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Editorial

Articles

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Editorial

Special Issue Call for Papers: Impact of COVID-19 on Societies around the Globe

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Deadline for submissions: August 31, 2020

The "Journal of Advocacy, Research and Education" [ISSN 2410-4981] is a double-blind peer-reviewed journal that accepts high standard articles. The journal is announcing a call for papers that focuses on the multidisciplinary impact of COVID-19 on societies around the globe.

All article submissions to the journal are free and accepted papers will be offered expedited peer review and prompt editorial decisions. Submissions in all disciplines may include results of empirical research, case studies, short reports, commentaries, correspondence, meta-analysis, and reviews. Additionally, these submissions will be accepted on a rolling basis and reviewed by experts in the field.

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Questions can be sent to the Lead Editor, Jacob Owusu Sarfo, Ph.D. (✉ sarfojo@gmail.com or jsarfo@anu.edu.gh)

Thank you and hoping to receive your brilliant submissions.

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Articles

Assessing the Scope of Impact, Impact Measures and Factors Influencing Social Enterprise Impact Measure Selection across Africa

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Abstract

Social enterprises have been identified as one of the ways of tackling some of the most challenging social problems around the globe. Despite, being touted as indispensable to the developmental agenda of most developing economies, especially across Africa, very little effort has been made to understand the scope of impact and impact assessment measures adopted to evaluate the activities in the space in the continent. The current study is an inquiry into the mechanisms adopted by SEs in their impact assessments within Africa. Additionally, the research focuses on the scope of impact of SEs across the continent. The results revealed an imbalance in the use of the two categories of impact measures; "individual-based impact measures" and "non-financial impact measures". SEs have relied more on "what we do" and numbers to justify their impact in several parts of the continent. Additionally, the research also revealed that some of the impact areas of SEs included poverty and inequality; education and technology; entertainment; child empowerment; girl and women empowerment; youth empowerment; and social welfare and disability. The research recommends that SEs should endeavor to measure their impact from a comprehensive perspective, to align their activities and measures to the broader national and/or global agenda.

Keywords: Africa, impact measures, impact, social enterprise.

Introduction

Social enterprises have been identified as one of the ways of tackling some of the most challenging social problems around the globe (Kickul, Lyons, 2012; Noruzi et al., 2010). Most of the problems that social enterprises tackle are problems governments have struggled to effectively address. Consequently, this has necessitated Public-Private Partnership into the social space in a desperate attempt to mitigate the negative effects of such social menaces (Coleman, Kariv, 2015). As a result, social enterprises have become indispensable to the developmental agenda of most developing economies, especially across Africa. This is because of their potential to impact various sectors such as sanitation, education, and assess to good health. Thus, their focused efforts in the

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social space have the potential to ripple several benefits across numerous sectors of any economy. This, notwithstanding, social enterprise efforts across Africa have been scattered in tiny bits across several sectors, with little or no effort made to understand the scope of activities in the space. As such, an analysis (scope of activities) into the space across Africa is necessitated to reveal the focus of social enterprise efforts across the continent. This may reveal areas of consolidation.

In developing economies like Ghana, some recent empirical evidence has revealed project-specific impact assessments are common practices of social entrepreneurs (Adomdza et al., 2016). Notwithstanding this recognition, a major problem of social enterprise is how to measure impact from a broader perspective; for example, how social enterprise activities align with the strategic development goals of a country or region (Haski-Leventhal, Mehra, 2016). This situation has necessitated an inquiry into the mechanisms adopted by these firms in their impact assessments, especially within the African region. Some of the questions posed by current research include:

- What is the scope of impact of social enterprises (Thus, who are SEs affecting and what sectors are they impacting) in Africa?
- How are SEs measuring their impact in their host communities (Thus, whether they are impacting their target beneficiaries or not)?
- How do SEs select impact measures?
- How proportionately balanced are impact measures used by these SEs in assessing their impact?
- How can SEs improve their measurement mechanisms?

Stemming from this, the present study seeks to understand the scope of SEs across Africa (areas of impact), their impact assessment measures, and how these impact assessment measures are determined. The study will attempt to achieve this via an analysis of previous impact assessment evidence, and a primary assessment of a case-by-case review of the tools employed by some social enterprises across Africa. The study attempts to identify all levels of impact variables (firm, individual, national, etc.). The current researchers are of the view that an understanding of the impact measure of SEs, may aid the postulation of an approach that may ensure that impact assessments are not skewed. The finding of this study may be useful to help to identify impactful SEs across the continent.

As an outline of the discussions in the study, the research considers the scope of social enterprise research across Africa; detailing the geographical and subject focus of extant studies in the field. Additionally, the study also attempts to review the impact of social enterprise across Africa; in terms of research and practice. Some effort is also made to discuss popular impact measures that have been employed in evaluating and monitoring social enterprises. As a foundation for further primary enquiries, the review section considers a background analysis of selected social enterprises.

Research Scope

Several social entrepreneurship studies have been conducted over the years by researchers across the globe, especially in sub-Saharan Africa. These studies have in most cases explicitly and implicitly suggested and discussed the relevant role of this form entrepreneurship in most developing countries. Despite these relatively extensive reports, very little is known about the impact measures adopted by these entrepreneurs in assessing their performance. Additionally, there seems to be a scarcity of empirical evidence suggesting the specific areas of impact and balance of the impact measures. Furthermore, the scanty evidence on social enterprise impact assessment has also not done much to assess and affirm the factors influencing the choices of impact measures adopted by these firms. Additionally, to offer specificity to the impact narrative, the current research also identifies specific impact stories from across Africa, pinpoint specific impact "barometer" indicators adopted by these entrepreneurs, and the developmental focus of these organizations, against the background of their host country.

The Global Entrepreneurship Monitor's 2009 Global Report indicates that social entrepreneurs in developing countries focus mainly on elementary issues and pressing needs such as basic health care provision, access to water and sanitation, or agricultural activities in rural areas (Bosma, Levie, 2010). In addition to assessing the focus area of social entrepreneurs in Africa, the

study conducted a review of studies that have investigated impact assessment among social entrepreneurs.

Impact and Outcome Measurement Approaches

General Overview

The performance of a social enterprise can be measured subjectively or objectively. Likewise, performance can be assessed from the operational or financial lens. In other instances, there are special "pre-impact" assessment approaches such as those employed by the Ashoka East Africa Foundation to admit members into their fellowship. The approach follows a four-stage process that evaluates the historical performance of a social enterprise; innovation and ability to create long-lasting change. Thus, the pre-impact assessment approach, focus on the ability of an idea to create social impact (Ashoka, n.d.). Most enterprises (i.e. Profit, non-profit, or both) adopt either, efficiency or growth and liquidity measures along with other subjective measures (Murphy et al., 1996). In recent times, social investors are looking to commit financial resources to social enterprises that deliver on both ends of "returns continuum", thus, social change and decent financial returns. For instance, Ashoka identifies and invests in social entrepreneurs who are willing to lead social changes in education and youth development.

Social ventures are set up to create and sustain social impact and hence their performance is measured by their ability to do so. Most of the indicators used to measure performance among social enterprises are often a mirror of indicators used by for-profit businesses. Concerning the former, social change and sustainability receives much priority than profit. In the social entrepreneurship space, literature that explores the reporting practices of impact created by social enterprises is sparse. In the commercial venture space, established accounting standards that have evolved have been used to report impact. Thus, while there seem to be established reporting practices in commercial ventures, there is a lack of such practices among social ventures. Nicholls (2009) identifies some factors explaining why there is a scarcity of established reporting practices for social ventures. The aforementioned author explained that this had to do with the item to be measured and reported. Links between factors like grants, volunteers' contributions, social capital, and the social impacts that correspond to the mission of such establishments are difficult to measure. Unlike social enterprise, their commercial counterparts operate within well-established structures and markets and hence it is easier to measure their output. As posited by Nicholls (2009), the institutional complexity of social enterprises poses a challenge in measuring the real impact of social enterprises.

The unavailability of a standard quantifiable mechanism for social value creation and a unit against which results will be compared raises questions on how to measure what has been reported. Economically, the value of social good can only be quantified by eliciting what a beneficiary or consumer of the social good will be willing to pay for the continued enjoyment of that good. However, for social ventures, resources are allocated based on trust and market positioning. The results and impact of existing reporting practices are always long terms than the short term in nature. Hence, social entrepreneurs have difficulty assessing short-term impact. Conventional reporting practices have ignored the full value creation offered by these social ventures especially in the short term. Existing reporting practices favour commercial ventures that are solely evaluated by financial terms. Social enterprise, on the other hand, starts off to serve a social mission and not getting into the trap of profit maximisation (Mair, Marti, 2006).

Nevertheless, there are several approaches to measuring social impact emerging in literature (Nicholls, 2009). Most of emerging approaches are qualitative and focus on the descriptive narration of outcomes and success stories. Such metrics are however non-comparative and focuses on the question 'what did we do?' A limitation to a metric of this kind is assigning an appropriate value to each unit of the result. For instance, in one enterprise, the number of clean waters provided with developmental money and to another enterprise, the number of unemployed given employment. An approach such as this is rarely comparative.

Single and Double Bottom Line Method

Annually, all social enterprises that are registered as companies with the Registrar General's Department are required by law to submit their financial accounts for review. According to Ucbasaran et al. (2001), the outcomes or impact of social enterprises has been measured

traditionally based on financial standing and firm survival. However, this practice of assessing impact fails to acknowledge the social and environmental gains of such entrepreneurship. More to that, most studies on the impact of entrepreneurship are done at the individual, local and regional levels and few studies are done on multiple level impacts (Haugh, 2006). Double bottom line method by definition measures fiscal performance by adding a second bottom line to measure the performance of enterprises or firms in terms of positive social impact (Emerson, Twersky, 1996).

Triple Bottom Line

This is by far the most widely used qualitative social metric according to Elkington (2004). This model assesses impact not only from the traditional measures of financial performance but also integrates social and environmental outcomes. Thus, each of the three assessment components is considered in evaluating the impact of a social project. Unlike the financial accounts which are quantitative, the social and environmental audits are descriptive and mostly subjective rather than objective. Any external comparative dimension is typically lacking for this approach since there is no common and agreed social and environmental performance benchmark.

Balanced Scorecard

The balanced scorecard is another qualitative method used to measure performance. Non-profit organisations mostly adopt this method of performance measurement. This approach to performance measurement defines a causal link between non-financial performance measures and the achievement of the mission. "The adapted Balanced Scorecard involved defining mission success by setting and then testing organisational objectives with respect to a range of stakeholders aligned to an internal process and organizational learning" (Kaplan, Norton, 1996).

Social Return on investment (SROI)

This measurement approach was first developed by the Roberts Enterprise Development Fund and tested by the New Economics Foundation. The approach is based on the traditional cost-benefit analysis. The approach works by assigning monetary values to social and environmental returns. This provides an opportunity to show a wider value creation. SROI is a measure of the intersection formed as a result of the interaction between social, environmental, and economic impacts. Hence a relationship can be drawn between the two assessments. Despite the popularity of the above tools, literature in this area shows limited usage of these tools by social enterprises (Nicholls, 2007). For instance, Bertotti et al. (2011) analysed data using the 2009 social enterprise survey and discovered limited adoption of impact measurement tools in the social enterprise sector. SROI is reportedly being used by only 1 % of health and social care organizations. The same study found that only 65 % of health and social care organizations did measure social and environmental impact. Considering those who did measure impact, the majority used internal tools or social audit.

Research Gap in Current Literature

Extant social entrepreneurship literature has primarily been based on case studies and anecdotal evidence to explore the phenomena of social venture creation. Thus, systematic data collection efforts are lacking (Mair, Marti, 2006). This is mainly due to the lack of consistent measures used to measure the value created by these social ventures (Dees, 1998). Standardized and widely accepted measures of value creation are still at the infant stage. Additionally, questions have been raised as to whether impact measures adopted by most firms are not only one-sided, thus either focusing too much on the number or the quality of impact. These grey areas open opportunities for recent empirical assessments to focus on impact areas of SEs; assess the balance of SE impact measures and factors influencing the selection of such measures.

Context of the Study

Background of Select SE Organizations across Africa

To offer a contextual understanding of the present study, a background review of all the select organizations considered for the study was undertaken. This includes a secondary enquiry into the country of origin of the organizations; sector; beneficiaries/target population; products/services and founders. The organizations were selected based on regional categorization

depending on the geographical location of the country of origin. Thus, an effort was made to ensure that every geographical category (North, South, East, West and Central Africa) was represented in the study by at least one Social Enterprise from the region. Discussed below, are select social enterprise organizations from each of the aforementioned country classifications in Africa. This effort seeks to offer a foundation for some assessment into the impact of social enterprise organizations across Africa.

Research Sample and Sampling Method

With respect to the primary research component, 10 social enterprises (entrepreneurs) in the 5 geographical classifications were selected for the study. The study considered qualitative data from in-depth interviews with the selected social enterprises from the different regional categories. These social enterprises were purposively and conveniently selected from a number of recognized social enterprise platforms including Reach for Change, Ashoka, Social Enterprise Ghana, Ashesi Innovation Academy and general online social platforms.

Firstly, the social enterprises were purposively selected to ensure that at least one of the social enterprises was from one of each regional category: North Africa, East Africa; West Africa; Central Africa and South Africa. Secondly, the convenience sampling technique was adopted to ensure that social enterprise organizations considered for the study had enough secondary background information, necessary for the present study on their respective platform, plus they were available to participate in the study. The qualitative data was analyzed with an Interpretative Phenomenological Analysis' (IPA) idiographic guarantee (Smith et al., 2009).

Table 1. Demographic Summary of Respondents (Social Enterprise – SE)

Organization Name	Host Country	Sector	Product	Beneficiary (-ies)
SE1	Ghana	Health and Sanitation	Recycling	Community/Children
SE2	Kenya	Women Empowerment	Mentoring; Leadership etc.	Young Girls and Women
SE3	Uganda	Sex Education	Awareness Creation	Young People
SE4	Egypt	Health & Blood Donation	Website that connects people	Patients that need blood
SE5	The Gambia	Youth Empowerment	Youth Programs	Youth
SE6	Zimbabwe	Children Empowerment	Children programs/mentoring	Children
SE7	Zimbabwe	STEM	Scientific and Technology Workshops	Tertiary Student
SE8	The Gambia	Youth Empowerment	Youth Programs	Youth
SE9	DR Congo	Disability	Awareness Creation and Support	Persons Affected with Disability
SE10	Rwanda	History & Entertainment	Leadership Camps and Concerts	Community/ Youth

Summary of Respondents (Social Enterprise – SE)

The Table 1 shows the countries that were considered for the research. In all 8 African countries participated in the current study. In all, 10 social enterprise organizations were included in the research. Three social enterprise organizations were considered from two West Africa countries, namely Ghana (1) and Gambia (2). Two of the respondents were located in Zimbabwe

representing the Southern Africa region. One each of the respondents was from Uganda and Kenya, representing the Eastern Africa region. Similarly, one each of the respondents was from Rwanda and DR Congo, representing the Central Africa region. Only one institution Northern Africa, specifically Egypt, participated in the study. In this respect, the study covers and offers a representative view of social enterprises across Africa, as it captures, at the very least, a view from each of the geographical regional categories. Northern Africa recorded only one participant because of the availability and accessibility (convenience). Most of the institutions in this region were difficult to access and had contacts that were difficult to reach. Consequently, efforts to invite them to the study via email were futile.

