

Vibhuti sharma Ph. D Research Scholar Department of Economics University of Jammu, Jammu
Jammu & Kashmir UT, India

Abstract:

The transition of educated youth is important for getting suitable employment throughout their life course. This study investigates the extent of the skill gap in educated youth's educational and vocational educational attainment. A large number of studies help build a theoretical framework on skill gap & employability. However, substantial research lacks in investing a skill gap & youth employability. Therefore, there is great importance in finding current knowledge in this field. Thus, this paper carries out systematic reviews in appropriate manner including, the skill gap in general & vocational education, Employability and Labour Market Participation, Skill development opportunities (VET) for youth employment and Industry 4.0 role in educated youth employability. This paper analyses the skill gap & youth employability. The purpose & contribution of the paper is to provide a clear picture of the skill gap among educated youth & causes of delay in labour market transition. A systematic review in this area of specialisation attracts the attention of the government in finding loopholes in the education system & creating the bulk of employment generation for educated youth.

Keywords: Industry 4.0, skill gap, skill development opportunities, VET, employability, Labour market participation

JEL code: L16, J24, J29, M53, J21, J82

One of the important goals of our education systems is to inculcate skills and knowledge among youth for labour market success. Thus, there is a great need to examine different paths among youth from high school to labour market participation in the labour market (Lindsay, 2016). During the transition from adolescence to adulthood, most youth move from economic dependence on their parents to their independence. (Hartman, 2016). In the past, youth after finishing school education starts their first full-time job, marry and then start a family (Marini, 2016). However, this pattern has changed due to the nature of the changing pattern of technology, learning a new skill has changed the transition of youth. So, there is a rapid growth of mass higher education with the new pattern of skills (Wanner, 2015) and there is an essential demand for new skills & technical know-how in the youth employability. We learned from the previous literature that youth transition pathways such as leaving the parental household, completing education, acquiring a stable job, and family formation are complex, interlinked, and associated with changes in values and ideals (Furstenberg, Rumbaut and Settersten, 2015). Now, successful employment transitions in early adulthood with appropriate skill is important. Pathways of transition are of two main types: (1) either youth go directly from high school to post-secondary education and then enter the labour market or (2) they enter the labour market directly from high school, bypassing further education with adequate skill & practical knowledge. (Fellin, 2016). The term youth can be defined as the period between childhood and adulthood when spending a longer period in education and training (Furlong, 2012). 15-24 years is a period of youth in which the first 15-19 years as an adolescent group and later 19-24 years as a young adult. The age group is 15-24 years considered a youth (UN, UNESCO, ILO, 2021). Youth age between 15-35 years (The African Youth Charter). In India, the age group of youth is 13-35 years (National Youth Policy, 2003), Youth refers to the age group of 15-24 years, (Census, 2011). It is modified and defined 'youth' as people aged 15-29 years. (National Youth Policy, 2014). The present paper emphasises the youth who still is in education or completed his education & wants a satisfying job in the industry. Skill gaps become major challenges for youth's employability in industry 4.0. The paper highlights loopholes in the present education system, which hinders youth employability.

It is the transition in youth from school to suitable employment (Threadgold, 2020). Its success is seen and measured by getting employment and by having new skills (Pham & Jackson, 2020). The transition of educated urban youth from education to a

suitable job has gained attention with adequate skill (Ryan, 2020), due to an increase in educated youth unemployment (Kalil, 2020).

Education with skill & practical know-how is one of the important factors in determining the transition from education to suitable employment. Educational attainment of educated youth with appropriate skills plays an important role in shaping their life, transitions and participation in the labour market (Partanen, 2020), which impacts risks and uncertainties towards work (Myllylä, 2020). Youth transitions to the labour market have been complex and uncertain. Social, economic, and political changes significantly impact youth's lives by providing suitable skills. Youths are 'at risk' or 'vulnerable', therefore, systemic, institutional and structural responses are needed for increasing youth employability (Tåhlin & Westerman, 2020).

With the pace of technological change and new working methods, the use of artificial intelligence is termed a "great job-creating machine" (Scheau, Arsene, 2018). Educated urban youth have future goals, and fight for their rights in education and employment. Major problems seen in them are unemployment, inadequate knowledge & experience, and skill gap (Nair, 2016) and face sorrow & misery for unemployment after spending a lot on education and over education (Choudhary, 2016). vocational skill, skill up-gradation, and changes in a new pattern of education have come into force so that the transition period can be reduced & new demand of industry can be fulfilled (Quintini and Martin, 2014).

Global challenges faced by Youth are unemployment, over-education, qualification mismatch, skill mismatch, gender gap, low wages, poor working conditions in a job, low-quality job, high labour market inequalities, longer and insecure labour market transition but skill gap is one of the major challenges among youth. Youth also faces problem in getting suitable employment, and education concerning their profile in society, an economy in which youth live and work (Nair, Vemuri, & Ram, 2016).

Youth Studies on "school to work transition" which include labour market transition, skill mismatch, the gender gap in education and labour market, vocational educational attainment and skill development opportunities, help to understand the determinants of labour market employability (Cieslik & Simpson, 2013; Balarin & Sennett, 2017; Manacorda, Rosati, Ranzani, & Dachille, 2017). Various policies and actions on youth employment are framed across the world but among these, "Action plan on Youth" with increasing youth employability with adequate skill is one of the top priorities (ILO, 2014).

The future of Indian youth is dark due to the non-job-oriented education system, lack of basic skills and ineffective government policies and programs for transitioning educated youth into the labour market. As compared to a developed nation, problems faced by Indian youth in labour market transition include skill gap, lack of vocational and market-oriented skills, poor school to labour market transition, and the poor performance of schools/ institutions in vocational education, NEET. (UNDP, 2021). Employability helps youth to gain financial independence and social integration, and develop knowledge and skill (OECD, 2015). India is one of the youngest populated countries around the world as out of 65 % of the working population majority are youth (UNEPA, 2020) suffer from inadequate access to education, unemployment, lack of skills training, technical know-how, and skill gaps in the labour market. (Brunello, 2021) if does not invest more in education and training, the system might face worse youth unemployment (Wruuck, 2021).

