A SPECIAL ISSUE ON

Contemporary Issues and Challenges In Management Research (SIBRM11)

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- PROFESSOR SANJAY DHINGRA
- DR. DEEPTI PRAKASH

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EDITORIAL PREFACE

By Chief Guest Editor
Prof. (Dr.) Sanjay Dhingra
(USMS, Guru Gobind Singh Indraprastha University, India)

As authors from Guru Gobind Singh Indraprastha University, we are grateful that **International Journal of Business Research Management (IJBRM)** opened its pages for this Special Issue dedicated to the theme of Contemporary Issues in Management and Technology in the present scenario. We are privileged to have collaborated and published some thought-provoking articles in this Special Issue. It collates empirical and theoretical papers focused on technology-enabled research in the business field able of presenting solutions to contemporary problems. Papers from diverse management areas are discussed to address the issues of today's world and provide insights for decision and policy-makers in business, government agencies, academic and research institutions.

With the rapid advancement of technology and globalization, new market forces are arising. Innovation is critical for every firm to survive and thrive in such an environment (Lee &Trimi, 2018; Yadav &Pavlou, 2020). Technology and innovation go hand in hand. The focus has shifted towards the pivotal role of technology in fostering innovation. For emerging markets with limited resources, research is being performed on ways to offer innovative and high-tech products with low-cost capital investments, thus maximizing profit. Entrepreneurs began bringing new technologies to market, taking user-friendly products, technology services, and inventive solutions into consideration (Neumeyer et al., 2018).

Technology and innovation management has attracted attention of many researchers (Cristofaro et al., 2021; Farkas, 2021). Numerous businesses have the dilemma of determining whether future initiatives to develop in-house vs. outsourcing, given the high level of technological uncertainty (Fixson et al., 2017). Thus, in today's world, businesses leverage technology and innovation to achieve excellence, and literary studies give the foundation for these improvements. Contemporary technological advances in many fields like management information, manufacturing, healthcare, etc. have initiated scope for new improved solutions for business models for attaining profit-maximizing goals Ardito et al., 2019).

The first article in this special issue by Khatri and Kaur "Employability in the Digital Age" highlighted the role of digital literacy in employability. As it can be seen that mostly jobs in today's time requires some form of interaction with information technology (IT) systems, having digital literacy is now becoming a crucial skill for employees in all organizations irrespective of their levels. In this article the authors reviewed, synthesized and analyzed the literature on employability in the era of digitization. They have also identified the key themes that have emerged from the extant literature. This review article makes a unique contribution to literature by assimilating two strands of literature-employability and digital literacy.

The second article by Prakash, Manchanda & Arora "Sustainability: Future Orientation through Engagement of MSME's" tries to institutionalize the various sustainability measures by using the leadership approaches and the theoretical approaches in the various Micro, Small and Medium Enterprises (MSMEs). The research paper highlighted the required support to be given to MSMEs for supporting sustainability specifically in the large organizations which hold a varied set profile and resources. Moreover, it mentioned that sustainability is not a unitary concept, but involves a throng of efforts to explain, the activities, actors and the resources employed.

In the third article by Kumar & Kukreja "Human Technology Interaction Amidst Covid-19", they emphasized on intensifying human involvement with the technology in healthcare arena, which is inconspicuously giving rise to 5th Industrial Revolution. The current terminologies like Isolation,

Quarantine and Social Distancing; has alienated humans from humans and because of this the only connecting link is the technology. We can say that technology is playing a prominent role in keeping humans close to friends, relatives, business, government and health experts. It was highlighted that the humans are prime mover in Industry 5.0. The pandemic has opened various digital pathways to keep up the pace of life.

This special issue addressed the current trend of managing Business Innovations and Technology. However, there are other areas which can be used by future researchers from both theoretical and managerial point of view. Future studies can ascertain the business risks and underline the issues like Environmental Concerns, Financial Predicament, Globalization, Sustainable Development, Social and Political Issues, Resource Management, Corporate Social Responsibility and Ethics, Entrepreneurship etc. from Business & Management perspective.

Special thanks to Dr Matteo Cristofaro for prompt and in-depth guidance, and all the authors for your dedication and efforts to make this Special Issue a reality. We hope both academicians and especially business practitioner readers will benefit from this special issue.