Informed consent

Informed consent waivers were included in the data collection. Thus, respondents were allowed to voluntarily consent formally to their participation in the study. This was achieved by disclosing and discussing the purpose of the study and how the study will use the information offered to support the achievement of its specific objectives.

Data Collection

The study purposively and conveniently considered 10 participants scattered across the five geographical regions. The researchers ensured that at least one participant was considered from each region. Secondary data was collected from the websites, Facebook pages, and Linked-In pages of these participants. These sources, offered information on the country of origin of the organizations, beneficiary (-ies), affiliations, products/services/projects and sectoral focus. To ensure data quality, these details were double checked in the primary research interviews to affirm their validity. Additionally, the contact details of the some of the participants were ascertained online from their organization's website. In situations where these details (contact) were not available, links to Facebook and Linked-In profiles were used.

The data collected was in two categories. The first section focused on demographic information of the participants and their organizations. The second section sought to ascertain the impact a participant's organization has had on their host community/beneficiaries and how this impact was measured.

Research Results and Discussion

Figure 1 illustrates the type beneficiaries and focus areas of the social enterprise organizations considered in the study. The hanging fruits are metaphorical used to represent the target beneficiaries that are directly enjoying the "fruit" (work) of these SE organizations. While the labelled stems areas, represent the broader focus areas that the organizations concentrate their impact. In this respect, it is clear that social enterprises concentrate on a variety of beneficiaries and focus areas.

The focus areas were deduced from the secondary data gathered from the respondents and were also confirmed in the interview sessions. Some of the focus areas identified among SE organizations included poverty and inequality; education and technology; entertainment; child empowerment; girl and women empowerment; youth empowerment; and social welfare and disability. Additionally, the beneficiaries of the impact also range from children, youth, young women and girl, person living with disabilities and minority groups.

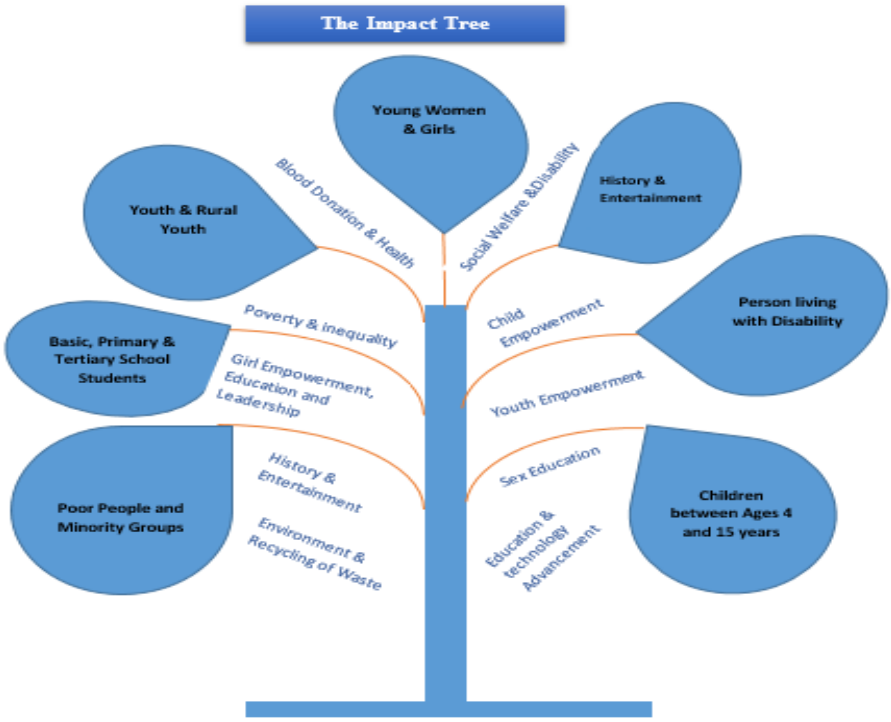

Fig. 1. Illustrating the area of impact areas and beneficiary entities

These results go to affirm the Global Entrepreneurship Monitor's 2009 Global Report (Bosma, Levie, 2009) that social entrepreneurs in developing countries are mostly focused on the elementary issues and pressing needs of their host community. Furthermore, Leadbeater (1997) also corroborate these results by explaining that several social enterprise case study evidences seem to suggest that these organizations act decisively to fill gaps left by the private and public s ectors, as in the case of the above.

The study's findings also support the calls for policy makers and governments to assist the development of the social enterprise space, as its impact across the continent affect several facets, and fill the gaps that are not prioritized by governments and private agencies. Social enterprises affect beneficiaries ranging from all walks of life; from the very educated to the very poor, males and female, able and disabled persons and the young and the old alike. Governments and policy makers must by the evidence shown in the current study, must support the establishment of structures that aid growth and operations of social enterprises in the continent. They must endeavor to support the enactment of social enterprise policies and create a favorable business environment; that allows social enterprises to strive.

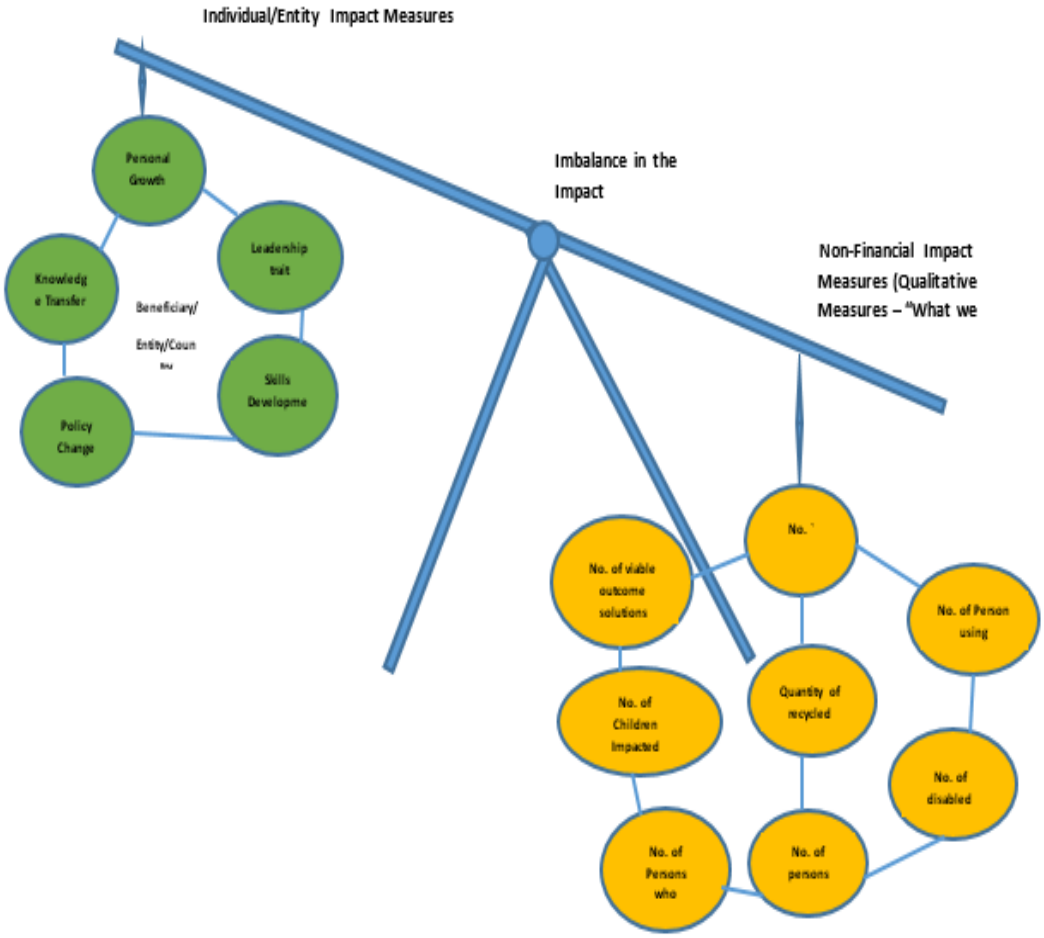

Fig. 2. Illustrating imbalance in choices of impact measures

The Figure 2 displays impact measures adopted by the respondents of the study. The responses provided by the respondents were classified into "non-financial impact measure" – also known as qualitative indicators (Nicholls, 2009) and individual impact measures. "Non-financial impact measure"/qualitative indicators answer the question "what we do?" and often aids in quantifying impact. "Individual impact measures" – include indicators that are focused on the individual beneficiaries and measure personal improvements in the life of the person.

Understanding how to measure and identify impactful social enterprises across the continent was one of the key objectives of the present study. The figure displayed above shows how impact was measured among a sample of social enterprises. The results affirm that most of the respondents adopt measurement approaches and indicators that are mostly "Non-financial impact measure"/qualitative indicators drawn from the Balance Scorecard Instrument. This further confirms Kaplan and Norton (1996) assertion that the Balanced Scorecard is one of the most adopted methods of performance measurement among Non-profit organization. Most of the social enterprises interviewed in the current study had adopted these "Non-financial impact measure"/qualitative indicators in a bid to establish a causal link between "what we do" and the achievement of their mission. The difficulty, however, is that while quantifying the numbers, social enterprises often fail to capture the actual "change" their activities might have achieved on their target groups.

Provided below are some of the quotes corroborating the usefulness of the non-financial impact measures.

Respondent 2: "For us, it's the number of children we reach; the number of collection points we have and the number of plastics we collect".

Respondent 3: "One of the key things they look for is the number of users, and the number of repeating users. The other thing too is the number of calls we receive daily, monthly and annually, the number of requests coming in and the number of referrals. How many downloads of the app do we have, how many text messages are coming in"?

On the other hand, "individual impact measures" were also adopted by some SE organizations to show individual developments that were difficult to quantify or measure on the surface – Such measures include leadership potential development and personality growth measures. These measures are assessed in each individual over a period of time. As shown in the figure above, the measure is seldom adopted despite its usefulness in showing the effectiveness of a firm's activities on its target group after the superficial engagements. The challenge with this metric is that, it is less appreciated without the numbers and often cannot be adopted as a stand-alone measuring tool. Thus, they have to be backed by some figures.

Provided below are some of the quotes affirming the usefulness of the individual impact measures.

Respondent 1: "We would like to measure not by the numbers but say, we trained a girl in 2010 and today, we can know where she is, and what she has been able to accomplish".

The Figure 2 also reveals the imbalance in the use of the two categories of measures, suggesting that SEs have a greater propensity to adopt impact measures that emphasize "numbers" rather than quality and effectiveness. This situation seems popular among social enterprises in developing economies because they mostly believe that donor groups and sponsors are more likely to be persuaded by the huge numbers.

Factors that influence the selection of impact measures

The study also discussed the motivation of SEs for adopting a particular impact measurement. In this respect, the results from the current study revealed that two main motivating factors seem to account for the adoption of these specific impact measures, namely; "sponsor's requirement" and the "organizational objective (s)" of the institutions.

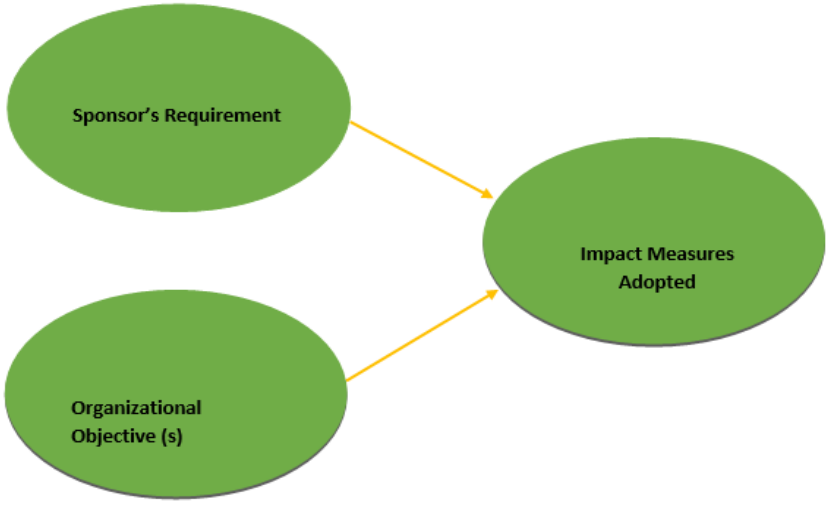

Fig. 3. Illustrating the factors that influence the selection of impact measures

According to some respondents, the adoption of a particular impact measure was often influenced by the demand and funding criteria of sponsoring parties or the expectation of anticipated funding sources. Social enterprises often use impact measurement metrics that are in the line with the expectations and impact requirements of potential or actual donors.

The following comments from one of the respondents illustrate the latter:

Respondent 10: "[…] I mean, we all do have KPIs and each project has its own KPIs. So, for instance, for Donor A (name of the Sponsor), it the volume and quality recyclable waste we get from communities that is set as a yard stick to assess our performance […]".

Additionally, the results from the study also demonstrate that the organizational objectives of SE organizations influence the type of impact measurement metrics adopted by institutions, especially in Africa. This result affirms Kaplan and Norton (1996) conclusion that, some specific performance measures sought to assess the link between the organization's activities and its organizational mission and objectives. Thus, it assesses the link because what the organization does (daily actions of the organization) and its overarching goals. The following comment exemplifies how some of the respondents illustrated this view:

Respondent 1: "We recently got funding from a "Bill and Melinda Gates Foundation" in middle management, and they gave us money to work with 20 organizations, 10 in Kenya and 10 in Tanzania. We would like to measure not by the numbers but say, we trained a girl in 2010 and today (2018), we can know where she is, and what she has been able to accomplish".

While, the findings of the current study reveal that "organizational objectives" and "sponsor requirements" are the main drivers of the impact measures adopted by some SEs across Africa, the current study recommends that social enterprise organizations must endeavor to measure their impact from a broader perspective; thus, their specific measures must be in relation to a broader objective like the strategic development goals of a country or region (Haski-Leventhal, Mehra, 2016).

- What is the scope of impact of social enterprises (Thus, who are SEs affecting and what sectors are they impacting) in Africa?
- How are SEs measuring their impact in their host communities (Thus, whether they are impacting their target beneficiaries or not)?
- How do SEs select impact measures?
- How proportionately balanced are impact measures used by these SEs in assessing their impact?
- How can SEs improve their measurement mechanisms?

Conclusion and Recommendations

The current study considered 10 social enterprises (entrepreneurs) from 8 countries in the 5 geographical classifications (North Africa, East Africa; West Africa; Central Africa and South Africa) of Africa, as case studies for the study. Social enterprises selected for the study were purposively selected from countries in specific regions to ensure every geographical region was represented. Additionally, the respondents were selected from some recognized platforms like Reach for Change; Ashesi Venture Accelerator; Ashesi Innovation Academy just to mention a few. This was done because these platforms have a reputation for churning out impactful and successful social enterprises or entrepreneurs. The findings of the current research corroborated the fact that, SEs have mostly focused on areas that have received little or no attention from governments and private business organizations.

