard for vehicles and disrupt traffic, which hinders economic progress. Intelligent techniques are used to detect and address these issues, but development practitioners must ensure that the benefits of these interventions are equitably distributed.

Data privacy issues also play an important role in the development of intelligent techniques. Data is the lifeblood of these technologies, and responsible use requires consistent implementation of data security standards. Developing an intelligent technique system designed to remain private by default usually comes at a higher cost, but it is worth noting that measures that allow intelligent technique models to learn from datasets without compromising their privacy are becoming more important. Building trust and mitigating risks are essential to the success of intelligent technique applications in development.

In conclusion, the responsible use of intelligent techniques is critical to achieving development goals. While these techniques have the potential to improve productivity, efficiency, and sustainability, they must be developed in a way that is responsible, equitable, and fair. Development practitioners must be aware of potential negative externalities and barriers, including the lack of high-quality training data, the need for ethical considerations in machine learning algorithms, and the importance of data privacy issues. Through careful consideration and responsible use, intelligent techniques help achieve sustainable development goals and improve the lives of individuals and communities.

The following cases are discussed for the use of intelligence techniques in sustainable development

3.1 Water Management

Water is a precious and essential resource for human survival and development, and its management has been a critical challenge for thousands of years. The Sustainable Development Goals (SDGs) recognize the importance of water and sanitation in achieving sustainable development, as it has far-reaching impacts on various sectors such as energy, agriculture, infrastructure, and technology. However, the availability of clean, safe, and sufficient water resources is under threat due to increasing demand, population growth, and climate change, among others. Intelligent techniques have the potential to revolutionize water resource management and help ensure its sustainability. These techniques applied in various aspects, including water distribution, efficient water management, optimized use of available water resources, and water system design, among others. Fig. 2 shows the different aspects of intelligent techniques for water resource management.

The decisions made by communities, cities, and nations on water resource management have significant implications for our well-being and future. Over exploitation of freshwater sources, contamination of natural water resources, and damaged ecosystems have compromised our future security and stability. Therefore, it is crucial to harness technological advancements and intelligent techniques to meet short-term economic demands while ensuring long-term environmental sustainability. The management techniques available for water resources have evolved over time, and the use of intelligent techniques further enhance their efficiency. For instance, water utilities are benefit from smart water management powered by intelligent techniques. These techniques can make water treatment plants cheaper and easier to monitor, leading to improved public health. Furthermore, expert systems or rule-based algorithms can be used to select native intelligent technique-based software outputs or evaluate options, thus enabling intelligent technique tools to learn over time.

During the learning phase, input data is linked to known output, enabling the algorithm to learn over time. Once the algorithm enters the operational phase, it recognizes patterns when new data is supplied, and its ability to continuously convert and process data makes it a perfect tool for managing water resources in a constantly changing environment and water business. This allows water utility managers to optimize current revenues and plan successfully for years to come. However, the adoption of intelligent techniques for water resource management is not without challenges. One of the main challenges is the lack of high-quality training data, which is

essential for machine learning algorithms to work correctly. Therefore, it is necessary to purchase data collection technology or collaborate with data-holding or data-generating partners to obtain diverse and representative data. The lack of such data is lead to biased and erroneous conclusions that hinder the achievement of development goals.

Another challenge is the need to incorporate ethical considerations into machine learning algorithms to ensure that the adoption of intelligent techniques does not result in adverse development projects. For example, the shift towards more use of intelligent techniques may lead to a reduction in low-skilled jobs, thus posing a challenge to ensure inclusivity in development. Moreover, data privacy issues are becoming increasingly important, and creating an intelligent technique system designed to remain private by default may come at a higher cost. Therefore, it is necessary to build trust and mitigate risks by implementing consistent data security standards and ensuring the responsible use of intelligent techniques.

Iintelligent techniques have the potential to transform water resource management and ensure its sustainability. However, the adoption of intelligent techniques in the water sector requires the availability of high-quality training data, the incorporation of ethical considerations, and the implementation of consistent data security standards. By addressing these challenges and ensuring the responsible use of intelligent techniques, It is possible to harness their full potential to achieve sustainable development in the energy sector and beyond.

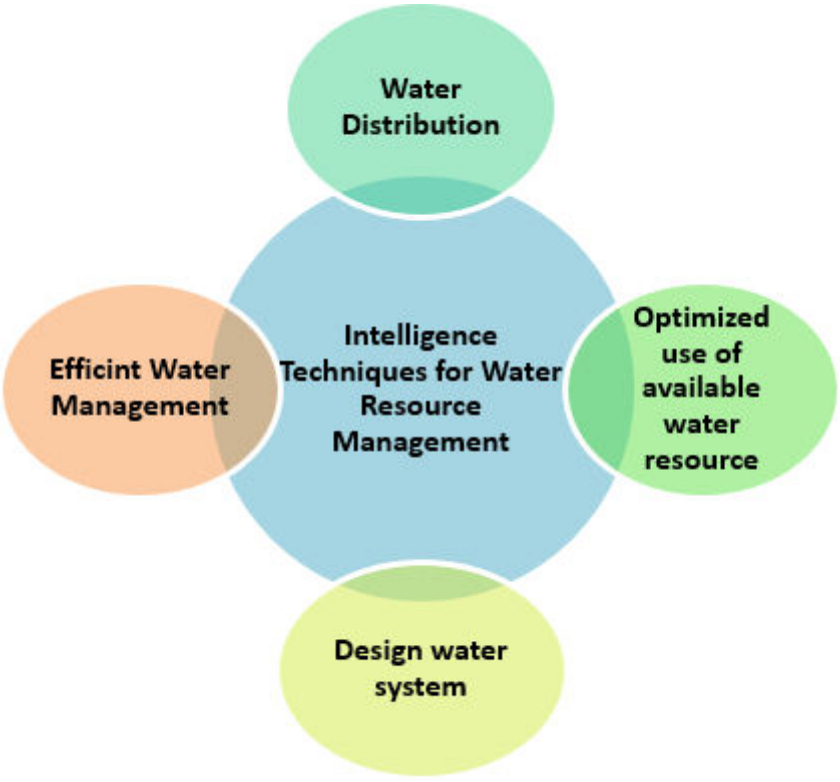

Fig 2. Intelligence Techniques for Water Resource Management

3.2 Health and hygiene

The role of intelligent techniques for sustainable development in the energy sector is not limited to the efficient management of water resources. It also extends to the improvement of health and hygiene, particularly in areas where access to clean water is a major problem. As shown in Fig 3, an intelligent technique in the health sector is helping to solve problems related to disease diagnosis, treatment, health records, and clinical records. In a world where billions of people suffer from waterborne diseases, access to clean water is a significant challenge. The problem

requires financial support and time to learn how to make the most of the new pure water system. However, intelligent techniques are aid in solving this issue. The clean water system employs artificial intelligence to identify the size of molecules under a microscope. Aquatic microorganisms are identified by distinct forms, colors, densities, and edges in each evolutionary neural network. In its conceptual evidence, the researchers focused on identifying the microorganisms that cause Escherichia coli and cholera. However, because various species of bacteria have distinct forms and features, identification of other bacteria is able to done.

The intelligent technique testing system is detected hazardous germs and contaminants on a map in real time, and it is simple to use, requiring little training. The system creates a method for towns to employ to install monitoring devices in water sources, and then it creates particular regional variants that require installing devices in water pipelines. This innovation has far-reaching implications for enhancing the safety and effectiveness of water and sanitation systems and practices all around the world. Artificial intelligence-based clean water has far-reaching implications for towns and cities all over the world, particularly for those that are willing to make modifications and early expenditures to take advantage of this low-cost breakthrough. It is important to note that the availability of clean water is a crucial factor in maintaining public health and hygiene, and the use of intelligent techniques are ensure that people have access to safe drinking water. Thus, it is vital to promote the use of intelligent techniques for sustainable development in the energy sector, specifically in the field of health and hygiene.

Fig 3. Intelligence Techniques in Healthcare

3.3 Education

The study explores how introducing intelligent technique applications in education can benefit students and future corporate executives and strategists. It also emphasizes the importance of science, technology, engineering, and mathematics (STEM) education in ensuring that a significant digital gap between nations does not emerge. Intelligent technique applications have several advantages, such as transforming the way students and researchers study, execute, and assess solutions to problems. The decision-making capacity of intelligent techniques is far superior to that of humans, making them ideal for remote data gathering strategies, such as smartphone-level diagnostics in remote parts of the world where such help is not readily

available. These strategies can help tackle some of the problems highlighted in the Sustainable Development Goals (SDGs), making them an essential part of sustainable development in the energy sector.

Education needs to prepare students to collaborate with artificial intelligence and new technologies available in diverse businesses. One such example is smart water management, which uses intelligent techniques to aid decision-making. Therefore, educators must teach students how to work with intelligent techniques and comprehend their role in making management decisions today and in the future. Additionally, professors should instruct students on how to enter data into intelligent technique decision-making neural networks accurately. As shown in Fig. 4, intelligent techniques are used for various problem-solving in the education sector.

The study emphasizes the need for education to prepare students for the rapidly evolving technological landscape. It is essential to educate students on how to use intelligent techniques for management decision-making, as many future prospects will require in-depth information input into these techniques. Therefore, students must learn about in-depth learning and be aware of the importance of accurate data input. Education must also prepare students for collaboration with intelligent techniques, as they will become an essential part of sustainable development in the energy sector. Intelligent techniques have a crucial role to play in sustainable development in the energy sector, particularly in education. The study highlights the importance of STEM education in bridging the digital gap between nations and the need to prepare students for the rapidly evolving technological landscape. Educators must teach students to collaborate with intelligent techniques and comprehend their role in making management decisions. This research provides valuable insights into the potential of intelligent techniques in education and their significance in sustainable development.

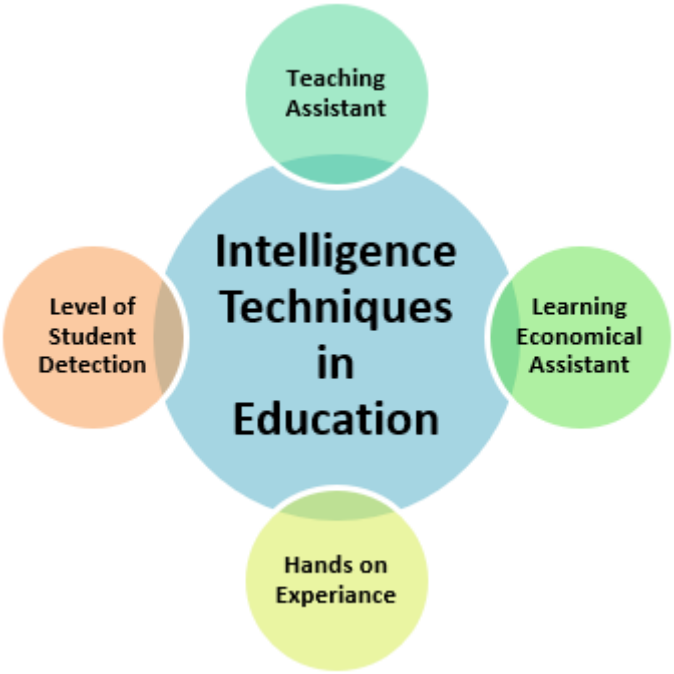

Fig 4. Intelligence Techniques in Education

3.4 Social Sector

The use of intelligent techniques in the social sector has great potential to address various societal issues, but there are also concerns about the potential negative impacts of these technologies. One significant challenge is the issue of affordability, as the cost of implementing

complex intelligent technique systems may be prohibitive for low-income families and disadvantaged communities. If left unregulated, this could exacerbate existing inequalities and result in further disparities between different groups. Moreover, it is crucial to address the issue of bias and systemic racism in intelligent technique systems. Research has shown that many of these systems, particularly those in the NLP and computer vision domains, are still affected by social biases in the data used for training. This leads to perpetuation of harmful stereotypes and discrimination against marginalized groups.

To address these challenges, it is important to prioritize transparency and diversity in the development and implementation of intelligent technique systems. One approach could be to adopt a decentralized model that involves teams with diverse cultural, ethnic, and gender backgrounds in the design and development process. This helps to ensure that intelligent technique systems are more objective and less susceptible to bias.

As shown in Fig. 5, intelligent techniques can be applied in a range of social sector applications, from addressing inequality to combating hate crimes. However, to fully realize the potential of these technologies in the social sector, it is essential to address these challenges and prioritize responsible and equitable deployment.

Fig 5. Intelligence Techniques in Social Sector

3.5 Economic Outcomes

The use of intelligent techniques has been shown to improve productivity and add value to various sectors of the economy, including agriculture and security. Fig. 6 illustrates the broad range of economic sectors that have benefitted from intelligent technique applications. While intelligent techniques have the potential to enhance economic growth and productivity, there are concerns that they may also widen income inequality, particularly in low- and middle-income countries where access to resources for human capital development is limited. If current trends continue and future markets rely heavily on data-driven economies, there is a risk that the income gap could widen dramatically.

To address these concerns, government-led efforts are needed to promote retraining and reskilling programs that help individuals acquire the skills necessary to compete in a data-driven

economy. This will be critical in reducing the potential negative impact of intelligent techniques on income inequality. Moreover, there is a need for government regulation to ensure that the benefits of intelligent techniques are distributed fairly across different sectors of society. For instance, if only large producers are afford expensive intelligent technique systems for improving production, small farmers may lag behind and inequality may increase. Therefore, it is important to regulate how profits from intelligent techniques are distributed to different parties to avoid exacerbating existing inequalities.

While intelligent techniques have the potential to enhance productivity and economic growth, they also have the potential to widen income inequality and exacerbate existing social biases. Therefore, government-led efforts are needed to ensure that the benefits of intelligent techniques are distributed fairly and to promote retraining and reskilling programs to reduce the potential negative impact on income inequality. Furthermore, efforts to promote transparency and diversity in the development of intelligent techniques can help mitigate the risk of perpetuating social biases.

