

### NAVIGATING UNCERTAINTY: THE RISING ROLE OF FINANCE AND AI GIG PROFESSIONALS IN EMPOWERING EDUCATION ECOSYSTEM IN THE INDUSTRY 5.0

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#### Abstract

**Purpose:** The 21<sup>st</sup> century is marked by a changing landscape at workplace and future of jobs is predicted to be fairly different from contemporary days (Kim, et.al., 2017). Due to uncertain times, (pandemic and post pandemic days), there has been a conundrum that the institutions, societies and governments face with a high levels of youth unemployment on one hand, and a shortage of professionals with industry-required critical skills, on other (Blustein et.al., 2020). A significant shift in India's workforce is now being addressed by the gig economy, which is visibly growing rapidly, and the need of financial education, empowered by AI skills among youths is the call of the hour. This study is dedicated to the analysis of the Industry 5.0 skill requirements, UN Sustainable Development Goals, the growing importance of financial education and AI skills among youths to shape the teaching-learning ecosystem of future. Design: A thematic analysis of qualitative data has been done to bring forth the elements of learning-ecosystem for learners at secondary level, identify stakeholders and leverage the rising pool of gig-professionals for designing an integrated framework using semantics databases for Industry 5.0. The UNSDG was probed into to act as a fulcrum to design the model. An in-depth study of rising gig economy trends in India and the need of upskilling with the financial and AI competencies among learners for productive outcome was taken into this research. Findings: The research unlocks the resource entities that exists in the valuechain of teaching-learning process at the secondary education level. It is required to build in the skill set for future employability in India. The research proposes a conceptual model that links the major entities of teaching-learning ecosystem on one side and available resources on other side with the pivotal role of financial and AI gigprofessionals, to address the challenges of employability for Industry 5.0. Practical Implications: The study seeks to offer a solution to challenges faced by learners towards attaining employable skills for Industry 5.0. It thereby addresses the skill development mechanism as well as productive utilization of a rising pool of Gig professionals armed with financial and AI competencies, especially during the current turbulent days of global economy. Social *Implications:* The proposed model is expected to serve the identified stakeholders facilitating development of a sustainable learning ecosystem to employ the available resources towards achieving developmental goals outlined by UN to meet India's aspiration of being a global guru. Originality: This study differentiates as being among a very few research in India highlighting the challenges faced by secondary school learners to imbibe employable skills that are industry oriented. This study contributes to development of an integrated model of Teaching-Learning framework that weaves in challenges faced by secondary level institutions with the robust support system of other stakeholders.

**Keywords:** Education Ecosystem, Fifth Industrial Revolution, Employability Skills, Finance Gig Professionals, Uncertain Times, India.

#### **1. INTRODUCTION**

Economies across nations have been passing through times of uncertainty since the onset of millennium. Be it the global dotcom burst in 2000, the 9/11 attack in 2001, the financial meltdown triggered in 2007, the demonetization drive in India in 2016, the recent past pandemic days, or ongoing wars in Europe, Middle East and South Asia. These events had an enormous ramification for economies, societies and businesses (Bozkurt, et.al., 2020).

In a prominent report on skill crisis (UNICEF, Education Commission and Global Business Coalition for Education, 2019), over half of learners in schools among economies of South Asia would complete their education without the vital job-ready skills for Industry 4.0 (Fourth Industrial Revolution) in the next decade. This is an alarming situation and calls for immediate attention among educators across nations (Ras, et.al., 2017).

The growth of automation and human-centric approach since the advent of Industry 5.0 mandates equipping multiple skills among learners joining the future workforce. The technological advances of topical years including artificial intelligence, robotics, machine learning, block-chains, cloud computing and other forms of technology overwhelm the personal and professional space of people around (Rojko, 2017).

The recent pandemic's aftermath and wars at different geographies have been marked by widespread disruption, including economic downturns, tragic loss of life, and a decline in trust. While a few sectors have been upbeat, others have fallen apart, triggering an existential crisis. The disruption in normal teaching-learning process due to pandemic and ongoing wars is bound to carry steep social and economic costs for societies across globe.

Their effect is predominantly substantial for the most vulnerable and marginalized learners (Hasan & Bao, 2020). The resulting disturbances threaten to aggravate already existing disparities within the education system and their future employability. The cyber-physical system thus created calls for developing new competencies, exploring newer opportunities in the equation of intelligence, people, processes and innovation. These will be impacting the existing business models and calls for reviewing critical dimension of learning contents and experiences in the learner's curriculum (Chu & Mok, 2016).

The gig economy is on the rise across nations as reported in *The Week* by Hiranandani (2020). Year 2025 and beyond will see it as a major driver of the remote work and the changing work preferences coupled with flexibility and autonomy. The significant growth of the gig sector is estimated to leapfrog by 12 million in 2025 and pegging at 23.5 million by the AY 2029-20 (Drishti, 2025).