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Employability In The Digital Age

Puja Khatri   *pujakhatri@ipu.ac.in*
Professor, HR-OB
University School of Management Studies
GGSIP University (State University under Delhi Government)
Dwarka, New Delhi-110078, India

Harshleen Kaur Pahwa   *harshleen.pahwa@gmail.com*
Research Scholar
University School of Management Studies
GGSIP University (State University under Delhi Government)
Dwarka, New Delhi-110078, India

Abstract

Digitization has transformed the way we work. Routine tasks and activities with low complexity require little human involvement. A high premium has been placed on dynamic capabilities of employees, bringing to fore the question of employability. Amid this tectonic shift, staying employable is a key concern for the workforce. As a substantial number of jobs today require some form of interaction with information technology (IT) systems, digital literacy has become a crucial skill for employees. In this article we review, synthesise and analyse the literature on employability in the era of digitization. We also identify three key themes that emerge from here- What constitutes as Digital Skills, Why Digital Skills are important for Employability, and How can these Digital Skills be developed to enhance employability. This review article makes a unique contribution to literature by assimilating two strands of literature-employability and digital literacy.

Keywords: Employability, Digital Literacy, Digital skills, Digital Age.

1. INTRODUCTION

The last few years have seen a tectonic shift towards digitization, transforming the way we work today. Routine activities and low complexity tasks require little human involvement. Instead, a shift towards knowledge-intensive processes and tasks is being observed. While on one hand, this has rendered many jobs obsolete, on the other plenty of new jobs have been created. Without a doubt though, most jobs have changed markedly in terms of what activities and tasks are performed, and more importantly, how they are performed (Bejaković & Mrnjavac, 2020; Joint Research Centre & European Commission, 2019). The COVID-19 pandemic has greatly accelerated this shift to digital transformation. From governments to organizations, everyone has been forced to adopt new operating models. While the outcome of digitization, like all other technological revolutions, is largely expected to be positive (McKinsey Global Institute, 2017), it still brings to forefront the question of employability of the workforce.

The employability concept originated over a century ago, and has since been evolving. Initially, conceptualized as a labour market instrument on a macro-level, it was concerned with governmental policies which aimed at boosting employment (Berntson & Marklund, 2007; Forrier & Sels, 2003). From a political perspective, this has been adopted by governments to address unemployment issues in the labour market via skill development and inclusion schemes (Tymon, 2013). From an educationalist perspective, it is realised by embedding employability into the curriculum (Rothwell, 2015), with the aim of enabling graduates' entry into the labour market. However, the advent of globalisation accompanied a shift in perspective towards meso-level, with

employability largely functioning as an HR instrument of organizations. Companies were compelled to become more agile, more flexible and more adaptable to respond to changes in the business environment. In this situation, employability came to be understood as an organizational concern, in which demand of personnel had to be matched with the supply, at the right time, at the right place and with the right level of competence (Forrier & Sels, 2003; Nauta et al., 2009). Now, amid changing employment contracts (Pruijt, 2013; Soares & Mosquera, 2019), and the emerging gig economy in the digital workplace of today, employability is conceptualised on an individual, or micro-level. The emphasis here is on one's own capability to find a job and sustain that job (Rothwell & Arnold, 2007).

The COVID-19 pandemic has been detrimental for businesses and economies across the world. According to estimates by the World Bank, it has triggered one of gravest global recessions since the second world war (World Bank, 2020). Global unemployment, on the whole, is soaring (International Labour Organization, 2020). The only way to survive this transforming business landscape, and cope with the reverberations of this pandemic is by ensuring that one is equipped with the skills and competencies required to stay employable (World Economic Forum, 2020). A significant number of jobs today require some interface with information technology (IT) systems. Work-from-home, wherever possible, has become customary, and is a trend that is likely to continue in the post-pandemic workplace as well. This requires today's workforce to be well-versed with IT basics. Digital literacy, defined as the knowledge, skills, and abilities of an individual in interacting with digital technologies (Cetindamar Kozanoglu & Abedin, 2020; Stordy, 2015) thus, will be essential for survival in this knowledge economy, irrespective of functional areas and industries. There is a need for the workforce to possess 21st century digital skills instead of just 21st century skills. This is because the digital component is now invariably included in all aspects of a task. So, problem solving requires not just problem-solving skills but in fact, digital problem-solving skills as well. Digital skills are thus an essential component of employability (Van Laar et al., 2019). Innovation capacity and competitiveness of organizations will depend greatly on thedigital skills possessed by its employees (Picatoste et al., 2018). In 2017, G20 member countries agreed to promote development of digital skills as a key aspect of facilitating easy adaption to the requirements of this new digital economy (OECD, 2017).