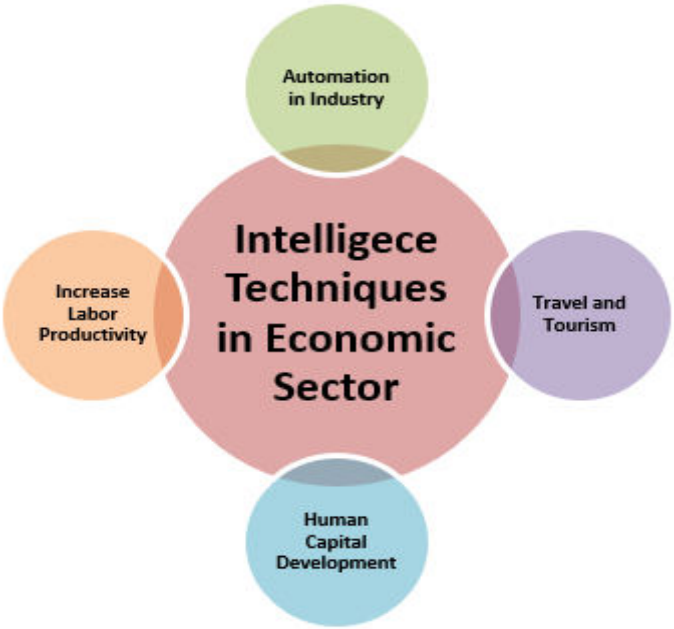

Fig 6. Intelligence Techniques in Economic Sector

4. ENERGY SECTOR

The energy sector is a crucial area where intelligent techniques are increasingly being applied to improve efficiency, reliability, and sustainability. Advances in IoT hardware and intelligent technique algorithms, such as Vision and Sensor Fusion, have made it possible to incorporate renewable energy into a smart grid and accurately control its risk. This is particularly important in countries where coal-based power is still generated, as increased efficiency is critical for reducing emissions and meeting climate goals. One area where intelligent techniques are being used in the energy sector is smart grids. By integrating renewable energy sources such as solar and wind power into the grid, intelligent techniques helps to balance supply and demand and reduce the need for fossil fuels. For example, demand response programs that use intelligent algorithms to manage energy consumption helps to reduce peak demand and prevent blackouts. Smart grids also enable the integration of electric vehicles (EVs) by providing charging infrastructure and managing their impact on the grid. Intelligent techniques are also being applied in the monitoring of energy systems and infrastructure. Sensors and vision systems is able to provide real-time data on energy consumption, production, and transmission, enabling

more efficient operation and maintenance. For example, predictive maintenance algorithms are use sensor data to identify potential failures before they occur, reducing downtime and maintenance costs.

In agriculture, intelligent techniques are being used to improve energy efficiency and reduce waste. Precision agriculture techniques use sensors and intelligent algorithms to optimize crop production, reduce water and fertilizer use, and minimize energy consumption. For example, using data from soil sensors and weather forecasts, intelligent irrigation systems are optimize watering schedules and reduce water waste. Overall, the use of intelligent techniques in the energy sector has the potential to significantly improve efficiency, reliability, and sustainability. As shown in Fig. 7, the number of intelligent technique applications in the energy sector is increasing, and by 2030, it is estimated that information and communication technology will consume up to 20% of the world's total electricity demand. It is therefore essential that the energy sector continues to invest in and adopt intelligent techniques to meet the growing demand for energy while minimizing its impact on the environment.

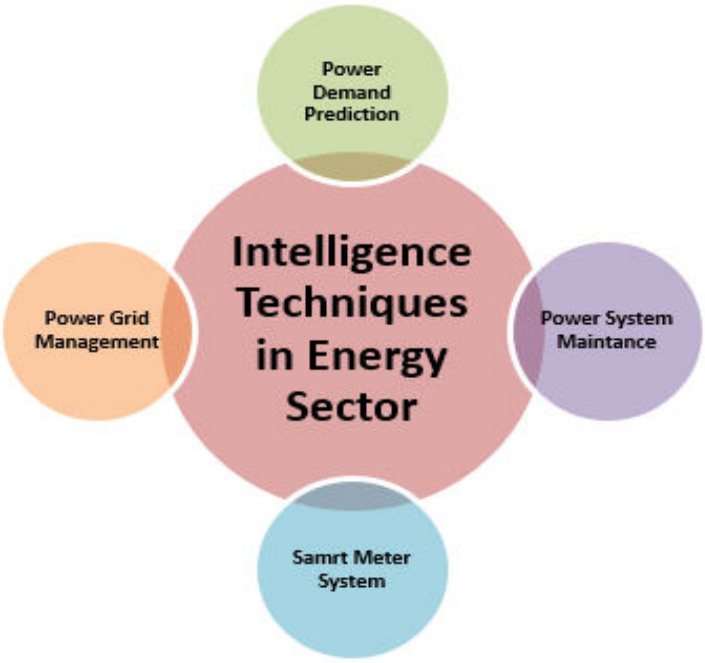

Fig 7. Intelligence Techniques in Energy Sector

4.1 Applications of Intelligence Technique in Energy Sector

The energy sector is a critical sector in modern society, as it provides the necessary energy needed for powering homes, businesses, and industries. However, energy production and consumption also contribute significantly to carbon emissions, which have negative impacts on the environment and public health. Therefore, there is a growing need for sustainable energy systems that meet the energy demands of modern society while reducing the negative impact on the environment. Intelligent techniques have emerged as a potential solution for sustainable development in the energy sector. In this chapter explore the role of intelligent techniques for sustainable development in the energy sector, with a focus on 15 applications of intelligent techniques.

Energy Forecasting and Demand Prediction

Energy forecasting and demand prediction are crucial in optimizing energy production and distribution, reducing energy waste, and ensuring that energy is available when and where it is needed. AI used to forecast energy demand patterns and predict future energy usage, which

helps to optimize energy systems. Machine learning algorithms analyze historical data on energy consumption and weather patterns to forecast energy demand accurately. This helps utilities to adjust their production and distribution to meet demand, avoid energy waste, and reduce carbon emissions.

Optimization of Energy Production and Distribution

Optimization of energy production and distribution is essential to increase energy efficiency, reduce energy costs, and improve the reliability of energy systems. Intelligent techniques are used to identify areas where energy is being wasted and where energy use is optimized. For example, machine learning algorithms are analyzed real-time data on energy consumption, weather patterns, and grid performance to identify inefficiencies. These help utilities to adjust their production and distribution to optimize energy use, reduce energy costs, and improve system reliability.

Energy Efficiency Optimization

Energy efficiency optimization is crucial in reducing energy consumption and costs. AI is used to identify areas where energy is being wasted and optimize energy consumption. For example, machine learning algorithms analyzed data on building usage, occupancy, and energy consumption to identify areas where energy-efficient lighting and heating systems is installed. This helps to reduce energy consumption, costs, and carbon emissions.

Optimization of Renewable Energy Systems

Renewable energy systems such as solar panels and wind turbines are crucial in reducing carbon emissions and promoting sustainable energy production. However, the efficiency and reliability of these systems improved using intelligent techniques. Machine learning algorithms are analyzing data on weather patterns, energy production, and energy consumption to optimize the performance of renewable energy systems. This helps to reduce energy costs, increase the efficiency and reliability of renewable energy systems, and promote sustainable energy production.

Optimization of Energy Storage Systems

Energy storage systems such as batteries are critical in ensuring that energy is available when it is needed. Intelligent techniques are used to optimize the storage of energy in batteries and other energy storage systems. For example, machine learning algorithms analyze data on energy consumption, production, and weather patterns to optimize the charging and discharging of batteries. This help to improve the efficiency and reliability of energy storage, reduce energy costs, and promote sustainable energy production.

Smart Grid Management

Smart grid management is crucial in reducing energy waste and increasing efficiency. Intelligent techniques used to manage and optimize the performance of smart grids. For example, machine learning algorithms can analyze data on energy consumption, production, and weather patterns to predict energy demand and supply patterns. This help utilities to identify the most efficient ways to distribute energy, reduce energy waste, and increase the efficiency of energy systems.

Demand Response Management

Demand response management is crucial in reducing energy usage during periods of high demand. AI used to manage demand response programs, which help to reduce energy usage during peak periods. For example, machine learning algorithms analyze data on building occupancy and energy consumption to adjust the temperature in buildings and reduce the use of energy-intensive.

CONCLUSION

In conclusion, the use of intelligent techniques has the potential to significantly impact social and environmental sustainability in the energy sector. As discussed in this chapter, there is a need to strengthen the global discussion on the use of these methods and provide regulatory knowledge and control for technology based on intelligence techniques. While these technologies offer increased productivity, institutions must carefully consider their contribution to sustainability. There is a lack of guidance in scientific and scholarly literature on this matter, but it is important to analyze each technology's impact on industry and sustainability aspects before investing in it. The energy sector is facing various challenges, including increasing consumption, changing supply and demand patterns, and lack of analysis required for successful management. These issues are further exacerbated in emerging market countries. However, intelligent technologies such as smart grids, smart meters, and Internet of Things devices are being used in the energy sector in developed countries. These technologies will help improve energy management, efficiency, and transparency, as well as increase the use of renewable energy sources. The integration of intelligent techniques in the energy sector contribute to a more sustainable energy economy. However, careful consideration and analysis are necessary to ensure that the technology used prioritizes sustainability while minimizing negative impacts on the environment and society.

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SUKUK WAQF PRODUCT DIVERSIFICATION ON MUSLIM INVESTOR LOYALTY

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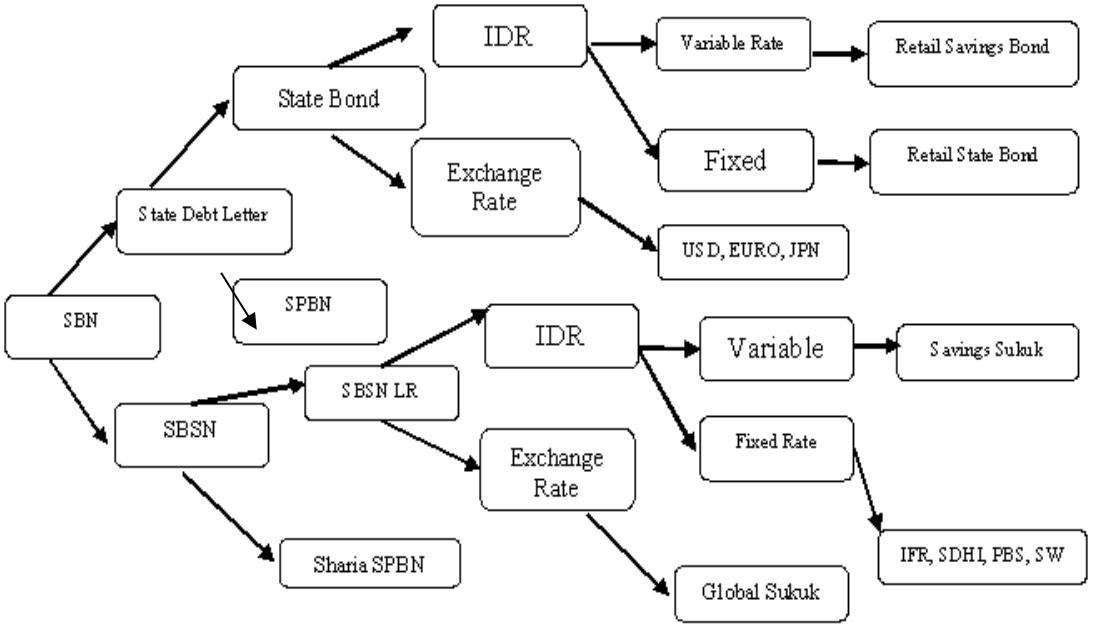
ABSTRACT
Waqf sukuk are securities that are a combination of state sukuk and waqf which are shown to empower productive waqf for socio-economic activities of the people. The issuance of waqf sukuk is shown to optimize the huge amount of waqf funds in the economy to become a variety of sustainable productive activities. The purpose of this paper is to provide an overview of the importance of product diversification to build a brand image so that it will give birth to service ability from product or service users. Understanding this concept is important in the implementation of the issuance of state sukuk which have a large captive market in Indonesia, namely Muslims. The concept of loyalty to state sukuk investors must continue to be built by the government through various efforts, namely sustainable sukuk product education so that public knowledge about state sukuk is more comprehensive, diversification of sukuk products becomes very significant in order to expand market segments both domestically and abroad as well as consistency with Islamic values. in its development. The existence of loyal state sukuk investors will accumulate development funds from the domestic market and increase the empowerment of economic actors in the low-income group.

Keywords: Sukuk waqf, Empowerment, Investor Loyalty

INTRODUCTION
The existence of state sukuk in the economy cannot be doubted. State sukuk have taken a very strategic role in the economy. State sukuk have become a pillar of infrastructure financing which cannot be fully met by the government. Since its first issuance in 2008, state sukuk have stolen the attention of many investors. State sukuk have become an alternative for Muslim communities who want to invest which is free of interest rates. Since the issuance of state sukuk in 2008 amounting to 4.7 trillion Rupiah, the trend of issuing state sukuk continues to experience very significant developments. In September 2021, there was an outstanding state sukuk of 37.16 trillion Rupiah or an increase of 690% over a period of 14 years or an average yearly increase of 49.33%. This increase was followed by various diversification of state sukuk instruments. The diversification of state sukuk includes segmentation of investors, currencies and business scale as well as the implementation contracts. The government's commitment to actively issue state sukuk indicates that the government wants to shift its dependence on external funding originating from foreign debt to funding that involves the community or the domestic market, so that independence in financing development is achieved. The purpose of writing this article is to provide an overview of the importance of diversifying state sukuk products to build a brand image so that it will give birth to service ability from product users (sukuk investors).

Development of State Sukuk Diversification
Product diversification can be interpreted a strategy to improve business performance by expanding the selection of goods or services through efforts to create new products, new markets or both such as improving the type, color, model, size, type, etc. with the aim of pursuing growth and increasing sales.Kotler and Armstrong (2001), interpret product diversification as a way to improve existing business performance by identifying opportunities to add attractive businesses that are not related to the company's current business.In the middle the rapid development of financial instruments in the capital market requires the government to

continue to innovate in the issuance of state sukuk through various diversification efforts from state sukuk in order to build the loyalty of its investors. Loyalty is a process that is formed in the long term starting from the product introduction process until consumers feel suitable and satisfaction arises with the product. In its development, every government issued a new series of state sukuk always sold out. This indicates that state sukuk already have large investors, although empirically state sukuk investors are still among muslim investors. In building loyalty other than through continuing education programs, the government needs to continue to innovate sukuk products that can provide satisfaction for its investors. The following is the diversification of state sukuk into various forms of instruments, contracts and currency values.



Source: DJPR Ministry of Finance of Indonesia

Information: SUN (State Debt Securities), SBSN (Sharia State Securities), SPBN (State Treasury) SBSN LR (Long-Term State Sharia Securities).

Investor Loyalty and Product Diversification

One product of state sukuk that has attracted a lot of attention from investors is waqf sukuk (Cash Waqf Linked Retail Sukuk or Retail CWLS). Retail CWLS is a productive waqf in the form of cash waqf in state sukuk whose rewards are channeled by Nazhir (manager of funds and waqf activities) to finance social programs and economic empowerment of the people. Retail CWLS is a form of government commitment to support the development of social investment and the development of productive waqf in Indonesia. Through Retail CWLS, the government provides facilities and conveniences for individuals and institutions to make cash waqf safely and productively and participate directly in supporting the acceleration of people's economic strength. Retail CWLS is one form of productive waqf, namely waqf that is produced or invested so as to generate profits. The profits from this waqf investment will be returned to the beneficiaries of the waqf (mauqul alaih) as alms. In its development the Retail CWLS instruments not yet integrated with government development projects like other state sukuk. Retai CWLS managed by the government based on Sharia principles, does not contain ambiguity (usury), gambling (masyir) and has received recognition from the National Sharia Council-Indonesian Ulema Council number B-0263/DSN-MUI/III/2022, dated March 25, 2022.

