SUSTAINABLE DEVELOPMENT IN FINANCIAL MODELS: APPLICATION OF MODERN DATA ANALYTICS

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Abstract

The number of industries that enhance communal expectations as a section of their business approaches is on the rise. Expanding dependence on the issues related to sustainability by sustenance is crucial to the uprising communication and future value of a business. This article aimed at inspecting the role of financial management to give sustainable business development and implementation. Based on confined inspection of resources from assorted scholars, it defines that proper financial management models are obligatory to embrace productivity while reducing issues related to financial threats. The findings also indicate promoting capital budgeting for sustainable development. The study concludes that financial models play an important role in implementing sustainable development aims to give an analysis of the present state and future directions of green and sustainable finance through comprehensive analysis.

Keywords: Sustainable development, Financial Models, Modern Dataanalytics, ESG factors

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I. Introduction

The 2030 agenda of the United Nations for sustainable development and the global dedication to living no one behind needs processing, gathering and spreading an unprecedented amount of data, as well as disaggregated data for successful policy design, observing and evolution of progress (United Nations Report 2019). This agenda strongly declare that we are regulated to protect the planet from humiliation. A striking example of an unsustainable and inflexible way is given by finance and the financialization of the entire economy. This is due to neoclassical finance theory having caused insignificant damage to the environment. The arrival of Big Data (BD) has brought comfort to societies and human beings in frequent ways; especially in present-day anxieties confronted by common people who can fruitfully minimize using BD. This article is a sample for giving some stake to integrate financial systems with the aims of the agenda of 2030. The outline of the article discussed the effect of any risk modeling related to finance in the modern economy, as a cause of declarative powers of risk models working on technical types of equipment and rules.

### Definition of sustainable development and its importance

Sustainable development is termed as the concept that common people should assist by fulfilling their common requirements, while also ensuring those future generations are capable to meet their basic requirements. In 1987, the ONU World-wide Commission for the Development and Environment describes sustainable development as the ones that manage the requirements of how without compromising the availability of future generations to take care of. In other terms, it is a path to generating a society by which it can live for a long time without negotiating the accessibility of resources for future generations (Ruggerio 2021).But this is an old approach followed by many civilizations over the historic course with an objective of controlling a balance between nature and human beings as well as the economy. This term is also dedicated to as environmentally sustainable growth of the economy.

The importance of sustainable development is to make sure that our society does not go through resources that are plays an important role in existence. Through the process of an undertaking that gives sustainable development, human beings can live for a long time while resources are utilized. As per Agbedahin (2019) with the selection of sustainable development, many challenges can be solved as well as someone will be able to maintain balance within the surroundings as nature takes its natural call.

The role of financial models in promoting sustainable development

A financial model is enlarged after having an insight into the business. The observers understand how a business works and the various factors that could affect such business and the business also need to understand the changes. Organizations which are developed financial models can recognize their business besides the factors that affect them better than their challengers and finally prepare better for any uncertain condition (Ziolo et al. 2021). This article proclaims that any type of ecological finance theory that comes up to fit the Sustainable Development Goals (SDGs) requires a paradigm concert in the analysis of changeability underlying financial risk modeling, by implementing the component of nature and sustainability into the modeling carried out.
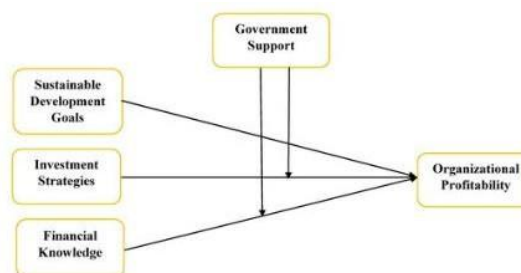
Theoretical Framework of sustainable development in financial models

(Source: Ziolo et al. 2021)

The structure of the current study is combined with different phases. In this phase, the importance of different models in promoting sustainable development is discussed. To realize the effectiveness of business finance, there is a requirement for genuine financial management (Nie et al. 2020). Financial management is an approach of corporate finance and it deals with resolution connected

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to acquisition, financing and observation of aspects, obtaining financial management.

Overview of modern data analytics and its applications in sustainable finance

Data-driven development in data analytics is rapidly widening the scale while surviving technologies are improving steadily. It builds on proper value to the financial sector with the application of AI (Darvazeh et al. 2020). As a result of this, banks and other financial sectors have a large opportunity to create by enlarging and refining their heavily data-based business and working models. The main challenge of an organization is to access technologies such as solutions of artificial intelligence, advanced analytics, big data and others which are data-driven, for their organizations and generated proper solutions for the needs of the business.

By totally computing its banking and financial services sectors, India will develop its economy. The way to change the game will be a fruitful use of data and information about their customers. In a current budget speech Nirmala Sitharaman, finance minister of India forced business people to create artificial intelligence in India and also generate the function of artificial intelligence for India (Ren et al. 2023). However, the country must create a secure and normal financial data-sharing process to establish a strong digital infrastructure. Financial organizations such as banks and other fields are analyzing the advantage of AI through a transformation of multilayer of their risk management, operations, marketing, support and compliance.

