# Value Adding for Environmental Social and Governance Influenced Investment by Technological Innovation

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**Article History**: Received: 11 January 2021; Revised: 12 February 2021; Accepted: 27 March 2021; Published online: 10 May 2021

Abstract: The advancements in technology are in rapid phase with the Information and Communication Technology (ICT) as a big driver of other sectors to be automated in a large context. The right to life for various non-human living organisms is denied forcefully by many of the side effects of these human technological advancements. This has led to lot of ethical awareness among many Governments as well as private or institutional investors to implicate Environmental, Social and Governance (ESG) based decisions in the fund management, so that the Corporate Structure of such business they invest does not violate the ESG based ethics. This conceptual paper stretches its objectives for comparing the existing ESG based criteria in developed countries with focus on strategic policy making for the Asian peers. This study examines the importance of ESG in investment related decisions as well as policy making; and describe current influencing status of ESG in various ways as well as to identify the benefits and concerns through ESG in Startups investment. This paper also describes the use of various technological advancements in effective implementation and utilization of ESG at both Policy making as well as investment decisions. This paper mainly focuses on the study of effective ESG based sustainable investment in the startup culture through relative technological advancements.

Keywords: ESG Policy Shift, Technological Influence in ESG, ESG Criteria Improvement.

#### 1. Introduction

The Earth which in current sense is the only known planet in this Universe that is feasible for living organisms is undergoing advancements in technology at rapid phase with the Information and Communication Technology (ICT) as a big driver of change in other sectors. In recent years, technological advancement has dramatically increased and involved across every sector. Many people and businesses in the recent past centuries have taken themselves granted for utilization of most of the natural resources, in contrast to the view that those resources are common to all the species living in this Earth. Human research for advancement in technology is mostly aimed towards the better livelihood of mankind. But its side effects have made costly impact of erosion of many scarce species from this Earth. The right to life for various non-human living organisms is denied forcefully by many of those side effects of human technological advancements. Those have comfortably forgotten that by the natural definition of Earth's ecosystem - "if other species get affected, it will directly or indirectly impact the human race also in multiple ways", as a short to long term cause and effect equation. Such cause and effect are the Global warming and its implications. This has led to lot of ethical awareness among many Governments as well as private or institutional investors to implicate Environmental, Social and Governance (ESG) based decisions in the Businesses, so that the Corporate Structure of such business does not violate the ESG based ethics. Also, According to Christophe Geissler, chairman of French asset manager Advestis, ESG metrics provide more valuable information on future performance of a company than the accounting or balance sheet variables do; which means lesser portfolio risk and more performance. Similarly according to James Purcell heading sustainable and impact investing at UBS Global Wealth management, Investors earlier had to struggle in their sustainable responsible investment decisions due to the concern of full ESG compliance by organizations, as certain companies may do well in certain areas like Pollution but not in Human rights, thus not fully ESG compliant, which affects both the financial returns and sustainability performance. But now they are able to give positive ESG preferences in their investment decisions. (Craik, 2019). ESG involves various areas such as Environmental - climate change, pollution related issues, waste management, etc; Social - human capital, stakeholder issues, product liability, etc; Governance - Corporate Governance and Behaviour in both internal and external factors like employee related decisions, regulatory decisions and compliance, corporate social responsibility and so on. Below is the broad and general categorization of ESG with different areas.

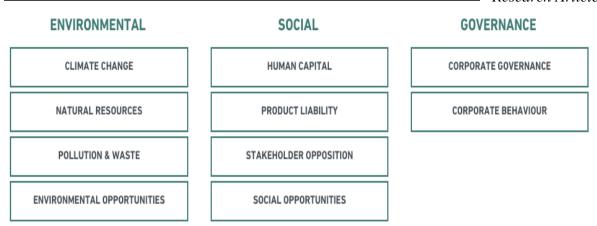


Figure 1. ESG broad areas

Source: https://www.msci.com/esg-investing

According to United Nations Development Programme for Sustainable Development Goals (SDG), "Achieving the SDGs requires the partnership of governments, private sector, civil society and citizens alike to make sure we leave a better planet for future generations". There is no definite quantitative tool or technique for Sustainability measurement and is still evolving. Most of the indicators in Sustainability measurement are achieved through secondary reporting mechanisms which are relative proportional to this to benchmark the index. United Nations Commission of Sustainable Development has given more than 100 indicators relative to ESG like the Environmental Performance Index, Environmental Sustainability Index, Environmental Vulnerability Index and so on. Similarly, there are lot of benchmarking parameters, metrices and international standards that support in this part. But benchmarking parameters vary with regional aspects and a comparative study based on these parameters or metrics seems difficult. The Organization for Economic Co-operation and Development (OECD) member states have brought reforms in this regard to give aggregated values periodically and use them for policy making. There are status index and management index in this that give the need and capacity for policy reforms respectively. All these indices are related to Sustainability, but they don't give accurate information on the Ecological balance or Environmental factors.