The Indonesian government first issued Retail CWLS on March 10, 2020 by way of private placement with a nominal value of 50,849,000,000.00 Rupiah (fifty billion eight hundred forty-nine million rupiah). In accordance with the authority given by laws and regulations in the field of waqf, the Indonesian Waqf Board (BWI) in its position as nazhir or waqf manager has placed cash waqf funds in SBSN through a private placement mechanism. The Waqf Sukuk issued are SBSN series SW001, a period of 5 years, non-tradable, and with investment returns in the form of discounts and coupons. The discount is paid once at the beginning of the SW001 issuance transaction and will be used by BWI for asset development new waqf, namely the renovation and purchase of medical equipment to support the construction of the retina center at the Achmad Wardi Waqf Hospital located in Serang, Banten Province. Meanwhile, The coupon is paid monthly and will be used for free cataract surgery services for the poor at the same hospital, with a target number of poor people served for 5 years as many as 2,513 patients, as well as the procurement of an ambulance to reach patients who are far from the hospital. Furthermore, the waqf sukuk funds will return 100% to the waqif when the SBSN series SW001matures. Retail CWLS presence retail complement the needs of investors who want investment in endowment and temporary funds for projects to empower the people's economy in a productive manner. This moment will be one of the factors that can foster satisfaction for state sukuk investors which can have an effect on growing the level of loyalty of investors to Islamic financial instruments issued by the government.

Kertajaya (2007) explains the meaning of loyalty as a manifestation of the fundamental human need to have, support, feel safe, build attachment and create emotional attachment. Furthermore, Kotler and Keller (2009), loyalty is a deeply held commitment to buy or resupport a preferred product or service in the future even though the influence of the situation and marketing efforts has the potential to cause customers to switch. From the two definitions, it can be seen that loyalty is the highest form of devotion from a consumer to a product or service, because consumers have felt the highest satisfaction from the goods and services they consume, so that they will still be present for the product even though there are many goods and services from others producers present on the market. Griffin (1995) defines loyalty from the duration of time in which consumers are said to be loyal if they make purchases no less than twice. Loyalty is the repetition of purchasing frequency for the same brand. Ruiz-Mafe, et al. (2016) conclude loyalty as an expression of the relationship between relative attitudes towards the company/ product/ brand and purchase intention.

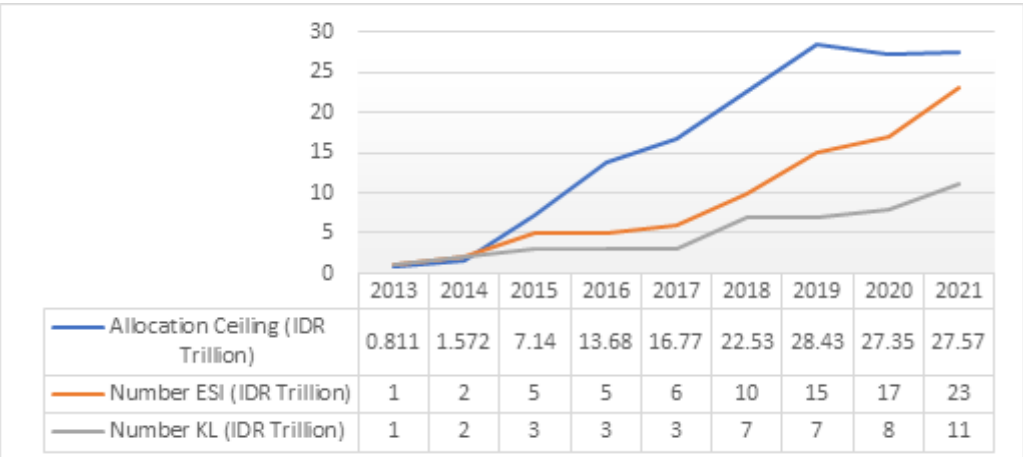
Business owners must know exactly which form of loyalty their business customers belong to, in order to ensure a long-term business strategy. The form of loyalty in question is in the form of transactional loyalty, social loyalty, engagement loyalty, emotional loyalty, behavioral loyalty and advocacy loyalty. Transactional loyalty is built by the company by offering goods and services with more discounts. Furthermore, social loyalty is loyalty that is built by the company by involving customers in social channels. This form of loyalty is enforced by the company by giving points to customers for providing important posts about the company. On the other hand, engagement loyalty is similar to social loyalty, namely offering rewards to customers for subscribing to the company's products and services. This method can increase the conversion rate of a company's marketing. Emotional loyalty is loyalty that is built to build emotional relationships with customers by giving rewards at special moments or providing VIP services to customers. Behavioral loyalty is a program directed at getting customers to do what the company wants them to do. Studying customer behavior patterns generally yields the best loyalty results. Finally, advocacy loyalty is loyalty that is built by giving rewards to customers when they are willing to do what the company wants on social media. This method can increase the conversion rate of a company's marketing. Emotional loyalty is loyalty that is built to build emotional relationships with customers by giving rewards at special moments or providing VIP services to customers.

The government can use a combination of forms of loyalty in building the loyalty of sukuk investors. Emotionally, sukuk waqf investors have the same emotional bond, namely as a Muslim who wants to make non-ribawi investments and build the economic resilience of the people through the empowerment of productive waqf. The important issue in building this loyalty is to build intensive communication with customers so that customers know exactly what products from waqf sukuk work, the working mechanism of waqf sukuk, rewards from waqf sukuk and how the profit scheme of waqf sukuk is distributed for the economic activities of the people. The selection of the form of loyalty is very important for the government to provide the most optimal results with minimum costs.

Although there are many investors who still see the return from their investment activities. But outside of the product, there are many factors that can affect customer loyalty, such as the expectations of investors from waqf sukuk products. Waqf sukuk products must meet a series of customer expectations in all aspects including the government's commitment to developing waqf sukuk that are in accordance with Islamic values, nazhir's consistency in empowering the results of waqf sukuk for the people's economy and the competitiveness of returns from waqf sukuk that can be obtained by nazhir for the economic empowerment of the people. Customer service is a tool that must be built by the government and Nazhir behind the waqf sukuk product. Customer service is as valuable as the product itself. Minimum risk and certainty of investment in the future is an attraction for investors to continue investing in waqf sukuk. In addition, personal relationships need to be established to build investor loyalty. Personal relationships between waqf sukuk investors can be built through nazhir so that individual investors (waqif) have confidence and comfort in investing in waqf sukuk. Furthermore, the government can contribute to community activities to build intensive communication with potential investors. In this case, the government must be present to support the economic empowerment of the people in order to build trust and loyalty from individual investors and the community.

Development of Building Loyalty of Sukuk Investors

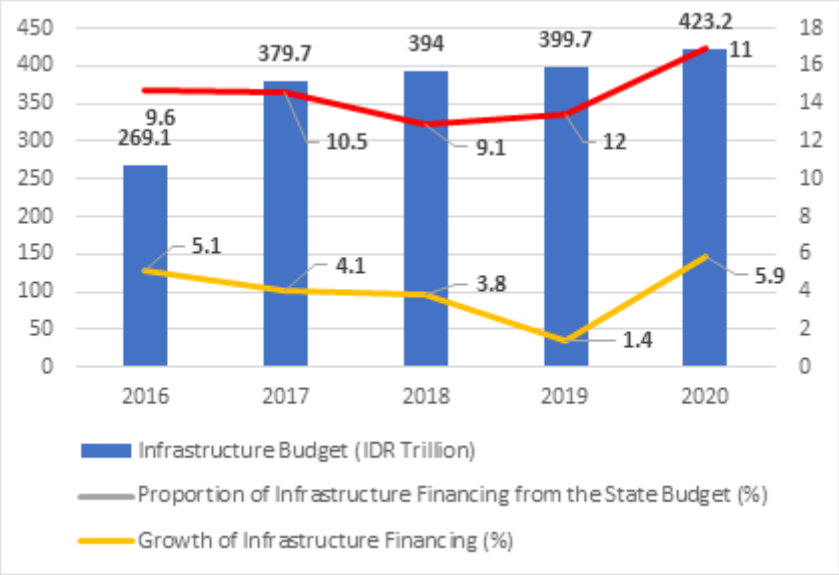
A period of time of 14 years is enough time long to build loyalty from investors to state sukuk. During this time, the government has diversified many state sukuk products to provide alternative investments for state sukuk investors. As a result of the diversification of state sukuk, the government has managed to raise very large funds for the construction of physical infrastructure which is very much needed for economic development in this country. The following is the development of the allocation of state sukuk in infrastructure development in various regions in Indonesia:



	2013	2014	2015	2016	2017	2018	2019	2020	2021
Allocation Ceiling (IDR Trillion)	0.811	1.572	7.14	13.68	16.77	22.53	28.43	27.35	27.57
Number ESI (IDR Trillion)	1	2	5	5	6	10	15	17	23
Number KL (IDR Trillion)	1	2	3	3	3	7	7	8	11

Graph 1. SBSN 2021 Project
Source: DJPR Ministry of Finance

The total financing for SBSN projects in 2013-2021 is IDR 145.84 trillion, with a total of 2,939 projects in 8 K/L and spread across 34 provinces. The main sectors to be developed are the development of the Trans Sulawesi (Parepare – Makassar) railway infrastructure, the South Java double track from Cirebon – Kroya – Solo to Madiun – Jombang – Surabaya, as well as the development of Trans Sumatra railway facilities, construction of roads, bridges, and construction of resource projects. water resources (dams, irrigation, groundwater supply and management) in various provinces, with several strategic projects such as the Holte kamp/Youtefa Bridge in Papua, the Balang Island bridge in East Kalimantan, and the national road network in Sumatra and Kalimantan; construction and development of Lecture Buildings in more than 100 universities, both within PTKIN Kemenag and PTN Kemendikbud. The issuance of state sukuk has helped ease the burden on the government budget in infrastructure financing. This can be seen from the proportion of sukuk financing in the state revenue and expenditure budget each year as shown in the following graph:



Graph 2. Infrastructure Budget Development and Infrastructure Proportion to the Indonesian State Budget

Source: Indonesian State Budget for 2020-2021

With the existence of state sukuk, the government can allocate spending for infrastructure development which continues to increase every year. In 2020, the proportion of government spending on state sukuk grew by 5.9%. From the World Competitiveness Yearbook (WCY) 2021 survey conducted by IMD, Indonesia's competitiveness is ranked 37th out of a total of 64 countries. This achievement is actually better than the previous year where Indonesia's competitiveness was in 40th position. In the Asia Pacific Region, Indonesia's position is in 11th out of 14 countries, above India and the Philippines. When viewed more specifically, Indonesia's infrastructure ranking is at 57th in 2021, lower than the 2020 ranking, which is at 55th position.

The government's good performance in infrastructure development from the issuance of state sukuk will build good public confidence in the state sukuk instrument. Sustainable product diversification accompanied by intensive product communication will build good knowledge and interest for investors and potential investors to use state sukuk products.

There are many empirical studies that have proven the power of product diversification in building product brands and customer loyalty.Yashasvi Kanodia (2020) found a significant impact of brand loyalty on product sales as well as the impact of marketing and brand strategies

on product attractiveness. Furthermore, Shao Chi Chang & Chi Feng Wang (2007) explain that product diversification has a positive effect on the performance of multinational companies and there is a relationship between international diversification variables and marketing performance with unrelated product diversification as a moderating variable. Giovanis, & Athanasopoulou (2018), concluded that the affective aspect of brand relationships has a stronger effect on price tolerance, while trust has no direct effect. Nasiru Adamu, et.al. (2011) explains that companies with high and moderate diversification have a higher Return on Total Assets, Return on Equity, and Profit Margin compared to companies that do not diversify. However, there is no difference in the performance of companies that do not diversify with companies that do diversify based on the size of Return on Total Assets, Return on Equity, Profit Margin. Research in Nigeria shows the impact of product diversification on performance in construction companies (Ramanujan and Varadarajan, 1989). Ramanujan and Varadarajan (1989) explain that the entry of a company into a new line of business activity can be through an expansion or acquisition process. Cannon and Hillebrandt, (1989) concluded that companies that will carry out business activities outside of their core business activities can go through diversification, which includes vertical and horizontal integration. Companies that diversify can also consider diversifying operational processes in several industries (Ibrahim and Kaka, 2007). Diversification increases the investment opportunities of companies which are positively correlated with opportunities to increase profits in the economic sector (Pawaskar, 1999). According to Palepu (1985) strategy diversification is an important component for the strategic management of a company, so the relationship between diversification strategy and economic performance needs to be considered by managers and academics. Market volatility causes strategic decisions regarding diversification to consider the combination of the company's strengths and the business mix, so that the company can survive in the midst of its competitors (Teo, 2002). Management literature studies by Ibrahim and Kaka (2007), Palich et al (2000) show that there is an effect of diversification on firm performance. Giovanis, et al. (2015) states that consumer loyalty is a consumer's commitment to repurchase products and services in the future, thus companies need to create a desire to buy products for repeat purchases made by consumers. Management literature studies by Ibrahim and Kaka (2007), Palich et al (2000) show that there is an effect of diversification on firm performance. Giovanis, et al. (2015) states that consumer loyalty is a consumer's commitment to repurchase products and services in the future, thus companies need to create a desire to buy products for repeat purchases made by consumers. Management literature studies by Ibrahim and Kaka (2007), Palich et al (2000) show that there is an effect of diversification on firm performance. Giovanis, et al. (2015) states that consumer loyalty is a consumer's commitment to repurchase products and services in the future, thus companies need to create a desire to buy products for repeat purchases made by consumers. Joya (2015) explains that diversification can offset the negative impact of resource volatility. If diversification is controlled then the negative impact of volatility caused by resources can be eliminated.