The 21st century has seen us move slowly but significantly away from the concept of lifetime employment towards that of lifetime employability (Hoffman et al., 2013). In fact, employability is often described as the only job securityof this forever changing business environment (Berntson et al., 2006). Staying employable through this tectonic shift is a key concern for today's employees. In this paper we review, synthesize and analyze the literature on employability in the digital age. Our research aims are a) to review the literature on digital skills/competencies and employability b) extract the digital skills/competencies essential for employability, and c) integrate and systematize the findings. The paper contributes significantly to the research field majorly in three ways. First, it reviews and synthesizes the extent literature on employability in context of digital skills, thereby advancing the body of knowledge.Second, this study utilizes PRISMA framework (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) given by Moher et al., (2009) to identify, screen and select articles. This framework allows us to capture and detail structured insights on a construct, consequently making the article methodologically and academically robust.While digital skills and employability are used as buzzwords, it has been observed that there is a dearth of in-depth studies that discuss this topic systematically. With this article we aim to concretize it into a concept which can help researchers to build on in the future.Finally, this study presents a comprehensive research agenda giving signposts for future scholarship in the area.

The rest of this paper is organized as follows. The methodology followed for this article has been outlined in section 2. We have used PRISMA framework (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) given by Moher et al., (2009) to identify, screen and select articles. The theoretical background of the study has been discussed in section 3. In section 4 we present the findings from our review. The three key themes identified have been

discussed in detail here. The future research agenda has been detailed in Section 6. In the last section, we discuss the conclusion and implications of our study.

2. METHODOLOGY

In this section we outline the methodology for the review of literature using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework (Moher et al., 2009) and general guidelines given by Paul and Criado(2020) for creating literature review articles. We used Web of Science (WOS) and other databases like Google Scholar, ProQuest etc. for finding the research articles. We have followed international best practices for conducting systematic reviews in the area of management to develop this article(Piccarozzi et al., 2018; Rasoolimanesh et al., 2020).
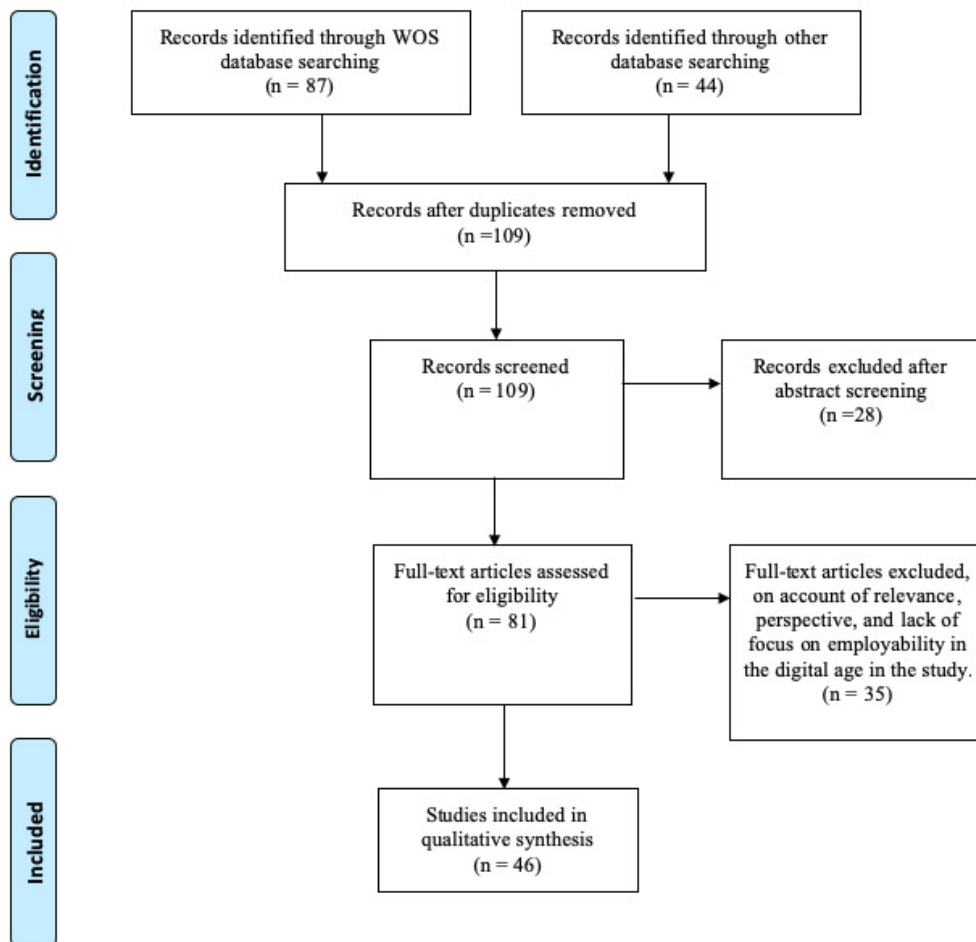
FIGURE 1: PRISMA Framework for Systematic Review (Moher et al., 2009).