The objectives of this systematic review are: skill gap in general & vocational education, Employability and Labour Market Participation, Skill development opportunities (VET) for youth employment and Industry 4.0 role in educated youth employability. These reviews help in the development and implementation of educational and vocational training policies and bridge skill gaps and the finding of the study helps in creating employability among educated youth.

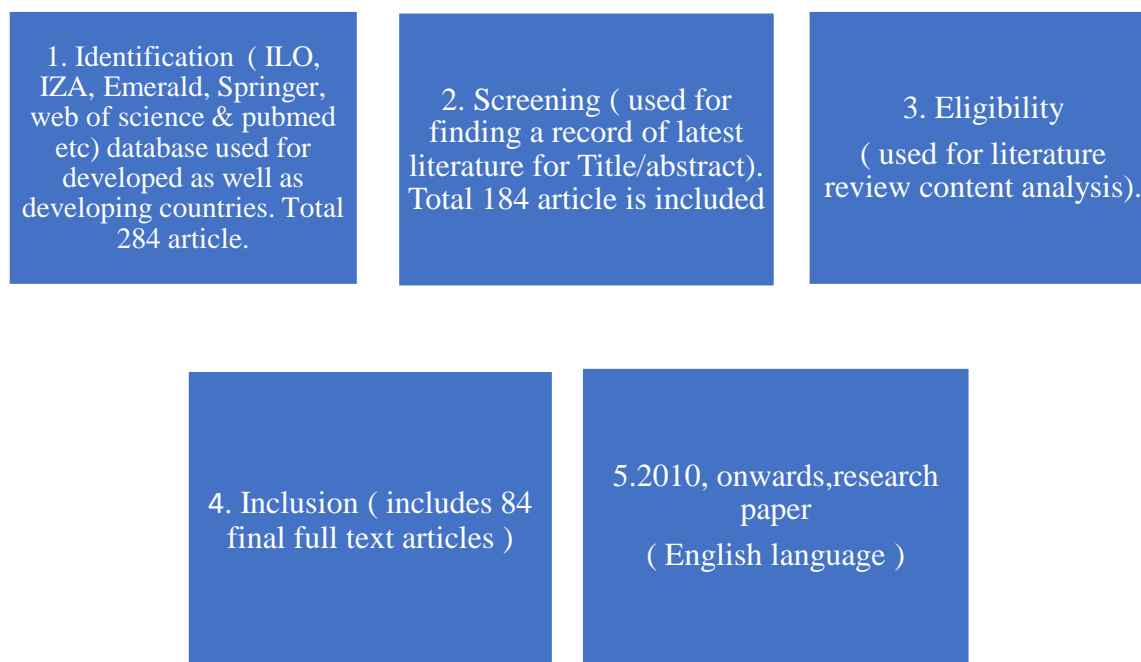


Methodology

The author of this paper studies reviews on the skill gap among educated youth & employability. The objective is to find out skill gaps in educated youth employability in industry 4.0, which will help in future research directions in this field. In addition, this paper aims to develop an understanding of local, national and international employability skill that increases labour market participation & employment opportunities among youth in industry 4.0.

The foremost important research question is 'What are the skill gaps in educated youth & become a hindrance for industry 4.0 employability'? The main need is to first focus broadly and then scrutinize the literature part and find evidence from a national as well as international perspective, a systematic approach is used for the review process by applying the (Identification, Screening, Eligibility and Included) criteria ((Whittemore & Knafl 2005;), Grant & Booth 2009). Specific literature review supports the flexibility and uniqueness of the context. It is used in a systematic & review manner by analysing information on the challenging social issue of skill gap and employability.

A total amount of 284 papers have been found on systematic review databases like ILO, IZA, Emerald, Springer, web of science & PubMed etc. for the documentation of data of developed as well as developing countries. 184 are used as research content like title, abstract & keywords and are more consideration for the researcher & practitioners. A final full-text article of 84 documents is used for the literature review & analysis part. These documents have been weighed in two ways, first 32 recent documents are used for the analysis of titles, abstracts & keywords. After reading the entire text final 52 documents are used for the up-to-date literature review analysis. The selection process of paper (for the year 2010), onwards with (English language) is used for the significance of documents for the study.



Discussion

The skill gap in general & vocational education

Today's youth face a very terrible skill gap problem, which reduces their probability of employability. Skill gap refers to the difference between the skills required for a job & the skills employers possess. Skill gap threatens long term economic prosperity of nation & there is need of high-quality workforce for business success. There is a crucial need for employability skills possessed by youth including communication, teamwork, problem-solving, planning & organising, self-management, learning skill & technology. There is a scarcity of youth with good technical and soft skills required for suitable employment. As a result, youth work in a turbulent environment that demands new and developing skills to set up in global competitiveness. (Malik, 2017). Vocational education is a core of school knowledge as education for jobs, and work. Education for jobs carries a direct link between the curriculum and actual jobs in the labour market. On the other hand, in the context of general education, youth-only study for degree/diploma, there is no practical know-how for the job. To desire a job, youth must have to face stiff competition for getting a suitable job (Venkatraman, 2017)

According to research by Boston Consulting Group, estimated in 2020 India have a surplus of the active population ((in the working-age group of 15-50 years) - about 47 million people in total. The skill gap appears to be staggering - 75% of IT graduates are deemed 'unemployable', 55% in manufacturing, 55% in healthcare and 50% in banking and insurance, according to higher education in India: Vision 2030, a report produced by international consultants Ernst and Young for the Federation of Indian Chambers of Commerce and Industry, or FICCI." (Mishra, 2016))

There is a dual challenge on both the demand and supply side wherein, on one hand, there is a scarcity of highly trained labour & non-employment of educated youth due to lack of skills, on the other hand. There exists a wide skill gap due to a mismatch between demand and supply since there are more people than available for jobs at low skills levels and fewer people available at high skills level jobs (Agarwal, 2016). India and many other developing nations face a deficit of available human intellectual capital required to manage the show and sustain their rapidly changing economic enterprises. So, there is a problem of a vast skill gap in the Indian labour market.