To maintain investor loyalty to Retail CWLS, the government issued the next series, the SWR003 series on April 11 – July 7, 2022 with a total purchase order volume of 38,253,000,000 Rupiah (thirty eight billion two hundred fifty three million rupiah). Retail CWLS series SWR003 has a tenor of 2 years and offers a fixed rate of return/coupon of 5.05% per year, of which the proceeds will be channeled to social programs/activities that have social and economic impacts on the community, such as food security programs, livestock business programs, productive economic waqf programs for MSMEs, scholarship programs, programs for the procurement of medical equipment and revitalization of inpatient rooms and public benefits. The distribution of productive waqf results from Ritail CWLS for the economic empowerment of the people is more varied than the Ritail CWLS in the first series. This development will further foster the interest of the waqif in entrusting their waqf to the nazhir. This is reflected in the emergence of orders for SWR003 from individual waqifs of 27, 38

billion Rupiah and institutional waqif of 10,87 billion Rupiah. The number of waqif SWR003 is 688 waqif, consisting of 687 individual waqif and 1 institutional waqif. The SWR003 series is a Retail CWLS series that can be ordered online (only for individual waqifs). Online orders dominate both in terms of nominal orders, which are 27,17 billion Rupiah (71.04%), and the number of waqif, which is 647 waqif (94.04%). Buyers for the SWR001 and SWR002 series are dominated by private employees with individual waqif orders (13,81 billion Rupiha or 50.44%) as well as the number of waqif (320 people or 46.58%). Meanwhile, orders from waqif who are civil servants or the Indonesian Armed Forces or Police of the Republic of Indonesia amounted to 3,84 billion Rupiah from 103 waqifs. Based on generation, Generation X waqif dominates orders with a total nominal value of 14,49 billion Rupiah came from 256 waqifs, while the largest number of waqif came from Generation Y/Millennials, which was 347 people (50.51%). The participation of Generation Y/Millennials has continued to show an increasing trend since SWR001, both in terms of nominal and number of waqif. Meanwhile, Generation Z's participation in SWR003 is 10 million Rupiah from 6 waqifs. Overall, orders for SWR003 came from 26 provinces throughout Indonesia. DKI Jakarta became the province with the largest nominal order, which was IDR 21.36 billion and the largest number of waqif, namely 183 waqifs. The Midis sector with the largest contribution both in terms of nominal orders and the number of waqifs was PT Bank Syariah Indonesia Tbk, with nominal orders were reaching 23,45 billion Rupiah (61.3%) and a total of 458 waqifs (66.57%). There were 619 new waqifs who bought SWR003, or 89.97% of the total investors. This very high portion of new investors is relatively the same as SWR002 which is 91.03%. Loyal investors of Retail CWLS as many as 12 individual waqifs with a total nominal purchase of 805 million Rupiah. Based on generation, loyal individual waqif is dominated by Generation X (Ministry of Finance, 2022).

CONCLUSIONS AND RECOMMENDATIONS

Indonesia has a loyal Muslim captive market for Sharia instrument products. Continuous education efforts about various Islamic financial instrument products as well as a strong commitment from the government will increase the market share of Islamic finance. In issuing state sukuk, the government has shown its commitment, namely by periodically issuing state sukuk and consistently diversifying state sukuk products to target all existing market segments, both corporate and individual, in domestic and foreign currencies as well as various contracts developed to adopt various interest. Although Retail CWLS products are relatively new developed by the government, they have attracted great attention from the public. This happens because the potential for waqf in the community is very large to optimize its use into various productive waqf products for the economic empowerment of the people. From the issuance of series 001-003, interest in waqif, both individual and corporate, continues to show an increasing trend with the dominance of the profession as private employees and civil servants with a distribution of 26 provinces in Indonesia.

From the existing developments, the loyalty of state sukuk investors, especially for the Retail CWLS, has begun to build and consistent efforts from the government both in upholding consistency with Islamic values, continuous education through various information channels as well as diversification and issuance of state sukuk (especially the Retail CWLS).

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HOW COULD SMALL-MEDIUM ENTERPRISES (SMES) CREATE COMPETITIVE ADVANTAGE THROUGH SOCIAL MOVEMENT AND STRATEGIC OPERATIONS: A CASE STUDY OF FYC FOOTWEAR

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INTRODUCTION

Skateboarding is one of the symbols of resistance in mainstream culture, it is an inseparable element with subculture in society (Dinces, 2011). Skateboarding is embedded in cultures that exist in the youth subculture such as hip-hop, punk, skinhead, techno scenes. More specifically, Bobakova, Geckova, Reijneveld and van Dijk (2012) made sociological research that identified the youth subculture as being tied to the negative side of the youth subculture, namely body tattoos, the use of tobacco, alcohol and cannabis as part of the lifestyle of young people.

Thus it is undeniable that the spread of skateboarding culture to various parts of the world can also bring some negative effects on this lifestyle for young people, including countries with Muslim majority populations such as Indonesia. In Islamic teachings, some lifestyles originating from the youth subculture such as body tattoos and consumption of alcohol and cannabis are prohibited.

The dominance of global skateboard brands with a set of Western values and their freedom that is different from the view of life of the Muslim community, thus giving birth to a form of resistance from local brands that initiate paradigm differences through social movements by creating a 'Clean Lifestyle' campaign which intends to campaign for the community widely, especially among young people, skateboarding can still be done without body tattoos, tobacco, alcohol and cannabis and any negative effects of the youth subculture. One of the local brands that are in this step is FYC FOOTWEAR.

FYC FOOTWEAR is SMEs company from Bandung City, Indonesia. The main product is skateboarding shoes. The market segmentation is the skateboarding fans and the young generation who love fashion with casual style. Sneakers for skateboarding industry are currently dominated by long established international brands. This brings some impact to the young generation in Asia, especially Indonesia. Positive impact is to bring creativity in the middle of the young generation, but there are also negative impacts. International sneakers brands which come from western society also importing negative western culture to young generations in Indonesia, especially Muslim young generation.

The obvious negative impact is from the lifestyle changes of young Muslims who imitate western youth, such as drinking alcohol and making tattoos on the body. This is very destructive of identity as a Muslim, so it is necessary to conduct a flow of opinion in the midst of the younger generation of Muslims to keep playing skateboarding but with a clean and healthy lifestyle. FYC Footwear with their products wants to do a positive campaign against the young generation by challenging the already powerful international brands in the industry. So the need to study to make FYC can compete with international brands, especially in strategic operation decisions that can determine the overall business to be achieved by FYC.

They also campaign well through their social media with product designs and posters containing sentences against the negative subculture culture that is synonymous with skateboarding. They provoke young people who like skateboarding to fight against the negative mainstream culture in the skateboarding world that is already attached. They fight it all with social movements that they campaign through various skateboard championship events in Indonesia, especially now that skateboarding has been recognized as a sport in the Olympics. By having a characteristic

against the mainstream and emanating from their social movement ideas about a positive life campaign for skateboarders, they have a competitive advantage that many other brands rarely have.

COMPETITIVE STRATEGY

The Hijrah Social Movement

If it refers to Competitive Advantage Strategy that developed by Porter (1985), FYC enters the market with a differentiation strategy approach. The authors can see the differentiation strategy shown by FYC in their sneakers products. Their product symbol or logo is very different from many skateboarding brands. Skateboarding is an extreme sport that is synonymous with dangerous things, so the selection of logos or symbols in skateboarding tends to have dangerous interpretations, such as the human skull symbol or fire.

But FYC uses a logo with a yellow banana image firmly. The owners of the FYC say if the banana is a healthy fruit and symbolizes strength. And the most important is the banana is a symbol that tends to be positive when compared with the image skateboarder which is identical with alcoholic beverages. FYC wants to campaign if skateboarding is a positive activity filled by positive young people who are away from alcoholic beverages and drugs. This differentiation campaign is visible from their motto as in Picture 1.

Picture 1: FYC's motto

The motto "Stay Young, Good, Clean & Fun" has a deep content of meaning. Especially in the term "Clean", the term "Clean" is a popular term among drug addicts to show "not a drug addict". This is due to the past by the owners of FYC. The two owners of FYC are former vocalists of two famous punk rock bands in Indonesia. They experienced a phase of "*hijrah*", which is in intensive contact with *ta'lim Islamiya* and decided to leave the band and start new positive activity.

They also want to invite all their friends in 'that world' to '*hijrah*' through *da'wah* slowly and start *hijrah* campaign as a social movement that is increasingly trending among young people in Indonesia (Hamudy & Hamudy, 2020). One of them through '*uslub*' or method to create sneakers with a positive campaign that is expected to slowly awaken their friends and many people involved in 'that world'.

Picture 1: FYC Footwear with Skateboarding Community in Bandung City

The authors see this as a competitive advantage that takes FYC to a different level with global skateboard brands. This competitive advantage also brings an element of Islamic branding that sharpens the social movement in the skateboarding world they create, that 'being clean is because of the foundation of faith'. Alserhan (2010) states Islamic branding aims to not only focus on the material aspect in succeeding a brand. But it is also makes the brand issued has a good deed record that can bring benefit to the Muslim *ummah*. That is the competitive advantage designed by the company in entering youth subculture, skateboarding and sneakers industry.

SWOT Analysis

Viewed from Albert Humphrey's SWOT analysis (1960-1970), here will be analysed on strengths, weaknesses, opportunities, and threats regarding FYC FOOTWEAR company. To analyse more deeply about SWOT, it is necessary to look at external and internal factors as an important part in SWOT analysis, namely internal and external factors (Piercy and Giles, 1989). These internal factors affect the formation of strengths and weaknesses (S and W). Where this factor is related to the conditions that occur within the company, which this also affects the formation of corporate decisions. These internal factors include all sorts of functional management: marketing, finance, operations, human resources, research and development, management information systems, and corporate culture (Rangkuti, 2004).

Internal Analysis: Strengths and Weaknesses

The author will create an internal factors into the matrix called IFAS (Internal Strategic Factor Analysis Summary) in Table 1. And make external factors into the EFAS (External Strategic Factor Analysis Summary) in Table 2.

Table 1: IFAS

No.	Internal Strategic Factor Analysis Summary	
	Strengths	**Weaknesses**
1	Strong personal brand from owners in the middle of skateboarder and young generation	Limitations of R & D division
2	The price of the product set affordably for consumers	Limitations of the number of employees
3	Bandung as a barometer place where creative young people located can help the company image	Limitations of vehicle inventory for mobile selling when events occur
4	Carries a positive campaign that gives added value to the product	Supply of raw materials for sneakers is not easy

External Analysis: Opportunities and Threats

Table 2: EFAS

No.	External Strategic Factor Analysis Summary	
	Opportunities	**Threats**
1	The only one of local sneakers brand in Indonesia	Hegemony of big international brands in sneakers industry
2	Interwoven cooperation with resellers are good and broad	Shoe manufacturer is owned by a separate company that is risky taken by competitors
3	Positive image in consumer view	Fluctuation of wage culture for employees
4	Expensive price for sneakers from big international brands	The location that became the centre of most skateboarding events in Indonesia, Bali Island is difficult to enter by local brands.

Identification of internal and external factors can create four main strategies: SO strategy (strengths and opportunities), WO strategy (weakness and opportunities), ST strategy (strengths and threats), and WT strategy (weaknesses and threats) that can be seen in Table 3.

Table 3: TOWS Strategy

IFAS x EFAS	**STRENGTHS (S)**	**WEAKNESSES (W)**
	Strong personal brand from owners in the middle of skateboarder and young generation	Limitations of R & D division
	The price of the product set affordably for consumers	Limitations of the number of employees
	Bandung as a barometer place where creative young people located can help the company image	Limitations of vehicle inventory for mobile selling when events occur
	Carries a positive campaign that gives added value to the product	Supply of raw materials for sneakers is not easy
OPPORTUNITIES (O)	**(SO) STRATEGY**	**(WO) STRATEGY**
The only one of local sneakers brand in Indonesia	Strengthen the company brand as belonging to sneakers and skateboarding lovers in Indonesia	Maximize R & D that owned by company to further strengthen the brand as the only one of Indonesian brand sneakers
Interwoven cooperation with resellers are good and broad	Strengthen the pricing strategy that aims to bind the loyalty of the resellers	Maximize network resellers as extra employees who are loyal to the company
Positive image in consumer view	To promote Bandung City as a city of creative young generation through positive events	Maximize positive and healthy life campaign for young people with some NGOs who have concern for young people and have great resources

Expensive price for sneakers from big international brands	Strengthen promotions regarding awareness of product quality at an affordable price	Looking for additional sources of raw materials that have the same quality to press the production cost
THREATS (T)	**(ST) STRATEGY**	**(WT) STRATEGY**
Hegemony of big international brands in sneakers industry	Strengthen brand promotion in areas other than big city in Indonesia	The focus of R & D on local uniqueness that is not understood by international brands
Shoe manufacturer is owned by a separate company that is risky taken by competitors	Provide affordable products with high appreciation to partner shoe factories	Establish relationships with shoe factory employees such as company employees themselves
Fluctuation of wage culture for employees	Seeking creative people who share the same vision in building creative and positive young generation through sneakers	Utilize online transportation like Grab or Uber as a partner company
The location that became the centre of most skateboarding events in Indonesia, Bali Island is difficult to enter by local brands.	Entering Bali through campaigns such as anti-drugs campaign for skateboarder and young generation to introduce the brand in Bali	Looking for material access or some raw material parts from Bali and hoping to have a network to enter Bali to promote the brand

3. STRATEGIC OPERATIONS

3.1 Quality Management

Performance, is a quality dimension that associated with the main characteristics of a product. A sneaker (shoes), the main performance that we want is the old usage and comfort when used. Especially shoes which used for skateboarding. To make shoes that are used in extreme conditions such as skateboarding, this required tremendous attention to the sneakers to be produced. This is the core of this business, some mistakes in controlling product quality will make the brand image destroyed. Because consumers will immediately think, "That's why international brand is better!"

Features, is a supporting or complementary characteristics of the main characteristics of a product. FYC has various features. Start from hats, t-shirts, hoodies, socks to shoes box are all designed to positive theme campaigns. There is always a positive message on the front picture of their t-shirt or jacket / hoodie. And their shoes box are also designed to be utilized. They designed their boxes so they could be used as tissue places. A positive campaign with no wasteful waste is delivered through this feature. Through these also positive messages are delivered, for example, positive messages are delivered via t-shirts that can get free that when buying shoes.

Reliability, is the quality dimension that associated with the possibility of a product being able to work satisfactorily at certain times and conditions. FYC products are designed to work very satisfactorily when used in skateboarding. Comfortable and not heavy when used, but difficult to break. That is the goal to be achieved. *Conformance* is the suitability of performance and product quality with the desired standard. Basically, each product has a predetermined standard or specification. FYC certainly hope if the quality of their products in accordance with the expected standards.

Durability, this is related to the resistance of a product to be replaced. This durability is usually measured by the lifespan or duration of a product. The average age of shoes that are regularly used skateboarding is 2-3 years. FYC products must necessarily meet this, and should not be under one year is damaged. FYC opens customer feedback on durability of products. Consumers can directly give testimony after several months or years using FYC sneakers via their social media and mentioning or *tag* FYC's social media account. This is a product evaluation strategy regarding durability of products.

Serviceability, is the ease of service or improvement if needed. For this it seems still difficult to do by FYC. It is still difficult for shoe companies to make repair services as they are in electronic products. But according to the author, FYC can make a breakthrough such as in cooperation with some cleaning, repaint and repair shoes companies in Bandung or several cities in Indonesia by giving free voucher wash or repaint shoes for costumers.

Then *Aesthetics* is a quality dimension related to the look, sound, taste or smell of a product. FYC products are designed with a brightly coloured eye catching and display that can be easily recognized. Especially the bright yellow colour typical of bananas. *Perceived quality* is the impression of the quality of a product perceived by the consumer. This quality dimension is related to the consumer's perception of the quality of a product or brand. Related to this is still not up parallel to the international brands that are so strong rooted in the sneakers consumers' mind. The way is FYC must embed in the minds of consumers about awareness of supporting local products with attractive product and design campaigns.