This trend may have a potential to grow at least twice that of pre-estimates of pandemic period. The pandemic continued to change the way businesses are steered, not only in India but also the other parts of the globe. Due to the rising remote work culture, multiple firms are recognizing its benefit on their stressed cash flow.

They are attempting to remodel their work-operations that supports business continuity plans under present circumstances and firms are even opting to hire gig-workforce talent on a continued basis. The availability of gig-workforce talent and need to embed new-age skills among learners, if coupled together, has potential to open a box of opportunities for millions of new-age jobs at the cost of thousands of present-day jobs (De, et.al., 2018). The confluence of these patterns would herald a world under a 'new normal'.

Urban India is seeing around a 90 million steady growth of gig workforce, and it is speculated that 15-20 million specialists would be required in the blooming gig economy. Amidst others, the financial sector is thriving hard for its landing due to financial equations. The emergence of gig economy, therefore, while showing up great potentials of newer workplace equations, the road ahead needs to be travelled with lot of perseverance and hard work by the financial sector (Fathima, 2022).

We started this research recognizing the current crisis of a shortage of employability skills among young population joining workforce after their early education. To address shortage of skills, triple fundamentals lens to gauge are- identification of new-age skills, networking gigworkforce with desired talent, and creation of eco-system using technology interfaces to meet those developmental initiatives at an early age.

This paper focuses on skill advancement, with special consideration to the mechanisms that link education to employment. In this work, we attempt to propose a framework that reimagines the building blocks of an enabling eco-system focused on imbibing the relevant skills at their formative age of learning. Thus, the main aim is to facilitate curating an integrated and robust framework of skill enriching activities encompassing key participants and required resources at academic institutes at secondary level. The other specific objectives are as under:

- i. Recognize the key constructs of learning to confer future job-ready skills among secondary-level learners.
- ii. Appreciate the growing demand of financial and AI competencies among the emerging workforce for Industry 5.0.
- iii. Determine the role of gig-professionals as key stakeholders, central to alter the future of secondary-level education.
- iv. Aim an integrated sustainable quality education model for industry 5.0 that facilitates access to youth for bridging the skill gap for the future employment opportunities.

### 2. THEORETICAL BACKDROP

To map the expanding role of gig professionals in the Industry 5.0 and arrive at a conceptual model later in this study, various literature on UNDP's vision, SDG 4, India 2030, 5<sup>th</sup> Industrial Revolution, Gig Eco-system were delved into.

#### 2.1 The UNDP's Vision 2030:

The UNDP's Vision 2030 stems from its statement tabled in 2015 and adopted by all UN members as 'The 2030 Agenda for Sustainable Development'. It provides a common framework for achieving peace, equity and prosperity for people worldwide and the Earth, both today and in generations to come.

There are 17 Sustainable Development Goals (SDGs) that call for an immediate action by member nations towards achievements of shared road-map towards its stated SDGs with triple bottom approach. Strengthening through its ambitious Sustainable Development Goals (SDGs), the UN has issued a compelling call to all nations, urging immediate action to eradicate economic distress/ poverty and reduce inequality via global collaboration (Fleacă et al., 2018). Key action topics include quality education, healthcare, climate action, economic growth, renewable energy, clean water access, inequality reduction, infrastructure development and international partnerships (Mabkhot et al., 2021).

#### 2.2 Sustainable Development Goal 4 of UN: Quality Education

As per the SDG 4 statement by UN, the member nations believe that 'quality education' that leads to employability forms the foundation of sustainable development, and therefore instrumental in meeting outlined SDGs (Saini, 2023). As a critical policy intervention, education serves as a powerful catalyst for self-reliance, economic growth through skill development, and improved quality of life by expanding opportunities for better livelihoods. SDG 2030 emphasizes ensuring universal completion of primary and secondary education for all children, alongside equal access to quality technical and vocational training (Artyukhov,



2022). Policy measures must focus on enhancing accessibility and quality while tackling barriers such as gender disparities, food insecurity, and armed conflict.

### 2.3 Envisioning India 2030: The Rise of Asian Giant

Based on a ten-point vision of GoI (Government of India) India was envisaged with reaching a USD 5 trillion economy by 2025 and increment it to USD 10 trillion by 2030. Envisioning India 2030, document by FICCI highlights that the major drivers of realizing this vision desires focus on Make-in-India, Digital-India initiatives, Infrastructure development projects, Food sufficiency, Sound Water management, Healthy India Programmes Clean Energy initiatives, Blue-economy, Space Programmes and Good Governance (Raman, 2021).

#### 2.4 Finance in Education: Evolving Needs

In the light of the rapidly growing professionals including gig workers and their needs in the finance sector, the role of finance in education can't be ignored. Handoyo (2024) emphasized on the need of weaving in emerging technologies in higher education space and advocated the critical need for advanced finance and accounting educations as evolving needs.