II. Sustainable Finance and Financial Models

Concept of sustainable finance and its drivers

Sustainable finance is an increasing sector, shaped by variables in the macro habitat like climate change. Some key drivers such as risk, opportunity, client investor and employee demand, regulations, policy aims, and financial centers make the business of sustainable finance (Ziolo et al. 2021). The crisis of climate is making worse, and now it is very important than ever for society to come together to prompt action against the climate crisis. Environmental Social and Governance (ESG) is a crucial focus region for most

corporate in the present day and the financial sector has a major role to play here. Sustainable finance justification for the variables of ESG of any curriculum when investments are considered. With this application, the financial sectors can not only set up sustainable development but also featured social and environmental tools in the business (Lagoarde-Segot 2019). For sustainable growth, different variables like natural sources, conserving the environment as well as controlling economic and social fairness that must be followed.

Integration of environmental, social, and governance (ESG) factors in financial models

Environmental, Social and Governance (ESG) investment terms are being used to describe the application of integrating ESG factors in the decision of investment. These factors are of enlarging interest for many organizational investors and other retail players. However Organizational investors vary in their perspective on taking into consideration of ESG factors for investment with several processes, strategies, and datasets which they use to implement ESG factors in their decision-making (Liang and Renneboog 2020). Integration of ESG is based on different data sources along with the data from the principles of the United Nations for Responsible Investment (UNRI) and from the survey OECD on the integration of ESG distributed to insurance companies and pension funds in the year 2019.

The UNRI information is used along with data only from UNRI registers. The implementation of ESG in financial models is knowing a common practice among organizational investors. According to a survey by OECD in the year 2018, near about three-fourths of financial investors admit that the integration of the factors of ESG will become classic in the financial sectors in the upcoming five years (Durrani et al. 2020). Finally, not every organizational investor promoted ESG factors in their financing method of decision-making at that time.

Types of sustainable financial instruments (e.g. green bonds, sustainability-linked loans)

There are several types of sustainable financial instruments such as sustainability bonds,

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social bonds, loan market sustainability, green loans, loans related to sustainability, and others. The green bond is not only an instrument of debt finance it is also used to enlarge private funds for sustainable growth in all over Asia (Popescu and Popescu 2019). In addition,market of sustainable debt increasing constantly in size. The increasing rate is expanding 25% between the years 2017 and 2018 which touches 246 billion USD value of insurance for the products of green development. This has also been assorted over the previous five years, along with the beginning of five extra tools such as social bonds, green loans, loans linked with sustainability, and sustainability bonds (Beerbaum et al. 2019). The market growth and the assortment of green finance instruments. As a substitute for sustainable bonds, the first green bonds were inaugurated in the year 2014 by Unilever. The International Capital Market Association (ICMA) describes bonds of sustainability as bonds whose methods are exclusively put into the financial sectors or re-finance a conjugation of social and sustainable projects.

The transformation of green-debt financing comes in the year 2015 along with the first social bond insurance. ICMA describes social bonds whose earnings are used to finance social projects with the benefit of socio-economic. One major social bonds proceed to date is EUR 500 million in the Finance Corporation of Korean Housing which was checked by Sustainalytics to be in line with SBPs. The green loans start in the year 2016 with Lloyds Banks' USD 1.26 billion reserve loans for greener organizations in the UK (Ferri and Acosta 2019). In these loans, banks and other financial sectors give loans to project benefits.

III. Method

In the current research descriptive research design has been used to make the better investigation scope of sustainable development of the financial model. To make better data reliability a deductive research approach has been used. Further data analysis has been done by using secondary data collection and the gathering has been evaluated to extract the findings about the impact of the financial model on sustainability development.

IV. Data Analytics in Sustainable Finance

Overview of data analytics and its role in sustainable finance

Regulations and rules are being set down in different jurisdictions and also several places. Sustainable finance plays a major role to reduce carbon efficiency in the economy and ESG data is a gold mine to best recognize where customers, suppliers, prospects and clients place in their net-zero journey. Green finance used to lack information (Akomea-Frimpong et al. 2022). Now there are huge information and the lack of data creates it complicated to relate, so, therefore, less dependable and less beneficial. The role of information is enlarging but the source of proper data has created some challenges till the year 2017; the best part is the explanations are now appearing in the current BNP Paribas Global ESG Survey shoes.

Inscribing information at the core of green finance strategy and allocating meaningful sources to generate its data collection and the abilities of processing. When the data is collected then it requires to be stored on a platform that commits quick access to every piece of data (Schumacher et al. 2020). AI appears to enable the matching of information collected from several channels with one given customer. To exhibit all data related to ESG are available to a customer with a simple search on a given platform.