Sectoral analysis of skill gap, 2022. The biotechnology sector in India is growing at a rate of 37.5 per cent annually. The Drugs & Pharmaceutical industry at the global level has grown at a rate of 7% while India's drug sector grew by 10% but a vast population of this segment lacks the skills required. The Indian IT/ITES have created 3 million job opportunities as it is the topmost destination

for IT/ITES outsourcing firms but has a manpower shortage due to the core issue of skill gap. (Malik & Venkatraman, 2017)

Employability and Labour Market Participation

Labour force participation is the measure to evaluate the working-age population in an economy. The participation rate refers to the total number of people currently employed or in search of a job. Labour force in a job with sex and age group gives a profile of the distribution of the working population (Mattos, 2016) and its level and pattern depends on employment opportunities, income, age, marital status and level of education and used as an indicator in labour market behaviours (ILOSTAT, 2018). Employability is correlated with Labour market participation. Fewer job availability causes a lower participation rate and high job availability causes a high participation rate in the labour market and is significant in understanding unemployment (Chaudhary, 2016).

The Global Labour force participation rate among youth is 42%, due to an increase in educational enrolment and greater employment opportunities (ILO, 2018). According to world employment and social outlook, the worldwide gender gap in labour market participation is 27% (ILO, 2020). In India, Youth participation in the labour market of males is 38% and that of females is 16% during 2017-18, which is quite low than males due to a lack of vocational education, skill and training, a rise in inactive female youth (Sahu and Kumar, 2021). Labour force participation creates new challenges and opportunities regarding the organization of work and distribution of resources. (ILO, 2018a).

Different labour market situation faced by youth in a country like India, having a strong economic growth rate, continues to be dominated by the unorganized sector (Giri, 2017). Labour force participation plays an important role in labour market equality in terms of gender and helps achieve human development goals, eradicate poverty, and increase production, and output in an economy. (Verma, 2017). Decent work and employment generation is one of the important goals of the Sustainable Development Goals (SDGs) to achieve inclusive growth. Lack of decent work threatens future employment prospects and causes undesirable labour market outcomes in long run. A low level of economic activities causes youth unemployment and lower future earnings (Cahuc and Charlot 2016).) and lower health and poor job satisfaction (Malherbet, 2016).

Labour force participation among women provides a choice to work in the labour market (Ahmed, Chinembiri, & Gillwald, 2021) and is generally lower among females than males. Women tend to leave the labour force to handle their families, children but in developed economies, the profile of female participation is similar to that of men (ILO, 2021) Higher educational attainment among women faces disparity concerning employment opportunities, skills and training, working conditions, job security, discrimination in a job, pay scale, sexual harassment in the labour market (Behera, 2021) and thus, falling labour market participation. Some women face problems in access to Malnutrition, disability and chronic sickness which affects their capacity to work in labour market participation. (Allagh, Pant, & John, 2017). Employment increased in labour market participation among women, with part-time jobs or mini-jobs playing an important role in re-entering the labour market after career breaks. (Doering & Thébaud, 2017).

Employability varies in educated youth with General and vocational education. Vocational education plays an important role in labour market job opportunities (Baert, 2015). and has more chances of employment and more likely to have a permanent first job as compared to general education (Brunello, 2015) and causes a short-term real wage advantage over a long period and age whereas long term disadvantage to youth with general education (Rocco, 2015). Vocational education yields higher expected long-term utility than general educated youth with higher education (Verhaest, 2015). Youth with vocational education are more likely to earn higher wages, and higher labour force participation (Manfredi, 2011). Various educational training programmes and apprenticeships help in provide skills to youth for labour market entry and successful professional carrier (Quintin, 2011)

Skill development opportunities (VET) for youth employment

Skill means the learned ability to perform an action, training or practice and skill development is the method of finding skill gaps and improving the ability to perform a skilful job (Muller, 2019). Skill Development means developing skills which add value to the organization and career development. Learning and developing such skills require pieces of training or on-the-job opportunities (Katole, 2020). The development of skills can contribute to structural transformation and economic development by enhancing employability and labour productivity. The creation of employment opportunities among youth improves their well-being and increases their future earnings, self-esteem, social identity and belongingness (Bahl, 2021).

Vocational education is a solution to address youth employability (Bhatt, 2021). Vocationally trained youth have a smoother transition to the labour market (Sharma, 2021). Occupation-specific skills make them more attractive to employers (Blommaert, 2020).) at the start of a career but later disadvantageous in life due to workers' inflexibility and inadequacy for changing job content due to technological innovations in contemporary labour markets (Wolbers, 2020). Vocational education is advantageous for labour market allocation (Gesthuizen, 2020) due to faster job absorption (Muja, 2020) and lowers unemployment probability at the start of their career (Carruthers, 2020). due to ownership of occupation and sometimes even firm-specific skills (Jepsen, 2020). Vocational education develops job-related skills in specific occupations (Verzillo, 2016). Vocational education increases the chances of early working life with a modest income premium (Vacca, 2016). A low level of educational attainment causes a high risk of unemployment, low-paid jobs and labour market marginalization (Wicht, Müller, Haasler, 2019). Low job attainment is associated with social class, gender and ethnicity (Nonnenmacher, 2019). Vocational education provides a 'safety net' for youth against unemployment or unskilled manual jobs (Pilz & Regel, 2021).

However, new technological innovations demand contemporary skills in labour markets (Rainie 2017), and occupation-specific skills are likely to become obsolete with changes in job content. (Anderson, 2017) Vocational education and Skill development training smoothen school-to-labour market transitions (Vincent & Rajasekhar, 2021). Skill underutilization and work experience in unskilled jobs may delay future jobs (Pilz, 2016). On-the-job human capital accumulation in unskilled labour may be of a lower "market-value" compared to skilled positions (Tåhlin & Westerman, 2020).