The impact of SEs on these deprived sectors suggests governments must pay attention and proffer policies to support and legitimize their (SEs) operations. On the contrary, the study reveals that governments have offered very little in terms of supports to these organizations. For example, none of the 8 countries considered for study had enacted a social enterprise policy to formally legitimize organizations within the sector. Furthermore, the results also revealed that only one (i.e. Ghana) had a recognized social enterprise organization that attempts to mobilize and set a platform for such organizations to interact. These evidences go to show the lack of support that SEs have to face across the continent.

Though some studies have attempted to capture the impact of social enterprise across developing economies, very few have focused exclusively on Africa. Furthermore, these few studies that have focused on Africa have only tangentially discussed social enterprise organization and have not offered an extensive assessment of their background and engagements. It was one of the prime objectives of the current study to do so. As a result, the study discussed impact stories of select SEs (5) across Africa. Such analysis offers opportunity for the SEs to be assessed in the context of their respective backgrounds and country of origin (See Table 1).

The proclivity to adopt a particular impact measure, according to the findings of the current study, was influenced by the "demands of donor groups/ sponsors" and "organizational objectives". The results showed that SEs adopted more "non-financial impact measures" compared to individual based impact measures. This situation seems to suggest that SEs have a higher motivation to adopt "non-financial impact measures" compared to its counterparts. This could be because donor groups and sponsors have shown appreciation for methods that emphasize huge numbers.

In respect of future and further research, the researchers recommend a critical investigation into the impact of social enterprises from the beneficiary perspectives, as most studies, including the current research focused on the perspective of the SE organizations. The current researchers are of the view that assessing impact from the perspective SE organization may be biased and may not be a true reflection of the actual impact. Hence, a need to consider an assessment that will be focused on the perspective of the beneficiaries. Furthermore, the current study only focused on identifying areas some SEs are engaged as a way of assessing the present areas of focus. Further research can focus on assessing the gaps, thus, what social enterprises are not focusing on, especially across Africa.

Conflicts of interest

The author declares no financial conflicts of interest

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Implications of Intellectual Property Protection, and Science and Technological Development in the Manufacturing Sector in Selected Economies

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Abstract

Several studies have measured the influence of socioeconomic factors, IPRs, science and technology, and innovation-related activities, and government policies on economic growth in developed and developing economies. However, the manufacturing sector contributes a large share in the GDP of most economies. Growth of the manufacturing sector depends upon socio-economic factors, science and technological change associated variables, and IPRs related activities. For this, limited studies could investigate the influence of aforesaid factors on the manufacturing sector across countries. This study, therefore, provides a vital technique to develop the intellectual property protection index (IPPI), science and technological development index (STDI), and socio-economic development index (SEDI) using composite Z-score technique in selected 41 developed and developing economies during 2005–2013. IPPI, STDI, and SEDI are the combined indexes of 7, 7, and 15 associated factors respectively. The aforementioned indexes identify the relative position of selected economies in IPRs, science and technological development, and socio-economic development. As per the assessed values of IPPI, STDI, and SEDI, this study reports that there is a high diversity in intellectual property awareness, science and technology development, and socio-economic development in 41 economies. Accordingly, it measures the influence of aforesaid indexes on manufacturing value-added using country-wise panel data. Linear and log-linear regression models are used to estimate the regression coefficients of explanatory variables. Empirical results indicate that science and technological development, socio-economic development, and intellectual property protection-related activities have a positive and statistically significant impact on manufacturing value-added. It facilitates several policy suggestions to increase the growth of the manufacturing sector worldwide.

Keywords: developed and developing countries, economic growth, India, intellectual property protection index, manufacturing sector, science and technological development index, socioeconomic development index.

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Introduction

Technology consists of the use of science for industrial or commercial purpose and it helps to attain commercial or industrial goals (Çaliskan, 2015). Technology can be defined as an idea or knowledge that may be useful to produce goods and services for manufacturing firms. Technological development has a significant contribution to increasing economic growth and development in several ways in a country. It is a vital driver to create several substitutes to sustain human livelihoods. Technological development improves as an increase in the involvement of scientists in research and development (R&D) activities (OECD, 2014). Moreover, the use of technological development in production activities brings new techniques to reduce human efforts to achieve their desired goals.

Technological development is supportive to increase resource productivity [i.e., human, environmental, financial, social, physical, institutional] (Toader et al., 2018). Consequently, it is useful to maintain the livelihood security of people. Further, technological applications in production activities will be useful to maintain economic efficiency of resources. Also, it is useful to create cheaper goods, increase capital accumulation and maintain the global competitiveness of a country (Çaliskan, 2015). Adoption of advanced technologies is imperative to create employment, new market and infrastructural development in a nation. Hence, it seems that technological development is a key driver to increase economic, human and social development (Çaliskan, 2015; Toader et al., 2018).

Furthermore, science and technology and innovation (S&TI) provide an incentive for entrepreneurs to use existing technologies in the production of goods (Çaliskan, 2015; Satyanarayana, 2008). Hence, innovation has a significant contribution to economic growth (Raghupathi, Raghupathi, 2017). Innovation is scientific knowledge and technological know-how which may be used by manufacturing firms to produce valuable goods and services. It is helpful to construct more startups and nurture a conducive business ecosystem in a country (OECD, 2014). Effectiveness and sustainability of new startups depend upon the ability of entrepreneurs to produce useful goods for consumers. For this, S&TI would be effective to produce more innovative products. Moreover, technological advancement would be useful to increase the efficiency of a mechanical instrument in manufacturing firms. Afterwards, the creation of high-tech goods and services through extensive R&D activities are supportive to create new industries/business firms, market and extensive jobs for skilled and non-skilled workers. More employment for people would be beneficial to increase their contribution to economic development in a country. Henceforth, R&D is a significant driver to improve economic growth and development, social welfare of a nation (Çaliskan, 2015). Furthermore, it is perceived that there is a positive relationship between researchers, research organizations/universities, S&T and innovation, R&D, startups/business, product development, new market, employment and economic development (Çaliskan, 2015; Gould, Gruben, 1997; OECD, 2000).

Researchers and scientists can get legal protection of their research output through an IPRs regime which is implemented by a government (Saini, Mehra, 2014). IPRs regime is a legal rule prescribed by a government to protect the output of researchers and scientists in a country (Adams, 2009; Williams, 2013). Patents, copyrights, trademark, trade secrets, geographical indicators are the various types of intellectual property (IP). Strong IPRs regime provides systematic and legal ways for the use of technologies by manufacturing firms (Adams, 2009; Shugurov, 2015). IPRs protection is profitable in terms of greater domestic innovation for manufacturing firms, which promotes more investment in R&D by public and private players in a country (Cho, Kim, 2017). Consequently, IPRs protection is supportive to increase technological transmission in the public domain within and across countries (Falvey, Foster, 2006; Gold et al., 2019; Hossain, Lasker, 2010; Yueh, 2007).

Furthermore, IPRs regime provides an incentive to discover new technologies and knowledge in scientific fields (Williams, 2013). Also, it helps entrepreneurs to recover their R&D expenses (Laik, 2015; Saini, Mehra, 2014). Strong IPRs regime is useful to maintain technology transfer and technology commercialization in a country (Shugurov, 2015). Moreover, effective IPRs regime is supportive to attract the foreign direct investment (FDI) inflow in a country (Hindman, 2006; Sharma, Saxena, 2012). FDI inflow is useful to create a business ecosystem and additional employment and increase money flow, capital formation and infrastructure development in a country. Consequently, FDI inflow is positively associated with per capita income of a nation

(Hossain, Lasker, 2010). Aforesaid review shows that intellectual property protection is a crucial driver to increase the economic growth of a country (Gould, Gruben, 1997; Lahsen, Piper, 2019).

Furthermore, IPRs regime is a part of the institutional infrastructure which encourages private investments in R&D activities (Yueh, 2007). Several studies have theoretically and empirically have proved that IPRs have a positive influence on economic growth in developed and developing economies (Hudson, Minea, 2013; Janjua, Samad, 2007; Odilpova, 2016; Sattar, Mahmood, 2011). Chang (2011) have reviewed that property right regime has positive implications on economic development. However, Adams (2009) have found a negative impact of IPRs on economic growth in developing economies. Few studies have claimed that the positive effect of IPRs on economic growth is higher in developed economies than developing economies (Schneider, 2005; Yang et al., 2014). Since imitation rate of technologies is high in developing economies, thus IPRs may harm economic growth in these economies. In the aforesaid perspective, existing researchers could not provide systematically acceptable and concrete information on the influence of IPRs and technological change on economic growth in developing economies. Gold et al. (2019) have claimed that the impact of IPRs on economic growth in developed and developing economies are not clear. However, few researchers produce a cause and effect relationship between IPRs and economic growth (Schneider, 2005). Therefore, the impact of IPRs and technological change on economic growth in developing economies is debatable (Azevedo et al., 2012).

In most economies manufacturing sector has a greater contribution to gross domestic product (GDP) (Singh et al., 2019a). Growth of manufacturing sector depends upon socio-economic factors, science and technological change related variables and IPRs regime (Singh et al., 2019a). However, limited studies could investigate the influence of IPRs and science and technological factors on manufacturing value-added across economies. This study, therefore, includes large numbers of factors related to IPRs, science and technological development, and social-economic development to investigate their impact on manufacturing value-added in selected 41 economies. This study addressed the following research questions:

1. What is the association of manufacturing sector with IPRs and S&T related indicators?
2. Which country has a better position in IPRs and S&T as compared to others?
3. How global economies can increase their position in IPRs, S&T and socio-economic development?
4. With regards to aforesaid research questions, this study is achieved the following objectives:
5. To create intellectual property protection index (*IPPI*), science and technological development index (*STDI*) and socio-economic development index (*SEDI*) using *Composite Z-score* techniques for selected 41 economies.
6. To assess India's position in intellectual property protection, science and technological development and socioeconomic development among the undertaken economies.
7. To investigate the influence of *IPPI*, *STDI* and *SEDI* on manufacturing value-added using country-wise panel data during 2005–2013.

Research Method and Material

Selection of Countries

This study compiles IPRs, science and technological development and socioeconomic development related factors using country-wise panel using 2005-2013. The selection of countries is based on the availability of data for prescribed variables. Total 41 countries are found suitable to undertake the proposed research. These economies are categorized in 28-high income; 9-upper middle income; and 4-lower middle-income economies (See Table 1).

Table 1. List of selected economies

Countries	Income group
Austria, Belgium, Croatia, Czech Republic, Estonia, Finland, France, Germany, Hungary, Iceland, Ireland, Japan, South Korea, Latvia, Lithuania, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom and the United States	High income
Argentina, Brazil, China, Colombia, Malaysia, Mexico, Romania, South Africa and Thailand	Upper middle income
India, Moldova, Pakistan and Ukraine	Lower middle income

Source of Data

Essential data for this study is derived from World Development Indicators (World Bank); National Accounts Main Aggregates Database; World Economic Forum; Cornell University and INSEAD; The World Intellectual Property Organization (WIPO); and United Nations Development Programme Database (UNDP).

Process to Create a Desire Index

(i) Selection of Variables: Inter-linkage of variables with desire output is useful to choose the key indicators for socioeconomic development, science and technological development and IPRs regime (Ashraf, Singh, 2019; Singh, Issac, 2018; Singh et al., 2019).

(ii) Classification of Variables: Group-wise distribution of selected variables is a second task for index estimation (Ashraf, Singh, 2019; Kumar et al., 2017; Singh, Issac, 2018; Singh et al., 2019).

(iii) Valuation of Composite-Index or Standardization-Index: *Composite Z-score* technique is used to create a *composite-index* (Ashraf, Singh, 2019; Kumar et al., 2017; Singh, Issac, 2018; Singh et al., 2019). It converts all values for a specific variable between 0–1 to make a reliable comparison across entities. C*omposite-index* is calculated using the below formula for those variables that have a positive association with output:

$$SI_{ic} = \{[X_{ic} - Min(X_{ic})]/[Max(X_{ic}) - Min(X_{ic})]\} \quad (1)$$

Here, SI_{ic} is *standardization-index* for i^{th} variable; *c* is cross-sectional country. $Min(X_{ic})$ and $Max(X_{ic})$ are the lowest and highest values respectively in each series of a variable across countries.

(iv) Assessment of Weight for Each Arbitrary Variable: Weight of each variable is useful to make a study rational with unbiased finding. It also increases the consistency of constituted index. Whereas, weight for each factor is estimated as:

$$Wi = \frac{K}{\sqrt{Var(SI)}} \quad (2)$$

Here, *Wi* stands for the weight (0<W>1 and $\sum_{i=1}^{m} Wi = 1$) that is allocated to the i^{th} variable (Ashraf, Singh, 2019; Kumar et al., 2017; Singh, Issac, 2018; Singh et al., 2019). *Var*(*SI*) is a statistical variation across *standardization-indices* for all variables. In equation (2), weight reveals the significance of an individual variable. *K* is assessed as:

$$\text{Here, } K = \frac{1}{\left\{\sum_{i=1}^{n}\left(\frac{1}{\sqrt{Var(SI)}}\right)\right\}} \quad (3)$$

(v) Final Index: It is a linear sum of all *standardization-index* that is multiplied by the weight of a specific variable. It is calculated as:

$$(FI)_{ct} = W_1*(X)_{1,ct} + W_2*(X)_{2,ct} \ldots + W_n*(X)_{n,ct} \quad (4)$$

Here, *FI* is the final index; W_1, W_2, W_3,..., W_n are the weights for associated variables. X_1, X_2,..., X_n are the *composite-index* of associated variables which are considered to estimate the desired index; *c* is the cross economy and *t* is time period. The present study includes 29 different to investigate *IPPI*, *STDI* and *SEDI* during 2005–2013. Hence, the aforementioned procedures are recursively applied for an individual variable with each year for 41 economies.

Theoretical Perspectives of Index-Based Estimation

Formation of Intellectual Property Protection Index (*IPPI*)

Several factors can be used to assess the strength of IPRs regime (Singh et al., 2019b). Previous studies have used different factors for measuring the strength of IPRs regime. For instance, Adams (2009) have considered patent rights index as a proxy for IPRs. Saini and Mehra (2014) have used Ginarte and Park index as a representative for IPRs in developed and developing economies. Gold et al. (2019) have also introduced an index to measure the strength of IP protection in developing economies. Li et al. (2020) have used Ginarte-Park index as a proxy for intellectual property protection to estimate its impact on renewable energy in 102 economies. In this study, intellectual property rights protection index (*IPPI*) is created to assess the relative performance of undertaken economies in IPRs regime. In this study, *IPPI* is defined as the integrated value of most factors which are essential to strengthen the IPRs regime of undertaken countries. Intellectual property protection can be measured in terms of patents applications filed, registered industrial design, published scientific & technical articles, charges for use of intellectual property (IP) payments, charges for use of IP receipts and IP protection score (Raghupathi, Raghupathi, 2017; Singh et al., 2019a,b; Singh, Ashraf, 2019; Yang et al., 2014). Accordingly, *IPPI* is an integrated index of aforesaid factors that are specified as:

$$(IPPI)_{ct}=w_1*(SI\_PaFiPTRe)_{ct}+w_2*(SI\_InDePTRe)_{ct}+w_3*(SI\_TrPTRe)_{ct}+w_4*(SI\_STJAPTRe)_{ct}+w_5*(SI\_CUIPRPPRe)_{ct}+w_6*(SI\_CUIPRRPRe)_{ct}+w_7*(SI\_IPPS)_{ct} \quad (5)$$

Here, *IPPI* is intellectual property protection index; *SI* is a *standardization-index* of associated variables and $w_1 \ldots w_7$ are the weight of corresponding variables in equation (5). The detail description of the variables is presented in Table 2.