Types of data used in sustainable finance (e.g. ESG data, climate data)

Different types of data such as Climate Data, Social Data, ESG Company Data, Sustainable Finance Framework & Regulatory Data, are used in sustainable finance. Change in climate creates a huge risk to global financial system solidity. Climate data of ICE implements climate data and analysis for districts, mortgage-back certainty and corporate in which investors are helped to recognize the importance of the risk of Physical climate and transition (Arif et al. 2022). ESG Company of ICE gives granular data which is gathered and quality controlled by ICE, to provide simultaneously updated data on ESG opportunities and risks.

The information is covered by a series of data points like emission of greenhouse gas, workforce and broad multiplicity. A service of

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safety mapping permits the data to be obtainable across a huge range of particular income and worthy securities. The Impact Bond data is used in addition to the extensive reference of ICE. It also evaluates data services along with data coverage of around 34 million retired and active financial instruments (Folger-Laronde et al. 2022). In the growth of ESG investors are seeking to recognize how social variables can affect their investments. ICE gives a series of information to help market participants to measure social variables.

Use of machine learning and artificial intelligence in sustainable finance

Upgradation in Artificial Intelligence (AI) and machine learning has conducted the generation of new ESG data. This new ESG data do not depend on the data that is given by companies. This study implies the use of AI in the field of ESG to measure firms. AI permits market participants to gather and inspect more data than ever before when considering social and environmental opportunities and risks (Abad-Segura et al. 2020). AI can assist sustainable investors in Procedure Mountains of data that grip important information related to ESG investment. Computer algorithms that are examined to inspect content and tone can absorb the total data available of a company which implies a huge task for an employee. The capabilities of AI are proven very useful for ESG investment and it reflects the enlarging sensitivity of customers to how companies are regulated as variables in their consuming decisions (Moro-Visconti et al. 2020). Investment executives come under expanding pressure to observe the criteria of ESG in their portfolios. These programmers must be instructed to read a type of discussion and recognize the tone by differentiating the

words that are used to a reference series of living data.

V. Case Studies Analysis

Examples of financial models that incorporate sustainable development and data analytics

As per Kariuki (2020) the concept of financial models having an impact on reality leads to an affluent current of notion on the financial model's sociology, in a proper social study related to financial access and the performativity framework are a good establishment to it. Such types of financial models that comprise sustainable development and data analytics are ESG models, Carbon Pricing Models, Impact Investment Models, Sustainability Supply Chain Models, Circular Economy Models and others. The maximum potential of AI in the investment in ESG rises from sentiment analysis algorithms. These permit systems to inspect the discussion, a work that could not be as successfully done. Impact bond insurance rapidly enlarges as investors seek paths for their money to commit to sustainability goals (Nasrallah and El Khoury 2022). To conduct transparency on a large scale to this market IBCS collects data that merge with organization-recognized impact bond structures.

Observation of ESG Financial model for Sustainability aspect

From the analysis of the integrated ESG framework scope of better determination of individual or corporate growth is developed. The chances of evaluating the company alignment for the return of values can be determined with the use of the ESG model from a financial perspective.
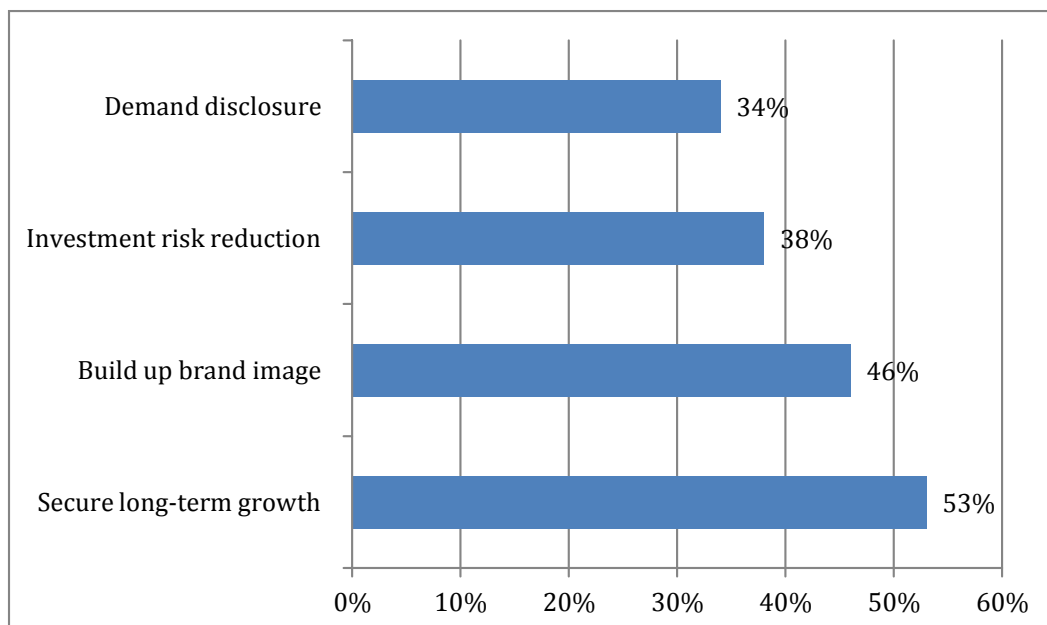
Figure 1: ESG generating benefits from a financial perspective