Unskilled unemployment tends to persist throughout an individual's career (Buchs, 2016). Similarly, entering the labour market during recessions crucially hampers future occupational and social positioning (Helbling, 2016). Less participation of youth in industrial training and youth training programmes fails to meet the firm's job requirements related to abilities and skills (Panth, 2020). Skill development is helpful in the acquisition of knowledge and competitive skills (Maclean, 2020) and successful in a smooth transition from school to post-secondary education for employment generation (Watanabe, 2019).) and also improves employment outcomes for youth (Betcherman & Khan, 2018). It is also helpful in generating employment and labour market requirement for entrepreneurial tasks, enhanced employability and high future earnings for participants (Carnoy, 2020).

Skill development affects employment and emerges as positive and significant for employment-generating schemes with higher employment and cost-effectiveness (Agrawal, Singh & Thakur, 2020). The value of Skill development is measured in earning differentials (Carnoy, 2020) and payoff to education and increase in wages (Khan, 2018). Youth with low prospects of decent work at their entry into the labour market will face undesirable labour market outcomes in long run such as lower earnings, unemployment, lower health and low job satisfaction (Sumberg, 2017). Most of the skills training and microfinance programmes have failed to deliver decent work and poverty reduction (Güney, 2017) not absorbing new entrants into the labour market and marking high rates of underemployment. The relationship between skill development and labour-market outcomes is evident (Ansari & Khan, 2018). The educational system must adopt Skill development programmes and reduces the skill mismatch in labour markets (Papakitsos, 2016).

Youth faces unique challenges in labour markets due to entry barriers such as lack of access to productive assets including credit, education, and vocational training (Agrawal, Singh, & Thakur, 2020). which causes them to engage in low-skilled wage labour or labour-intensive self-employment

and informal sector activities are characterized by insecurity, seasonality and low returns (Mullan, Rolleston, 2020). Investment in skill development depends on central grants in aid, and the lack of private investment in the economy due to the law-and-order situation. Fewer Job opportunities are available to youth, so there is a need to become the nation a hub for economic activities (Upadhyay, 2019).

World Skill Declaration report, 2019 emphasizes that skill is important for employability which includes certain basic, cognitive, digital, socio-economic, and cultural skills. In the global economy, there is a need for versatile skills and vocational education & training with a special focus on apprenticeship and lifelong professional learning skills in the labour market. Vocational education is acquired through knowledge, skills and competencies specific to the particular profession (Global Education Future, 2020). The demand for Skill increasing at the global level with the rapid spread of technology, globalization and the shift from industrial economies to information and knowledge-based economies (Joynes, Rossignoli & Kuofi, 2019).

In India, the Demographic profile of youth faces the problem of a skilled workforce. According to the Government of India estimates, 93% of the workforce is in the unorganized or informal sector, which is not supported by a structured skill development system (Giri & Verma, 2017). No training on employable skills is given to youth with employment opportunities as per the current education system. India's labour force has a high number of the labour force with outdated skills. The skill development environment in India is quite complex. To capitalize on the demographic dividend, India will need to empower its workers with skills (Aggarwal, 2016). In the National Policy for Skill Development and Entrepreneurship 2015, the main aim was to promote entrepreneurship as the key to a successful skills strategy. The Vision of this Policy is "to create an ecosystem of empowerment by Skilling with high Standards and to promote a culture of innovation-based entrepreneurship which can generate wealth and employment to ensure Sustainable livelihoods for all citizens in the country". The National Skill Development Mission (NSDM) was launched on 15th July 2015 on the occasion of World Youth Skills Day. The National Skill Development Mission seeks to provide a strong institutional framework at the Centre and States for the implementation of skill activities in the country (Skill Development Report, 2020-21). The present education system is not linking students with the world of employment (GOI, 2016) and the problem of low skill is one of the reasons for it. In India, 2.3% of the total workforce is informal skill & training as compared to 63% UK, 75% in Germany, 52% USA, 80% in Japan & 96% in South Korea (GOI, 2015).

Industry 4.0 role in educated youth employability

In the fourth industrial world & digitalisation, industry 4.0 plays an important role in the 21st century. Industry 4.0 is a term used for technologies (Artificial Intelligence) and concepts realized in industrial production. Industry 4.0 is referred to as exploiting the power of communication technology and innovative inventions fostering the development of the mechanized industry (Tyenge and Martinsen, 2018). Five key capabilities that are highly relevant in Industry 4.0, are namely self-reflective learning, creativity, problem-solving, cooperation, and communication. Within the Smart Factories of Industry 4.0, the cyber-physical system (CPS) monitors physical processes, creates a virtual copy of the physical world and makes decentralized decisions. Over the Internet of Things, CPS communicate, cooperate and humans in real-time and cross-organizational services are accessible and utilized by participants of the value chain. People's employability depends upon their competence to gain the desired job and is no longer dependent on what they earlier know but on what they are expected to learn more for a new job (Biggs, 2013).

Industry 4.0 is a big challenge for educated youth as our society has changed from an industrial to an information society (Ras & Wild, 2017). Now there is a demand for youth who learn quickly and self-organise the core content of specific knowledge fields, manage and master the vast amount of information, and the influence of technology on life. Current challenges in work-life not only demand knowledge but also acquiring abilities to become successful and to make appropriate decisions (Stahl & Baudet, 2017). There is a need to develop competencies like critical skills, critical thinking, lifelong learning & teamwork among youth so that they can adjust to the labour market (Bailey & De

Proprius, 2019). Critical skills include communication, teamwork, problem-solving, self-management, planning and organizing, technology, life-long learning, and enterprise skills (Stentoft, Adsbøll, & Haug, 2021). These critical skills help youth to adapt to changes and to improve career opportunities and also help in employment with changing jobs (Khandelwal, & Martini, 2020). Industry 4.0 scenarios “only” highlight the need for employees to master skills so that it will help in getting suitable employment. Industry 4.0 uses a new concept of the production line and management processes which causes changes in the skills and competencies for the employability of youth. Moreover, the management of the manufacturing process changes and those new skills and competencies are required (Kiesel & Wolpers, 2015).