Table 2. Factors related to intellectual property protection index (IPPI)

Explanation of variables	Symbol	Unit
No. of patents filed per 1000 researcher	PaFiPTRe	Number
No. of industrial design registered per 1000 researcher	InDePTRe	
No. of trademarks registered per 1000 researcher	TrPTRe	
No. of scientific and technical journal papers published per 1000 researcher	STJAPTRe	
Charges for the use of IP payments per researcher	CUIPRPPRe	Current US$
Charges for the use of IP receipts per researcher	CUIPRRPRe	
IP protection score (1-7 best)	IPPS	Number

Source: Williams (2013); Yang et al. (2014); Singh, Ashraf (2019); Singh, Ashraf, 2019; Singh et al. (2019a, b).

Formation of Science and Technological Development Index (STDI)

Previous studies have discussed that science and technological development is directly associated with R&D expenditure, number of researchers and scientists, number of research institutions and universities, number of scientific research articles, high-tech industries, association of research organizations with exiting industries, technology transfer and commercialization (Williams, 2013; Singh et al., 2019a,b). Aforementioned factors are useful to boost the science and technological development of a country. Existing studies, therefore have claimed that single factor may be ineffective to evaluate the science and technological development of a nation. Thus, the progress of science and technological development can be observed through R&D expenditure, researchers in R&D, R&D expenditure per researcher, high-technology exports, high-technology exports per researcher, ICT goods exports and ICT goods imports (Ashraf, Singh, 2019; Sattar, Mahmood, 2011; Singh et al., 2019a,b; Singh, Ashraf, 2019; Toader et al., 2018; Yang et al., 2014). Hence, this study creates science and technological development index (*STDI*) to assess the relative strength of undertaken economies in science and technology. *STDI* is defined as a simple number which includes most factors related to science and technological development. This index identifies the relative position of a country in science and technological development as compared to other economies. In this study, *STDI* is an integration of aforesaid factors, which is assessed as:

$$(STDI)_{ct}=w_1*(SI\_R\&DInt)_{ct}+w_2*(SI\_RePMP)_{ct}+w_3*(SI\_R\&DExPRe)_{ct}+w_4*(SI\_HTExMEx)_{ct}+w_5*(SI\_HTExPRe)_{ct}+w_6*(SI\_ICTGEx)_{ct}+w_7*(SI\_ICTGIm)_{ct} \quad (6)$$

Here, *STDI* is science and technological development index. *SI* is a *standardization-index* and $w_1,\ldots, w_7$ are the weights of corresponding variables which are described in Table 3.

Table 3. Factors related to science and technological development index (STDI)

Explanation of variables	Symbol	Unit
R&D expenditure (% of GDP)	R&DInt	%
No. of researchers in R&D (per million people)	RePMP	Number
R&D expenditure per researcher	R&DExPRe	Current US$
High-technology exports (% of manufactured exports)	HTExMEx	%
High-technology exports per researcher	HTExPRe	Current US$
ICT goods exports (% of total goods exports)	ICTGEx	%
ICT goods imports (% total goods imports)	ICTGIm	%

Source: Sattar, Mahmood (2011); Yang et al. (2014); Toader et al., 2018; Singh, Ashraf, 2019; Singh et al. (2019a); Ashraf, Singh (2019).

Formation of Economic Development Index (*EDI*)

The economic development of a county may not be defined by a single variable. However, previous studied have claimed that economic growth may be helpful to improve human well-being and social welfare of a country. Economic growth is a situation in which production activities are supportive to satisfy the human requirement (e.g. employment, purchasing power, income, consumption, food security, education, health and social security, cultural security, and sanitation) in a country (Çaliskan, 2015). Economic growth increase as an increase in production scale of a nation (Adejumo, Adejumo, 2014). It is specified that economic development may not be explained by a single variable of a country. Therefore, factors related to economic development must be integrated into an index to measure its strength in a country. GDP per capita, gross capital formation, manufactured exports and imports, exports and imports of goods and services, and foreign direct investment (FDI) and FDI outflow are the necessary drivers of economic development (Adejumo, Adejumo, 2014; Raghupathi, Raghupathi, 2017; Singh et al., 2019b; Toader et al., 2018).

Previous studies have argued that economic growth may be defined through capital accumulation, technological advancement and working population (Çaliskan, 2015; Toader et al., 2018). In this study, therefore economic development index (*EDI*) is created to measure the relative position of countries in economic development. *EDI* is defined as a combined large number of related factors which are associated with economic development in this study. *EDI* is a combined index of aforesaid variables, which is assessed as:

$$(EDI)_{ct}=w_1*(SI\_GDPPC)_{ct}+w_2*(SI\_RMVAGDP)_{ct}+w_3*(SI\_GCF)_{ct}+w_4*(SI\_MME)_{ct}+w_5*(SI\_MMI)_{ct}+w_6*(SI\_RMVAEGS)_{ct}+w_7*(SI\_RMVAIGS)_{ct} \quad (7)$$

Here, *EDI* is economic development index; *SI* is *composite-index* of associated variables; w_1, …, w_7 are the weights for related variables which is presented in Table 4; and *c* and *t* are cross-sectional economies and time-period respectively in equation (7).

Table 4. Factors related to economic development index (EDI)

Description of variables	**Symbol**	**Unit**
GDP per capita (Constant 2005 US$)	GDPPC	US$
Ratio of manufacturing value added (Constant 2005 US$) with GDP at market price (Constant 2005 US$)	RMVAGDP	Number
Gross capital formation (annual % growth)	GCF	%
Manufactures exports (% of merchandise exports)	MME	
Manufactures imports (% of merchandise imports)	MMI	

Ratio of manufacturing value added (Constant 2005 US$) with exports of goods and services (Constant 2005 US$)	RMVAEGS	Number
Ratio of manufacturing value added (Constant 2005 US$) with imports of goods and services (Constant 2005 US$)	RMVAIGS	

Source: Adejumo, Adejumo (2014); Adams (2009); Toader et al. (2018).

Formation of Social Development Index (SDI)

Social development is complex and multi-dimension interacting component of the society, which is positively and negatively associated with several activities of a nation. Since scientific research community could not produce a uniform and internationally accepted factor to measure the strength of countries in social development. However, previous studies like (Duasa, Afroz, 2013; Singh et al., 2019; Singh et al., 2019b) have used different factors such as education index, literacy rate, female literacy rate, gender ratio, female labour participation rate, infant mortality rate and other variables as a substitution for social development. Aforesaid factors have a significant influence on social development, these factors, therefore, must be integrated into a single number to assess the relative or absolute position of a country in social development. Social development shows the equal distribution of available services among the society and it improves as education level, political literacy, human health, economic capacity and communication of people increase (Adejumo, Adejumo, 2014). Furthermore, social development depends upon employment for female, female GDP per person employed, female labour force participation rate, population growth, age dependency ratio, and unemployment rate, female literacy rate, and education index (Adejumo, Adejumo, 2014; Singh et al., 2019; Singh et al., 2019b). In this study, therefore social development index (*SDI*) is formed to identify the relative position of undertaken economies in social development. *SDI* makes the cross-comparison of economies in social development. The relationship of *SDI* with its associated variables is specified as:

$$(SDI)_{ct}=w_1*(SI\_GDPPC)_{ct}+w_2*(SI\_RMVAGDP)_{ct}+w_3*(SI\_GCF)_{ct}+w_4*(SI\_MME)_{ct}+w_5*(SI\_MMI)_{ct}+w_6*(SI\_RMVAEGS)_{ct}+w_7*(SI\_RMVAIGS)_{ct}+w_8*(SI\_GDS)_{ct} \quad (8)$$

Here, *SDI* is social development index; *SI* is *composite-index* of all associated variables; $w_1,\ldots, w_8$ are the estimated weights of associated variables that are described in Table 5. *c* and *t* are the cross-sectional countries and time-period respectively in equation (8).

Table 5. Variables related to social development index *(*SDI*)*

Explanation of variables	Symbol	Unit
Employment in industry (% of total employment)	EMPI	%
GDP per person employed	GDPPPE	Constant 1990 US $
Total labour force participation rate (% of total population ages 15-64)	LPR	%
Population growth (annual %)	PGR	
Age dependency ratio (% of working-age population)	ADR	
Unemployment rate for youth (% of total labour force ages 15-24)	UYT	
Education index	EDIN	Number
Urbanization	UR	%

Source: Duasa, Afroz (2013); Milenkovic et al. (2014); Adejumo, Adejumo (2014); Singh et al. (2019).

Measurement of Socioeconomic Development Index *(SEDI)*

As the socio-economic development may be an integration of economic and social development related variables (Milenkovic et al., 2014). Therefore, socio-economic development index (*SEDI*) is considered as a linear sum of *EDI* and *SDI* in this study and estimated as:

$$(SEDI)_{ct} = (EDI)_{ct} + (SDI)_{ct} \quad (9)$$

Here, *SEDI* is socioeconomic development index, *EDI* is an economic development index, and *SDI* is the social development index in equation (9).

Formulation of Empirical Models

The present study explores the relationship between intellectual property protection, science and technological development and socioeconomic development with the manufacturing sector in selected economies. For the aforesaid investigation, manufacturing value-added is used as the dependent variable and it is regressed with *IPPI*, *STDI* and *SEDI*. Previous studies have also used created indexes as a dependent and independent variable for different empirical investigations (Adams, 2009; Ashraf, Singh, 2019; Duasa, Afroz, 2013; Kumar et al., 2015; Kumar, Sharma, 2013; Saini, Mehra, 2014; Sharma, Singh, 2017; Singh et al., 2019; Singh, 2018; Singh, Issac, 2018; Singh, Jyoti, 2019; Singh, Sharma, 2018). The functional relation of manufacturing value-added with *IPPI*, *STDI* and *SEDI* are explained as:

$$MVACon = f(IPPI, STDI, SEDI) \quad (10)$$

Here, *MVACon* is manufacturing value-added; *IPPI*, *STDI* and *SEDI* are the intellectual property protection index, science and technological development index and socioeconomic development index respectively in equation (10). For empirical analysis, the aforesaid relationship is used as:

$$(MVACon)_{ct} = \alpha_0 + \alpha_1 (IPPI)_{ct} + \alpha_2 (STDI)_{ct} + \alpha_3 (SEDI)_{ct} + \mu_{ct} \quad (11)$$

Here, α_0 is constant term; α_1, α_2 and α_3 are the regression coefficients of associated explanatory variables; μ_{ct} is the error term in the equation (11).

Since this study comprises manufacturing value-added as the independent variable; and *IPPI*, *STDI* and *SEDI* as explanatory variables for 41 economies during 2005–2013. So, there are needed to estimate another test like country-level fixed effects that are quite beneficial in capturing unobserved heterogeneity across the country. Year-specific effects model is useful to control for the annual difference in output across. Country-by-year fixed effects model is quit beneficial to capture the unobserved heterogeneity and to control annual difference in manufacturing value added (Gold et al., 2019). After incorporating these variables, equation (11) is used as:

$$(MVACon)_{ct} = \beta_0 + \beta_1 (IPPI)_{ct} + \beta_2 (STDI)_{ct} + \beta_3 (SEDI)_{ct} + \xi_{1(c-1)} CD_{(s-1)} + \epsilon_{1(t-1)} TD_{(t-1)} + \psi_{1(c-1)+(t-1)} CD_{(c-1)} \times TD_{(t-1)} + \mu_{ct} \quad (12)$$

Here, $CD_{(c-1)}$ is the vector for countries dummies; $TD_{(t-1)}$ is the vector for time dummies; $\xi_{1(c-1)}$ is the estimated regression coefficient for country-wise dummies; $\epsilon_{1(t-1)}$ is the vector of estimated regression coefficients for time dummies. Country and time dummies are also used to capture the country-level fixed effects and to control for the annual difference in manufacturing value-added across countries. $CD_{(s-1)} \times TD_{(t-1)}$ is the vector of combine countries and time dummies, and $\psi_{1(c-1)+(t-1)}$ is the vector of estimated regression coefficients for countries and time dummies to country-by-year fixed effects to capture the unobserved heterogeneity. In this study, the log-linear regression model is also applied to check the consistency of regression coefficients of explanatory variables. Random-effects and fixed effects regression models provide better results, thus the interpretation of results based on both the models are given (Sattar, Mahmood, 2011; Singh, Issac, 2018).

Discussion on Descriptive Results

Position of Economies in Intellectual Property Protection

Figure 1 shows the position of undertaken economies in intellectual property protection that is estimated through *IPPI*. The average values of *IPPI* for two time periods (i.e. 2005-2008 and 2009-2013) are included in this figure. It infers that Switzerland, Luxembourg, Ireland, Netherlands and Sweden have 1st, 2nd, 3rd, 4th and 5th position in intellectual property protection according to estimated values of *IPPI* during 2009-2013. These economies are in a better position in intellectual property protection. Since, these economies have a better position in patents filings, industrial design registration, trademarks registration, payments and receipts for intellectual property, and IPRs protection score than other economies. Lithuania, Thailand, Pakistan, Moldova and Ukraine have the 37th, 38th, 39th, 40th and 41st position respectively in intellectual property protection as per the estimated values of *IPPI* for the abovementioned period. The rank and estimated values of *IPPI* for all economies are presented in Table 6. Cross comparison of countries in *IPPI*, *STDI* and *SEDI* during 2009-13 is presented in Figure 4. India have the 33rd position in intellectual property protection as per the estimated values of *IPPI*, thus it has a poor position in intellectual property rights regime. Hence, it is suggested that Indian researchers need to increase their involvement in IPRs activities. For this, Indian policymaker also must be implemented a policy to maintain the strong IPRs regime. Consequently, it would be beneficial for researcher and research institutions to get a better return from R&D activities. Also, IPRs regime would be

beneficial to increase technology transfer from research institutions to industries, thus it will be helpful to maintain technology commercialization in India.

Position of Countries in Science and Technological Development

The relative position of selected economies in science and technology-based on mean values of *STDI* during 2005-2018 and 2009-2013 is presented in Figure 2. Values of *STDI* indicate that Singapore, Malaysia, South Korea, Switzerland and Japan have 1st, 2nd, 3rd, 4th and 5th position respectively in science and technology during 2009-2013. R&D expenditure, number of researchers in R&D, R&D investment/researcher, and high-technology exports/researcher is high in these economies. Therefore, these economies could maintain a better position in science and technology. India, Colombia, Ukraine, Moldova and Pakistan have 37th, 38th, 39th, 40th and 41st rank respectively in science and technological development (See Table 6). These countries are highly lagged in science and technological development. India could not increase R&D investment, researchers and scientists, R&D expenditure/researcher, and high-technology exports per researcher. India, therefore could not produce high-production technologies and it has a poor position in science and technological development.