(Source: OECD.org 2019)

From the above figure, it has been presented that an integrated financial model creates the opportunity of generating benefits for a different aspect. Possible growth of long-term sustainability, spontaneous growth of brand reputation and reduction of the investment risk are identified. Influencing factors of the ESG financial model have been analyzed to understand the criteria that are filled out by leading factors. Three standard parameters are there for the use of ESG in business that includes environmental, social and governmental. Collaboration and meeting up with the section factors always come up with better potential growth and stability.

the rate of energy efficiency activities	the supply chain	corporate ethics

Table 1: Thematic factors of ESG model operation

(Source: OECD.org 2020)

Impact of these models on promoting sustainable development

The models such as ESG Models, Carbon Pricing Models, Impact Investment Models, Sustainability Supply Chain Models, and Circular Economy Models have a deep impact on promoting sustainable development in financial sectors (Arner et al. 2020). Esg model examines social, environmental, and governance factors in the process of investment to recognize companies that develop sustainability. Data analytics is used by them to analyze the sustainability of a company with the assets of potential threats and opportunities. Carbon Pricing Model embraces the cost of carbon emissions in financial decision-making. With the use of data analytics, the following model can calculate the financial effect of carbon emissions and help organizations to create more sustainable opportunities (Alkaabi and Nobanee 2019). The Impact Investment Model use data analytics to recognize the

Included environmental factors of the ESG model	Identified social factors for ESG	Included Government factors
Better control of the individual or corporate sector used natural resources	The obligation of human rights by sector	Presence of diversity on the board
Rate of carbon emissions	Balancing diversity in the working process	Consideration of the right of shareholders
Understanding	Stability of	Follow-up

opportunities regarding the investment that has

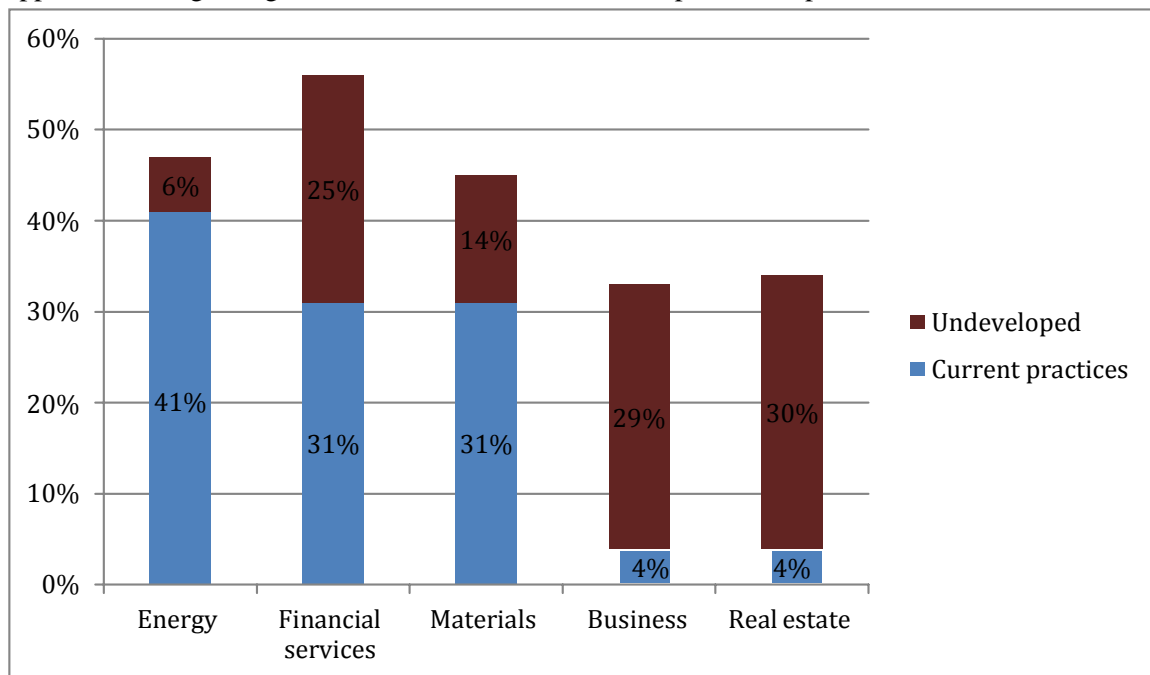a positive impact on the environment.

Figure 2: Practices of carbon pricing model in real industries

(Source: eTurbonews 2021)

Practices of the carbon pricing model have been analyzed throughout different industries to check the current state of development. It makes sense about the changes need to be executed to mitigate the till now existence gap of using this model in individual or industrial operations. From the above figure main affecting gap is noticed for business and the field of real estate.