Regarding staff involvement in quality management, empowering workers means involving workers at every step of the production process. The way is all parties within the FYC must realize that improving quality is the responsibility of everyone in the organization. Awareness of the responsibility of achieving quality will have an impact on togetherness in the organization so that each person will strive to achieve quality based on their jobs and their respective capabilities.

Quality goals involve all levels of both leaders and employees. so that the goals to be achieved by the organization is known by all levels not only at the leadership level. This action will benefit the organization. So FYC must emphasize togetherness among all members.

Then the very important thing is communication. Communication is very important in an organization, especially in quality management. This communication is necessary to establish harmony, increase cooperation in carrying out tasks. If this is well built it will affect the quality product of FYC.

Involving all the elements in the organization in accordance with the competence and their job will make improvements in quality management. As small as the involvement of people, it will be useful for FYC.

3.2 Location

Location greatly affects the risks and benefits of the company as a whole. For example, the cost of transporting incoming raw materials or finished products out of the company can account for a quarter of the product sale price. In addition, the location can also affect the cost of taxes, wages, raw materials costs, and rent.

According to the author's analysis, FYC uses combination of location strategy, such as proximity-based consumers, based on telemarketing industry, and based on easy to access of raw materials for production. According to FYC, their most sales through online selling. Direct purchases at their outlets in Bandung and Jakarta are also quite good, but online selling is their best way. Then this is combined with opening outlets in Bandung City is not only a city of their birth, but Bandung is a symbol of creative industry in Indonesia. This is very beneficial to their

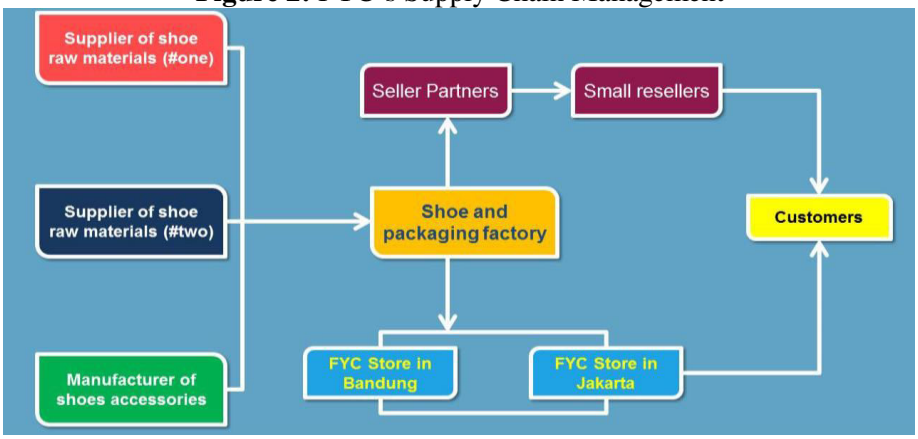
brand image among young people. Jakarta was chosen because of the proximity to raw material access. This is because Jakarta is the first place to be visited by raw materials sent from various regions.

But there is a shortage in this case, FYC has not been able to open outlets in Kuta, Bali Island, Indonesia. Kuta as a city that is very famous for skateboarder, not only in Indonesia but International. Actually in this industry, the location is not too sensitive, because in the era of digital marketing today everyone in various regions in Indonesia can buy sneakers online, without having to come to Bandung and Jakarta. But for the advice of opening outlets in Bali is a branding that can strengthen the brand position of company.

3.3 Supply Chain Management

Supply chain management that adopted by FYC Footwear is illustrated in Figure 2:

Figure 2: FYC's Supply Chain Management



In carrying out the supply chain management strategy, the author sees if FYC has not practise vertical integration, namely by developing the ability to produce goods or services which previously purchased, or by actually purchasing suppliers or distributors. Two suppliers and one manufacturer that used by FYC adopted based on few supplier strategy, namely the company establishes long-term relationships with suppliers who commit. Because in this way, suppliers tend to better understand the broad goals of the company and the end consumer. this strategy allows some suppliers to create value by enabling suppliers to have lower transaction costs and production costs.

But this strategy has a negative side that could endanger FYC, which is the cost of replacing a large partner, so the FYC can face a position as a prisoner of suppliers if suppliers perform poorly. FYC can not immediately replace them. This is disadvantage for the FYC in this phase. The way that FYC can do right now is to keep the suppliers' performance in the right track by getting closer to the communication and making them friends who can understand each other.

But in the business world, sometimes such things are very difficult to happen, so in the long period the FYC must change the strategy at this stage by adopting vertical integration strategy with forward integration approach which is a strategy to gain ownership or increase control over distributors or retailers. So this will be an advantage for FYC. The first important step is that they are trying to develop capital and human resources capable of managing shoe factories. The goal is to improve the excellence in the quality of sneakers made. Because the supply chain is in one vision with the company.

3.4 Inventory Management

If FYC wants to maximize profits, then it should choose an inventory strategy that matches the state of the consumer and the company. Maximum profit can be achieved by minimizing costs

that associated with inventory. However minimizing the cost of preparation of product can be achieved by ordering or producing sneakers in small quantities, whereas to minimize the cost of ordering can be achieved by making large and rare sneakers orders.

Thus minimizing storage costs encourages few inventory or no inventory, FYC can adopt a 'to order' system. While minimizing the cost of ordering must be made by ordering, inventory in relatively large quantities, thus encouraging large inventory quantities, FYC can adopt a 'to stock'.

The Author sees if FYC seeks to adopt a 'to stock' system. The author agrees with this option because first, on the issue of demand uncertainty. If the demand for materials or products is greater than expected, then inventory may serve as a buffer, giving the company the ability to meet the delivery date so that the customer is satisfied. This is very important considering in the stage of growth stage, brand position in the minds of consumers is still not strong. Errors in meeting the date of delivery of goods to consumers can cause disappointment to consumers and think to buy international sneakers brand which ordering and access is very easy to reach.

Second, to avoid problems at manufacturing facilities due to engine failure, component damage, until unavailability of components to make sneakers. Because raw materials are presented from various regions that also invite uncertainty in the delivery schedule. If there is a serious problem, then the FYC will face many problems in the face of consumers who have ordered or have come many times to the FYC store.

Third, to face increasing price in the future. Raw materials for making sneakers are the types of raw materials that are volatile in price. If relying to order, while FYC has set the exact price before, then the next order awaits but raw materials prices have gone up, then FYC will face the problem of production costs. Raising prices, consumers will be disappointed, making a fixed price will burden the company.

4. DISCUSSION

Quality Management

Weckenmann, et al. (2015) state if creating a continuous quality product is highly dependent on employee readiness. And required the involvement of employees in maintaining quality management applied by the company. So FYC must be able to involve their employees in running quality management that try applied by the company.

But Srinidhi (1998) states that to keep strategic quality management in the right way does not involve all employees, it is important for them to be aware of the importance of strategic quality management that companies are trying to run. In this strategy FYC can only involve employees who are considered as the core team to fully engage in maintaining the quality of management built, but also to understand all elements of employees within the company to support this strategy.

FYC must also create an atmosphere within a company that is full of morale as their goal of starting a business that wants to deliver moral values to subcultures and skateboarding societies. Fisscher and Nijhof (2005) stated if quality can not be managed without moral and ethical behaviour.

In improving quality, after forming moral and ethical behaviour, the author sees if FYC wants to improve quality, they have to improve human knowledge to employees. Aravindan et al. (1996) explains in their study, if continuous of human knowledge is one of the important factors that improve quality enhancement in company. The author sees it is still relevant in the digital age that makes changes faster and can only be faced with a qualified human knowledge.

Location

For location strategies that analysed by the author, Freeman et al. (2012) argued that disadvantage of SMEs in making overseas sales (exports) is a lack of network, and suggests that

SMEs who want to enlarge their business are choosing a location that can open this lack of network. In this case FYC that can not penetrate skateboarding market in Kuta, Bali make them can not move much in international skateboard festival. Their brand is not yet known by the international skateboarder, thus making their brand is still considered just one eye by many skateboard lovers. So the strategy to install a location in Kuta Bali that can open the lack of network will be a good location strategy for FYC.

However, when deciding to choose Kuta as a place to open the outlet, FYC should carefully prepare the cost of transportation of goods which produced far from Kuta, Bali. Handoko (2011) stated that the business which located far from its suppliers will be get higher cost of transportation and distribution of product. The selling price of the product will be greatly influenced by the high level of basic materials and other materials required in the production process. The price of basic materials and auxiliary materials is also influenced by the cost to the supplier to distribute the product.

If reception sneakers lovers and skateboarding fans in Kuta Bali good then FYC's brand image will improve. Janiszewska and Insch (2012) stated if a company that has a good image, will benefit from medium- and long-term competitiveness in the market. The company will get a shield if a time of bad things happen to the company, this good image that will make customers want to understand or forgive the mistakes made by the company.

And according to Herstein et al. (2013), location is one sub part of marketing mix variable, that is place. Location is also one of ten strategic decisions in operations management. In their study that took the research in fashion company, they stated for a company location strategy can be a determinant of brand image of fashion company. So by utilizing the location strategy to achieve the improvement of brand image, FYC will get the advantage to compete with big international brand.

Supply Chain Management

Associated with the supply chain management (SCM) strategy that has been implemented by FYC, the author sees if there are some shortcomings, including a shoe factory that is not owned by FYC. So in the short-term strategy is to maintain a relationship with suppliers that must be more than just business relationships, but such as friendship and kinship. Jabbour et al. (2011), identifies if supplier relationship is one factor that can improve supply chain management (SCM) practice.

According to Guan and Rehme (2012), the most important factor that makes the company should move toward vertical integration in supply chain management (SCM) is the development of the company's positioning strategy in supply chain management. So in this case FYC who want to develop their supply chain management should think towards vertical integration strategy to achieve excellence in sneakers business competition. And this will be in line with the goals that FYC wants to achieve in their SCM strategy.

The goal of supply chain management is to coordinate activities within the supply chain to maximize the competitive advantage and benefits of the supply chain for end consumers. Like the championship team, the key features of a successful supply chain are the members who play a role in the concerns of their team (Rangkuti, 2004). With this FYC to make supplier companies join into teams that have the same vision, it can produce the maximum quality sneakers that can compete with international brands.

Inventory Management

For inventory management, Wilson et al. (1983) provides a fundamental view of the importance of managing stock for a shoe company in inventory management. In their book, they give examples of shoe-making companies from Germany who successfully manage the 'to stock' strategy with flexibility stock. This strategy is measured by calculating forecasting of near-accurate requests, creating an excellent inventory management strategy. FYC must adopt a 'to

stock' strategy with the ability to predict demand by a number close to the number of real demand from consumers. So that can make the company does not waste a lot of money to manage the stock of goods, and not harm consumers with the delay of delivery schedule.

The 'to stock' approach that can be used by FYC is safety stock. According to Talluri et al. (2004), safety stock is a term used by inventory specialists to describe additional stock levels that maintained under the stock cycle to buffer against stock outs. Safety stock exists to deal with uncertainty in supply and demand. Safety stock is defined as an additional unit of inventory brought in as protection against the possibility of stock outs. By having an adequate amount of safety stock in hand, the FYC can meet sales demands that exceed their estimated demand without changing their production plans. This is done if the FYC has not been able to accurately predict the demand or grace period for delivery of the product to the consumer.

The amount of safety stock an organization chooses to keep at hand can dramatically affect their business (Talluri et al., 2004). Too much safety stock that taken by FYC can lead to high costs in holding inventory. In addition, sneakers that are stored for too long can damage the shoe canvas structure that changes shape during the warehousing process. Too little safety stock can result in loss of sales and, thus, a higher customer turnover rate. Therefore, finding the right balance between too much and too little safety stock is very important for FYC if they want to gain excellence in inventory strategy.

5. CONCLUSION

FYC FOOTWEAR is a sneakers company from Bandung City, Indonesia that makes skateboarding fans and sneakers users as their market segment. When viewed from the product lifecycle, FYC is at the stage of growth which means it is designing business expansion. FYC uses differentiation strategy as their competitive advantage strategy to face their competitors, international brand sneakers who have dominated sneakers market with a solid. FYC brings the distinction by highlighting positive campaigns and healthy lifestyles for young people with local community understanding that may not be well understood by international brand competitors.

The author analyses the SWOT Analysis: SO Strategy, WO Strategy, ST Strategy, and WT Strategy that can be considered early to design a strategic operation. After detailing the SWOT, FYC designed a quality management strategy that involves performance, features, reliability, conformance, durability, serviceability, aesthetics and perceived quality. FYC should be very focused on the performance of their products. Since the first thing that is taken into consideration for skateboard enthusiasts in buying shoes is a performance of product that is worthy of skateboarding in the long term.

In this case, the FYC needs to engage their core employees very well to ensure the quality management strategy that the company is trying to build well. And understand all employees to support this. In the location strategy, FYC needs to consider opening an outlet in Kuta, Bali as an international skateboarding event destination to raise their brand image and be better prepared to fight big international brands.

In supply chain management, FYC in short term should be able to make the relationship with suppliers to be very good, not only as a business partner but as a friend. This is because the potential of big companies can seize suppliers from FYC with not too difficult. This strategy is accompanied by long term strategy preparation that is preparing vertical integration system with forward integration approach to protect product quality and increase it so that can compete with international sneakers brand.

In Inventory management, FYC must endeavor to apply 'to stock' strategy to anticipate various factors that may disrupt the business. Such as rising prices of raw materials to produce sneakers, and also anticipate delays in delivery schedules to consumers that could potentially lead to a loss of consumer confidence to FYC.

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FOOT NOTES

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APPENDIX

Picture A: Young Generation with Casual Fashion Style

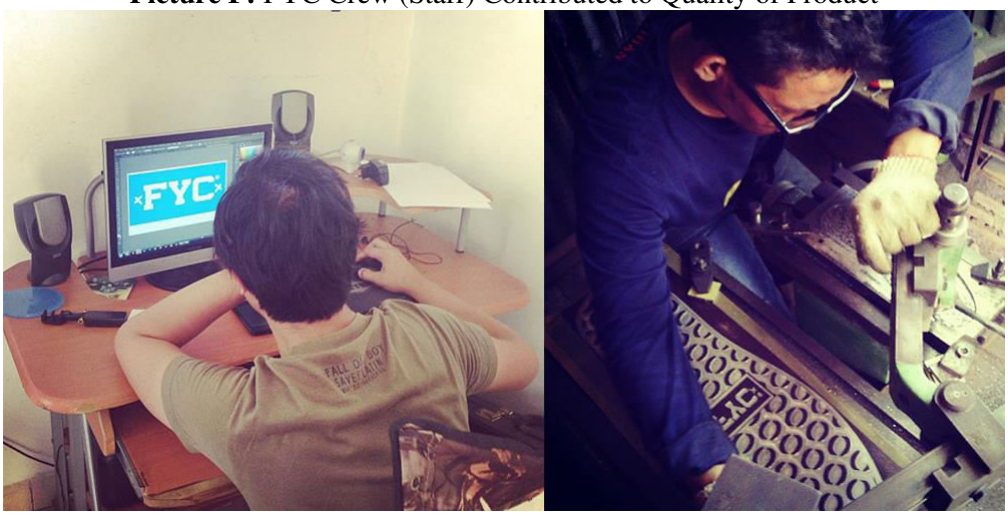
Picture B: Maintain product performance

Picture C: Quality of Product Features

Picture D: Durability of The Product

Picture E: Aesthetics of Local Product

Picture F: FYC Crew (Staff) Contributed to Quality of Product



Picture G: FYC Crew (Staff) Together During Skateboard Festival

Picture H: Routine Dinner Time Among FYC crew

Picture I: FYC Store in Bandung

Picture J: FYC Store in Jakarta

Picture K: FYC's Storehouse

TRIANGULAR GEOMETRY & SYSTEMIC THINKING SYSTEMS, CIRCULAR ECONOMY & ENTREPRENEURSHIP

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ABSTRACT

The established system of the economic world order has reached a turning point. Natural disasters, increasing in quantitative and qualitative terms, pose a threat to it. Causally and consequentially they also develop impacts on societies. In addition, confronting natural effects are accelerated by interconnected complexities having their roots in multiple dimensions of the actual system's human routines. Incumbent organisations and politics are struggling to find consent on possible, but especially unavoidable solutions. In this given context, the chapter argues that too simplistic thinking, which opposes complex realities is not sufficiently system oriented.