The ESG based investment decisions started well ahead in developed countries, mainly in Europe compared to the Asian segment. According to Cruz (2019), the European counterpart started such mechanism 20 years ago. In Asia, key nations like Japan, South Korea have already given a heavy foot into this followed by Hong Kong, India and others. With a huge target of net-zero emissions by 2050, more Asian peers could accelerate this run. United Kingdom has already signed a law related to this. According to Pieter Furnee, the Global Head of Responsible Investing Covergae at DWS, the Europe started it earlier before decades and could have achieved significantly in the ESG part but the progress was relatively slow. But the Asian part has now started integrating ESG criteria into their portfolios and expected to be performing much quicker than the European part in future perspective (Bayani, 2019). This is mainly due to the reasons like increase in awareness as well as the regulations improving towards the ESG compliance. According to Wan (2018), there is a significant rise of ESG based investing specific to Asian countries. According to Toh (2018), there is an emerging trend through use of technology in responding with the ESG framework to foster more Corporate business practices. According to Monga (2008), Nowadays the international trend is towards online service delivery and greater people interaction, this interaction and service delivery can be achieved through the uses of new technologies.

In the literature part, the research based institutions that provide strategic advisory to investments have done vast research report related to ESG and sustainable investment. Similarly, individual researchers have published lot of articles on the growing trend of ESG based investments. According to Talan (2019), some researchers are of perspective that ESG influences on unequal effects for corporate sustainability. But there exists inconsistency in results on effectiveness of the strategies relating to ESG in its objective of responsible and sustainable investment as well as good financial returns. As reviewed by Talan, Giamporcaro & Pretorius are of opinion that some countries like South Africa focus on social development goals but not much on the environmental issues. Similarly, few are of the opinion that many corporates do not disclose the data relating to ESG policies and implications based on such policies in real time scenario. Also there is a opinion that some businesses are motivated mainly on the profit perspective and perform ESG related objectives as part of their operations out of compulsion in various ways like Government regulations or motivated ESG investors in the group and so on. Also, preference and tendency for rapid growth rate of the business over quality and ethical responsibility; to focus on capturing of the market with large share as well as striving for fame through these can also be considered as high resistant and bias. This is mainly on the reflection of debate of whether financial risk to better

performing investments could be given reduced priority over the ESG concerns. This dilutes the key perspective ESG in investment decisions and tends mainly towards profit and other monetary gains which could be a huge setback for fragmented growth in ESG for business portfolio. Hence there is a definite need for redefining the policies, regulations related to ESG investments using appropriate scientific tools, techniques for benchmarking as well as adapting appropriate technology to facilitate the same in feasible, realistic and robust way of approach.

### 2. Purpose of the Study

The purpose of this study is to examine the importance of Environmental, social and corporate governance in investment related decisions as well as policy making; and describe current influencing status of ESG in various ways as well as to identify the benefits and concerns through ESG in Startups investment. This paper also describes the use of various technological advancements in effective implementation and utilization of ESG at both Policy making as well as investment decisions. This paper mainly focuses on the study of effective ESG based sustainable investment in startups culture through relative technological advancements.

## 3. Analysis

Investment decision or so-called Capital budgeting is the key starting point for any business proposal towards success. It is the proportionality between the risk taken and the satisfactory returns. Investment decisions involve deep analytics of various kinds of related data in different dimensions such as fundamental analysis, technical analysis, PEST (Political, Economic, Social, Technological) analysis, SWOT (Strength, Weakness, Opportunity, Threat) analysis, Sensitivity analysis, ratio analysis and so on. Any business investment applied is also relates to be part of a 'global citizen', with certain responsibilities and rights. Hence the investment decision should not focus on just the key business aspects but should involve criteria related to various factors and indicators involving ESG and more. The start-up or corporate utilizing this investment should have good Governance policies for all part of ESG in place such as its tendency towards human rights, employee benefits, discrimination, carbon emissions, global warming, water usage, Corporate Social Responsibility objectives and so on. By this the investment decision could be framed as a well responsive investment. It can indicate on the preparedness of a business to handling risks with potentially high negative consequences. For example, to make an investment decision in Aquaculture at a particular region, various factors influencing the same has to be considered as given below.