The evolving 'Accounting Information Systems', the 'ICT' and 'Big Data' focus on equipping finance and accounting professionals with the much-needed skills and competences including the gig finance workforce. Influenced by the recent past pandemic days and other global disruptions, the shift towards digital and decentralized online learning environments, is becoming far more prominent for the finance workforce of the existing and future time (Tettamanzi et al., 2023).

#### 2.5 Emergence of AI competencies in Industry 5.0

Artificial Intelligence (AI) is fast emerging as a cornerstone technology for Industry 5.0. The needed competencies are moving beyond the automation and efficiency focus of Industry 4.0 towards a more human-centric, resilient and sustainable industrial landscape. Thus, the role of AI skills is getting pivotal in advancing collaboration between human workforce and machines, enhancing human capabilities as well as driving innovation too.

#### 3. FOURTH INDUSTRIAL REVOLUTION & SKILL SCORECARD 2030

The UNICEF report (2019) on impending skill crisis for the Industry 5.0 has to be deep-dived to understand and curate a framework for sustainable model of education at secondary level to be job-ready workforce of the next decade.

#### 3.1 Industry 5.0: Fifth Industrial Revolution

Created in 2011, the Industry 4.0 has been defined as the contemporary workplaces operating using technologies such as Artificial Intelligence, Internet of Things and cyber-physical systems progressively blending with humans resulting in extensive shift for organisations, employees, and society (Ross & Maynard, 2021).

The Industry 5.0, coined in 2021, has moved beyond the skill requirements of Industry 4.0 towards a newer human-centric, sustainable and resilient model (Nair, 2024). It carries the potential to affect manufacturing domain with thrust on advanced technologies that would capture, optimize, and deploy data. Businesses, societies and economies that appreciate and capture the value of these advantages would be taking leadership position to bail out of challenges that lie ahead (Rijwani et al., 2025).



#### **3.2 Rising Role of Gig Professionals**

The role and hiring of gig talent may be based on typical challenges faced by industries across the board in India. The sunshine sectors including tourism, consultancy, FMCG, financial and banking institutions, which are assessed through seasonal demands for specific skills and non-core business competencies required by organizations. While in financial and banking, the former could be credit season, festivals, and holiday seasons while the latter may stand for bankruptcy specialists, audit professionals and legal specialists (Srinath, 2025).

Gig workers in general, often are required to focus on short-term projects and specialized tasks. Having said so, the finance gig workforce may involve in a variety of tasks such data collection, research, financial modeling, data analysis, and some niche assignments as legal counsel. The finance giggers may be acquired to handle inconsistent demands, short-term consulting projects, audits, Gig4U (2024).

#### 3.3 The 2030 Skill Scorecard: The Expanding Skill- Gap in South Asia

According to a UNICEF (2019) report, youth in South Asian nations are projected to lag behind their global peers in skill proficiency by 2030, based on current learning outcome estimates. Despite this, South Asian countries are set to supply the world's largest workforce until 2040. If leveraged strategically, this demographic advantage could transform the region into a hub of dynamic and productive economies.

This presents a critical opportunity to invest in a forward-looking education framework. It prioritizes student-centered general as well as vocational training at the secondary level, aligned with the skill demands of Industry 5.0 and beyond. The current framework may fall short of this requirement as shown in Figure 1.



Figure 1: Education Framework for Industry 5.0 (Source: Authors' Own)



#### 4. THE GAP ANALYSIS FOR THE STUDY

The expanding role of gig professionals in the education ecosystem during turbulent times calls for several critical skills required for Industry 5.0. The major gap is to integrate AI skills and financial competencies with multiple skills (as forwarded by skill scorecard 2030) and pedagogical proficiency. Gig professionals have niche technical skills and if curated well in the education ecosystem, they promise to serve important resource for effective teaching and curriculum delivery.

Gaps in terms of AI competencies, financial knowledge, digital literacy, data analytics, adaptive learning technologies, soft skills and continuous learning have emerged more as a potential opportunity and less as a challenge to excel in the industry 5.0. The rise of gig economy during and post pandemic and the growth of AI and digital technologies have opened up new opportunities as India's gig-sector was projected to increment to over 455 billion dollars by the year 2025 at a compound annual growth rate (CAGR) of healthy 17 per cent (Retail.com, 2024) and the prediction has further gone up, wherein Business Research (2025) have reported that India would be the biggest beneficiary of the international gig-economy market which is expected to surpass USD 2146.87 billion by 2033, at a CAGR of approx.16.18% between the forecast period 2025-2033.

The gig economy would serve diverse sectors as education, training, information technology, food and beverages, creative fields, social media marketing, etc. and offering employment to freelance professionals and workers (Navarrao, et.al., 2016). Mehta (2023), while contextualizing the development of gig economy, argued that no matter the exponential growth of the gig sector, the Industry 5.0 possesses its own challenges in the realm of newer skills of the current and future workplaces.

In the wake of a progressive and future-oriented learner ecosystem of quality education, the need of the upskilling and cross-skilling of young learners for industry 5.0 is conceptualized here in this study wherein a new model of education is mapped with critical dimensions of learning.