In explanatory form, the concept of the circular economy, which, e.g., the Ellen MacArthur Foundation promotes, has been adopted as a central factor for the discourse. On the one hand, the circular economy offers interfaces for systemic change by entrepreneurial actions but also causes significant disaggregating effects for incumbents' activities affecting their established resources, processes, and values. To bridge between the old and a new order, innovation and system-oriented entre/intrapreneur-based reorganisation may be understood as an influential third and critical variable (re)connecting the circular economy and incumbent organisations.

The argument is that necessary three-dimensional thinking, which is based on nature's likely most stable form, triangles, can support the design and development of an architecture which delivers a system-oriented roadmap to more robust, but especially sustainable solutions. The chapter's contrasting emphasis is on the demonstration of how complexities oppose simplistic approaches to change.

Keywords: Triangular geometry, systems, innovation, complexity, circular economy, entrepreneurship

INTRODUCING DEFINING PARAMETERS

The system of planet earth imposes natural laws on the supra-level. The human being can overrule the general validity of these laws and their power for a short period of time only. A permanent overload of the given system must lead to either explosion or implosion. Global efforts on sustainability and socio-economic activities leading to an equilibrium of better balance, e.g., fighting climate change or pollution, are slow to advance and controversially discussed on all relevant levels. To this adds that the global economy uses more resources annually than the planet is able to reproduce. The end of this system-relevant loop of organisation, which depends on the ill belief of unlimited growth, is rapidly approaching. Indications for a systemic overload became multiple and stress factors are growing for which discontinuation of the existing economic and, causal-consequentially, the social systemic order must be expected. What is suggested is that incumbent organisations are unable and/or unwilling to make necessary changes to their activities for a variety of reasons. Alternative thinking offers entrepreneurs a central meaning. They are less bound to given industrial structures and expectations. Furthermore, thinking in systems becomes essential, but, as Pirsig (cited in Meadows, 2008) confirms, much talk about systems is opposed by very little knowledge on these. A next key argument is that a two-level game between what can be economically afforded and what will be nationally accepted is running. This game is subject to different rules of various national systems. Yet, the supra-system earth demands fast and rather

radical change. Systems innovation has become less a variable than a must. Again, this problematic makes an advantageous constellation for entrepreneurs per se. Responsible entrepreneurship can gain an important role in the necessary restructuration of the global economic system. As Christensen, Anthony & Roth's (2004) RPV-Theory explains, entrepreneurial structures are typically less restricted by existing processes and values. They can think, act, and organise without those limitations of an incumbent organisation.

The starting point and challenge are for all the same, the rapidly increasing natural extremes of all kinds are threatening the ways of the established economic macrosystem with expected serious impacts on the superior systemic social level. This means that the social cost of economic activities becomes more and more a negatively loaden burden in the fundamental equation of affordability. It cannot be said yet that there is a general level of awareness and preparedness to follow new discoveries, and, often enough, to simply do what might be the right pathway of action regarding the established order of the triple line of people – planet – profits. The number of variables and especially controversial beliefs is still too widespread. (For essential reasons, attention is drawn to those p-dimensions of the construct, because the factor three in it builds the defining red file of the entire discourse.) However, there is much evidence that the human-organised system continues to overload the supra-system's natural order further. To find sustainable ways and answers, a new concept has emerged which is called circular economy. 'In our current economy, we take materials from the Earth, make products from them, and eventually throw them away as waste – the process is linear. In a circular economy, by contrast, we stop waste being produced in the first place' (Ellen MacArthur Foundation, n.y., n.p.). The Foundation continues to explain that there are three dimensions consisting of biological loops, technical[/technological] loops, and information loops. The explanatory introduction concludes that '[i]t is underpinned by a transition to renewable energy and materials. A circular economy decouples economic activity from the consumption of finite resources. It is a resilient system that is good for business, people and the environment' (Ellen MacArthur Foundation, n.y., n.p.). Once more, attention is drawn to the emphasised three-dimensional aspects embracing those defining elements. They are becoming building blocks for an explanatorily clarifying but complex artefact. It is multi-dimensional and multi-layered. They are also forming a synthesis, yet effective lens on a differently organising economic system.

System. It is suggested to be understood as the explaining umbrella of the 'everything' due to the iron, but by agents frequently neglected principle: in a system everything is connected with everything. Several justifications for this can be already found in the paragraph above. However, for better understanding of the entire argumentation, some more light needs to be shed on the central figure three. It starts with the suggestion that a complex world which owns fast-paced change rarely offers stability, cf. the concept of permanent crisis (Heifetz, Grashow & Linsky, 2009, Westerman & Jowitt, 2009/10). 'Economies cannot erect a firewall against intensifying global competition, energy constraints, climate change, and political instability. The immediate crisis—which we will get through, with the help of policy makers' expert technical adjustments—merely sets the stage for a sustained or even permanent crisis of serious and unfamiliar challenges' (Heifetz et al., 2009, p. 2). At this point, an additional layer connects with Fuller. His research on vectors concludes that nature itself must be based on triangles as the most stable geometric structure. The triangle builds a set of three energy giving events owning critical proximity and have mutually stabilising effects (cited in Keidel, 2010). Fuller's explanation, adopted by Keidel, can be complemented with additional evidence. By a cross-disciplinary approach Oestreicher (2012) has explored the stability-giving resilience of triangular constructs and their importance in managerial decision-making in contrast to other physical and geometrical forms. As well, Wittmann & Reuter (2011) equally support triangular thinking. Triangles allow to fully respect the often missing, but critical Variable C (cf. Keidel, 2010), which, e.g., both limited and physically vulnerable two-dimensional matrices cannot

host. No matrix or other flat construct own the same resilience against physical impacts, and a seamless flow of energy is much more complicated or impossible. This very brief development of triangular thinking should help to understand and follow up, why the framework of geometric triangles makes a robust tool, which can assist to explain multiple complexities at the same time. Methodologically, the process of artefact development finds its roots in those parameters which the Design Science Research Approach (Hevner, March, Park & Ram, 2004) delivers. More generally, studying new and different phenomena should not remain restricted to enshrined methodological expectations. The belief is that the more radical the progress or demand on explanations becomes, the more innovative it should be investigated to overcome potentially existing limitations. Miles & Hubermann (1994, p. 5) state that 'research is actually more a craft than a slavish adherence to methodological rules'.

Three Dimensions – Three Layers

Three-dimensional thinking, especially its wider systemic form, as, e.g., Meadows (2008) holds, firstly requires the identification of relevant dimensions and secondly their meaningful connection. Both steps can then be systematically translated into nature's most stable structure of the triangle (Fuller cited in Keidel, 2010). Keidel (2010) holds that this makes a most flexible and adaptive form, yet of extraordinary solidity and self-stabilisation. Eventually, the critical Variable C now finds its influencing own place as equal and, at the same time, interdependent constituent. All three dimensions are interconnected, a systems-defining parameter, and also an interactive part within the seamless energising flow (cf. the following dimensions of loops). In terms of methodology, one particular virtue of this method is that it owns both logic and systematic. This can be understood as adding discipline to the process at the same time. In terms of methodology, the triangular artefact's dimensions are building interfaces which allow to use and switch between quantitative, qualitative, and mixed method data. In theory and in practice this allows deep insights supporting validity and reliability, but also solid planning, monitoring, and evaluation of systems' processes. This is a significant outcome, which underlines the artefact's versatility and energetic power further. It also explains the specific intention of using geometry, which is stemming from natural laws, and the attribution of a method suggesting an at least not directly linear (system's frequent non-linearity) way of connecting entrepreneurial actions with the new circular economy.

Keidel (2010) attributes to his basic triangle three dimensions. They are versatile, but precise, and, with reference to key characteristics defining a system, support one further factor. Three-dimensional thinking should not only be transforming flat to spatial, but it should also use spatiality for providing multi-layered explanations. The total perspective leads to a deep construct which explains and displays key constituents of a system: being organised and that processes can start. This makes and links two layers. The third one is the umbrella of everything is connected with everything. To be precise, not just connected, but connected by links of effectiveness. The bridge to those macro dimensions, which Keidel suggests, can be built: collaboration = everything is connected with everything, autonomy = organisation, and control = the system's own processes which are keeping it alive. The importance of the involved systematic design with effects on the system's effectiveness cannot be overrated. In direct application, the Ellen MacArthur Foundation suggests two three-dimensional lenses. They help to define the circular economy. I.e., there are three dimensions of three constituting dimensions which are part of the respective triangle (see Graphic 1).

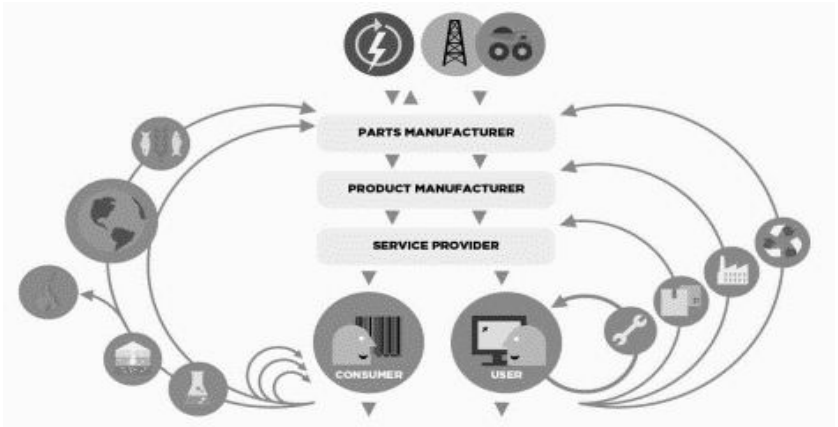
The third dimension of importance for this discussion addresses the part of entrepreneurship. Entrepreneurs are often following different ways than their incumbent counterparts (Christensen et al., 2004). They can innovate more radically which consequently means, too, that they disaggregate a system's organised forms and processes to reaggregate them anew for a better or more future-oriented different system. This closes the circle. The old economic system tends to

lock in incumbents. They fight for their established ways of doing things and cannot easily adopt new ways, even if they become an ever-increasing urgency, without sacrificing valuable possessions. Causally logic instead would be finding answers which may be found in radically innovative approaches; history is full of these (cf. Utterback, 1996). Having arrived at three key dimensions with three dimensions each, the next step towards a systemic order is to connect them:

	Circular Economy	**Key Loops**	**Entrepreneurship**
Dimension 1	Eliminate	Biological	Innovation
Dimension 2	Circulate	Technical/Technological	Disaggregation
Dimension 3	Regenerate	Information	Reaggregation

Transforming a Butterfly into a Triangle

In the discussion on a sustainable economic future, the Ellen MacArthur Foundation's Butterfly Diagram (n.y.) has gained attention. It is a reflected approach to shape new ways of restructuring the existing systemic economic order. Hence, the concept has also potential for stabilising effects of the social system on global level. The reduction of waste and fighting climate change remains a global urgency. It is not a matter of the global warming's origin or of people's beliefs any longer. Even if the present economic order may not be the only origin of the increasingly imbalanced natural system, it decisively adds to it. To state this has the reason to argue that a system must be in balance. Short-term stress can be absorbed, but long-term overload leads to collapse. All systems have a lifecycle and if a system is intoxicated, it must die (Iansiti & Levien, 2004). Essential for the three-dimensional discussion is that the Butterfly Diagram economically hosts three recognisable layers. This emphasizes and condenses the importance of the now nearly omni-present triangular construct of systemic importance here. All three layers of the Butterfly Diagram are potential interfaces, which, e.g., entrepreneurial thinking can use as points of connection. Each layer makes a systemic interface.

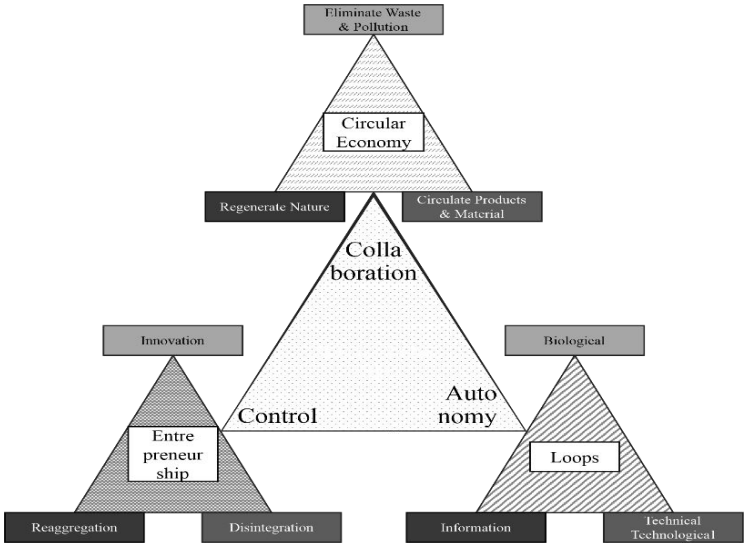


Graphic 1: The Butterfly Diagram (Ellen MacArthur Foundation, n.y., n.p.)