Industry	The reduction rate of emission
Transportation	4%
Building	6%
Electric power	79%
Others	2%

Table 2: Reduction rate of emission by Industries

(Source: Energy Policy 2019)

From the above figure, it has been observed that the rate of emission reduction is continuously happening which makes sense about the need for policy efficiency. The existence of federal policy makes a reliable change for the upcoming industries' operations.

Year	Price planning	The reality of current pricing
2015	43%	58%
2018	59%	72%
2019	69%	92%

Table 3: Comparing price planning and actual price growth

(Source: ORF 2021)

From the above figure, a better understanding of the market pattern and upcoming future concerns is identified. It has been observed that passing year prediction and actual pricing gap are growing higher and higher.

Lessons learned and future directions

Exhausting natural sources at a rate of sustainability, protecting the environment and minimizing the effect of climate change certify the planet will remain healthy in future. Expanding attention on investors, policymakers, regulatory authorities and policymakers towards the change of climate has spurred the extensive requirements to properly examine the present practices of sustainable finance. It is important to identify the social impacts of development to conserve the health of the planet for the future (Al

Ahbabi and Nobanee 2019). As a result, we are faced with changing climate due to unsustainable infrastructure practices. Industrial practices have given resulted in enlarging greenhouse gas emission that harms human prosperity in future. If unsustainable development proceeds then future generations will have to carry the natural burden that is generated presently.

VI. Findings

By the use of the impact investment model risk generating concern can be measured easily for the different aspects of the business. Having accession to the business-affecting factors and the rate of affecting the easier flow of business process control can be developed through the use of an impact investment model.
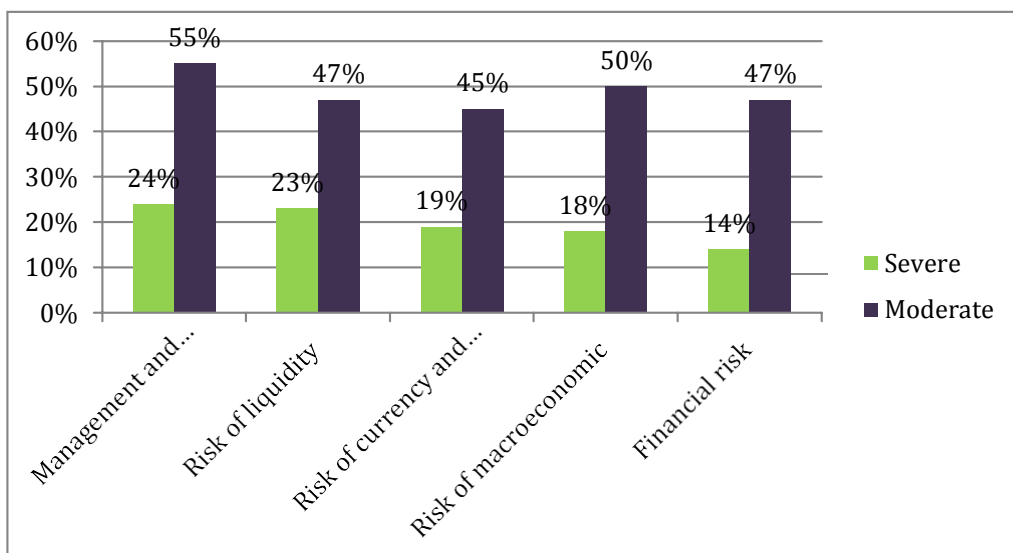

Figure 3: Using impact investment model risk determination

(Source: GIIN 2019)

From the above figure, it has been observed that severity and moderate risk may vary for the industries but the need of measuring the risk and determine the proportion is observed through the above figure. The use of the

sustainability supply chain model has been analyzed through the real-life use of this model. Current involvement and generating scope for future sustainability are measured through the use of the below figure.
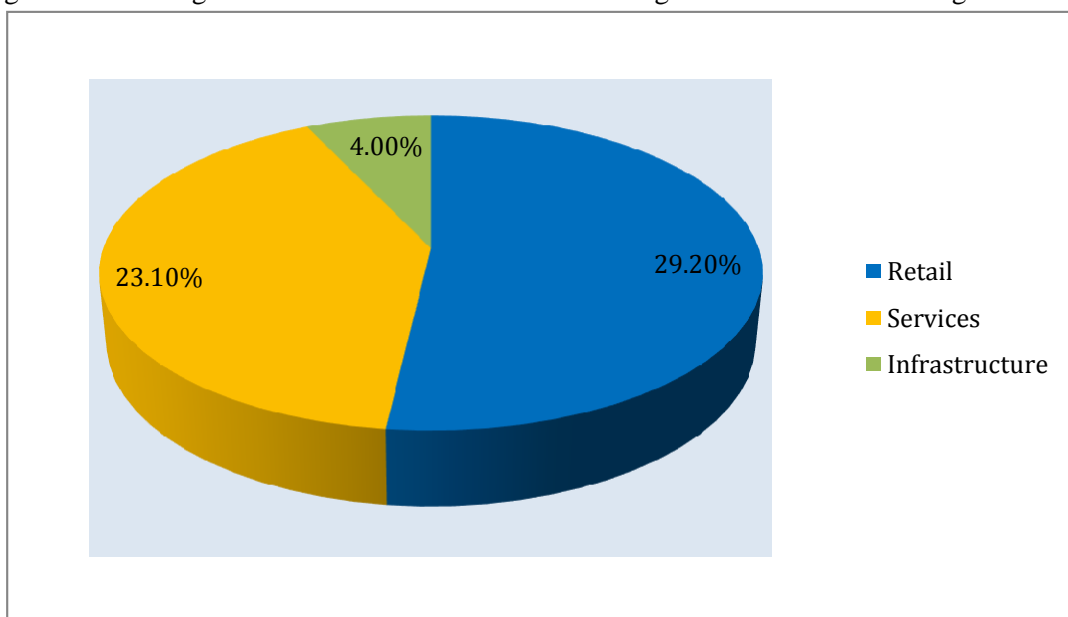