- 1. Local laws and standards relating to this investment. For example, standards in American continents and Europe may differ with respect to freshwater aquaculture and brackish water aquaculture.
- 2. Environmental issues and bio-diversity factors have high influence in long term strategy.
- 3. Infrastructure and political stability.
- 4. Cost related to labour, tax and availability of resources / raw materials.
- 5. Depending on local market capacity, export has to be planned.

There are various tools and techniques that solve complex equations to give quantitative values in these investment decisions. According to Chin (2012), Quantitative models provide values based on scientific techniques in performance, asset allocation, active and passive approaches and so on. It provides objective analysis on short term analysis to long term results. It eliminates emotions out of the equation by applying mathematical models over the negative impacts of behavioural finance and provides improved 'forward information' and repeatability. But the factors influencing this are not always quantitative. And to large extent, certain factors are difficult in analysing by quantitative means. Some other factors can influence quantitative indicators like the social issues in Corporate. It involves sociological, economic and psychological impact with respect to change in values, patterns as well as characteristics. Some researchers are of the view that in Corporate the social views are in a bottom up approach. For example, there will be huge difference in implementation between when a eco-green initiative is taken by Top management of a company or by a Trade Union. Also, the sustainment through collaboration and discussion should be open and substantive with available opportunities. Hence ESG influence is determined by factors in a collective mode such as the ethical behaviour, building relationships, connecting the reputation to the values and operation in ESG also, providing region specific values and practices and a clear policy on bottom-up and top-down approach. Similarly measuring of return should also pass by these factors to a quantitative indicator to indicate the growth level. The improvements in social and corporate Governance influenced by above factors can gradually then lead to the Environmental factors too, comprising of a complete ESG values to the entity.

Environmental, social and corporate governance can be considered as a multi-dimensional principle influencing the issues related to investment decisions. It involves the major Environmental concerns like climate

change, bio-diversity, sustainable eco-system; the major Social concerns like Right to life as well as peaceful life, consumer protection, discrimination on demographic diversity; the major Governance concerns like Employee issues, management structure and so on. The ESG influences the term 'Responsible Investment (RI)' with ethically defined parameters. But RI is inversely proportional with short term goals and gains. RI can succeed only in long term strategic investment decisions. Many short to medium investments may collectively form a long-term RI but framing such a prototype itself should be part of Sustainable Investment. For example, initial phase of one investment decision may not indicate water scarcity through this investment. But a strong chain of investments in future may lead to Environmental issues. Hence a proper risk, PEST and sensitivity analysis about side effects needs to be done as a scientific research with appropriate tools and techniques to make sure the final prototype is also part of RI. Both individual as well as institutional investors in developed countries like Japan and United Kingdom give high priority to RI.

According to the report by European Commission, awareness of ESG based sustainable investment is high among the investors in different categories including institutional investors, business federations, NGOs, investment research agencies, auditors, credit agencies and so on. As indicated above, this report also concerns about the short term investments not coinciding with the ESG concerns as do the long term investments for the sustainable investment decisions. The main reasons according to this report for such cause are the financial regulations and tax/duty difference based on short/long term investments. It also stresses on the reliability of information related to ESG available to investment decisions. Similarly, according to the opinion of investment research institutions, there is significant lack on the metrics to benchmark and compare on RI performance to provide strategic advisory on ESG based investment decisions.