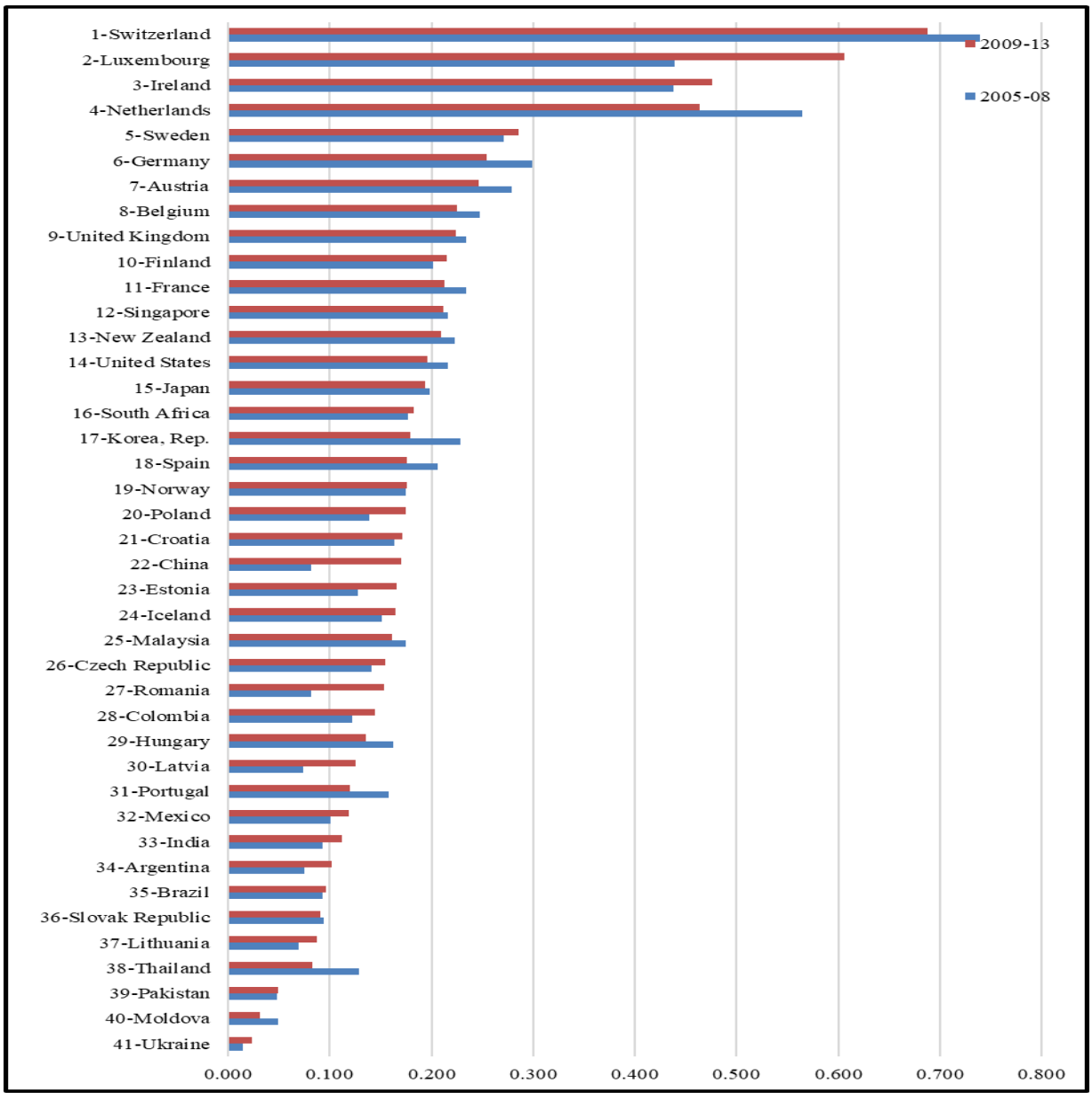

Fig. 1. Performance of economies in intellectual property protection
Source: Author's Estimation.

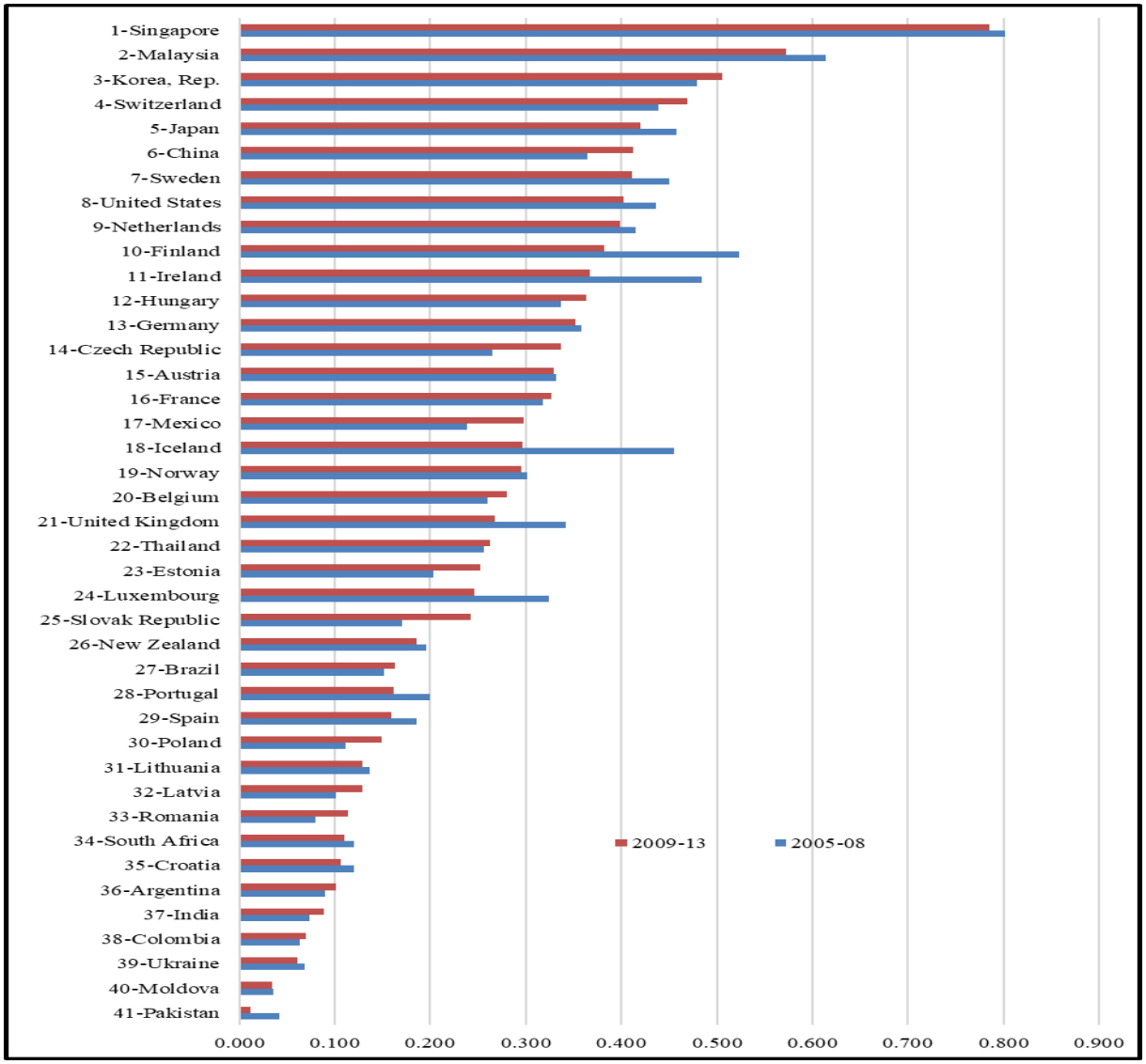

Fig. 2. Performance of economies in science and technological development
Source: Author's Estimation.

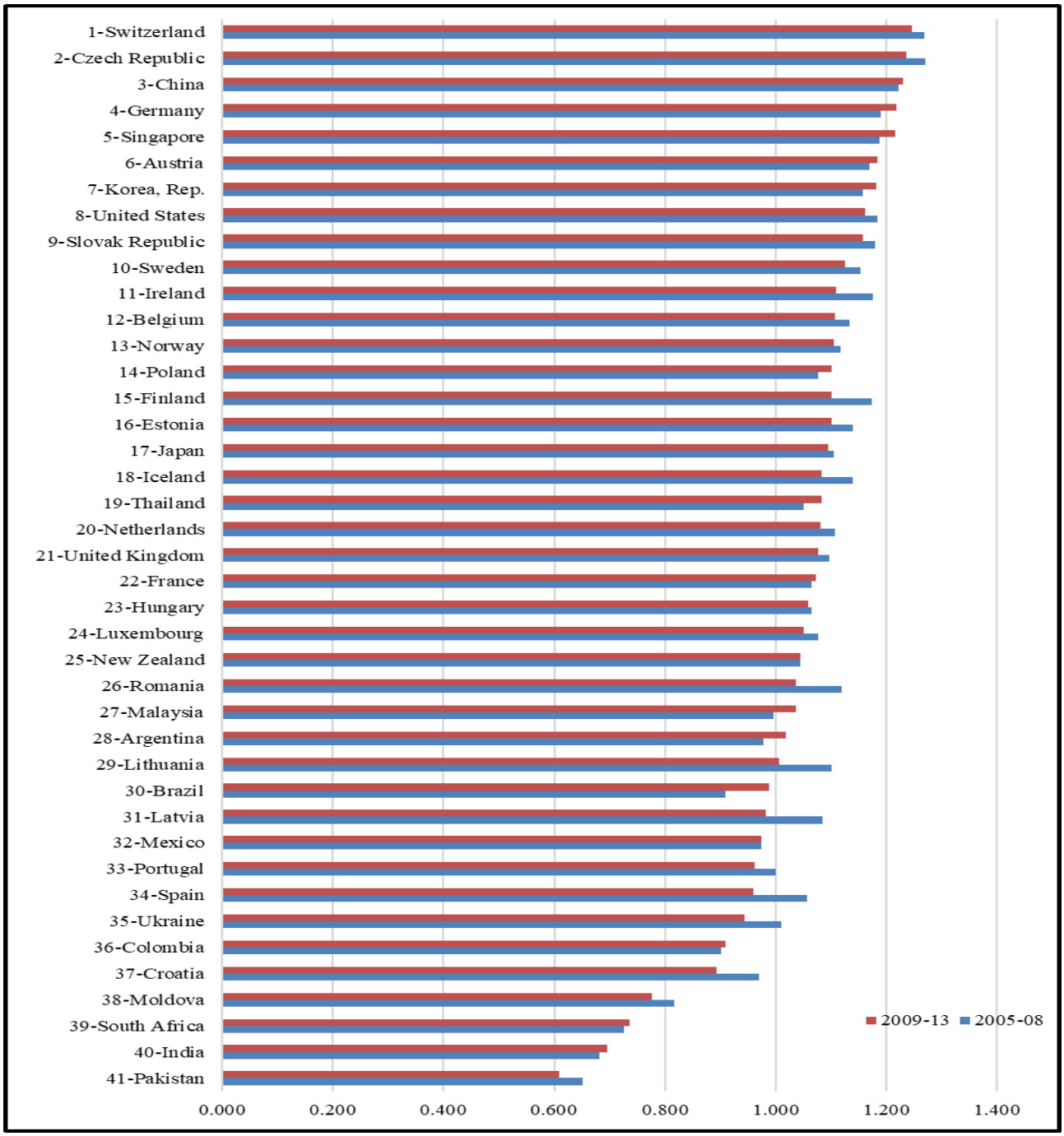

Fig. 3. Performance of countries in socio-economic development
Source: Author's Estimation.

Performance of Economies in Socioeconomic Development

Descriptive results which ascertain the socioeconomic position of undertaken economies is presented in Figure 3. The average values *SEDI* during 2005–2008 and 2009–2013 are included in this figure. It demonstrates that there exists a high diversity in socio-economic development across economies due to high disparity in socio-economic related activities in these economies. The estimated value of *SEDI* showed that Switzerland, Czech Republic, China, Germany and Singapore have 1st, 2nd, 3rd, 4th and 5th position respectively in socioeconomic development during 2009–2013. As estimated values of *SEDI* comprises several factors like GDP per capita, ratio of manufacturing value-added with GDP, gross capital formation, manufactures exports and imports, ratio of manufacturing value-added with exports of goods and services, manufacturing value-added

with imports of goods and services, employment in industrial sector, GDP per person employed, labour force participation rate, and education index. Switzerland, Czech Republic, China, Germany and Singapore are in a better position in aforesaid factors, therefore these economies could maintain their better position in socio-economic development. Croatia, Moldova, South Africa, India and Pakistan have 37th, 38th, 39th, 40th and 41st position respectively in socioeconomic development as per the values of *ESDI* during 2009-2013 (See Table 6 and Figure 4).

Table 6. Estimated value of *IPPI*, *STDI* and *SEDI* for selected economies during 2009–13

IPPI			STDI			SEDI		
Country	Rank	Value	Country	Rank	Value	Country	Rank	Value
Ukraine	41	0.023	Pakistan	41	0.012	Pakistan	41	0.608
Moldova	40	0.032	Moldova	40	0.034	India	40	0.696
Pakistan	39	0.049	Ukraine	39	0.061	South Africa	39	0.735
Thailand	38	0.083	Colombia	38	0.070	Moldova	38	0.777
Lithuania	37	0.087	India	37	0.089	Croatia	37	0.894
Slovak Rep.	36	0.090	Argentina	36	0.101	Colombia	36	0.911
Brazil	35	0.096	Croatia	35	0.107	Ukraine	35	0.944
Argentina	34	0.101	South Africa	34	0.110	Spain	34	0.960
India	33	0.112	Romania	33	0.114	Portugal	33	0.961
Mexico	32	0.118	Latvia	32	0.129	Mexico	32	0.974
Portugal	31	0.119	Lithuania	31	0.129	Latvia	31	0.982
Latvia	30	0.125	Poland	30	0.149	Brazil	30	0.988
Hungary	29	0.135	Spain	29	0.159	Lithuania	29	1.006
Colombia	28	0.144	Portugal	28	0.162	Argentina	28	1.018
Romania	27	0.153	Brazil	27	0.162	Malaysia	27	1.036
Czech Rep.	26	0.154	New Zealand	26	0.186	Romania	26	1.037
Malaysia	25	0.161	Slovak Rep.	25	0.243	New Zealand	25	1.045
Iceland	24	0.165	Luxembourg	24	0.246	Luxembourg	24	1.051
Estonia	23	0.165	Estonia	23	0.252	Hungary	23	1.058
China	22	0.170	Thailand	22	0.262	France	22	1.074
Croatia	21	0.171	UK	21	0.268	UK	21	1.077
Poland	20	0.175	Belgium	20	0.280	Netherlands	20	1.081
Norway	19	0.176	Norway	19	0.296	Thailand	19	1.083
Spain	18	0.176	Iceland	18	0.297	Iceland	18	1.084
South Korea	17	0.179	Mexico	17	0.297	Japan	17	1.095
South Africa	16	0.183	France	16	0.326	Estonia	16	1.101
Japan	15	0.193	Austria	15	0.329	Finland	15	1.102
United States	14	0.196	Czech Rep.	14	0.336	Poland	14	1.102
New Zealand	13	0.210	Germany	13	0.352	Norway	13	1.106
Singapore	12	0.212	Hungary	12	0.363	Belgium	12	1.108
France	11	0.213	Ireland	11	0.367	Ireland	11	1.109
Finland	10	0.215	Finland	10	0.382	Sweden	10	1.125
UK	9	0.223	Netherlands	9	0.399	Slovak Rep.	9	1.157
Belgium	8	0.225	United States	8	0.402	United States	8	1.162
Austria	7	0.246	Sweden	7	0.412	South Korea	7	1.182
Germany	6	0.254	China	6	0.413	Austria	6	1.184
Sweden	5	0.286	Japan	5	0.419	Singapore	5	1.215
Netherlands	4	0.464	Switzerland	4	0.469	Germany	4	1.218
Ireland	3	0.476	South Korea	3	0.505	China	3	1.231
Luxembourg	2	0.606	Malaysia	2	0.572	Czech Rep.	2	1.236
Switzerland	1	0.688	Singapore	1	0.785	Switzerland	1	1.247

Source: Author's Estimation.