Figure 4: Integration rate of sustainability supply chain model in industries

(Source: Meilirobot.com 2019)

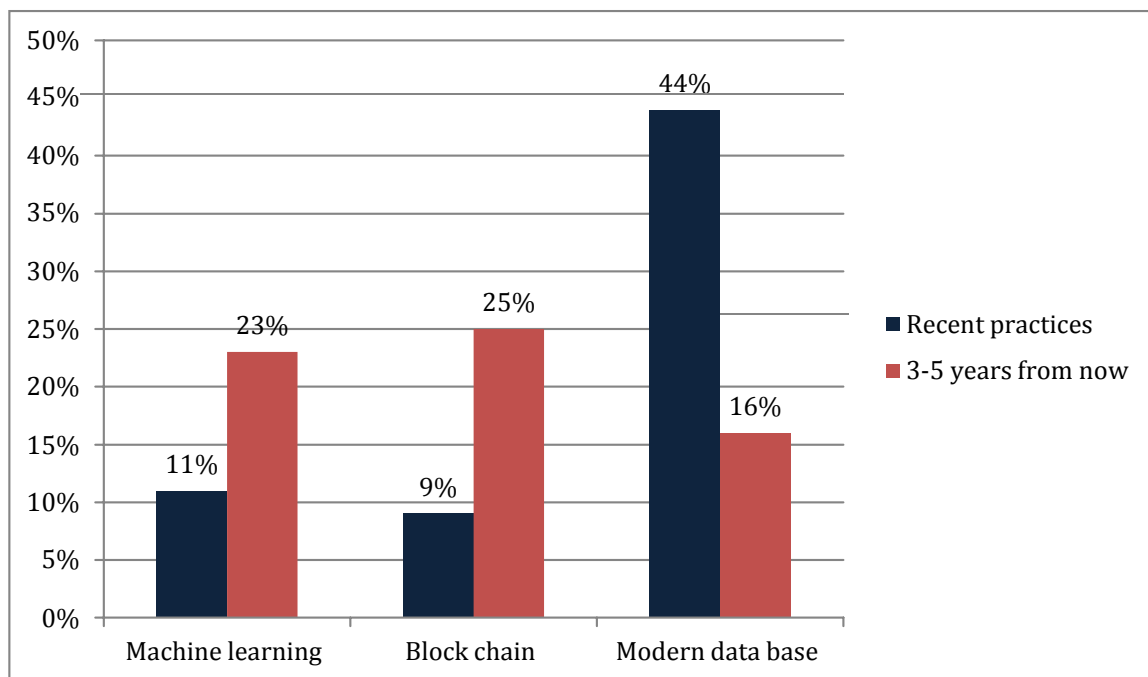*Eur. Chem. Bull. 2023,12(2), 167 – 178*

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Figure 5: Current Practices of Supply Chain Sustainability Model

(Source: Meilirobot.com 2019)

From the above figure current business practices have been measured to generate the scope for future practices. It has been observed that the potential scope of generating growth is there that can be beneficial to established sustainability.

VII. Conclusion

Importance of incorporating sustainable development in financial models

The financial service sectors give adequate power in investing and bringing awareness to the issues regarding sustainability, whether by permitting the development and research of related sources of energy that follow clear and sustainable practices. Sustainable development in finance takes into description the factors of ESG of an economic project (Monasterolo et al. 2019). Different environmental factors with the reduction of the climate crisis of utilization of sustainable development. On the other hand several social factors along with human and animal rights, besides the protection of customers and diverse hiring practices. In Sustainable financial development, green finance become a part of global concern. All the countries are conjugated about the change in the environment and environmental pollution. For further sustainable development, it is required to recognize the possible green projects also in financial service sectors and

must be verified whether they are sustainable or not.