## 5. MAPPING CRITICAL DIMENSIONS OF LEARNING: THE NEW MODEL OF EDUCATION FOR INDUSTRY 5.0

Earlier research works have pointed out the positive relationship between formal education and relative social mobility (Kweik, 2015). Though a general observation globally is the increase in the enrollment number of the learners both at primary & secondary level together with their access to education over the previous decade. Surprisingly, this may not have converted to comparative social mobility in equal measures (Gloster, et.al. 2015).

One crucial impediment to this has been the quality of education attained by the learner that has a noticeable impact on productivity as well as earning outcomes. This underscores the growing consensus that educational quality must be redefined through new paradigms. An urgent transformation is needed in both curriculum content and learning experiences to train students for future employment demands. As highlighted in a World Economic Forum (2020) study of sixteen global schools, eight key characteristics define high-quality education for tomorrow's institutions. To align with Industry 4.0 requirements, a fundamental overhaul of current teaching methodologies and subject matter is essential to ensure workforce readiness, even more for Industry 5.0. Hence this proposed model of learning (Education 4.0) for Industry 5.0 requires considerable increment in skill dimensions, as shown in Figure 2. It may then



become an enabler for learners to equip for the new-age jobs with required skills and competencies required for Industry 5.0.

The four distinct critical factors/ dimensions of '*learning contents*' that need shift are:

- i. **Innovation and creativity skills (ICS) dimension:** The transformation in learning content must cultivate innovation-focused competencies, including creative thinking, analytical reasoning, complex problem-solving, and systems analysis. These skills are essential to prepare youth for navigating uncertain environments (Kaur, 2017)
- ii. **Interpersonal skills (IS) dimension:** The shift in learning content must emphasize developing emotional intelligence, equipping learners with critical interpersonal skills such as negotiation, social awareness, and leadership (Guzman et al., 2020)
- iii. **Technology skills (TS) dimension:** The transformation in learning content must prioritize developing digital competencies, including programming skills, while fostering responsible and ethical technology use (Keser & Semerci, 2019).
- iv. **Global citizenship skills (GCS) dimension:** The necessary shift in learning content must cultivate essential competencies for developing global awareness, understanding critical sustainability challenges, and empowering students to contribute meaningfully to societal betterment (Ryshina, 2018).

We propose additional two skill factors/ dimensions as:

- i. **Financial knowledge/ competencies dimension:** There is a rising demand of financial literacy among young learners as an essential competency to calibrate for the productive outcome of any professional work piece.
- ii. **AI skills dimension:** AI skills are now indispensable for the Industry 5.0 where there is a strategic integration of other work sphere activities for empowering humans and achieve broader societal and environmental goals.

The four critical dimensions/factors of 'learning experiences' that need shift are:

- i. *Personalized and self-paced learning (PSL) dimension:* The PSL transformation is crucial for moving beyond standardized, teacher-centered learning models toward recognizing diverse learner needs through more flexible, individualized pacing (Umachandran et al., 2019).
- ii. *Accessible and inclusive learning (AIL) dimension:* This transformation is vital for overcoming physical limitations in educational access, extending learning opportunities beyond traditional classroom boundaries to create truly inclusive environments for all students (Khandelwal et al., 2020).
- iii. **Problem-based and collaborative learning (PCL) dimension:** The PCL transformation is critical for transitioning from process-oriented instructional delivery to project- and problem-based learning approaches that cultivate peer collaboration and teamwork skills imperative for mirroring future workplace demands (Maharjan et al., 2019).
- iv. *Lifelong and student-driven learning (LSL) dimension:* This paradigm shift addresses the current system's imbalance in prioritizing early-stage education over lifelong learning. As highlighted by the World Economic Forum (2018), sustained skill development is now imperative to align with the dynamic requirements of future economic and institutional landscapes



#### Figure 2: Dimensions of Quality Education for Industry 5.0 (Source: Authors' own)

This framework serves as a basis to design the general and vocational education model for the learners at secondary school level.

# 6. STRATEGIC STAKEHOLDERS IN THE NEW MODEL OF EDUCATION FOR INDUSTRY 5.0

The World Economic Forum's (2020) influential report advocates for reimagining education as a lifelong endeavor that transcends traditional school boundaries, emphasizing inclusive, problem-based, and collaborative learning approaches.