Critically seen, the Ellen MacArthur principle demonstrates a promising but in terms of innovation only marginal systemic change. Many established key factors remain intact and are redirected, or after disconnection reconnected in ways of a recognisable linearity. I.e., key factors of the prior system remain intact. The butterfly's advantage is that changing marginally avoids radical change, which may overstress people and/or established systems. The disadvantage is that remaining on the level of the marginal, the now unavoidable new orientation, which is far from being done or just generally accepted, could prove being insufficient, too late, or both. What can be further seen, is that there is the usual top-down, the industrial dimension, with users and consumers at the end. The Butterfly Diagram shows, too, that between users and consumers no systemic connection is considered. In contrast, users and

consumers own a very close proximity, however, a really critical third variable is missing: e.g., will they participate in the concept's decisive waste avoidance? To conclude, the Butterfly Diagram has only two dimensions in the end: the industrial side and the consumer/ user one. That is exactly what Cassia, Fattore & Paleari (2006) used as offer and demand. The Butterfly Diagram is no three-dimensional thinking. In contrast, innovative non-linear approaches tend to create deeper innovative thinking than gradual processes of path-dependency. Again, the matter of balance gains importance: to be radical enough to achieve urgently necessary change or, to reaggregate the system only marginally, as the widely linear Butterfly Diagram, for that uncertainties caused by fears and risk-avoidance of non-linear change can be mitigated? It is a complex question holding many variables and uncertainties.

Precisely here step physics and geometry as representatives of natural laws in, despite, as von Bertalanffy (1969) holds, that not everything can be fully explained this way alone. The Butterfly Diagram is two-dimensional. It sees the economic world and its order as flat – offer and demand. One may argue, too, that the Graphic 1 displays a closed system. One disadvantage of closed systems is that path-dependency can cause one or more lock-ins, e.g., in managerial thinking and formation, technology, values, etc. (cf. Oestreicher, 2012). On the other hand, transforming the circular economy with its critical three dimensions of {eliminate waste and pollution + circulate products and materials + regenerate nature} constitutes a formula, which forms an energy-giving flow and has many interfaces for both linear and non-linear change. Therefore, the argument is that transforming the concept and ideas into, just to repeat it, nature's most stable form and, at the same time, to expose it to the free flow of powerful energy of creation opens ways for dynamical change. In terms of the arguments, i.e., those dimensions the Ellen MacArthur foundation holds, the Butterfly Diagram is now transformed and equally extended to:



Graphic 2: Triangular Transformation

The explanatory graphic shows a system-oriented organisation. It supports three-dimensional thinking and systemic organisation for interconnected processes. Comprehensiveness for times of turbulence and disorder finds the facilitation of an overview. It becomes easier to effectively manage complexities and to analyse their impact. For entrepreneurial approaches such drawing plan can identify key interfaces for prioritization and effective leverage of action. All starts with the triangle in the centre. The connected triangles are building the second layer. This can be continued and extended to a third layer, and so on. In the end, it becomes a process and a construction plan in which the essential flows of energies are no longer some types of remote

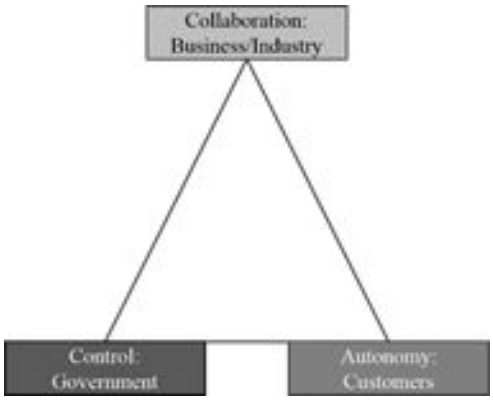
side-effects but become precisely directed power centres. This should be seen together with what Morin explains: 'By organising the production of objects and services, [the organisation] self-organises, self-maintains, if necessary self-repairs, and if things go well, self-develops by developing its [processes]' (2005:114). Here it is about more, organising an entire system. Effectiveness-oriented explanations emerge and blank spots can be discovered. There is always space for a third critical variable which guides to deeper understanding and can deliver action points. What agents must learn and do is to be open to discoveries, fill data in instead of biased beliefs, and evaluate each layer and dimension critically. Organisation can then be understood as forming a multi-layered structure of three-dimensional, i.e., spatial orientation which develops long-term effects and gives structure to these, because it is solid and robust. Solid and robust, this demand closes the circle by returning to what Fuller holds. In addition, the three important factors of systems are included: organisation, processes, and, especially important, everything is connected with everything.

The Geometry in Systems, Entrepreneurs, and the Circular Economy

With its roots in system-orientation, the design of the Ellen MacArthur Foundation makes a promising starting point. The three loops of the circular economy, which the table below summarises in shortened form, invite to dig deeper.

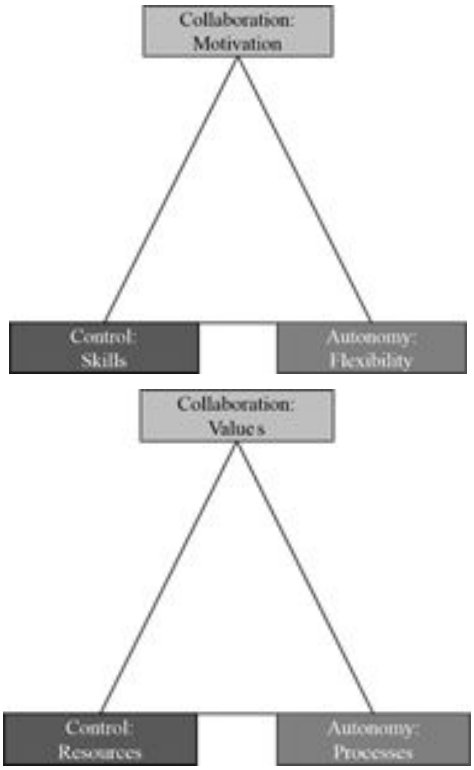
Biological loops	Technical loops	Information loops
… contain materials such as food and wood … are managed to leverage the sophisticated circularity inherent in natural systems. … maximisation of renewable resources … drives regeneration … increase resilience of environmental systems. …	… represent non-organic materials. … this circle is concerned with design of the materials, components, products, and services … to keep them in the loop in as high-quality form for as long as possible.	Data and the ability to interoperate … opportunities for businesses and governments - increase reduce waste - increase effectiveness within existing business and industries - Identify new solutions to existing problems/ opportunities - Identify future trends and business opportunities

One result of interest of this process is the identification of a meaningfully refining layer within the system, the ecosystem. The ecosystem has its roots in biology. Clapham (cited in Campbell, Reece, Taylor, Simon, & Dickey, 2008) and Odum (1971) hold that an ecosystem is formed by all interacting organisms living in a particular area to which add all non-living physical components of the environment with which these organisms interact for that a flow of energy leads to clearly defined trophic structure and biodiversity and material cycles. For those more economic purposes, which the circular economy owns, Moore (1993) suggests that an economic community is supported by a foundation of interacting organisations and individuals producing goods and services of value to customers, who are themselves members of the ecosystem. Iansiti et al. (2004) complement this web by the complexity of interactions among an ecosystem's species and that interactions on one level (or layer) of the ecosystem can have serious effects on another one. I.e., there are interdependencies and further interactions, which might not be directly or immediately discoverable.



'These three cycles are not separate but interconnected. Success in the new circular economy is about building connections and collaboration between business, customers, communities, and government' (Ellen MacArthur Foundation, n.y., n.p.). Essential is that three cycles are connecting the living and the non-living species on multiple layers and across systemic dimensions. A crack in the system-relevant thinking is that communities are listed as if they are a separate form of species. Business, customers, and governments are building a community. Cross-orientation or cross-activities do not constitute something outside. All are directly or indirectly interacting species of the system; thus, they are part of the community whether in positive collaboration, neutrality, or rivalry. Of relevance for innovators, the provided approach of the circular economy follows widely what they define as marginal innovation, i.e., gradual improvement of the existing. It is logic and plausible that the mere impact on the global systemic order makes a revolutionary or radical change presently impossible. On the other hand, at this moment of time, marginal improvements alone may not be sufficient any longer. This would then result in a fundamental dilemma, which affects the processes of governments, and businesses and industries alike because, in Iansiti et al.'s (2004) understanding, the entire system's supra-layer is intoxicated. The essential systemic equilibrium is disturbed, with consequences for all species on all layers.

One other specific point needs to be added to the argumentation: an ecosystem consists of the living and the non-living species. I.e., they are all interacting, and they are all interconnected. In reverse logic, that means the impossibility to exclude the non-living. As one example, applied to the circular economy, this is waste in its different forms. For a very long time, this non-living species of the system may have been a part of "that is waste, throw it away, and forget about possible consequences". As waste belongs to the everything, it is connected with everything; waste has never disappeared. It has always circled in the entire system, in all its dimensions and layers. It has been sold or burnt, it may have dissolved into something else, differently looking or interacting then, but it still exists, somehow and somewhere. Now, the argument of this perspective makes waste to what was introduced as critical Variable C. A matrix consists of two axes, x and y: two axes = two variables. There is no third axis for dimension 3 (waste here). It remains aside, often forgotten and excluded in such thinking; especially for systemic thinking – no self-stabilisation, no seamless, but a more and more disrupted flow of energy. For far too long, waste was set aside, yet, its effects have never disappeared, they are returning now. Had there been systemic thinking and were instead of matrices three-dimensional options, then a chance existed that an earlier inclusive assessment had been possible. Most importantly, it may be argued that the addition of the Variable C of the name waste had allowed to discover those new opportunities and trends which the Ellen MacArthur Foundation allocates as chance, and probably also much more profound and decisively earlier. These chances are of significant entrepreneurial and, in incumbent structures, intrapreneurial characteristic.



'We have seen that the function of entrepreneurs is to reform or revolutionize the pattern of production by exploiting an invention or, more generally, an untried technological possibility for producing a new commodity or producing an old one in a new way, by opening up a new source of supply of materials or a new outlet for products, by reorganizing an industry and so on' (Schumpeter, 1950, p. 132). It could be said that this is what the circular economy intends to do and what is found in the Butterfly Diagram. However, what deserves attention, is the use of words like revolution or untried. What makes even more curious in the quote is reorganising an industry and opening up new sources of supply. That is neither new, nor was it not done often before. The difference this time is the enormous global size and the urgency in face of an annually increasing number of natural disasters. This suggests that radical new thinking may be the only solution for rebalancing a dissolving natural system. For this, entre-preneurial capabilities can be part of communities of practice (COP), business incubators, and project teams for the development of opportunities in business ecosystems. Here, Davenport, Leibold & Voelpel (2006) are meeting the Ellen MacArthur Foundation. More generally, it could already be a race between Schumpeter's Wind of Creative Destruction and what Christensen et al. (2004) hold in their Radical Innovation Theory, that incumbents wait until it is too late, for which Utterback (1996) delivers an abundance of further evidence as well.

The view that incumbent businesses and industries must be involved is correct, but their conflicting interests make unavoidable change very complex. It may be the point where Christensen et al.'s (2004) RPV Theory clashes with the quoted statement of the Ellen MacArthur Foundation. Resources, processes, and values own defining character for incumbent organisations, and they represent their soul. Turning these into a new direction, or even worse, forcing them to abandon these, is no easy task, as the slow progress of and resistance in so many high-level rounds of global negotiations make evident. Morin's earlier view on the self may find here an extension in incumbents' self-blockade, exactly when things are not running smoothly as the long resistance of incumbents shows on political, economic, and social levels. In this dilemma, the entrepreneur could find the important keystone role. His now skills, flexible

thinking, and motivation can provide connecting points for inroads breaking up – disaggregation – the existing system and organise Schumpeter's new ways – reaggregation through innovation. That this must respect deep and wide social aspects and needs serious considerations for many dimensions and various layers is where the systemic orientation returns unavoidably. – A further layer of triangular nature develops which directly connects with the entrepreneur's triangle of Graphic 2: skills, flexibility, and motivation.

To this adds that for actions which are driven by entrepreneurial approaches, the dimensions of collaboration, autonomy, and control continue their central role, in addition, sometimes even in contrasting form, to those attributed in Graphic 2. Systems need an equilibrium. For their long-lasting performance and especially viability, balance is a matter of vital interest. Uncontrolled disaggregation of an existing order bears high risks to end in chaos. In some cases that might be the right way to do it. For the case of the circular economy such risk is far too high. The established economic system cannot be subjected to uncontrollable actions of disaggregate (the) everything → see what happens → find new ways of reaggregation. As well, it is no option to rely on the power of creativity alone, which can push the economic order in a sustainable direction. It must be a carefully planned process, carried out in controlled channels to identify, mitigate, and reduce risks. It must also find a predetermined balancing point preparing acceptance for the new and then serve for monitoring and evaluation. Acceptance means to embed and respect national, collective, and, from time to time, individual interests as well. That makes many interfaces for the dimension of collaboration, which are also simultaneously placed on various levels. On the other hand, entrepreneurial thinking cannot exist without a good portion of autonomy. Not only to plan and test with entrepreneurial curiosity, but also to rethink what is really needed if a concept, such as the circular economy, wants to be globally accepted and successful. The concept to rebalance by integration of waste into a much longer life cycle can only be successful if wide global awareness and consent can be achieved. All of this makes autonomy a balanced process itself, in which entrepreneurs can freely think but must carefully plan by having the wider system in mind, and the holistic effects which the implementation of their plans can have. Concluding with Meadows' (2008) arguments, thinking in systems is paramount.

Another centre of critical reflection is whether entrepreneurs can have or find the power and leverage to become a systemic hub for turning the existing global economy into a sustainable successor. Malerba & Brusoni argued in 2007 that entrepreneurs are confronted with many obstacles and physical difficulties. There are many further constraints, too, such as inflexible political regulations, and organisational, one may even claim, institutionalised economic rigidity. E.g., there are strict regulations of dealing with and handling waste which can become a process-barrier for a circular economy. A defining factor for entrepreneurs must be the holistic resource-based view. Not too long ago, they often had decent beginnings. However, against this now older argument stands that meanwhile 21st-century entrepreneurs have seriously developed their access to significant resources. Latest since the 1990s, entrepreneurs designed and erected multinational corporations of value and global impact in shortest periods of time. As well, there are national entrepreneurial efforts to note, e.g., Rwanda. Only 20 years after the genocide, investments in the country's new hi-tech sector reached US$1.2 billion in 2018 (Morgan, 2019). History has also shown that industrial revolutions started with one central, often entrepreneurial trigger, and that specific key innovations sparked a non-linear future by disaggregation of the established system (cf. Utterback, 1996). This does not automatically suggest success and/or that all steps will lead to a new and more sustainable economic system with responsible processes. What it shows is that the system, even on much bigger scale than a small environment, can be turned into a new direction and that powerful entrepreneurial thinking can find the necessary resources to change established beliefs and processes. While in terms of the three loops of biology/ technical/information, change can be achieved, probably relatively

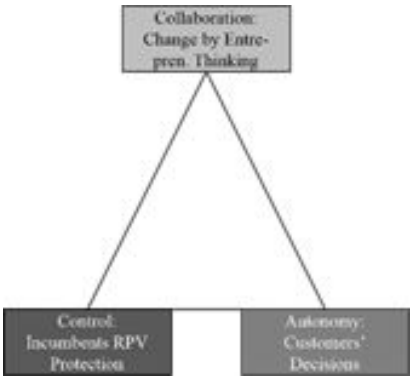
quickly, the biggest issue may be again changing perceptions and layers of incumbents' values. That, this must be assumed, can be the one dimension, which takes the longest time. It forms the system's psychological component on the side of its living species. However, the psychological connection can also develop an entrepreneurial meaning by activities which increase the market acceptance of products manufactured and serviced under circular economy conditions, while they reduce the market acceptance of those not following the new paradigm. This argumentation demonstrates the multiple perspectives and the various layers a system involves. It explains as well that actions and interactions on one level have consequences on one or more other layers (cf. Iansiti et al., 2004).