India's 40th position in socioeconomic development indicates that it has the poorest position in social development. There are several reasons such as low per capita GDP, low literacy rate, high population growth, and high unemployment rate, and high urbanization, low rate of capital formation, low FDI inflow and high inflation and extensive dependency of population on agriculture sector are responsible for India to make its poor position in social development. It is suggested that there is necessary to give substantial attention to increasing the socioeconomic status of people through implementing proper social development policies in India.

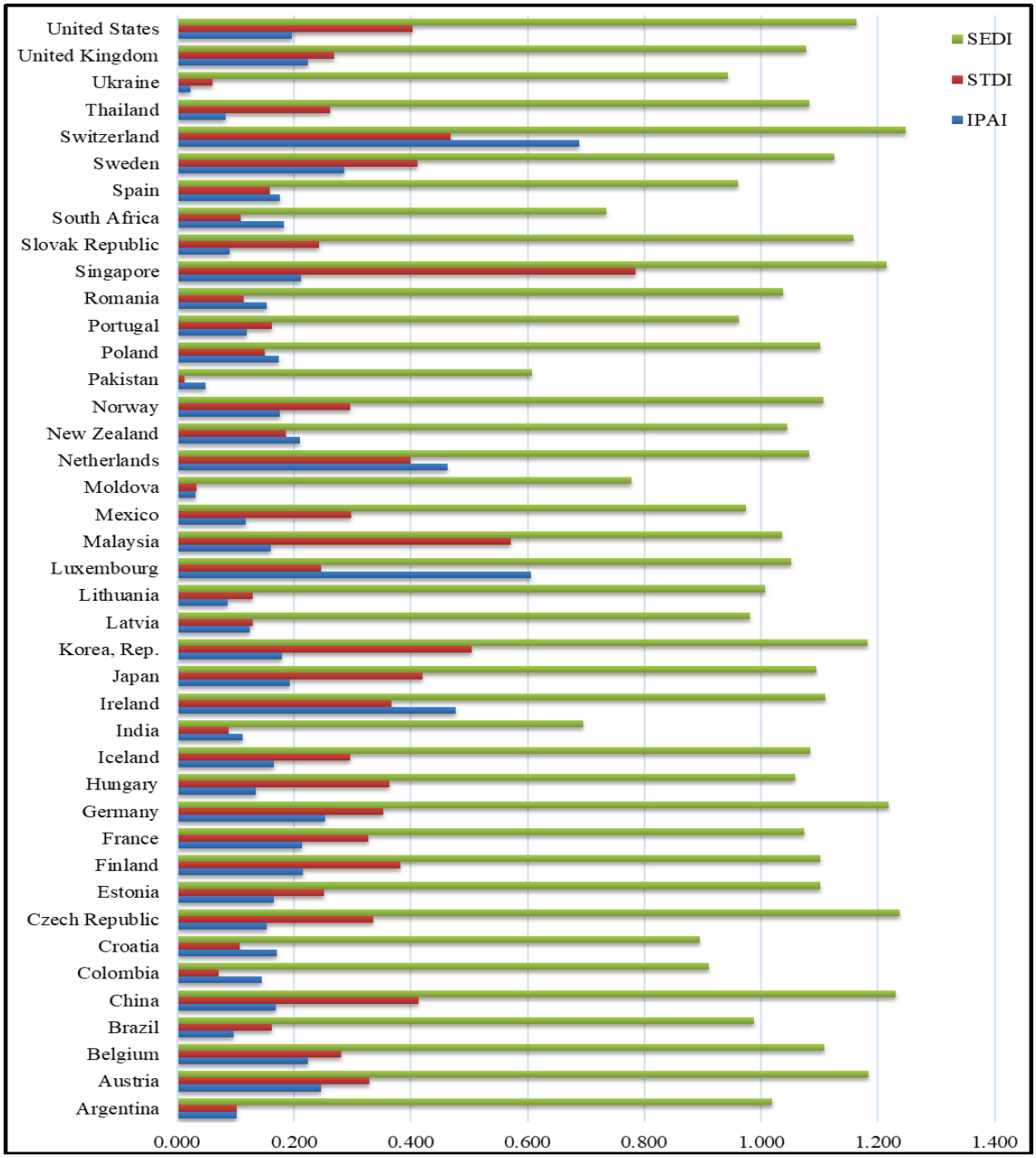

Fig. 4. Cross comparison of countries in IPPI, STDI and SEDI
Source: Author's Estimation.

Validity and Practical Viability of Estimated Indexes

Validation of an index is compulsory to increase the unanimity among the various stakeholders (Ashraf, Singh, 2019; Kumar et al., 2017; Singh, Issac, 2018). Moreover, it useful to increase the legitimacy and practicability of an index for considering it in empirical exploration. An index has validity if it is positively or negatively correlated with its associated indexes or

variables (Ashraf, Singh, 2019; Kumar et al., 2017; Singh, Issac, 2018). So, Karl-Pearson correlation coefficients among the constructed indexes are taken into account for authentication of these indexes (See Table 7). Correlation coefficients of IPPI with science and technological development index (STDI), economic development index (EDI), social development index (SDI) and socio-economic development index (SEDI) are found positive and statistically significant. Science and technological development index have positive and statistically significant association with manufacturing value added (MVA), gross domestic product (GDP), IPPI, EDI, SDI and SEDI. Here, it is sensible that intellectual property protection improves as science and technological development in a country increases. EDI, SDI and SEDI are also positively correlated with manufacturing value added, GDP, IPPI and STDI. As all indexes have a statistically significant association with each other, therefore results show that these have validity and consistency.

Table 7. Karl-Pearson correlations coefficients among the indexes

Indicators	MVA	GDP	IPPI	STDI	EDI	SDI	SEDI
MVA	1						
GDP	0.884**	1					
IPPI	0.011	0.036	1				
STDI	0.274**	0.228**	0.453**	1			
EDI	0.221**	0.132*	0.318**	0.495**	1		
SDI	0.219**	0.185**	0.301**	0.521**	0.332**	1	
SEDI	0.266**	0.199**	0.373**	0.619**	0.721**	0.893**	1

Source: Author's Estimation.
Note: ** and * show that the correlation coefficient is significant at the 1 % and 5 % significance level respectively.

Statistical Inference of Empirical Results

Empirical results which investigate the influence of intellectual property protection index (IPPI), science and technological development index (STDI), and socio-economic development index (SEDI) on manufacturing value-added is presented in Table 8 and Table 9. Regression coefficients of explanatory variables with manufacturing value-added are estimated using random-effects and fixed-effects models. The results indicate that IPPI, STDI and SEDI have a positive association with the manufacturing value-added. It emphasis that intellectual property protection is useful to increase the growth of the manufacturing sector. Intellectual property protection index is an integration of patents files, industrial design, trademark, scientific and technical research articles, and charges for use of intellectual property payments and receipts/researcher. Aforesaid activities, therefore, would be effective to increase the contribution of the manufacturing sector in these economies. Science and technological development have a positive impact on manufacturing value-added. Science and technological development is a compilation of R&D expenditure, researcher and scientist, high-tech exports, and ICT exports and imports, thus aforesaid variables would be essential to increase the growth of manufacturing sector across economies.

Table 8. Empirical results with Random-effects GLS regression model

Model's Name	Linear Regression Model		Log-linear R Regression Model	
No. of Obs.	368		368	
No. of Countries	41		41	
No. of Obs./Country	8		8	
R-Sq: within	0.0438		0.1487	
Wald Chi^2	16.40		58.45	
Prob>Chi^2	0.0009		0.0000	
Variables	Reg. Coef.	P>|z|	Reg. Coef.	P>|z|
IPPI	2.75e+11*	0.003	0.053718**	0.039

STDI	1.82e+11**	0.048	0.0494378	0.126
SEDI	1.30e+11***	0.068	0.8218875*	0.000
Con. Coef.	-6.32e+10	0.524	10.69385*	0.000

Source: Author's estimation; Note: *, **, and *** indicate the parameter is statistically significant at the 1 %, 5 % and 10 % significance level respectively

The regression coefficient of *SEDI* with manufacturing value-added is found positive, therefore socioeconomic development is valuable to boost the growth of the manufacturing sector. Since, socioeconomic development index is an integration of GDP per capita, ratio of manufacturing value-added with GDP size, gross capital formation, manufactures exports and imports, ratio of manufacturing value-added with exports and imports, employment in industry, GDP per person employed, labour force participation rate and education rate. Thus, it is proposed that a country needs to focus on aforesaid factors to sustain the growth of manufacturing sector.

Table 9. Empirical results with Fixed-effects (within) regression model

Model's Name	Linear Regression Model		Log-linear R Regression Model	
No. of Obs.	368		368	
No. of Countries	41		41	
No. of Obs./Country	8		8	
R-Sq: within	0.0441		0.1488	
F(3,324)	F(3,324)=4.99		F(3,324)=18.88	
Prob > F	0.0021		0.0000	
Variables	Reg. Coef.	P>|z|	Reg. Coef.	P>|z|
IPPI	2.96e+11*	0.002	0.0514899**	0.048
STDI	1.61e+11***	0.091	0.0432855	0.180
SEDI	1.24e+11***	0.088	0.8143014*	0.000
Con. Coef.	-5.46e+10	0.516	10.69167*	0.000

Source: Author's estimation; Note: *, **, and *** indicate the parameter is statistically significant at the 1 %, 5 % and 10 % significance levels respectively.

Conclusion and Policy Suggestions

The present study creates intellectual property protection index (*IPPI*), science and technological development index (*STDI*) and socio-economic development index (*SEDI*) for selected 41 developed and developing economies using a *composite Z-score* technique. It also highlights India's position in intellectual property protection index, science and technological development and socioeconomic development among the 41 economies. Thereupon, it assesses the association of *IPAI*, *STDI* and *SEDI* with manufacturing value-added using linear, log-linear and non-linear regression models. Descriptive results show that there is high diversity in intellectual property rights regime, science and technological development and socioeconomic development across economies. This diversity exists due to the high gap in factors which are associated with IPRs, S&T and socioeconomic development.

Moreover, empirical results infer that intellectual property protection is a crucial driver to increase the growth of the manufacturing sector in these economies. Science and technological development show a positive impact on manufacturing value added. Socioeconomic development is seemed positive to boost the growth of the manufacturing sector. Intellectual property protection will provide an incentive for the researcher to do more research in the scientific field. So, it may be helpful to increase the position of global economies in patent, industrial design and trademark. Global economies are required to give significant focus on IPRs regime, science and technological and socio-economic development associated factors to boost the growth of manufacturing. For this, IPRs related courses must be included in the syllabus of research institutions for high learning of researcher towards IPRs (Janjua, Samad, 2007). Many industries are bound to produce a low quality of products due to use of poor technologies in production activities in developing economies (Sattar, Mahmood, 2011).

In India, the manufacturing sector is well dominated by capital and skill intensive enterprises which have limited scope for unskilled workers. India has a large population with unskilled labours and it is one of the youngest labour force which includes around 54 % of its population under the age of 25 years (GoI, 2015). Also, the current size of India's formal skilled workforce is around 2 % (GoI, 2014) and 2.3 % skilled workforce received formal skills training. Thus, India needs a large quantity of skilled workforce to utilize the indigenous technologies in the manufacturing sector (GoI, 2015). It is also expected that there would be a requirement of 120 million skilled workforces in India by 2022. In India, the labour force is expected to be increased by 32 %, while labour force would be declined by 4 % in the industrialised world in the next 20 years (GoI, 2015). It is, therefore essential to increase skills workforce to boost the growth of the manufacturing sector in India.

Furthermore, India have a several challenges such as low technological advancement, high reliance of manufacturing sector on foreign technologies, low level of instruments to produce goods in industries, low capacity of workers to use advance technologies in industries, research organizations do not have conducive R&D ecosystem, technologies are not being transfer from research organizations to industries, research organizations are not generating enough revenues through technology commercialization, government have low spending on R&D, ineffective partnership across manufacturing firms, low number of high-tech industries, low trust of foreign investor to invest in domestic firms due to fruitless mechanism of government policies, and instability in financial markets, existing industries are not in a better position to increase their production scale, low demand of goods and services in domestic market and large segment of society are in poverty trap to increase the contribution of their youth population in national building. Hence, the Indian government needs to give more focus on R&D activities, thereby India would be strong in domestic technologies. There must be mandatory for industries and research institutions to work together to solve aforesaid problems in India. The Indian government also needs to formulate effective policies to increase the demand of goods and service through improving the purchasing power of consumers especially in an unorganized sector that involves more than 90 % of the informal labour force of India (Kalyani, 2015; Sakthivel, Joddar, 2006).

China and South Korea are greater competitors for the Indian manufacturing sector. However, India have a lower labour cost than China and South Korea, therefore India has better opportunities to utilize their youth population (skilled, semi-skilled and unskilled workforce) in the manufacturing sector. It is proposed for India to contribute the stock of knowledge to improve human skills, discover new products, and upgrade the quality of products to enhance the growth of Indian manufacturing sector (Singh et al., 2019a). For this, science and technological advantage would be an option to enhance technological cheapness in India. Furthermore, India requires a greater effort in technological up-gradation, for this extensive investment in R&D would be indispensable. There must be policy with a special focus on attracting private sector's investment in R&D which would be useful to create innovative ideas and discover more technologies for the manufacturing sector in India. Consequently, an increase in R&D expenditure and researchers in emerging research areas would be beneficial to meet the industrial requirements in India. Industry-research academia partnership, the establishment of more technology transfer offices (TTOs) at institute level would be supportive to increase the diffusion of existing technologies across industries (Singh et al., 2019a).