According to Talan (2019), the ESG based sustainable investment have significant recognition with high growth rate in Europe, Australia and American continents compared to the Asian developing countries. Hence, Talan has categorized the sustainable investment into three categories of research viz. holistic approach to solve unequal effects related to corporate sustainability, increasing the growth rate of ESG in developing countries and metrics to measure RI obtained based on sustainable ESG based investment. Talan is also of the focus that there is lack of research related to sustainable and ESG based investments in developing countries with insignificant proportions showing up less awareness. This is derived from the Global Sustainable Investment Alliance confirming that America and Europe constitute together for about 95% of the overall ESG based investment assets whereas Asia has a very low share of 0.2% which can be considered as a negotiable figure. This also reflects in the investment growth rate related to ESG, the America is at the top level followed by Canada and Europe and then the Australia. But according to the Asia-based Chartered Financial Analyst (CFA) Institute, Asia has a dynamic and growing ESG investment sector with around US\$500 billion ESG assets under management. This makes up about 2.2% of the global ESG market of assets under management, which is currently estimated to be US\$23 trillion. This trend is expected to improve specific to Asia with lot more investments relatively in ESG framework for social responsibility and sustainable development progress in an active approach (Toh, 2018). Similarly, according to Bayani (2019), Japan's Government Pension Investment Fund (GPIF) has given a portfolio target of 10% of its US \$1.3 trillion assets towards the ESG compliance in near future. This is followed by other Asian peers like South Korean entity called National Pension Services (NPS), Monetary Authority of Hong Kong, Bureau of Labour Funds in Taiwan and also the private entity AIA Insurance group.

Without sophisticated tools based on scientific methods and techniques to give quantitative values related to the ESG factors, there is no single method for accurate statistics in this regard. It is vital for adaptation of latest advanced technologies to provide such tools, as a software based approach using scientifically framed methodologies, frameworks from the combination of different tools and techniques to provide useful information about ESG investment decisions and well as the RI to financial returns ratio supporting and recommending right decisions towards ESG compliance ethically. This may also incorporate the necessary regulations, periodically aspects in various ways and the growth rate. Data mining to obtain such information using various relative technologies at affordable cost using well defined and widely accepted metrics will boost the ESG based invest strategic decisions as a sustainable and RI.

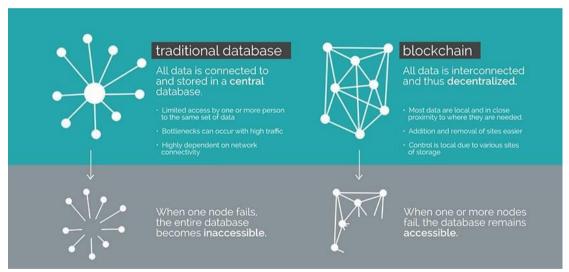
## 4. ESG Investment Decision through Artificial Intelligence

The technological influence to innovation and digital transformation is applied in every sector today. The ESG also cannot be an exception. The quantitative models that provide index for ESG values as well as the improvement measures and factors influencing ESG based Investment decisions criteria are all part of this. This could guide the managerial and social decisions in a well improved manner with transparency in less cost and time. According to the United Nations Global Compact report on Responsible Investment, Technologies like

Artificial Intelligence (AI), digitization, automation and Blockchain play a key role in investment decisions related to ESG by Institutional investors. Data Science and analytics extracts meaningful data from various data sources to provide the forecast about future gains through the use of various tools and techniques. Hence data and tools to process the data are important for the investors in their strategic decision making process. The Artificial Intelligence can be considered as a boon which supports in various ways by providing multiple analytical functions to support this process. It involves data modeling by AI algorithms to provide useful statistical data from different sources available. But this is possible only if key data sources are available to process the respective data using these AI algorithms to get rich analytical reports.

## 5. Blockchain and ESG

The technological influence in ESG based investment decisions is growing gradually. Abundant software tools are available to recommend best RI with top rated factors reasoned as report supporting such decisions. It includes legislative concerns, international standards, environmental factors related to United Nation Conventions, sustainability and so on. According to Steinberg (2019), Blockchain, one of the latest technological advancement has lot of overlap with ESG based investments. For example, the consensus mechanisms and ability to gauge participants preferences of blockchain are spurring tremendous innovation in this area. Similarly, according to Snevd (2018), blockchain technology can overcome major ESG related issues such as high energy intensity, lack of regulations and industry standards, security and data privacy laws. Blockchain spending by many blue-chip corporates have doubled in 2019 to an estimate of US \$2.1 billion and expected to reach massive amount of US \$9.2 billion within 2021 including the solutions related to ESG. It can provide ESG related supply chain management, renewable energy distribution with a powerful sustainability solution. Blockchain is not a new technological invention, but it has improved exponentially in past 2 decades. Blockchain originated from the concept of P2P or the Peer to Peer Networking for improved security through Cryptography among untrusted peers connecting together for a common goal. Although it is predominant with the digital currency mining, it's use case is expected to be much beyond that with applications in various segments including the ESG. It is basically a decentralized and distributed form of networking with peers in various ways. The peers may or may not be known to others in the network. The authentication can happen in multiple ways like a permissioned blockchain (proving the identity by a known form of recognition such as Government identity or authorised digital signature) or permissionless blockchain (proving identity by a challenge sequence and cyptography) and the peer identity maintained by Membership Service Providers (MSPs) thereafter. The differentiation of blockchain to the traditional mechanism is given below.