In the first step, our search returned 131 records. A *Boolean search*was run on both databases. The search terms that were used were: *employability AND (digital OR technological OR digitisation OR digitalisation OR ICT).* The search query was limited to the English language. With the rising importance of digital skills in the 21st century, and the dominant role that digital connective technologies have played in this century(Saykili, 2019; van Laar et al., 2020a), we have limited our search to the last two decades (2000-May 2021). It was, however, observed that majority of the papers have been published in recent years.

The second step involved removing duplicate records leaving us with 109 records. In the next step,records were screened on the basis of abstract.28 records were removed at this stage particularly because they were missing a skills perspective.The remaining 81 articles were then downloaded. These full-text articles were examined and eligibility for selection was adjudged on the basis of their relevance, perspective, and focus given to employability in the digital age in the study. Studies were considered relevant if they discussed the different digital skills required to be employable in today's labor market. Papers that shed light on the different governmental or institutional or even individual efforts essential for to build a digital workforce were also shortlisted. Articles examining the topic from any of the three perspectives- macro, meso and micro, were included to obtain a comprehensive picture.

To endorse this a focus group was conducted to ensure that aspects of employability relevant to current digital scenario weren't missed out. The focus group was conducted in April 2021 in an online mode, and comprised of six members, two faculty members from reputed national universities, two members from industry and two students. The discussion was moderated by the authors of this study. The focus group emphasised the importance of studying the typology of digital skills, especially the technical and analytical skills required to obtain suitable employment.The importance of digital skills in developing entrepreneurs was also a line of discussion. The different steps taken by employers and educational institutions to make the workforce digitally ready was also identified as a key research area. In keeping with these views, a rationale for selection was developed in addition to criteria specified above.46 papers were selected for this review. This methodology is detailed in Figure 1.

Table 1 presents these top 5 most influential bibliographic sources in the context of employability in the digital age. To demonstrate the credibility of these sources, their Impact Factor has also been provided.

Journal Name	Frequency	Impact Factor
Urban Studies	3	4.663
Higher Education, Skills and Work-Based Learning	2	2.00*
Telematics and Informatics	2	6.182
Economics: The Open-Access, Open-Assessment E-Journal	2	1.234
Employee Relations	1	3.091

TABLE 1: Top 5 Bibliographic Sources.

The different types of articles in the review are as listed in Table 2. Some exemplary papers along with their key principles and content discussed in Table 3.

Types of Articles	Frequency
Empirical	22
Conceptual	15
Review	5
Qualitative	3
Mixed	1
Total	**46**

TABLE 2: Types of Articles.

Primary theme under discussion	Exemplary Papers	Key Principles/ Content Discussed		
Digital competence of students	(Torres-Coronas & Vidal-Blasco, 2015)	Aligning higher education to labour market requirements	Analysing the perception of students and employers in relation to digital competence	Suggest inclusion of the three parties involved – University, students and employers– in the employability process is important for achieving the best results.
Main skills needed in the digital age workforce.	(Gouda, 2020)	Digital age changed the needed skills individuals should hold to become attractive job candidates. Skills in the digital age can be categorized into two groupings: Business Know-how and Digital Know-how(knowledge on the usage of technology and communication platforms and devices)	Managers recruit graduates not only with technical skills, as represented by the degree obtained or the subjects that they took in college, but also with their employability skills: personal skills in business practices and digital media and information literacy.	
Taxonomy of digital skills	(Prezioso et al., 2021)	Build upon a taxonomy of digital skills to explore the diffusion of each digital skill in different departments	Identification of digital skills for every department allow recruiters to acquire the most talented candidates as employees	
Digital literacy as a gateway skill	(Vrana, 2016)	Digital literacy skills are directly related to the concept of employability as digital literacy aims to improve "employability because it is a gate skill, demanded by many employers when they first evaluate a job application"	Universities around the world adapt their study programs according to the needs of the labor market.	Constituting elements of the selected digital literacy definitions-collaboration, computer, context, information etc.