Potential benefits of using modern data analytics in sustainable finance

Modern data analytics resolution will include instruments that permit the observation of data in such a way that goes beyond conventional tabular reports and charts when giving responsive and quick reports (Maltais and Nykvist 2020). This advance which exemplifies the utilization of data analytics with machine learning of professional articles is especially given noteworthy of the astonishing demolition of the conversation. These analytics can help organizations to give future developments and needs. Modern data analytics helps to reduce resources and shocks disruptions by minimizing the consumption of resources to become less affect able to the variation in cost. It also helps in staying with the competition.

The Internet has been built to make it possible. A company can establish to potential consumers and investors that the sustainability of initiatives is more than basic words by using modern data analytics (Ziolo et al. 2019). Moreover, it helps to assist to recognize future risks. Advanced data analytics are used by a company to recognize potential risks

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regarding labor practices, environmental effects and resource use in the company.

Call to action for greater collaboration and innovation in sustainable finance.

Earning a place on the sidelines of the UN General Assembly forum will inaugurate on 21st September, online. The 12th Annual Forum, sturdy on the strength of collaboration, glow the spotlight on the potential of creative PPP. As per Monasterolo (2020) Opening the extent for dialogue, this incident calls on business executives, development participants, policymakers and experts to maintain their place at the connection of exclusive and sustainable requirements. The forum of the present year relates the present and dots on how BCtA draws the lead to execute and implement solutions that fruitfully capture private and public actors for systematic change.

This resolution is based on four types of pillars such as inclusive procurement, transformation through replication, measurement of impacts, and successful private sector engagement for the evolution of cooperation (Chen et al. 2021). With the continuous tradition of bringing combined experts, advocates and specialists into the field of sustainable development, and business, BCtA has appreciated speakers within the United Nations system and also from private and government institutions who can discuss their knowledge and experiences.

VIII. Recommendations and future scope

Environment Sustainability is now a key issue globally which has increased the scope for investments in sustainable projects in finance. Therefore many financial service sectors and banks would look ahead to tapping this growing service sector. However, there will be an enlarged demand for Green bonds and the development of green funds. Market participants would gain the profits of diversification from market investors in the bonds (Park and Kim 2020). This is verifiable in the context of India, which found that an expected increase in the emission of carbon to 5-6.4 million MT in India Could be reduced by 30% to 45% by the year 2030 by contributing

technologies related to energy efficiency in the building structure.

As a cause of this, there would be a requirement of extra 600-700 billion Euros even after considering for steep decline in the value of renewable energy mechanics. In this regard, Internation Financial Corporation (IFC) has taken a step. It has pronounced to invest $75 million in green bonds which are issued by Punjab National Bank. In India, the Climate Change Council under the observation of the Prime Minister was created in the year 2007 which are recreated in the year 2014 for the reduction of climate change.

References

Abad-Segura, E., González-Zamar, M.D., López-Meneses, E. and Vázquez-Cano, E., 2020. Financial technology: review of trends, approaches and management. *Mathematics*, *8*(6), p.951.

Agbedahin, A.V., 2019. Sustainable development, Education for Sustainable Development, and the 2030 Agenda for Sustainable Development: Emergence, efficacy, eminence, and future. *Sustainable Development*, *27*(4), pp.669-680.

Akomea-Frimpong, I., Adeabah, D., Ofosu, D. and Tenakwah, E.J., 2022. A review of studies on green finance of banks, research gaps and future directions. *Journal of Sustainable Finance & Investment*, *12*(4), pp.1241-1264.

Al Ahbabi, A.R. and Nobanee, H., 2019. Conceptual building of sustainable financial management & sustainable financial growth. *Available at SSRN 3472313*.

Alkaabi, H. and Nobanee, H., 2019. A study on financial management in promoting sustainable business practices & development. *Available at SSRN 3472415*.

Arif, A., Sadiq, M., Shabbir, M.S., Yahya, G., Zamir, A. and Bares Lopez, L., 2022. The role of globalization in financial development, trade openness and sustainable environmental-economic growth: evidence from selected South Asian economies. *Journal of Sustainable*

Eur. Chem. Bull. 2023,12(2), 167 – 178

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Finance & Investment, *12*(4), pp.1027-1044.

Arner, D.W., Buckley, R.P., Zetzsche, D.A. and Veidt, R., 2020. Sustainability, FinTech and financial inclusion. *European Business Organization Law Review*, *21*, pp.7-35.

Beerbaum, D. and Puaschunder, J.M., 2019. Towards an XBRL-enabled Sustainability Taxonomy: A behavioral accounting approach. *Journal of Applied Research in the Digital Economy*, (1).

Chen, Y., Kumara, E.K. and Sivakumar, V., 2021. Investigation of finance industry on risk awareness model and digital economic growth. *Annals of Operations Research*, pp.1-22.

Darvazeh, S.S., Vanani, I.R. and Musolu, F.M., 2020. Big data analytics and its applications in supply chain management. In *New Trends in the Use of Artificial Intelligence for the Industry 4.0* (p. 175). London, UK: IntechOpen.