**Figure 2.** Blockchain versus traditional data interconnection Source: https://faizod.com/blockchain-technology/

Basically, the blockchain is popular by the concepts it contains viz. the ledger and Smart Contracts. The ledger is any normal ledger of transactions between the peers attached to the blockchain in a highly secured manner that breaking integrity of such ledger/blockchain is very diffcult. The Smart Contracts are the actual executing digital contracts with certain terms and conditions in the ledger available. It executes based on certain conditions and does a lot of validation before execution making it powerful in the environment. A block in a blockchain is a set of transactions executed with these Smart Contracts together for different peer. Each block can't have more than one transaction of the same peer thus making it sequentially secure in integrity. This is

achieved by the Cyrptographic hash technology used in it for mining the blocks which are very difficult to tamper or editing the transactions after they are executed. Hence this also provides non-repudiation. Being a decentralised and distributed form of ledger, each peer will have a copy of all transactions in the network, so that no single or group peers can dominate and make changes in the network, thus eliminating the monopoly. It is also more transparent, secure, collaborative and accurate. This openness is considered one of the main advantages of blockchain which can also be a huge gain for the ESG criteria. For example, blockchain's Smart Contract execution can check and validate the necessary regulations and compliance before adding that transaction to the block. Only if all the ESG compliance is applicable in the validation stage, the Smart Contract will be executed. This will give more relief to the entity as well as the investors in their ESG based criteria in strategic decision making. Also, the relevant public and institutional authorities can also verify and certify the transaction as a digital contract to provide an additional security measure in the segment. With all platforms digitized this will take very less time and provide more accuracy as well as transparency in the process.

According to Beck and others (2018), the consensus mechanism and Decentralized Autonomous Organizations (DAO) concepts of blockchain can provide tremendous contribution in the Corporate Governance, which is one of the key segment of ESG. Termed as "Blockchain Economy", this can provide new organizational designs as DAO with autonomous entities and related rules that can be enforced autonomously with decision rights, accountability and incentives with Corporate sustainability. But they also raise concern about the cost and privacy of implementing their model of approach. Although, blockchain has cost and scalability issues, it can be reduced to certain extent and made as a key factor in cross collaborative environments where confidentiality and transparency are considered as critical factors. Another key factor of influencing blockchain mechanism in ESG is the ability of supply chain and reducing the hazards. When there is transparency and heavy fine for noncompliance, there will be clear objectives set by business entities for compliance related factors and the ways for implementing them in a complete sense. This can be achieved with high efficiency using the blockchain economy which is decentralised and easily verifiable. Hence it will be very hard for the involved business entities to hide their non-compliance from the public view. Also, Smart Contracts execution to the ledger in blockchain can be automated on all possible combination of desired rules which can be both time and money based. Hence, the compliance regulations can be implemented easily in an automated rule based system coded to execute in regular time frames. This will play a vital role in all the use cases described above. Similarly, it provides protection from unauthorized tampering or changing of rules after the execution starts. Hence the periodical execution indicated above cannot be changed by any individual or group with the intention of fraud purposes. At the same time, authorized updating or tracking of the progress periodically is made simple. This shows that the legitimate process can be achieved by simpler means but the fraudsters will be discouraged to try their luck in this regard. But another key concern is the time taken to implement such an effective strategy in real scenario with a robust and secure architecture. As this technology is still evolving and implementation involves huge cost, there is a need for Government policy level changes to boost its growth.