This paradigm shift necessitates identifying and engaging key stakeholders in designing Education 5.0 models for future schools. Critical entities identified for shaping both general and vocational education frameworks, as shown in Figure 3, are:

- i. Academic Leaders: The national education (like NEP 2020) and skill requirement priorities need to be aligned with the global SDGs (Scheyvens, et.al, 2016). This require an academic-administration team that can guide this alignment at national and local levels, keeping in mind the regulatory compliance of the education ecosystem of the country as well.
- ii. **School leaders:** The school leaders are the founding members, administrators of the school or both. They guide the enabling ecosystem design of processes for academic planning, delivery and evaluation through their personal vision (Sharma, 2018). They enable to build a learning network among the partner institutions, trade sectors and governments across nations for a global citizenship, inclusive and collaborative learning environment.
- iii. **Secondary-level learners:** These are the learners at the secondary level in various academic institutes across geographies with diverse socio-economic backgrounds. They join institutes to learn general/vocational courses. As per the report on skill development

at secondary level, learners expect and are keen to use a diverse bouquet of pedagogical tools on learning contents towards a superior learning experience. They aim to attain upcoming desired job-ready skills and aspire to develop beyond the academic and professional accomplishment of their parents/ guardians.

- iv. Faculty: The faculty community is among important stakeholders and enablers in evolving the desired ecosystem of education 4.0. Learner-centrism and a personal preference to model as a facilitator/ mentor becomes a requisite (Wingo, et.al. 2017). They may be the first consumers of technology enabled learning environment and a prime mover of in its adoption process among young learners for developing competencies in general and vocational domain for Industry 5.0.
- v. **Parents/ guardians:** They are important stimulants in this ecosystem as for their children, they aspire a higher relative social mobility, better financial security (Gloster, et.al. 2015). They thus keep the learners focused towards attainment of quality education not only to be fit for the future professions but scale up the socio-economic ladder.
- vi. **Other Stakeholders:** The other strategic stakeholders include gig professionals (AI & Finance), corporate, academic-partner establishments and technology providers. They facilitate curating learning content and experiences that mandates a quality driven general & vocational teaching-learning process.



Figure 3: Strategic Stakeholders for Quality Education in Schools of Future (Source: Authors' own)

# 7. ROLE OF FINANCE GIG PROFESSIONALS IN EMPOWERING EDUCATION ECO-SYSTEM: A BLENDED WORK MODEL

The events as pandemic and alike have herald a 'next normal' in the Future of Work. During times of uncertainty, the world has witnessed shifts in contemporary jobs, workforce, workplace, and work culture.

Currently, the education and training sector has shifted its preference towards gig-workforce riding on the rise of delivery on virtual platforms. As per a recent report (NASSCOM, 2020), the gig-professionals are set to add value as this sector moves towards a Blended-Work Model.

Many faculty, as freelancers, are adopting online teaching and mentoring as a blended model. Hence, the major domains of competence for Gig-Professionals as envisaged are:

- i. As a core domain specialist, the gig-professionals would suitably extend their expertise in the coursework on multiple fronts with diverse learners across nations. They may involve not only as faculty online for the specialized courses but also curate contents, assignment and thesis assistance, proofreading, academic mentoring, etc.
- ii. As members of Board of Governance, the academic inclined gig professionals could offer school leadership and support academic-administration. While the corporate professionals as gig, can extend their vast experience to channel the evolving school ecosystem to job-ready contents of Industry 5.0.
- iii. Further, they as partners representing social organizations, they can offer services to sensitize the learners to the local issues and challenges. The gig-professionals could work with learner-teams to collaboratively work towards solving those issues and contribute towards imbibing global citizenship orientation while learners are in different regions of the world.
- iv. Shaping the psychology of learners towards future gig-economy is another dimensional role of the gig-professionals in the future model of Education.

# 8. INTEGRATED MODEL OF QUALITY EDUCATION: SCHOOLS OF THE FUTURE FOR INDUSTRY 5.0

The integrated framework of Quality Education for Industry 5.0 (Figure 4), as theorized here, endeavors to ascertain and weave-in the stakeholders. The model here proposes use of digital technologies among identified stakeholders for creating value proposition in the teaching-learning process.

The stakeholder entities hence need to be designed for configuring an ecosystem. This would enable the desired critical shifts in learning domains using gig-professionals. To align general and vocational secondary education with SDGs, the value network will establish a response system enabling the seamless integration of learning content and experiences.

This will be achieved by unifying strategic stakeholders to create a collaborative platform for resource sharing, fostering better coordination and application of resources among ecosystem members. The study proposes an integrated framework to scale up from the existing secondary-level education model to a newer model of learning for Industry 5.0 riding on competitive advantage of gig-professionals.

The understated stakeholder entities are proposed for designing of an integrated and robust framework that is intended to create enabling ecosystem using technology for academic institutions of future in alignment with SDGs:

- i. **Secondary Level Learner:** It represents learners at secondary level who are to undergo the desired teaching learning process. The focused skillset is as needed by the Industry 5.0 in alignment with SDGs. These learners also need to be trained for joining future job opportunities in Gig economy.
- ii. **Educational Institution:** This entity aims to create an enabling ecosystem for learners to embed the required general and vocational skills for industry/sectoral readiness under Education 4.0 framework. These model institutions offer requisite infrastructure and resources to connect secondary level learners in offline and online mode across the educational societies (both formal and informal ones) in various countries.
- iii. **Gig-Professionals:** This is a vast pool of professionals who are available on-demand for the academic assignments of teaching, training and mentoring. There is growing demand of financial literacy and AI competencies in Industry 5.0. These professionals are from policymaking, academia, corporate and social institutions, ready to work with secondary level learners in alignment of Industry 5.0 and SDGs.
- iv. **Ministry of Skill Development & Entrepreneurship:** The ministry/ bureau acts as an apex establishment that envisions the skill-set requirements as per the national priorities and SDGs in host country. The office aims to align the workforce with evolving jobs and skill-sets to sustain Fifth Industrial Revolution. It functions in close association with Ministry of Human Resource Development at federal/ central front. It works towards creating a facilitating environment of skill building capacities and hosts several competitions, conferences, scholarships, etc. at national and international levels.
- v. **State/Local Government:** This body is an enabler for facilitating the policy guidelines, offers required infrastructure like Video conferencing Equipment, Innovation Laboratory set-up, etc. It supports student mobilization monitoring, regulating and aligns various stakeholders including technical boards. It not only advocates for skill enhancement but also support certificate (advance degree/ diploma) programme essential for the learner after mapping the scheduled assessment of desired learning outcomes.
- vi. **Skill Development Council:** It is an umbrella body that holds the responsibility for ideation and activation of vocational projects across scholastic institutes. It aids establishing quality standards, ascertaining member nations and avenues of cross-cultural exchanges, choice of training associates across different trades, information flow, etc. at national/ regional level.
- vii. Sector Skill Council: This entity facilitates ascertain national priority/emerging sectors of economy, access sectoral skill-set requirements, accreditation of STEAM (Science, Technology, Engineering, Arts and Mathematic) focused curriculum in alignment with the Industry 5.0 relevant courses like Machine Learning, Robotics, Artificial Intelligence, Block-chain, etc. The council could act as a support system for recognizing gig-professionals as Vocational/Country Coordinators across industries, benchmark training programmes against global standards, learner assessment & certifications, etc.
- viii. **Training Partner:** Training partners for supporting skill enhancement towards Industry 5.0 could be a private organization or a state-sponsored agency/NGO. They assist industry-integrated projects and social projects in alignment of SDGs and reflecting real-



life challenges of Industry 4.0 (Ghobakhloo, 2018). These entities assist in industry mentorship/vocational training, document outcome-reports and their disseminate among stakeholders for Industry 5.0.

ix. Education Technology Providers: Ed-tech providers are technology solution partners that design tailored programmes that promotes digital learning (Good, 2019). The aggregation facility of gig-professionals, institutional providers, learning resources, etc. using digital platforms (including Apps), enable working on learner projects forming learning-circles focused on sustainable issues of member nations.



Figure 4: Conceptual integrated model of Educational Ecosystem for Industry 5.0 (Source: Authors' own)

#### 9. DISCUSSION

As shown in Fig. 4, the conceptual integrated model proposed weaves-in the stakeholder entities with the facilitating resources over cloud-based SaaS to create multidimensional databases for an educational ecosystem 4.0. The recent pandemic and similar crisis in the last two decades have triggered a series of consequential events in form of lower investments, disruption of trade and supply chain linkages globally as well as erosion of human capital through lost work and schooling (Global Economic Prospects, 2020). The crisis highlights the urgent need to rewire the established frameworks of social, economic and business models to cushion these effects and set a stage for a persistent recovery.

The glaring skill deficit among learners coming out from educational eco-system at secondary level poses a vital challenge for the future growth globally. The rise of gig economy is a major phenomenon that needs to be captured in this framework for imbedding learning contents and experiences among learners. An integrated model for quality education qualified for Industry 5.0 for secondary school level learners calls for a seamless integration of resources, competencies and technologies. This study dwells deeper into the insights of 16 different schools globally that were mapped for their uniqueness of 'learning contents and experiences'. Their learning eco-system and enablers were mapped to arrive at 8 components of 'learning contents and proposed

for enriching the model. This is intended to close the loop and facilitate embedding the requisite skills among learners for being a qualified workforce for Industry 5.0.

It is now quite pertinent to underline the four 'learning contents' for the proposed model together with the additional two. The 'Global citizenship skills' aims to nurture the skill of sensitivity of identifying the emerging issues of sustainability emerging of uncertain times through the lenses of geo-political issues and UN SDGs (Maharjan, et.al., 2019). The skill can be nurtured by designing curriculum based on sustainable issues and resource-gap analysis. An eco-system to mobilize resources among geographies, societies and businesses using technological innovation platforms can be a plausible solution. Besides, developing Innovation Labs, Cross-cultural sensitivity training and International cultural-exchange programmes among professionals (including gig-workforce), exchange of views and resources using big-data servers would activate this skill. Higher Education Institutions enabled by generous technological interfaces and out-reach to gig professionals could be enabler for these initiatives for students among the member countries.