Findings of the study

There are several key findings which are found in this paper, as discussed in brief. Firstly, the macroeconomic effects of industry 4.0 become a major challenge for political, economic & company levels. Education and further education, basic skill & vocational education plays an important role (Ahmed & Chattopadhyay, 2016). There is a vital need to strengthen the industry digitally so that basic skills such as conceptual thinking, soft skills, and communication skills & all other basic skills generate employability in youth. (Aggarwal, 2016). There is an urgent need to develop skills & for further training for increasing labour market participation among youth. The skill gap increases the transition period for employment. (Lindsay, Hartman, & Fellin, 2016).

Second, the effects of Industry 4.0 are very rigorous on the economy such as the effect on job losses and new jobs being created with new skills, new products, macroeconomic interrelationships, adjustment of supply and demand of labour, price and quantity reactions changing requirements of the employer & more efficient processes. This directly influences youth employability. This situation causes an increase in value creation, increasing productivity and higher requirements for youth causing growth in wages. The employment in Industry 4.0 comprises 54 industrial fields and 63 economic sectors 490,000 jobs are lost while in other areas 430,000 jobs are newly generated within ten years beyond the baseline scenario. In particular professions, there is a decline in the manufacturing sector. There are increases in the service sector like IT and scientific professions. In terms of qualification levels, the demand for high-qualified & skilled youth increases. As a whole, it is observed that the effects of Industry 4.0 create imbalance, Shortages & skill gaps in the field of vocational & training youth. (Weber, 2016)

The primary focus is on university education in the area of vocational education with practical and theoretical training. Thus, a proactive policy should develop, strengthen & innovate skills in youth & to overcome the skill gap. Along with industry 4.0, production work, knowledge work, R&D & skills generate several employment opportunities for youth become a need of hour (Dishon, & Gilead, 2021). Occupations based on vocational, skill & training play an important role in creating human skills & providing productive employment in the labour market. Various labour market policies like occupational health & safety, working time regulation, management and social security must need change for the educated youth's employability. There must be a critical need to pay attention to the industrial, agricultural & service sector digitalisation for the growth & development of an economy.

Global industry 4.0 market size from 2017 to 2022

Year	Global 4.0 market size in (\$)
2017	47
2018	64
2019	87
2020	119
2021	163
2022	223

Source: IOT Analysis, 2020

It has been found that the Global industry 4.0 market size from 2017 to 2022 is increasing over some time. In pandemics, this trend is increasing as digital technology improves, the supply chain & internet of things improved and digitalization & virtual processing of the supply chain improved over

the period in gig economics. The key finding of the study is, that the majority of the graduates lack skills, unfit for industry 4.0. Therefore, basic skill is important for Industry 4.0. Youth with basic knowledge of computers and cloud computing and web development with good communication skills is demanded in industry 4.0.

Limitations & Future work

New technologies of industry 4.0 not only changed the pattern of production in the firms but also changed the balance between capital and labour, the workplace, the physical environment as well as lifestyle of workers. (Lindsay, McDougall, & Menna- Dack, 2018). A serious cause of concern is digital divides that emerge between regions of the same country, different countries and between the rich and poor in society. Factors causing digital divides cause differences in human capital and human capital development, infrastructural capabilities, institutional set-ups and policies, and access to finance and culture (including attitudes to risk and failure).

There is a need to adopt transformative industrial and regional policies for the promotion of industrial growth & technological change. There is a need to change skills and (re-)training policy, access to finance, support for SMEs & develop a more lifelong learning approach to training and retraining of youth. (Singh, 2020). The availability of skills in youth, innovation capacity, the supply chain base, support services and the role of institutions play an important role in the employability of youth. (Chowdhury, 2014) Policy needs to be framed for the private-public sector for the creation of skills (digitalisation, internet of things, robotics and artificial intelligence) & employment opportunities. There is a need to develop new skills, re-skilling and upskilling digital technologies for the employability of youth.

There are several problems faced by educated youth employability in industry 4.0. There is a need to develop skills for their employability to know the process of collection and utilising data & new products in the workplace (Baussola, & Mussida, 2014.) Therefore, digital manufacturing work is required employees who are both experienced and knowledgeable & the ability to learn a new skill. (Kring, 2017). There is a need to develop adequate performance assessment strategy training for the youth with suitable educational approaches (e.g., self-regulated, reflective, collaborative, blended learning & lifelong learning), arrangement of an intelligent assistance system for training by experience, live guidance and performance assessment from observation need to follow the change towards Industry 4.0 about processes with increased degrees of digitisation (Dietrich, Parker, & Salmela, 2012). New skills need to be developed with the pace of digitalisation for bridging the skill gap & secure employability.

Government should implement new policies for the safe employability of youth in industry 4.0. First, Live Guidance for Advanced Manufacturing, recording/enactment technology for the supervision of learning new skills and training at the workplace (Ivzori, Sachs, Reiter & Schreuer, 2020). There is a need to pay special emphasis on knowledge-intensive rich media and artificial intelligence (deep learning) approaches (Bratti, Ghirelli, Havari & Santangelo, 2022). Second, Performance Analytics: Skills Metrics and Prediction Performance skills are in practice by youth. So, there are more chances of change & learning new skills & employment can be easy for a newcomer. (Engelbrecht, Shaw & Niekerk, 2017). All stakeholders (i.e., industry, policymakers, and academics) need to frame positions for quantifying and benchmarking human performance against underlying competency, linking key business performance indicators with indicators of effective and efficient learning and job execution (Hansen, Kirkeby, & Andersen, 2021). New Learning and Training Methods for Performance Augmentation Research on learning and training methods are appropriate to the custom and practices of Industry 4.0. These methods have to support the acquisition of skill-enhancing capabilities relating to knowledge-intensive innovation, agility and value-generation in a 4.0 ecosystem. New learning and training technologies have to be adapted and evaluated in industry 4.0 (Jetha, Shaw, Sinden, Gignac, & Ginis, 2019).