Moreover, research institutions must be more transparent and systematic in the sharing of technologies with industries in India. Then, industries would be efficient to develop high-tech products and generate employment for the skilled workforce. Subsequently, it would be helpful to create a new market for capital and financial investment. Hence, technology-driven growth for the labour surplus country like India would be useful to increase the growth of the manufacturing sector and to create more jobs. Also, the Indian government must be conscious to implement strong IPRs regime to protect the IP of researchers and scientists (Adams, 2009). Thereafter, IPRs would work as a key driver to increase technology transfer and commercialization in India (Hossain, Lasker, 2010; Sharma, Saxena, 2012).

In India, commercial banks and other financial institutions give more preference to deal with larger companies which involve low transaction cost and minimum risks. So, there is difficulty in accessing bank credit for small and medium enterprises in India. Hence, appropriate credit facilities with low-interest rate must be provided to SMEs, business organizations and new industries in India. India's corporate taxes for domestic and foreign companies are 33.99 % and 43.26 % respectively. These are higher than China, South Korea, Thailand, Malaysia, Indonesia and

Singapore (KPMG, 2013). In recent years, most Asian countries have brought down corporate tax rates, while tax rates due to GST have increased in India. Hence, India's high corporate tax rate is less attractive for foreign investors as compared to other countries. Also, high inflation is caused to increase price variability of goods, which have an adverse impact on profits and investment of manufacturing firms in India. High inflation is also negatively associated with the productivity of resource and economic growth (Sattar, Mahmood, 2011). India thus needs to control high inflation to increase the consciousness of entrepreneurs to invest more in the manufacturing sector (Toader et al., 2018). It is also observed that high population growth is poised to reduce capital production per worker. Thus, high population growth and rapid urbanization have negative implications on economic growth. There are many factors like trade openness, public expenditure, foreign direct investment which have positive implications on economic growth and manufacturing sector (Adams, 2009; Toader et al., 2018). Hence, India is required to consider aforesaid aspects of policy formulation to enhance the growth of the manufacturing sector.

Limitations of the Study and Further Research Directions

In this study, economies are classified based on estimated values of IPAI, STDI and SEDI. These indexes are useful to increase the consciousness to policymakers and economic agents to take an effective and conducive policy action for developmental outlook in a country. These indexes show the comparative status of a nation in a specific indicator as compared to other economies. Though, there is one criticism for these indexes as it puts arbitrary weights and ranking which always change with every minor data revision. Therefore, it is not useful for inter-temporal comparisons of economies based on estimated indexes. Furthermore, the present study includes 28-high income; 9-upper middle income; and 4-lower middle-income economies in empirical investigation. The results of the study, therefore may not be generalized for developing countries due to the low number of countries.

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Conflict of Interest

Authors do not have any conflict of interest.

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Policy Scenarios in Ethiopian Higher Education Expansion: Challenges of Program Diversification and its Future Implications

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Abstract

The study investigated the extent of Ethiopian higher education expansions policies and its program diversification responding to the local market demands and realities on the ground. The study explored a range of literature on Ethiopian higher education policy scenarios within national development policies. The study was guided by one research question: To what extent the expansion policy and program diversifications in Ethiopia higher education responded to the demands and realities of the local economy? The literature review, document survey, and focus group discussions were used to examine the expansions policies and their program diversification processes. The findings of the study illustrate that the responsiveness of Ethiopia's higher education expansion policy brought a tremendous increase in enrolments within a short period. Moreover, the finding confirms that the Graduate Mix Policy resulted in poor program relevance and a graduate unemployment crisis. Based on the findings of the study, conclusions were made for policymakers to critically revisit the policy scenarios in Ethiopian higher education expansion, diversification, and relevance in line with national, regional, and global manpower demand.

Keywords: deliverology, diversification, expansion policy, graduate mix, higher education, program relevance.

Introduction

The endorsement of the Ethiopian education and training policy of 1994 brought endeavors to expansion and program diversifications of higher education for the last fifteen years (2002–2017). Following the education and training policy, the education sector development program was developed to translate policy into action in line with the Ethiopian government's five-year strategic plan (Ministry of Education, MOE, 2014). The reform initiated by the Ethiopian government aimed at addressing the rapidly changing global knowledge convergence that demands local and global knowledge integrity (Teshome, 2007). In the current transformation of nations into knowledge economies and knowledge societies, higher education provides not only educated workers but also knowledge workers who contribute to the growth of the economy (Altbach, Knight, 2007). Scholars of higher education remarked that higher education as the chief concern of the nation and plays a tremendous role in shaping and preparing nations for the future in an increasingly globalized world. As stated by Altbach et al. (2009):

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"Globalization is the flow of technology, economy, knowledge, people, values, ideas across the borders. Globalization affects each country in a different way due to a nation's individual history, traditions, culture and priorities. To cope with the globalization, the higher education system has to re-orient its structure and function besides enlarging the scope of its provisions to meet the challenges of globalization" (Altbach et al., 2009: 57).

On the other hand, institutions in any country or nation are a reflection of culture and traditions, although globalization directly affects institutions, whether educational or otherwise. Even though nations or countries have their institutional policies and procedures, they cannot escape the influence of global discourses (Altbach, Knight, 2007). Since the endorsement of the current education and training policy of 1994, Ethiopia has engaged in a highly ambitious effort to re-align its higher education system more directly to its national strategy for economic growth and poverty reduction (MOE, 2016). The number of universities changed drastically from two universities to 49 universities within the last fifteen years. Within this expansion, an attempt was made to diversify disciplines and human resource requirements in all sectors (MOE, 2016).

The increase in university enrolments in science, engineering, and technology is the result of the new strategic approach of the government of Ethiopia (MOE, 2017). In this context, the government of Ethiopia is focusing on helping its tertiary education institutions to become more innovative and responsive to the requirements of a globally competitive knowledge economy. However, the local responsiveness of Ethiopian higher education within the context of the current global demand may be questioned. In light of these realities, the study was guided by the research question: *To what extent the expansion policy and program diversifications in Ethiopia universities respond to the demands and realities of the local knowledge economy?*

Ethiopian Development Policy in Higher Education Context

The study was conducted in Ethiopia, the second-most populous African country after Nigeria with about 100 million people. According to the World Bank report, the population of Ethiopia is still growing at a rate of 2.5 % per year (World Bank, 2013). Regarding the population, about 45 % of the people fall into the youngest group of younger than 15 years of which 83 % live in the rural areas of the country. This shows that Ethiopia has considerable potential regarding human resource development that can make a positive contribution to national economic development. From the geographical and ecological point of view and concerning the traditions of the country, agriculture is the main occupation for both the highland and lowland inhabitants (World Bank, 2013). The inhabitants of the highland temperate zones are mostly into crop production and have good access to education. Nonetheless, most of the inhabitants of the lowland are pastoralists with limited access to education until the introduction of the 1994 education policy (MOE, 2016).

Based on the realization of the agriculture potential and the existing young population, Ethiopia's development policy was designed to be agricultural-development-led industrialization [ADLI] (MOFED, 2011). Ethiopia is one of the poorest countries even when compared to developing countries as well as other African countries. Ethiopia's population has experienced severe famine and endured starvation over an extended period. Traditionally, farmers engaged in only subsistence farming. There are neither educated farmers nor mechanized agriculture to satisfy the basic needs of the population such as food production, although the country has fertile land with sufficient and appropriate rainfall and enough water resources for potential irrigation (Belay, 2006).

Agricultural-led development policy was aimed at promoting agriculture and thereby, gradually producing an educated workforce that can promote industrialization. Strategically, when agriculture is well developed, it realigns its position in the industry; while the industry plays a leading role (MOFED, 2011: 34). As evident:

"Modernizing agriculture and improving its efficiency and productivity ensure food security, create employment opportunities and enhance the country's foreign exchange earnings with the aim to promote the development of a vibrant industrial sector and accelerate overall economic growth. ADLI is supplemented by sector-specific strategies in areas such as health, education, ICT, population, industry."

The Ethiopian government's ambition is to:

"...to see Ethiopia become a country where a democratic rule, good governance and social justice reign upon the involvement its peoples, and extricating itself from poverty becomes a middle-income economy" as recognized by a per capita income of 1000 USD by 2025" (MOFED, 2010: 12).

The intention of the Ethiopian government development plan can be met if the sustainability of educational reforms meets the pace of local and global demands through competitive performance (Teshome, 2004). Whatever the policy of the country, the skills of educated human resources ensure the implementation of a paper policy in practical terms in today's globalized knowledge economy, where 'information societies are emerging' (Teshome, 2004: 17), higher education institutions are inspired to produce appropriately skilled human power required that link-local and global knowledge demand.

The Ethiopian government endorsed the growth and transformation plan to boost the country's economic development to the minimum threshold of the middle-income countries by 2025. The first phase of growth and transformation plan was endorsed in 2010 till 2014/15, while the second phase of the plan to endorse from 2016 to 2020. To achieve the intended target by 2025, the Ethiopian government expects higher education to play a role in local development that in turn promotes the competitiveness of the country with global policy discourses.

The quality of knowledge and the knowledge economy relies on the quality of research and innovation that higher education delivers to meet the global knowledge demand (World Bank, 2015). The World Bank recommends that Ethiopia "would be wise to begin looking at ways to improve the relevance of education in the near-term, but must be aware of the long-term nature of investments in tertiary education (World Bank, 2015: 90). Therefore, on the legal basis of the Growth and Transformation Plan (GTP), Ethiopian higher education institutions are expected to produce graduates with skillful focusing on job creation, the satisfaction of local manpower demand, and technology transfer consistently with country's priority needs that responds to global policy discourses.

In Ethiopia, higher education research report portrays that for the last 15 years, different reform tools for both higher education administration and quality management have been introduced (Olkaba, 2015; Teshome, 2007). Some of these tools are as follows: Business Process Re-engineering (BPR) implemented for responding bureaucratic administration aspects of higher education, while Business Score Card (BSC) and Kaizen were introduced for quality and resource management strategies in Ethiopian higher education (Olkaba, 2015). The Office of Quality Assurance at institutional levels and Higher Education Quality and Relevance Agencies were established at a national level to monitor Ethiopian higher education quality at large (Olkaba, 2015; Teshome, 2007).

Graduate Mix Policy and program diversification in Ethiopian universities

Besides the expansion policy of higher education, the Ethiopian Ministry of Education inaugurated the 'Graduate Mix Policy' (MOE 2009: 39) in all public universities. The basis for the Graduate Mix Policy was to balance the qualified human power for the growth and transformation plans to revitalize the country's economy from an agriculture-based economy to the export-led economy (MOE, 2009). The Graduate Mix Policy intends to have about 70 % of science and technology graduates leave school to join public universities in the fields of science and technology (MOE, 2009). However, the Graduate Mix Policy of Ethiopian higher education resulted in a rapid increase in science and technology enrolments with large numbers of new entrants at all Ethiopian public universities. Though Ethiopia's Ministry of Education is claiming to continue at the same rate until 2025 (MOE, 2014), scholars in an area claim that the rapid increase in enrolments in the science and technology streams without much preparation and program relevance (Mulu, 2012, Olkaba, 2017, 2015). This they believe may affect the likelihood of graduates either getting employed or creating jobs as the country's economy is at an infant stage to absorb exacerbating graduates in science, engineering, and technology disciplines. In contrast, due to the global knowledge economy and market competitiveness, educated manpower with globalized knowledge for local and global development is demanded to foster sustainable, rapid and equitable economic

growth (World Bank, 2015). These illustrate the breadth and ambition of the Ethiopian government's current higher education reform, which suggests strengthening national capacities and improving the linkages between the labor force demands of an emerging global knowledge economy. Even though the Ethiopian government gives higher education a central position for social and economic development, its policy position for local knowledge economy development and market demand needs critical analyses to foster balanced manpower of both local and regional development demands.

'Deliverology': A quality management strategy in Ethiopian universities

Academic community and scholars in areas of higher education policy can question why deliverology in Ethiopia, and why it is in higher education? During the introduction of deliverology, the philosopher of Deliverology, Sr. Michael Barber came to Ethiopia and gave a day lecture on how to use deliverology in the educational system in general and higher education in particular. In his lecture, Michael Barber told the country that he worked in various levels of education in the United Kingdom and advisor of the former UK Prime Minister, Tony Blair and head of Delivery Unit, which supports the government of Blair for prioritizing and improving public high public demands and services (MOE, 2017).

During the inception of deliverology in Ethiopian, it was believed that the organization of delivery unit under ministry of education and delivery unit in each university were empowered to foster quality of graduates that secures job either by employment or by job creation. The partial restructuring of the delivery unit of each University was entitled to respond to the prioritized areas in quality teaching-learning processes, and assurance for program relevance of undergraduate programs (MOE, 2017). Accordingly, the endorsement of deliverology in Ethiopian higher education is to reverse the graduate unemployment crisis which is linked to the quality and relevance of the program, and the Graduate Mix Policy. Then, the government of Ethiopia took the initiative to translate the graduate employability plan in education sector development (ESDP V, 2016–2020) into action. Thus, the essence of deliverology in Ethiopia higher education is to ensure implementation of the fifth national education strategy for development program, ESDP-V (2016–2020). This program was planned to ensure graduate employability of 80 % within one year from the date of graduation (MOE, 2016).

However, in the last two decades, Ethiopian higher education is characterized by unexpected expansion and enrolment growth of students with the policy notion of graduate mix approach and program diversification without considering the country's economic backlog. Even though deliverology stresses a few qualities of input and process management, program relevance, and quality of the program itself in Ethiopian universities.

Methods

The study conducted an extensive literature review and recent empirical studies on Ethiopia's higher education expansion and its program diversification process for the higher education system. The researchers employed document surveys at the national level, Ethiopian ministry of education annual data of five years (2013–2017); policy documents and strategies, empirical studies and focus group discussions with the academic community of Ethiopian public universities. The rationale for this approach was to provide a general picture of realities on the ground and practical policy implications for future policy actions.

The results of the study were categorized into the potential patterns of higher education enrolment, graduate mix policies, institutional policy disparity, and program relevance directly linked to graduate employability, and practices which provided a basis for the data complementarities.

Results and Discussion

Graduate Mix Policy program diversification

Graduate Mix Policy and enrolment trends of the last five years (2013–2017) official data at Ethiopian Ministry of Education is evidence that expansion policy is going on. The data generated and computed from the Ethiopian Ministry of Education Annual Education Abstract (2017) depict

the realities of the Graduate Mix Policy exacerbating the science – engineering and technology enrolment beyond the market demand of the country.