Working in a digital world	(Schech et al., 2017)	Describe a new work-integrated learning model that embeds a multi-layered in-person simulation within an academic context.	Students' reflections on the model indicate that this model can foster a range of generic soft skills that enable them to work in a digital world.	
Digital skills and employment	(Bejaković & Mrnjavac, 2020)	Finds statistically significant correlation between digital skills and employment rates in European Union implying why it is so important for governments and employers to seek, propose and implement new strategies to promote digital inclusion, literacy and the training not only for new ICT professionals but also for the whole workforce.		
Relationship between digital skills and perceived employability	(Lissitsa & Chachashvili-Bolotin, 2019)	Digital skills was positively correlated with perceived employability for the Jewish majority	The positive correlation between digital skills and perceived employability corresponds to human capital theory.	
National level digital skills training programs	(Bode & Gold, 2018)	The G20 should establish national adult training programs that focus on improving workers' general skills, specifically their theoretical, non-cognitive, and digital skills. These general skills will enable workers to work with technology instead of competing with it, thereby increasing their job mobility and employability.	G20 should request comparative periodical reports on all national adult training programs. These reports should be prepared by international organizations specialized in the field, for instance the UNESCO, the OECD or the ILO.	

Employee involvement in digitization	(Cetindamar Kozanoglu & Abedin, 2020)	Measuring digital literacy at the organizational level, showing how various competencies (i.e. Skills and abilities) required for the execution of digital transformations	Expands the discussions on digital transformations to rethink digital literacy as the employee involvement in digitalization.	Digital literacy concept requires not only interactions between employee-technology but also employee-employee through their practice during digital transformation.
Individual involvement in enhancement of digital literacy	(Anthonysamy et al., 2020)	Examines how self-regulated learning strategies can foster the enhancement of digital literacy in digital learning to increase efficiencies in human capital for sustainable development in lifelong learning.		

TABLE 3: Some exemplary papers.

3. THEORETICAL BACKGROUND

Different theoretical frameworks have contributed to the development of the concept of employability and the factors important in determining it. Human Capital Theory (Schultz, 1961), which argues that educational knowledge acquired is essential to increasing an individual's productivity and thereby their workplace success, is one such theory that contributed heavily to the literature on employability (S. Kim et al., 2015; Wittekind et al., 2010). However, in such a fast-moving employment landscape, educational knowledge acquired can soon become obsolete. The neo-human capital theory consequently accentuates the need for developing human capital in response to the increased demand for technology-related skills (Pereira & Malik, 2015).Digital skills have become a necessary requirement for competence and quality of human capital (Grigorescu et al., 2021). Digital skills can consolidate an individual's position in the job market and contribute positively to their employability (Lissitsa & Chachashvili-Bolotin, 2019). Upskilling in the area of technological skills has been deemed as crucial for one's employability (Jaiswal et al., 2021). A digital human capital framework, in this regard, highlights the importance of digital inclusion wherein widespread access to technology is available for all (Bach et al., 2013). This calls for more training that can allow individuals to harness digital technologies for economic, social, and even political ends.

Another framework that has captured the attention of researchers is the social cognitive career theory (Lent et al., 1994) which explicates the role of self-efficacy, outcome expectations and personal goals in career development. It also exemplifies people's tendency to perform better at things where their efficacy beliefs are strong, given they have necessary skills and external support. This is crucial to understanding both the individual and contextual aspects in employability (Qenani et al., 2014). Thus, on an agentic level, acquisition of digital skills can foster strong efficacy beliefs relating to employability. On a contextual level, this implies that the external environment in terms of government, organizational and educational policies needs to support the development of these skills for employability development. From this perspective, employability development can be attributed to self-efficacy beliefs and the learning experience (Liu et al., 2020). It furtherhighlights how career interests develop, how choices are made

subsequently, and how success is achieved.This theory is also capable of predicting outcomes for individuals undergoing a university-to-work transition (Mohd Rasdi & Ahrari, 2020). Employability, as an individual difference variable, determines how an individual makes career decisions, achieves success, responds to job loss, experiences successful job recovery, etc. (Thompson et al., 2017). SCCT is thus, a commonly used approach to support career development and employability (McKenzie et al., 2018).