Conclusions

To implement a digital roadmap in industry 4.0, new policy implications need to be framed for developing new skills & employability among youth. The aim has to change the education system with technical & practical know-how and boost training providers, content developers, systems developers and scholars in this field. Despite the disturbance of technology that Industry 4.0 brings and impacts change in job demands, technology changes, demand for new skills youth & new opportunities in the employment market. Upskilling & up-gradation of new skills in youth is the only solution for the interruption of technologies. Further, we need to train youth in research and industry for Performance Augmentation for Industry 4.0. Adding an interdisciplinary R&D focus on Human Performance Augmentation would assist to recover productivity costs in various industries. Finally, the provision of such a technology will help to improve employability by providing access to better-paid jobs and it will help in the reduction of the brain drain of ambitious youth.

BIBLIOGRAPHY:

- Agarwal, A. (2016). Skill Development Training Programme: A Case Study of IGNOU. *Global Journal of Enterprise Information System*, 8(4), 66-70.
- Aggarwal, S. (2016). A central pillar of employability: Skill development. *Imperial Journal of Interdisciplinary Research*, 2(3), 386-389.
- Agrawal, M., Singh, C., & Thakur, K. S. (2020). Demographic Dividend: Skill Development Evidence in India. *SSRN*, 3590719, 2-13
- Agrawal, M., Singh, C., & Thakur, K. S. (2020). Demographic Dividend: Skill Development Evidence in India. *Emerging issue report*, 2-12
- Ahmed, S., Chinembiri, T., & Gillwald, A. (2021). Future of Work in the global South (FOWIGS): *Digital Labour, New Opportunities and Challenges*, 45
- Ahmed, T., & Chattopadhyay, R. (2016). Return to general education and vocational education & training in Indian context: Policy implications. *International Journal of Educational Management*, 45-78
- Allagh, K. P., Pant, H. B., & John, N. (2017). Factors influencing employment and employability for persons with disability: Insights from a City in South India. *Indian Journal of Occupational and Environmental Medicine*, 21(1), 36.
- Ameratunga Kring, S. (2017). *Gender in employment policies and programmes what works for women?* *International Labour Organization*, 34-44
- Ansari, T. H., & Khan, M. A. (2018). Role of Education and Skill Development to Promote Employment in India. *Skill India Opportunities and Challenges*, 208-214.
- Antoninis, M., April, D., Barakat, B., Bella, N., D'Addio, A. C., Eck, M., & Zekrya, L. (2020). All means all: An introduction to the 2020 Global Education Monitoring Report on inclusion. *Prospects, Global Education Future* 49(3), 103-109.
- Baanante, M. J., & Ugaz, D. C. Revisiting the steppingstone hypothesis: Transitions from temporary to permanent contracts in Peru. *International Labour Review*.
- Bahl, S., Bhatt, V., & Sharma, A. (2021). Returns to formal and informal vocational education and training in India. *International Journal of Manpower*. 0143-7720
- Bailey, D., & De Propriis, L. (2019). Industry 4.0, regional disparities and transformative industrial policy. *Regional Studies Policy Impact Books*, 1(2), 67-78.
- Balarin, M., & Sennett, J. (2017). Vocational and business training to improve women's labour market outcomes in low-and middle-income countries: a systematic review. *Campbell Systematic Reviews*, 13(1), 1-195.
- Baussola, M., & Mussida, C. (2014). Transitions in the labour market: discouragement effect and individual characteristics. *Labour*, 28(2), 209-232.
- Behera, M. B. (2021) emergence of India as the skill capital of world-possibilities & path ahead. *IJIRAQ*, 2(1), 15-20
- Benes, E., & Walsh, K. (2018). Measuring employment in Labour Force Surveys: main findings from the ILO LFS pilot studies. *ILO*. 23 (4). 23-89
- Betcherman, G., & Khan, T. (2018). Jobs for Africa's expanding youth cohort: a stocktaking of employment prospects and policy interventions. *IZA Journal of Development and migration*, 8(1), 1-20.
- Biggs, H. C. (2013). Essential elements for recruitment and retention: Generation Y. *Education+ Training. Emerald*, 3-24