The 'Innovation and Creativity skills' proposes embedding skills like system analysis, problem solving and critical thinking. The curiosity to design novel solutions, idea or products to the existing local issues faced by the community and sectors/ industry, are enablers for this skill (Erol, et.al., 2016). The role of local gig-professionals plays a vital role as mentors towards designing a solution. They facilitate comprehending these emerging issues at local level and help develop an enterprise that sees through the lens of constraints and is built upon available local resources.

The 'Technology skills' proposes embedding technical skills of designing programming and technological resources. It can be suitably facilitated by designing progressive STEAM curricula, digital work design environment, simulation labs. The infused support of Gig-professionals engaged as Education Technology partners would facilitate the right eco-system to thrive (Motyl, et.al., 2017).

The 'Interpersonal skills' calls for qualities to be a social influencer, high on emotional quotient demonstrating leadership acumen. The guidelines of local governments, UN SDGs may act as a lighthouse to guide stakeholders at all levels. The student learning circles for course facilitation, debates in parliament-type settings, Youth Entrepreneurship Programmes, are facilitating environments for this skill (Scheyvens, et. al., 2016).

There is also growing demand for 'Financial competencies' and 'AI skills' for the future industry. The expanding landscape of Industry 5.0 call for a significant upskilling and reskilling of the workforce, particularly in the orbits of 'financial competencies'. As businesses evolve towards more human-centric, sustainable and resilient models, a immersed understanding of financial principles becomes crucial for navigating the economic implications of these shifts. Professionals equipped with financial acumen will be essential for making informed decisions that drive both economic value and the broader goals of Industry 5.0.

The prevalent assimilation of AI across all aspects of Industry 5.0 demands a proficient workforce in developing, deploying, and managing AI-powered solutions. This includes not only technical proficiency in areas like machine learning, data analytics and AI ethics but also the ability to work in partnership effectively with AI systems and interpret their outputs. Thus, the demand for this dual expertise in finance and AI highlights the increasingly complex and interdisciplinary nature of the future Industry 5.0 workforce.

The 'Personalized and self-paced learning' experience can be curated through designing of learner-specific customized learning modules. The learning Apps on tablets and a personal



record of self-reflection curate this experience. The recent research (Godwin-Jones, 2019) substantiates that role-play-based approach centers to an improved learning outcome. The support of corporate donors, self-help groups by local NGOs, charitable institutions, etc. become quite prominent to it.

The 'Accessible and Inclusive learning' experience obliges for a co-creation of an experience by diversity-rich learner, self-formed cohorts with facilitation of virtual labs, digital courseware and parent/ guardian dashboard for follow-up. The role of gig-professionals become immensely important in forming a consortium of field experts backed by researchers, local/ regional employers, etc.

The 'Problem-based collaborative learning' experience can be curated through a discoveryapproach to a problem than the conventional route of finding a right response to the problem on desk. It mandates a groupthink of problem definition, idea generation through designthinking, examination of alternatives, interdisciplinary mindset among the team members (Ryshina-Pankova, 2018). The corporate support through the firms navigating through VUCA surroundings, the academic support through universities, innovation labs and community support through local SMEs can play a pivotal role.

The 'Lifelong & Student driven learning' experience is facilitated through embedding core skills of presentation, creative listening, a thirst for continued knowledge, leadership and communication. The emphasis on designing relevant subject matter, pedagogy and selfreflective assessment forms the core to this experience. The experience of gig-professionals in creating a synergistic association among academia-industry-ministry can be a touchstone of successful experience.

The creation of semantic database cluster forms the proposed design that incorporates the above-mentioned stakeholder entities and learning components. It is proposed to facilitate dimensional predictive analytics and support the SaaS and cloud-based model.

SaaS (Software as a Service) is one of the deliverables through cloud computing infrastructures. The apps deployed over cloud and categorized under SaaS are accessible using any digital device attached through internet as a backbone. Majorly, the apps need at least a thin client with a browser to access the functionality of the software working over cloud and providing the functionality to the users at the other end. The Gig-professionals form a key variable function for this model as the data exchange majorly would happen using the SaaS model. The model proposes non-physical distribution and is deployed almost instantaneously through the power of virtualization over cloud computing, thereby seemingly desirable option towards process automations handled remotely (Yadegaridehkordi et.al., 2019) The majority of SaaS solutions are based on multitenant hardware architecture with single configuration. It supports the scalability, adaptability and reliability of software solution.

The Multi-Dimensional Semantic (MDS) databases are enriching constantly due to the introduction of artificial intelligence (AI) and the implementation in various aspects of life through machine learning (ML) data sciences and deep learning. They are majorly being used towards natural language processing (NLP) to enhance the computational intelligence out of the text extraction from the big data getting updated every moment. To facilitate semantic data encoding, standardized technologies like Resource Description Framework (RDF) and Web Ontology Language (OWL) provide formal metadata representation. These frameworks enable the explicit description of conceptual domains, including entity relationships, categorical hierarchies, and domain-specific taxonomies. Such semantic enrichment delivers powerful

capabilities, particularly for logical inference operations and interoperability across heterogeneous data sources.