Already cloud based majors like IBM have come with readily deployable solutions and easy way of implementation in the blockchain architecture to make it as a service. For example, blockchain can be applied in the electronic recycling business opportunities. Various Smart Contracts as a chain can be executed to provide effective recycling process that is connected throughout a product lifecycle. This blockchain may track a particular raw material made into an electronic product, sold to a consumer and then taken to recycle process after its life time and then becoming part of new product in the eco-balance. By use of such technology based life recycle, e-waste problem can be easily tracked and reduced to large extent. This is also affirmed by the report from the United Nations Global Compact on Responsible Investment and Blockchain. According to the report, blockchain can also provide effective solution related to ESG in decentralizing share depositories, enabling shareholder e-voting platforms, giving voice to beneficiary ESG preferences, real time tracking of the ESG related data like climate chain coalition in green house emissions and related segments, alternative capital raising and so on. The same report also describes such UN initiatives like 'Blockchain for Impact Coalition', 'Blockchain for Social Impact' and 'Blockchain for social good' for betterment in these areas through the application of blockchain concept.

Also, according to Moinuddin (2018), blockchain can help in Corporate Governance for detect of various issues or risks faster and reliably trace the problem back to the specific source. This also provides enhanced initiatives in faster mitigation plans for quality related issues. As blockchain is more transparent and secure with its decentralized structure, it can definitely provide a huge impact on the ESG based investment decisions. This is also visualized in the UN report indicated above with United Kingdom based CAPITALusM coming with a blockchain solution to individual investors in setting preferences about their funds allocated diversely in various investment decisions based on the ESG index values. The fund managers will have this as a guide in their strategic decisions. Moreover as indicated above, the Smart Contracts in blockchain will apply a complete

validation before execution to specific ledger to ensure these ESG based preferences by Individual investors are given due values in the strategic decisions by the respective fund managers. If the respective Smart Contract validation is passed then the related Smart Contract terms are executed or otherwise, the event notification is given to every stakeholder about the discrepancy for appropriate correction. Even after execution, all these executions can be tracked and appropriate reports can be generated for further analytics. Similarly, it provides high transparency and security with less time consuming. This way and more in various other similar path blockchain can play a vital role in ESG based investment decisions.

## 6. ESG at Policy Level

ESG being a global concern for improvement (as indicated above), there is a need for multi-focus strategy. European and American peers have been there for few decades followed by Australia and Asia. With specific to the Investment decisions, according to Bayani (2019), Institutional investors of Asian region have already started understanding and implying the due importance of ESG in their strategic decisions. It is manifested by the improved awareness and interest to include ESG as an essential criterion of investment decision between asset owners and managers. Although Europe started before few years in this and achieved significantly, it is considered to be a slow progress. But with increased understanding, in near future perspective, Asia is expected to outperform the Europe in ESG criteria. This is mainly due to the reasons like increase in awareness as well as the regulations improving towards the ESG-compliance. Lack of tools in determining the ESG rating for both businesses as well as countries is still a big concern. Although significant improvement is seen in the past decade, still there is need for systematic tools that are accepted and used globally. Hence appropriate measures in collective manner are essential among global bodies like ISO, which can be used with the AI tools as analyzed above.

In India specifically, huge measures are taken in recent past for ESG awareness, although it started late compared to the developed countries. The Government with its special care for Environment wellness and global ESG improvement has been continuously insisting on various measures including the UN conferences. The Government has revised its Environmental policies for more sustained development as well as creating awareness among startups and Corporates for Environmental and Social Care. The Government has given lot of startup scheme benefits including the ESG based compliance clearance through simple online procedure which comprises of 6 Labour laws and 3 Environmental laws just by a self-certify compliance. Still there is a lot of room for further legislative and strategic actions by the Government to exponentially accelerate the ESG segment so that it can improve better than the American and European peers. There could be subsidies and more benefits for startups that use technology for Environmental and sustainable development. This will encourage investors in their ESG decisions to turn their focus on such startups. Similarly, Corporate can be encouraged for more research oriented to Environmental and Social factors. The Government supported success business concept of Self-help groups in India can also be extended to support in this regard. Afforestation, waste recycling, renewal resource improvement, agro based eco-friendly and organic production can be improved by empowering such Self-help groups towards both the awareness programs as well as real workers. For example, in some of Tamil Nadu State, with the support of State Government, women self-help groups are engaged in creating eco-friendly and organic seed growth scheme in various ways which are self-realized to grow without much care by Agro workers. This kind of schemes and word are done without any systematic tools or the technology influence. The Government can bring schemes to improve such initiatives, so that with the support of Government, ESG based investments can be integrated for large value of benefit in various phases across the region. Similarly, the Government should by itself setup a independent agency with legal regulatory authority for credit rating of the businesses based on ESG compliance so that it will be a great support for the investors in their strategic decisions. This credit rating can be done based on the technology like AI and Blockchain as a transparent and systematic process in secured manner as analyzed in detail above. This credit rating and subsidy scheme with necessary technology influenced implementation mentioned above will definitely encourage more investors in their ESG based decisions as well as promoting growth of ecological and social factors.