- Blommaert, L., Muja, A., Gesthuizen, M., & Wolbers, M. H. (2020). The vocational specificity of educational systems and youth labour market integration: A literature review and meta-analysis. *European sociological review*, 36(5), 720-740.
- Bratti, M., Ghirelli, C., Havari, E., & Santangelo, G. (2022). Vocational training for unemployed youth in Latvia. *Journal of Population Economics*, 35(2), 677-717.
- Brunello, G., & Rocco, L. (2015). The effects of vocational education on adult skills and wages: What can we learn from PIAAC? *OECD*, 168, 34-76
- Brunello, G., & Wruuck, P. (2021). Skill shortages and skill mismatch: A review of the literature. *Journal of Economic Surveys*, 35(4), 1145-1167.
- Buchs, H., & Helbling, L. A. (2016). Job opportunities and school-to-work transitions in occupational labour markets. Are occupational change and unskilled employment after vocational education interrelated? *Empirical Research in Vocational Education and Training*, 8(1), 1-18.
- Budzinskaya, O. V., & Teregulova, N. F. (2021). Labour Market Trends in the Transition to the Digital Economy. In *Sustainable Development of Modern Digital Economy*. UNDP 45(6), 253-261
- Cahuc, P., Charlot, O., Malherbet, F. (2016). Taxation of temporary jobs: good intentions with bad outcomes? *The Economic Journal*, 130(626), 422-445.
- Carnoy, M. (2020). Race earnings differentials. The economics of education. Academic Press, 133-147
- Carruthers, C., & Jepsen, C. (2020). Vocational education: an international perspective. *Econstor*, 8718
- Chowdhury, S. R. (2014). Skill mismatches in the Indian labour market: Policy priorities & challenges ahead. *The Indian Journal of Industrial Relations*, 422-438.
- Cieslik, M., & Simpson, D. (2013). *Key concepts in youth studies*. Sage, 33-77
- de Mattos, F. B., & Chaudhary, R. (2016). Women Labour Force Participation in Asia. *Transformation of Women at Work in Asia: An Unfinished Development Agenda*, 23.
- Delaure, G., Gardiner, D., & Verick, S. (2021). Moving towards a life course perspective to labour market transitions: approaches and challenges. *ILO*, 38-40
- Dietrich, J., Parker, P., & Salmela-Aro, K. (2012). Phase-adequate engagement at the post-school transition. *Developmental psychology*, 48(6), 1575.
- Dishon, G., & Gilead, T. (2021). Adaptability and its discontents: 21st-century skills and the preparation for an unpredictable future. *British Journal of Educational Studies*, 69(4), 393-413.
- Doering, L., & Thébaud, S. (2017). The effects of gendered occupational roles on men's and women's workplace authority: Evidence from microfinance. *American Sociological Review*, 82(3), 542-567.
- El-dali, Quintin & Manfredi, (2011). Towards an understanding of the distinctive nature of translation studies. *Journal of King Saud University-Languages and Translation*, 23(1), 29-45.
- Engelbrecht, M., Shaw, L., & Van Niekerk, L. (2017). A literature review on work transitioning of youth with disabilities into competitive employment. *African Journal of Disability*, 6(1), 1-7.
- Furlong, A. (2012). Youth studies: An introduction. *Routledge*, 312
- Furstenberg, F. F, Rumbaut & Settersten (2015). Becoming adults: Challenges in the transition to adult roles. *American Journal of Orthopsychiatry*, 85(5S), S14.
- Giri, R. & Verma, R. (2017). Informality in Indian manufacturing-an alternative explanation to 'jobless growth', *Imperial Journal of Interdisciplinary Research*, 5-20
- Gomis, R., Kapsos, S., & Kuhn, S. (2020). World employment and social outlook: trends 2020. *Geneva: ILO*. 56 (5). 45-99
- Gooptu, N. (2018). JSAD special issue on skill development in India. *Journal of South Asian Development*, 13(3), 241-248.
- Grant, M. J., & Booth, A. (2009). A typology of reviews: an analysis of 14 review types and associated methodologies. *Health information & libraries journal*, 26(2), 91-108.
- Güney, t. (2017). Youth Employment and Sustainable Development. *Unregistered Employment*, 148.
- Hansen, C. D., Kirkeby, M. J., Kjellmann, K. G., Andersen, J. H., & Møberg, R. J. (2021). A longitudinal study will examine the importance of adverse childhood experiences for labour market trajectories over the life course. *BMC public health*, 21(1), 1-12.
- Hermann, M., Pentek, T., & Otto, B. (2016). Design principles for Industrie 4.0 scenarios. *49th Hawaii international conference on system sciences (HICSS)*, 3928-3937
- Ivzori, Y., Sachs, D., Reiter, S., & Schreuer, N. (2020). Transition to employment program (SUPER) for youth at risk: a conceptual and practical model. *International journal of environmental research and public health*, 17(11), 3904.

- Jetha, A., Shaw, R., Sinden, A. R., Mahood, Q., Gignac, M. A., McColl, M. A., & Ginis, K. A. M. (2019). Work-focused interventions that promote the labour market transition of young adults with chronic disabling health conditions: a systematic review. *Occupational and environmental medicine*, 76(3), 189-198.
- Joyes, C., Rossignoli, S., & Amonoo-Kuofi, E. F. (2019). 21st Century Skills: evidence of issues in definition, demand and delivery for development contexts. *Emerging issue report*, 32-70
- Kalil, A., & Ryan, R. (2020). Parenting practices and socioeconomic gaps in childhood outcomes. *The future of children*, 30(1), 29-54.
- Katole, H. (2020). Skill development and economic growth of India. *Journal of Applied Economics and Business*.2-8
- Khandelwal, R., Kolte, A., Pawar, P., & Martini, E. (2020). Breaking out of your comfort zone: archival research on epistemology in inclusive education pedagogy for Industry 4.0. *International Journal of Educational Management.*, 36 (4), 364-380.
- Kiesel, M., & Wolpers, M. (2015). Educational challenges for employees in project-based Industry 4.0 scenarios. In *Proceedings of the 15th International Conference on Knowledge Technologies and Data-driven Business*,1-4
- Kyle, W. C. (2020). Expanding our views of science education to address sustainable development, empowerment, and social transformation. *UNEPA*, 2(1), 1-9.
- Lindsay, S., Duncanson, M., Niles-Campbell, N., McDougall, C., Diederichs, S., & Menna-Dack, D. (2018). Applying an ecological framework to understand transition pathways to post-secondary education for youth with physical disabilities. *Disability and Rehabilitation*, 40(3), 277-286.
- Lindsay, S., R. Hartman, L., & Fellin, M. (2016). A systematic review of mentorship programs to facilitate the transition to post-secondary education and employment for youth and young adults with disabilities. *Disability and Rehabilitation*, 38(14), 1329-1349.
- Linnenluecke, M. K., Marrone, M., & Singh, A. K. (2020). Conducting systematic literature reviews and bibliometric analyses. *Australian Journal of Management*, 45(2), 175-194.
- Malik, G., & Venkatraman, A. (2017). "The great divide": skill gap between the employer's expectations and skills possessed by employees. *Industrial and Commercial Training*. 34 (5), 45-99
- Manacorda, M., Rosati, F. C., Ranzani, M., & Dachille, G. (2017). Pathways from school to work in the developing world. *IZA Journal of Labor & Development*, 6(1), 1-40.
- McGowan, M. A., & Andrews, D. (2015). Skill mismatch and public policy *OECD*, 3 (23), 34-56
- Mishra, M. (2020). Blue economy: Emerging global trends and India's multilateral cooperation. *Maritime Affairs: Journal of the National Maritime Foundation of India*, 16(1), 30-45.
- Mullan, J., & Rolleston, C. (2020). Barriers to skills development in India's informal economy. *International Journal of Training Research*, 18(3), 211-230.
- Müller, N.(2019). The interplay between education, skills, and job quality. *Social Inclusion*, 7(3), 254-269.
- Nair, K., vemuri J., Ram J. (2016). Understanding the gender gap in physical literacy among peri-adolescent children. *Pediatric Exercise Science*, 28.
- Nalawade, P. D. V., Panjamurti-Malaysia, P. K., Huvag-Taiwan, K., Nalawade-India, P. D. V., Mahajan, S. Y., Dhondge, V. D., ... & Shikalgar, S. M. (2020). Webinar/FDP Report 2020-21. *Policy*, 2019, 14
- P. Nair, & A. Choudhary (2016). Acculturation gap distress among Latino youth: Prospective links to family processes and youth depressive symptoms, alcohol use, and academic performance. *Journal of youth and adolescence*, 47(1), 105-120.
- Panth, B., & Maclean, R. (2020). Introductory overview: anticipating and preparing for emerging skills and Jobs—Issues, concerns, and prospects. *Anticipating and Preparing for Emerging Skills and Jobs*, 1-10.
- Papakitsos, E. C. (2016). Systemic modelling for relating labour market to vocational education. *International Journal for Research in Vocational Education and Training (IJRVET)*, 3(3), 166-184.
- Partanen & J., Myllylä, M. (2020). Quality of life among young Finnish adults not in employment or education. *Applied Research in Quality of Life*, 15(3), 757-774.
- Pham, T., & Jackson, D. (2020). 13 Employability and determinants of employment outcomes. *Developing and utilizing employability capitals: Graduates' strategies across labour markets*, 22(7), 233-455
- Pilz, M. (2016). India: Preparation for the world of work. *The education system and school-to-work transition. Springer*,45-99
- Pilz, M., & Regel, J. (2021). Vocational education and training in India: Prospects and challenges from an outside perspective. *Margin: The Journal of Applied Economic Research*, 15(1), 101-121.
- Quintini, G., & Martin, S. (2014). Same same but different: School-to-work transitions in emerging and advanced economies. *OECD*, 33 (1), 23-56
- Rainie, L., & Anderson, J. (2017). The Future of Jobs and Jobs Training. *Pew Research Centre*, 23-55