Durrani, A., Rosmin, M. and Volz, U., 2020. The role of central banks in scaling up sustainable finance–what do monetary authorities in the Asia-Pacific region think?. *Journal of sustainable finance & investment*, *10*(2), pp.92-112.

Ferri, G. and Acosta, B.A., 2019. Sustainable finance for sustainable development. *Center for Relationship Banking and Economics Working Paper Series*, *30.*

Folger-Laronde, Z., Pashang, S., Feor, L. and ElAlfy, A., 2022. ESG ratings and financial performance of exchange-traded funds during the COVID-19 pandemic. *Journal of Sustainable Finance & Investment*, *12*(2), pp.490-496.

GIIN , (2019) impact investment plan (https://thegiin.org/impact-investing/need-to-know/(Accessed: March 16, 2023).

Global energy policy (2019) https://www.energypolicy.columbia.edu/publications/what-you-need-to-know-about-a-federal-carbon-tax-in-the-united-states/(Accessed: March 16, 2023).

Kariuki, F., 2020. Sustainability in the financial sector in Kenya. *Available at SSRN 3646976.*

Lagoarde-Segot, T., 2019. Sustainable finance. A critical realist perspective. *Research in International Business and Finance*, *47*, pp.1-9.

Liang, H. and Renneboog, L., 2020. Corporate social responsibility and sustainable finance: A review of the literature. *European Corporate Governance Institute–Finance Working Paper*, (701).

Maltais, A. and Nykvist, B., 2020. Understanding the role of green bonds in advancing sustainability. *Journal of sustainable finance & investment*, pp.1-20.

Meilirobots.com (2019) https://www.meilirobots.com/resources-list/sustainable-supply-chain/(Accessed: March 16, 2023).

Monasterolo, I., 2020. Climate change and the financial system. *Annual Review of Resource Economics*, *12*, pp.299-320.

Monasterolo, I., Roventini, A. and Foxon, T.J., 2019. Uncertainty of climate policies and implications for economics and finance: An evolutionary economics approach. *Ecological Economics*, *163*, pp.177-182.

Moro-Visconti, R., Cruz Rambaud, S. and López Pascual, J., 2020. Sustainability in FinTechs: An explanation through business model scalability and market valuation. *Sustainability*, *12*(24), p.10316.

Nasrallah, N. and El Khoury, R., 2022. Is corporate governance a good predictor of SMEs financial performance? Evidence from developing countries (the case of Lebanon). *Journal of Sustainable Finance & Investment*, *12*(1), pp.13-43.

Nie, D., Panfilova, E., Samusenkov, V. and Mikhaylov, A., 2020. E-learning financing models in Russia for sustainable development. *Sustainability*, *12*(11), p.4412.

OECD.org - OECD (2020). Available at: https://www.oecd.org/finance/ESG-Investing-Practices-Progress-Challenges.pdf (Accessed: March 16, 2023).

ORF. (2021) https://www.orfonline.org/expert-speak/pricing-carbon-trade-offs-

*Eur. Chem. Bull. **2023**,12(2), 167 – 178*

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opportunities-india/(Accessed: March 16, 2023).

Park, H. and Kim, J.D., 2020. Transition towards green banking: role of financial regulators and financial institutions. *Asian Journal of Sustainability and Social Responsibility*, *5*(1), pp.1-25.

Popescu, C.R.G. and Popescu, G.N., 2019. An exploratory study based on a questionnaire concerning green and sustainable finance, corporate social responsibility, and performance: Evidence from the Romanian business environment. *Journal of Risk and Financial Management*, *12*(4), p.162.

Ren, Y.S., Ma, C.Q., Chen, X.Q., Lei, Y.T. and Wang, Y.R., 2023. Sustainable finance and blockchain: A systematic review and research agenda. *Research in International Business and Finance*, p.101871.

Ruggerio, C.A., 2021. Sustainability and sustainable development: A review of principles and definitions. *Science of the Total Environment*, *786*, p.147481.

Schumacher, K., Chenet, H. and Volz, U., 2020. Sustainable finance in Japan.

Journal of Sustainable Finance & Investment, *10*(2), pp.213-246.

The rise of internal carbon pricing (2021): ETurboNews - Travel Industry News, eTurboNews. Availableat: https://eturbonews.com/the-rise-of-internal-carbon-pricing/ (Accessed: March 16, 2023).

Ziolo, M., Bak, I. and Cheba, K., 2021. The role of sustainable finance in achieving Sustainable Development Goals: does it work?. *Technological and Economic Development of Economy*, *27*(1), pp.45-70.

Ziolo, M., Bak, I. and Cheba, K., 2021. The role of sustainable finance in achieving Sustainable Development Goals: does it work?. *Technological and Economic Development of Economy*, *27*(1), pp.45-70.

Ziolo, M., Filipiak, B.Z., Bąk, I. and Cheba, K., 2019. How to design more sustainable financial systems: The roles of environmental, social, and governance factors in the decision-making process. *Sustainability*, *11*(20), p.5604.

Eur. Chem. Bull. 2023,12(2), 167 – 178

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