The reservoir of Academic and Skill-Development data is an important aspect of this model. The extraction of the information related to hidden talents available with the human resource needs a deep analysis of their abilities. Though majorly quantified through academic records, it still asks for the qualitative data is creating a separate vector of the same person. Both the dimensions of the people are required to prescribe best suitable jobs to them to nurture their talent. The same process needs to have a detailed integration with the upcoming government policies. In absentia of the same the best suitable people are not getting to work with processes they are suitable for execution.

The role of Gig-professional seamlessly gels through the multiple touch points that meshes with the databases created and updated on dynamic mode. The proposed model of education 4.0 for future learners would be inculcate the requirements of Industry 5.0 and aligned with the carefully curated learning contents and experiences, as detailed earlier.

### **10. SOCIAL & MANAGERIAL IMPLICATIONS**

Firstly, this study offers an insight into the evolving challenges during times of uncertainty that embryos skill deficiencies among learners at secondary level. Secondly, based upon the case study of sixteen different model schools across geographies highlights and recommends the pedagogical practices that are aimed to embed desired skills for the industry 5.0 among school learners at secondary level. It thus strives to tide the challenges of young learners with the available resources at local level, in different parts of the world. Thirdly, it spotlights upon the springing opportunities that could source a new learning model due to emergence of Gig economy. The proposed model seeks to leverage on conceivable technological interventions for seamless facilitation of quality education desired.

The study has highlighted the various challenges that the current educational framework is exposed to, due the current uncertain times. It focuses on the skill set needs that the industry requires among the workforce that is entering the various sectors of economy. This study would thus help identifying the desired skill sets for secondary level learners in different geographies as per the local priorities of the governments. It would thereby facilitate the policy makers in not only drafting a blueprint of progress but also budget the resources according to these priorities. This facilitates the achievement of SDG 4, as drafted.

The community stands to gain of this study, as it identifies the required skill sets for the young citizens who would soon be seeking employment across various sectors of economy. It could not only serve the industry on one hand of receiving the skilled workforce but also eradicate the social challenges of sustainable practices (Quendler & Lamb, 2016). This also in line with the desired goal of social mobility of its citizens towards higher echelon of society.

The education ecosystem stands to gain as it benchmarks the learning contents and creates a learning experience that unifies the global resources, both human as well as non-human, to create a desired learning curve. The students' academic journey would move towards the 'Joy of learning' from the present-day's 'Fear of assessment'. Besides, the different global association of quality assurance organization like NACIQI (National Advisory Committee on Institutional Quality and Integrity), INQAAHE (International Network for Quality Assurance Agencies in Higher Education), ENQA (European Association for Quality Assurance in Higher Education), etc. could design the future parameters to scale the quality benchmarks at secondary and higher education. Gig professionals worldwide are growing in numbers by the



day, and they seek a sustained opportunity of employment during the current times of uncertainty. They also stand benefitted due to availability of desired professional opportunities not only at local level but also global level. This is possible due to seamless connectivity with other stakeholders who are seeking the desired professional support, using the semantic databases.

The key constructs for outlining an academic framework of high-quality secondary level education have been highlighted in the study. The researchers could further collaborate with the highlighted stakeholders for identifying the variables that may be common across geographies and different at others, thereby support creating a local model of education suited more closely there. It would thus add to the growing body of knowledge among researchers as well as practitioners and policymakers. The huge gap was highlighted by UNICEF in its 2030 skill scorecard. This would be spanner for industry 5.0 when all the identified stakeholders join hand and work in close alignment for capacity building process.

#### **11. CONCLUSION**

This study seeks to score its stated goals. The primary goal/ objective was to define the key constructs of an academic framework for quality education, designed to equip learners with future job-ready skills. To identify the 8 critical criteria proposed by the World Economic Forum, the study examined progressive schools from sixteen academic institutions globally. These criteria were then conceptualized with additional two to align secondary-level learners' skills with Industry 5.0 demands.

The second objective was to ascertain the role of gig-professionals as key stakeholders in the conceptualized education framework. The gig-professionals (in additional spot-light to AI and finance professionals) have an important role to play in various roles as academic leaders, mentors, technology providers, policymakers and training-partners in the conceptualized framework of education for the future. Also, a wider stakeholder's view was lensed out to offer a holistic solution to emerging challenges during times of uncertainty with reference to the current geo-political and technological disruptions across the globe.

Finally, the objective was to propose an integrated sustainable quality education model for Industry 5.0 to facilitate bridging the skill-gap. It was achieved through the proposal of an integrated and robust model that highlights the various stakeholder entities who are wired through the use of technological interventions to create semantic databases that serve a converging platform of interaction. The skill building capacities use the public-private partnership (PPP) global model to architect a unique platform for creating an ecosystem forging networks with academia, industry and governments with learners at axis of learning.

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