- Rao, N. V. J., Sahu, M., & Gouda, S. K. (2021). Employability training gaps in industries: a post-covid scenario of India. *Emerging Business Practices And Trends During COVID-19*, 65
- Ras, E., Wild, F., Stahl, C., & Baudet, A. (2017). Bridging the skills gap of workers in Industry 4.0 by human performance augmentation tools: Challenges and roadmap. In *Proceedings of the 10th International Conference on Pervasive Technologies Related to Assistive Environments* .428-432.
- Scheau, M. C., Arsene, A. L., & Popescu, G. (2018). Artificial Intelligence/Machine Learning Challenges and Evolution. *Int'l J. Info. Sec. & Cybercrime*, 7, 11.
- Shehu, E., & Nilsson, B. (2014). *Informal employment among youth: Evidence from 20 school-to-work transition surveys*. Geneva: ILO, 6(2), 2-90
- Singh, S., & Ehlers, S. (2021). Employability as a global norm: Comparing transnational employability policies of OECD, ILO, World Bank Group, and UNESCO. *International and comparative studies in adult and continuing education*, 131.
- Stentoft, J., Adsbøll Wickstrøm, K., Philipsen, K., & Haug, A. (2021). Drivers and barriers for Industry 4.0 readiness and practice: empirical evidence from small and medium-sized manufacturers. *Production Planning & Control*, 32(10), 811-828.
- Sumberg, J. (2017). Introduction: New perspectives on Africa's youth employment challenge. *Institute of Development Studies* 48(3), 3-14
- Sumberg, J. (2021). Africa's "youth employment" crisis is a "missing jobs" crisis. *Development Policy Review*, 39(4), 621-643.
- Tåhlin, M., & Westerman, J. (2020). Youth employment decline and the structural change of skill. *European Societies*, 22(1), 47-76.
- Threadgold, S. (2020). Figures of youth: on the very object of Youth Studies. *Journal of Youth Studies*, 23(6), 686-701.
- Upadhyay, P. (2019). The linkage between knowledge management practices and organization-based projects for better learning outcome: A conceptual framework. *International Journal of Educational Management*. 33 (1),166-178
- Vacca, G., & Verzillo, S. (2016). Human capital estimation in higher education. *Advances in Data Analysis and Classification*, 10(4), 465-489.
- Verhaest, D., & Baert, S. (2015). The early labour market effects of generally and vocationally oriented higher education: is there a trade-off? *IZA*, 2-32
- Vincent, A., & Rajasekhar, D. (2021). Who participates in vocational education and training in India? An analysis of socio-economic determinants. *Journal of Vocational Education & Training*, 1-20.
- Wanner, T. (2015). Enhancing Student Engagement and Active Learning through Just-in-Time Teaching and the Use of PowerPoint. *International Journal of Teaching and Learning in Higher Education*, 27(1), 154-163.
- Watanabe, T. (2019). A Framework of Skill Training: Is Skill in Training or Learning? In *International Conference on Ubiquitous Information Management and Communication*. Springer, 501-516.
- Weber, E. (2016). *Industry 4.0: Job-producer or employment-destroyer?* IAB, 2- 7.
- Whittemore, R., & Knafl, K. (2005). The integrative review: updated methodology. *Journal of advanced nursing*, 52(5), 546-553.
- Wicht, A., Müller, N., Haasler, S., & Nonnenmacher, A. (2019). The interplay between education, skills, and job quality. *Social Inclusion*, 7(3), 254-269.