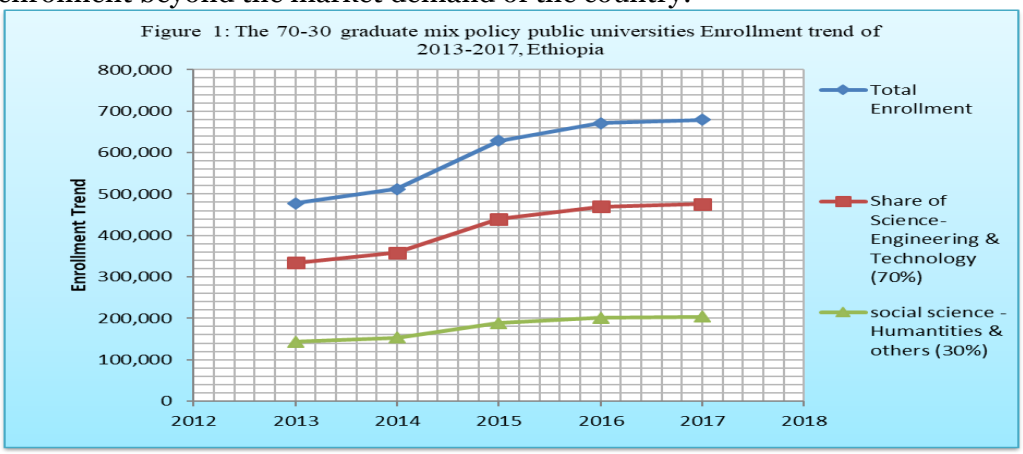

Fig. 1: Ethiopian higher education enrolment trend 2013–2017

Figure 1 shows the quantitative expansion of enrolment between 2013 and 2017. It shows the enrolment trends in science, engineering, and technology slightly increased from 2013 to 2014, and then sharply between 2014 to 2016. This essentially fulfilled the government Graduate Mix Policy premises of 70/30 student admissions to higher education.

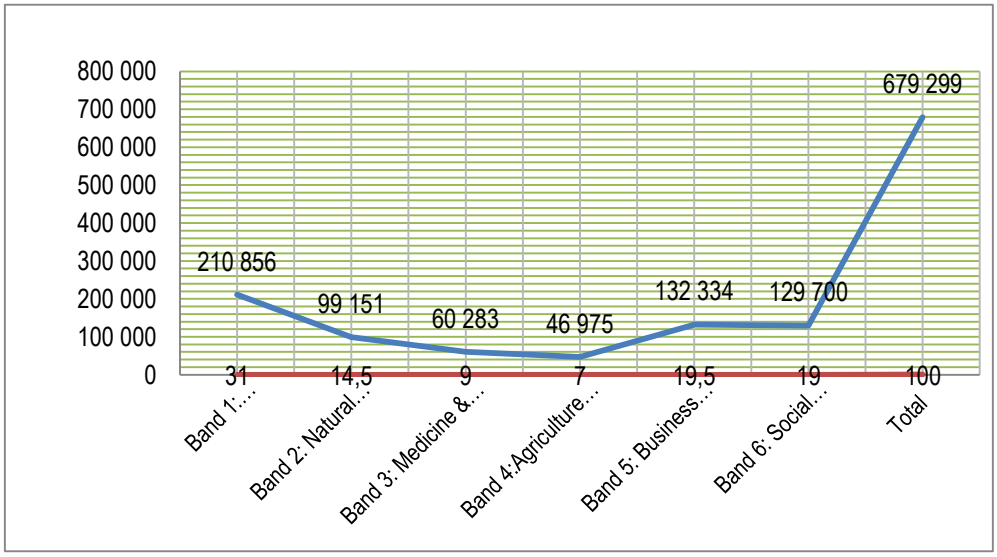

Fig. 2. Ethiopian public higher education undergraduate enrolment by band – 2017

Fig. 2 depicts that the Graduate Mix Policy of Ethiopian universities enrolment differentiated into different bands. From the total enrolment of students in public universities, 31 % of them joined engineering and technology, 14.5 % joined natural and computational sciences, 9 % joined medicine and health sciences, 7 % joined agriculture and life sciences, 19.5 % joined business and economics, and 19 % joined social sciences and humanities. Accordingly, the sum-up of students enrolled in science – engineering and technology (band1, band 2, band3, and band 4) account for 61.5 % while the sum-up of business and economics – social sciences and humanities (band 5 and band6) accounts for 38.5 %. Even though the differentiation of undergraduate program enrolments in Ethiopian universities attempted to balance manpower demands of the country, the enrolment in science – engineering technology is contrary to facts and figures of Ethiopian manpower demand with the existing economy.

Scenarios in a graduate unemployment crisis

The success of one university is measured by its quality education, program quality, and opportunity for graduate employment. In this regard assessing global and local manpower demands and designing reliable academic programs are the responsibilities of universities (Olkaba, 2015). On the other hand, the program quality should be assessed through a tracer study that shows where graduates are, indicates the graduates' profile, and their placement in the local and global job market. Further, the analysis of the evidence of the impact on students' knowledge, attitudes, beliefs, skills, and careers from global perspectives is a measure of graduate profile responding to the current global knowledge convergences. The response of ***Participant 1*** regarding graduate employment was as follows:

"We simply teach and graduate our students. We follow their academic completion according to their years of study and curriculum of their respective disciplines. So far no institutions are engaged in tracer study with clear policy direction to follow our graduate profile, whether employed at a local or global working environment. Because of Graduate Mix Policy, most students who graduate in engineering and technology erode the street in search of jobs. No need of researching the job security of graduates; you can hear from the family of graduates."

The participant reflection depicts the burden of Graduate Mix Policy suffering graduates of science-engineering and technology disciplines. On the other hand, some participants claim for the Ethiopian higher education expansion policy were as follows:

"Without any hesitation, the expansion of higher education has a lot of opportunities which can be explained in different dimensions. The current higher education expansion is addressing our country's educated manpower demand and fair disturbing of universities between regions and the provision of local higher education demands."

According to the views of these participants, the problem is not the expansion of higher education. It is possible to deduce from this argument that there is clear merit of higher education expansion. However, the challenge is the way Graduate Mix Policy endorsed without sufficient preparation and consensus among the implementers. Furthermore, regarding the outcome of the Graduate Mix Policy the participants had explicitly explained the realities on the ground as follows:

"There was an orientation when we took our first entry to our university how and why to assign the proportion of students as 70:30 ratios. During the orientation, some academic groups understood that the country's manpower demand dictated the government to develop the policy. Today it is referred to as 70:30 higher education admission policies. But within a short time, we are observing that there will be a mismatch between manpower demands in the intended ratio of graduates. For instance, for this year the Accounting Department of our university wanted to recruit lecturers who graduated with an MA degree in Accounting discipline and advertised in Addis Zemen two times and eventually didn't get any candidate. However, in the same university, in the Electrical Department vacancy advertised for the recruitment of lecturers 27 MSc graduates and more than 200 BSc graduates submitted their CVs to the Human Resources of our university. For further scrutiny, if we visit job seekers among others, at least 55% are graduates of engineering and technology. We cannot deny these realities; it is an implication of the 70:30 admission outcomes. On the other hand, even though not supported with statistical data, there are hearings of here and there on lack of social science teachers for secondary education. This is also one indication of the 70:30 outcomes."

These arguments confirm that there is a gap between the intention of endorsing program expansion and diversification process and having a clear policy and program relevance to make sure graduates will be employed by the local and global market.

Institutional policy disparities

The national development policy is rooted in agricultural led industrialization (ALI). The policy synopsis of ALI truly describes the realities of the Ethiopian stagnant economy. The country is technologically and economically underdeveloped, and on the other side, the country has well-resourced with fertile lands for agriculture and manpower to transform agriculture that would develop an economy which in turn promotes industrialization. Thus, to realize the national development policy, ALI, a qualified agricultural technologist with the relevant skill for national agricultural transformation should be expected to graduate from the universities.

Furthermore, the quality of Agricultural technologists must be with high-quality standards to create jobs and run their own business in agriculture. In short, the researchers' view is that until the country's economy is ready enough to start moving towards industrialization, the quality and quantity of students joining and graduating from Ethiopian universities in agriculture will determine the fate of ALI policy.

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Conflict of Interest

The authors of the manuscript declare that there is no interest in conflict and all reference materials were dually acknowledged.

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The Focus of Safety Research: A Brief Review

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Abstract

In the area of safety climate, research has mostly focused on safety performance and its antecedents while improving safety performance has been the aim of practitioners in the area. Variables that are examined in safety research as a result of this shift mainly include safety culture, safety climate, safety knowledge, risk perception, management safety systems, and safety practices. Safety climate and safety culture are sometimes used interchangeably by researchers and professionals; these constructs are different though both are predictive measures of safety performance. Also, previous studies have mostly focused on establishing a safe climate and how the safety climate will influence measures of safety performance. This is because researchers often assume that since a relationship exists between safety performance and safety climate, any influence on the safety climate will directly affect safety performance. The problem is that very few of these studies examine the actual antecedents of safety performance. Hopefully, future studies can explore the relationships between safety climate and its established antecedents; safety knowledge, unsafe practice, and employee risk perception.

Keywords: review, safety climate, safety knowledge, safety research.

Introduction

The concept of safety and safety systems for a long time had been the preserve of engineers, with the idea of making the workplace safer. Several engineering fetes and ergonomic accomplishments have improved safety standards in the workplace. However, in the industry, the aim has been to have a few accidents as possible given advancements in the way of doing things. Unfortunately, accidents may not necessarily be the result of inferior equipment or poor work environments but a great number of accidents are the result of human factors (Heinrich et al., 1980).

Heinrich et al. (1980) stated that 88 % of accidents which resulted in injury were caused by employee risk behaviour and 10 % originated from the hazardous mechanical or physical conditions of the workplace. Engineering modifications have made an impact on 10 % of the hazards in the workplace according to them. However, the remaining 88 % of the problem is still not being well addressed as most safety officers seemingly do not have an appreciable understanding of human behaviour modification and attitude change (Pettinger, 2012). Ostensibly, the psychologist may be better placed to solve this problem. Without prejudice, it is safe to say that if accidents are caused by human attitudes and behaviour then the issue becomes the prerogative of the behaviour and attitude modification science.

Yule (2003) makes the argument that safety practitioners have over the years tried so many strategies aimed at different aspects of the workplace to attain the goal of a safe working environment. Efforts have evolved and the psychological climate of the organisation has now been

put on the spot. Safety climate is a concept researchers developed to explain perceptions of employees of the organisational environment (Auzoult, Ngueutsa, 2019; Deng et al., 2019). It is a construct described as part of the psychological climate of the organisation. It has grown to be used as both a reactive and a proactive measure; the former as a way to determine lapses which may have led to accidents and the latter as a blueprint for improvements to safety systems (Jiang et al., 2019; Lee, 1998).

Safety Culture embodies values, beliefs, and underlying assumptions of the organisation including the day to day interactions, records, accident history, and company policy all over some time (Flin et al., 2000). Safety culture research has come to the fore in safety research. The idea is that the environment in the workplace should be one that prevents accidents from occurring. The priority of management would be to provide training, facilities, and place measures that were all aimed at preventing accidents before they occur. Employees would eventually imbibe this culture and adhere closely to its dictates. Such organisations would be characterized by employees adhering to proper house-keeping, making proper use of safety equipment, and avoiding shortcuts and other unsafe practices. Thus, if safety is an attitude then the culture that would eventually be created would form this attitude among employees. The point is that a high safety culture predicts to an extent of reliability, a high safety performance (Auzoult, Ngueutsa, 2019; Deng et al., 2019).

History of Safety Culture Research

Safety culture research was fuelled by events in history; most notably, the Chernobyl Nuclear Disaster. Yule (2003) however asserts that this was the focus of research until the concept of safety climate was introduced in 1980 by Dov Zohar. Safety culture in a practical sense is more of an abstract measure that reflected not only descriptive measures but also attitudes, safety records, hazard analysis, content analysis of performance reports within an organizational culture (Cooper, 2000). Up until this point studies that assessed the concept of safety culture were sometimes descriptive and employed quantitative measures (Carroll, 1998). Although researchers claimed to be measuring culture, their quantitative methods of study and general methodology questioned the validity of the cultural measure.

The papers then shifted focus to safety climate which then became adopted as a reflective measure of the safety culture. Safety climate became a more convenient measure as it lends itself to quantitative methods and does not require time-based research designs or intensive research (Yule, 2003). Previous studies were not quite extensive enough to assess any form of culture as a measure. The paper by Zohar (1980) which is described by Yule (2003) as seminal shifted the focus of studies to the relatively unknown concept of safety climate. Safety climate refers to the priority and/or value that the organisation places on safety and actions and issues of safety as perceived and shared by employees within the organisation (Zohar, 2008). The important thing to note is that though both constructs are used interchangeably, either safety climate or safety culture measurement has one aim, which is the prediction of safety performance. It is essentially a proactive step towards the establishment of accident-free organizations. Safety climate thus did not come to undermine the aim of research in the area. Safety climate is a compliment measure of safety culture.

Safety Climate As An Independent Concept

Safety climate represents shared views within the organisation of the organisation's policies and actions that prioritise safety (Yule, 2003). According to Zohar (2008), safety climate refers to the priority and/or the value that the organisation places on safety and actions and issues of safety as perceived and shared by employees within the organisation. Simply, it reflects what employees believe is the level of priority that the leadership/management ascribes to safety. It is a reflection then of the leaderships' commitment to safety. Safety climate is still a major indicator of workplace safety which workers derive from their working environment (McGhan et al., 2020). The concept of safety climate became a key concept in safety research after the work of Zohar (1980) in Israel which is often described as the most seminal study as far as safety climate issues are concerned (Yule, 2003). Schneider (1990) contends safety climate could be an indication of the underlying culture of the organisation. Zohar (2008) further claims that a safety climate is important because employees have been known to behave per the safety climate.

The current study considers the concept as an apt measure of safety within the organisation. It lends itself much easier to measurement as compared to safety culture. Being able to assess safety climate as a measure with various scales at a particular point in time makes the measure particularly useful in a time-bound study such as this. However, it is a very reliable measure of the safety situation within the organisation (Adutwum, 2010; Zohar, 2008; Yule, 2003). As its effects are expected directly on the employees, the focus of such studies then stays on the employees and the factors that "their own evaluation of safety priority in the organisation" is supposed to create. Nevertheless, even though safety climate is also now used as a fair predictor of performance and a reflection of safety culture the studies have focused mostly on the safety climate – safety performance relationship (Rundmo, 2000).

The path of safety climate to the achievement of the predicted performance has been neglected by most studies in the area. Essentially, the studies focus on the relationship and fail to establish how safety climate comes to establish performance. For instance, in reality, it is expected that safety knowledge informs safety attitudes such as risk perception which may in turn affect safety practices and ultimately performance. Few studies have explored these relationships and those that have done so have mostly failed to establish a strong relationship between these variables (Clarke, 2006). Less emphasis is placed on the path that having a high safety climate travels to achieve its corresponding safety performance.

Implications for Organisational Safety Research

To organisations, it may be speculated that the priority has always been to have high safety performance measures. Thus, the motivation to explore the said path is virtually absent. However strong the safety performance - safety climate relationship, it may be slightly erroneous to identify safety knowledge, employees' risk perception and safety behaviour as direct products of the climate. Perhaps, this is because this relationship has not been established as strongly by researchers as the safety performance - safety climate relationship.

In the future, researchers can focus solely on these variables to establish a possible predictive relationship that will eventually lead to safety performance. This will help explore convincing relationships that have practical relevance.

Conflicts of interest

The author declares no financial conflicts of interest.

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