# 7. Conclusion

Urbanization through increase in population and pollution has become a major challenge to eco-friendly environment for more than a century. Hence various measures are taken to improve the Environmental and Social factors across the globe. The success of ESG factors in investment decisions of Startups can be considered as one of the significant need to a more sustainable ecosystem in this Earth. In order to fulfill this need, this paper presented a study about the technology based evolution of ESG in policy and decision making criteria for various strategic investments in startups, so that the relationship bondage of profit-driven and ESG based investment breakthrough can be improved.

#### References

- 1. Beck, Roman & Müller-Bloch, Christoph & King, John. (2018). Governance in the Blockchain Economy: A Framework and Research Agenda. *Journal of the Association for Information Systems*. 19. 1020-1034. 10.17705/1jais.00518.
- 2. Chin Carlton (2012). Blog on *Improving Investment Decisions with Quantitative Analysis* https://seekingalpha.com/article/879811-improving-investment-decisions-with-quantitative-analysis.
- 3. Craik, David. (2019) How AI can help find ESG opportunities, http://www.morningstar.co.uk/uk/news/193882/how-ai-can-help-find-esg-opportunities.aspx
- 4. Cruz, Bayani S. (2019) *Asian investors beginning to understand the importance of ESG*, https://esg.theasset.com/ESG/38205/asian-investors-beginning-to-understand-the-importance-of-esg
- 5. Deutsche Bank, Big Data shakes up ESG investing (2018) https://www.dbresearch.com/PROD/RPS\_EN-PROD/PROD000000000478852/Big data shakes up ESG investing.pdf
- 6. Environmental, social and corporate governance (n.d).
- 7. https://en.wikipedia.org/wiki/Environmental,\_social\_and\_corporate\_governance.
- 8. European Commission, Long term and sustainable investment (n.d).
- 9. http://ec.europa.eu/information\_society/newsroom/image/document/2016-44/feedback\_final\_pc\_30068\_en\_19173.pdf.
- 10. Monga, A. (2008) "E-government in India: Opportunities and challenges", *Journal of Administration & Governance*, Vol. 3. No. 2, 2008, pp 52-61
- 11. Moinuddin, Syed. (2018) Blockchain: A new ESG tool, Retrieved from https://www.sustainalytics.com/esg-blog/blockchain-new-esg-tool/.
- 12. Sneyd, David. (2018) "ESG Viewpoint Blockchain solutions to ESG problems", https://www.bmogam.com/gb-en/intermediary/news-and-insights/blockchain/.
- 13. Startup India (n.d). *Startup India Scheme benefits*, https://www.startupindia.gov.in/content/sih/en/startup-scheme.html
- 14. Steinberg, Rayne (2019). *Is Blockchain the ultimate ESG investment*. https://medium.com/arca/is-blockchain-the-ultimate-esg-investment-8547d4f6cb35
- 15. Toh, Darren (2018). The Rise of ESG & Sustainable Governance in Blockchain, Blog https://www.nasdaq.com/article/the-rise-of-esg-sustainable-governance-in-blockchain-cm999779 cm999779
- 16. Talan, Gaurav and Gagan Deep Sharma (2019). *Doing Well by Doing Good: A Systematic Review and Research Agenda for Sustainable Investment, Sustainability*, https://www.mdpi.com/2071-1050/11/2/353
- 17. United Nations Commission of Sustainable Development (n.d). Sustainable Development Goals, https://en.wikipedia.org/wiki/Commission on Sustainable Development
- 18. United Nations Development Programme (n.d). Sustainable Development Goals, https://www.undp.org/content/undp/en/home/sustainable-development-goals.html
- 19. United Nations Global Compact (n.d). Responsible Investment and Blockchain, https://www.unpri.org/download?ac=4522
- 20. Wan, Fan Cheuk (2018). The rise of ESG investing in Asia, Article.
- 21. https://www.businesstimes.com.sg/hub/whos-who-in-private-banking-2018/the-rise-of-esg-investing-in-asia

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