Complexity is the Opposite of Simplicity

Morin's (2005) argument has returned. As simple as his thesis of the headline reads, as complex its understanding. One key argument of the entire chapter is to demonstrate that the bigger the challenge becomes, the less possible it is to analyse and explain complex phenomena by two-dimensional modelling. In Keidel's (2010) explanations, two-dimensional models are based on angular thinking as a powerful method to resolve difficult problems through the use of Cartesian coordinates. A key limitation is that it is, in Keidel's own words, simplistic black-and-white thinking. Two-dimensions may suffice from time to time but remain inferior to options which three-dimensions are opening. The Butterfly Diagram (Graphic 1) is an example. It provides a promising starting point which leads forward. In contrast, not enough options do exist to develop insights and thinking beyond and importantly beneath the model's given surface. For a meaningful and powerful development, which allows depth in planning and precision in the organisation of processes, the model's options remain too limited. It is argued that the world in which two-dimensional thinking was sufficient has disappeared decades ago. Since then, two dimensions are bound to miss or exclude influential variables. They produce results which are not providing comprehensive details. It is their supposed easiness which seduces. Presently, multiple global crises of complex realities have culminated. Decisive actions have become unavoidable, while time is running short. It means that complex challenges must be confronted with robustness and an in-depth understanding of the entire system, overview over its components, and holistic planning to rebalance. In the form of two-dimensional modelling that reads as a factually lost cause. Instead, for managing complexities, Fuller's observation that triangles must be nature's first choice means robustness. Based on his studies, triangles are self-stabilising and also allow a seamless flow of energy which has now reached a central point of meaning. The conclusion is that solid and stabilising architectures, which can be perfectly flooded with directed streams of energy are offering synergistic effects. When the triangle is about geometry, the flow of energy adds physics. The Law of Conservation of Energy holds that energy is a conservation quantity. It means that the total energy of a closed system does not change with time. Energy can be converted between its different forms. In positive and negative understanding, for the 21st-century world energy has become a highly critical variable, on multiple layers, such as availability, cost, environmental danger, but it also is the unavoidable carrier of the human system. This includes a circular economy as well.

What is debatable is, where the borderlines of a closed system should be drawn. Globalised economy suggests that the economic system of planet earth can be understood as such. On the other hand, national economic or social systems could make them on a smaller scale. Yet, simplistic thinking is not helpful. E.g., air or water pollution does not remain national, and planet earth is not more than a particle within a much bigger system. Complexities remain, multidimensional and multi-layered, without that two-dimensional black-and-white thinking could lead to any solid solution. But, despite much interest and need of following this further, for reasons of space this discussion cannot be continued. Therefore, as the last critical reflections suggested, triangular architectures are covering significantly more complexity than two dimensions are able to. The critical, influential is now added, Variable C needs its own

place. It builds a carrier for supportive data; e.g., for developing effective change models in the architecture of systems. If, following Schumpeter (1950), entrepreneurship means revolutionising patterns, then a different but closely adjacent field of entrepreneurial thinking can be identified. Revolutionising managerial thinking and patterns of planning and implementation through fit with complex challenges of the actual world or economic order then makes an additional layer of what entrepreneurship can mean and act upon. It is the direct upgrading file from simpler two-dimensional Cartesian coordinates to complexity-covering three-dimensional loops.



What does this mean for the level of an ecosystem which is composed of those systemic connections which make the system alive? Firstly, to be alive, the system must produce processes. Entrepreneurs can play their role by the process of forward-leading disaggregation of the old connections while rebalancing reaggregation constitutes new connections → here turning from linear, neglecting waste, to circular, using waste. That involves living and non-living organisms and their own biological, technological/ technical, and information loops. Remaining on two dimensions would mean missing important variables again, because there is the system of incumbents, too. I.e., it is not the question alone, whether the circular economy finds enough entrepreneurial power pushing the concept and achieving its global breakthrough. In the first instance, it means a major shift for interconnected and interacting established resources, processes, and values. Threatening these will continue triggering incumbents' self-protective resistance. Old vs new then crystallises the influential third variable: the customer. The customer can be seen as the keystone in the struggle. Offer and demand, those who make, and those who consume. But if those who make cannot convince those having the autonomy to buy, then the entire concept is not viable or not as successful as it must be. If the new (cf. Utterback, 1996) creates a match with positive effects, then such "revolution" of changing processes, resources, and own values starts to make sense, for incumbents as well. The decisive own circular process of the system starts, interconnected and interdependent. The same for the side of demand. It must learn and understand that products made in the circle of a new and different economic order are important and more sustainable for the entire system. Then, there is not only a system, but an ecosystem in which the ideal state of aggregation is mutually beneficial outcomes for all of the system's species or, in a wider view, its ultimate objective becomes the total equilibrium.

But systems are dynamic, there is no total equilibrium. It means that interactions among species can vary in form, frequency, or alignment leading to the formation of triangular versatility. E.g., an offer-demand relationship can evolve by direct connection, customers, which can naturally include consumers as well, and manufacturers and service providers. They are building two of the three tangential dimensions. To both, the third variable can be docked in the conceptual form of the circular economy, which then adopts function and position of the connecting keystone (cf. Iansiti et al., 2004). The next option (cf. Keidel's (2010) emphasis on modularity

and flexibility of the triangle) is when manufacturer/service provider and circular economy are building the direct alliance instead. Consequentially, the keystone function shifts to the customer. This provides explanatory logic, too. Customers' acceptance of circular-economy products is a keystone variable. I.e., customers' wide adoption boosts the viability of the circular economy. This leaves the third option, if customers build an alliance with the circular economy, then manufacturers/service providers consequentially are the keystone. In this constellation, it can then come to an effect in which manufacturers may find themselves in a position forcing them to follow those new ways, even if their existing resources, processes, and values are making it difficult, or are even opposing it. That explains what two-dimensions cannot identify and, as well, it shows the seamless flow making triangular thinking highly effective. In Morin's (2005) understanding of self-development as consequence of well-running things, it means an interface for a self-test of systemic health. However, this cannot be misunderstood as a one-layered check: Actions on one layer must be expected to have consequences on other layers (cf. Iansiti et al., 2004). I.e., a health-check of the system comprises multiple layers.

For reasons of space again, all three options remain basic in their explanatory logic, but they are highly complex in their meaning. Furthermore, they demonstrate the revolving energy which circulates within and circles around the triangle(s). There is multiple assessment possible and the demonstration of various connections. As the exemplary assessment shows, an identifiable nucleus comes to light. It makes a form of crystallisation which emerges when dealing with the triangular framework in good depth. Again something, which a two-dimensional form cannot achieve because it is not made for this. What is important, there is no triangular auto-organisation. A triangle does exist, those variables or dimensions do exist. Neither these dimensions will auto-join a triangle, nor are they automatically coming together in an orderly and/or logical manner. This process is decisively methodological and must be logically reflected; it needs discipline by analysis. In the first instance, analysis is about information. Both sides of the system's living species, offer and demand, need and deliver information. What speaks for and against something is essential for informed decision-making. The circular economy, understood at this moment as a non-living concept, needs input. As soon as the concept starts interacting processes, information input is steering wheel and regulator which needs to be the balance for offer and demand. Necessary technologies must be available, but equally the technical side, which covers inter and transactional processes, regulations, different service levels, etc. I.e., there must be a mechanical side to the system, and its interacting species, too. For the (circular) economy, three key parameters are affordability, accessibility, and acceptance. As interactive part of offer and demand their relationships are naturally fragile and in the need of technicalities balancing support and control. I.e., latent maintenance must keep the (economic) system functioning, which means permanent structural stabilisation of a fragile systemic balance (cf. Parsons cited in Luhmann, 2016). To understand this is not only essential in an abstract form; it is an ecosystem. It must connect the whole and bridge unavoidable gaps. Adopting and adapting Morin's (2005) view, a complex economic ecosystem

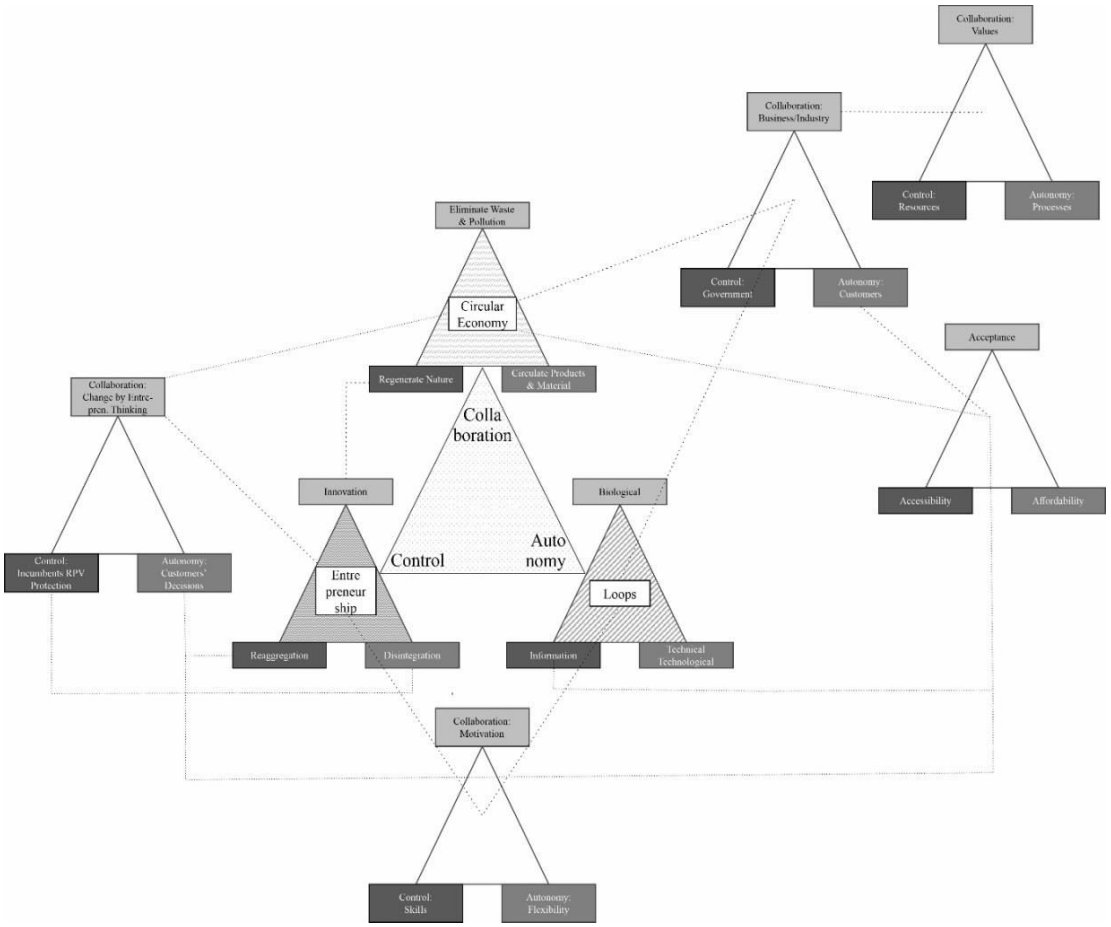
is a form (e.g., offer/demand or incumbent/entrepreneur) of being a part of the whole (circular economy), which is inter-dependently interacting at the same time inside of the whole (economic system). The multi-layered nature comes to light.

Its effects on the practical side of how and why economic systems work, cannot be overestimated. Isolating the dimension of the circular economy for a moment, means naturally the use and reuse of natural and sustainable resources. They are part of the system and inside the whole. It is this multi-layered architecture, but also its depth which helps to organise a "geometric roadmap". It can find, analyse, and visualise connections spatially and effectively. Spatiality opens ways, in which triangular thinking then supports improved solution-finding. In a further extended and more philosophical, but nevertheless very real understanding, it leads to the important view on systems that '[t]he whole is in the part that is in the whole' (Morin, 2005, p. 101). Precisely here a frequent blank spot in incumbent planning and organisation can be found. Narrowing things down to an extent, which cannot discover causal effects and impacts on the various systemic levels anymore. The consequence must be suboptimal solutions which are unsustainable in themselves. → Complexity is and remains the opposite of simplicity.

CONCLUSION

Triangular thinking is an effective means to deal with complexity. It offers ways to structure and prioritise. Such structure reaches far deeper than what could be discussed in a nutshell. Despite the own complexity which the triangular geometry provides, it offers deep insights and leads to discoveries which make planning, decision-making, and implementation more robust. However, to come to forward-leading outcomes requires in-depth analyses and methodological approaches. The direct connection with the concept of the circular economy as an example leads to the assumption that intended change processes within the established system achieved too little so far. The label of simplicity can be easily attributed, but it also neglects the many complexities which are building opposing forces. In contrast, the need to develop sustainable ways of economic activities is a matter of urgency. For more and faster progress, Schumpeter's (1950) defining understanding of entrepreneurship may support the necessary sparking process for rebalancing the system. Between the two dimensions of offer and demand, entrepreneurship may become a systemic keystone mediator (cf. Iansiti et al., 2004) in form of the energy-driving critical Variable C. It has not been the intention to discuss the concept of the circular economy regarding its advantages and limitations, but to demonstrate that frequent simplistic thinking and planning on two-dimensions must remain too limited with reference to the power and complexity of opposing forces. The concluding argument is that three-dimensional thinking is a forward-leading dimension in its own right. It is such whole which is in the part that is in the whole (Morin, 2005).

To conclude the discourse, Graphic 2 has demonstrated the initial development of triangular thinking. It follows Fuller's belief of triangles being nature's most stable form and the enabler of a seamless flow of energy. During the argumentation several sub-triangles have been developed. As resulting artefact and visualisation of three-dimensional thinking, Graphic 3 displays the extended structure of triangular geometry, which is neither complete, nor deep enough. Its purpose is exemplary demonstration and the visualisation of docking stations. Generally essential is that the triangular view on systems can provide direction, but it does not offer solutions. Yet, a world of rapidly growing complexities is the systemic opposite of simplistic approaches to finding solutions.



Graphic 3: Multidimensional and Multi-Layered, The Exemplary Triangular Roadmap (basic version)

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ABOUT THE BOOK

The book is the collection of research papers on wide range of topics related with various aspects of sustainable entrepreneurship and covers topics like green marketing, green finance, green human resource management, green business practices and sustainable development. The book will be of use to the faculty members, students and researchers in the field of business management and sustainable. It will also be useful to professionals and practitioner's working in the development and sustainability sectors.

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