4. LITERATURE REVIEW

Three key themes emerged from our comprehensive review of literature: What constitutes as Digital Skills? Why Digital Skills are important for Employability? How can these Digital Skills be developed to enhance employability?They are discussed in detail in the following subsections under three heads, What, Why, and How.

4.1 What?

A key theme that was addressed by majority of researchers in their articles was what digital skills and/or competences are essential in today's labour market to ensure employability? Digital literacy constitutes technology related skills and can be defined as one's capability to function efficiently in a digital landscape (Jones-Kavalier & Flannigan, 2006). However, it requires more than just the ability to use digital devices. Sutherland and Ho (2017) emphasise the need for 'digital wisdom' beyond technical skills. Digital literacy involves complete mastery over the digital environment with a mix of sociological, cognitive, emotional and motoric skills (Eshet-Alkalai, 2012). There is a need for socio-emotional thinking on the part of the individual in order to be able to address the different issues (team, communication, etc.) that may arise in a digital work environment (MN et al., 2020). In fact the capability for collaboration, social participation, and problem solving across digital technologies is an essential part of digital literacy (K. T. Kim, 2019).Schlech et al. (2017) in their study found that one needs to alter their interpersonal skills for the digital space when working in a global environment. This is mainly because digital relationships are harder to cultivate and often lack the professional intimacy that can be witnessed in physical spaces.

The key areas in digital competence are information and data literacy, digital content creation, communication and collaboration (through social media etc.), security (to protect personal data), and problem solving (using technology creatively) (Bejaković & Mrnjavac, 2020; Hinojo-Lucena et al., 2019). Researchers have also prepared a framework of 21st century digital skills comprising 7 core skills (Collaboration, Communication, Creativity, Critical thinking, Information management, Problem solving and Technical) and 5 contextual skills (Cultural awareness, Ethical awareness, Flexibility, Lifelong learning and Self-direction) (Picatoste et al., 2018; van Laar et al., 2020b). Mwakatumbula and Moshi (2020) identify six important digital skills for gig workers especially on digital platforms: technical skills, managing information, online communication, critical thinking and problem solving, online safety, e-payment/ banking expertise. Sutherland and Ho (2017)highlight that social media skills should also be considered an integral part of 21st century skills as they increase employability.

Based on this review we find that digital skills essential to employability can be classified under four heads-Operational, generic, analytical and social media. Operational skills relate to use of digital platforms (Deursen & van Dijk, 2010; Li & Hu, 2020) in a secure manner. Generic skills relate to communication, collaboration, cultural etc.skills required to sustain in an online environment. Digital analytical skills can be defined as the skills required to effectively collect and synthesise information, think critically, solve problems, take decisions, etc. Lastly, with the rising importance of social networks, social media skills required to manage social media profiles and create digital content for them have also become an important digital skill (Sutherland & Ho, 2017). This typology is given in table 4.

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Authors / Dimensions		(Prezioso et al., 2021)	(Bejaković & Mrnjavac, 2020)	(Mwakatumbula & Moshi, 2020)	(Gouda, 2020)	(Hinojo-Lucena et al., 2019)	(van Laar et al., 2018, 2020a)	(Bode & Gold, 2018)b	(Sutherland & Ho, 2017)
Operational Skills	Technical Skill	✓		✓	✓		✓	✓	
	Cybersecurity	✓	✓	✓		✓		✓	
	banking expertise			✓					
Generic Skills	Online communication	✓	✓	✓	✓	✓	✓		
	cultural awareness	✓							
	lifelong learning	✓							
	Self-direction	✓							
Analytical skills	Information Management	✓	✓	✓	✓	✓	✓		
	Creativity	✓					✓		
	Programming							✓	
	Critical thinking	✓		✓			✓		
	Problem solving	✓	✓	✓		✓			
Social media skills	digital content creation		✓		✓	✓			
	social media management								✓

TABLE 4: Typology of digital skills/competencies.

The skill focussed approach to digital literacy, however, has been criticized. In this information age, it's not sufficient that one knows how to look for information. Selecting the right information, synthesizing it and then using to take decisions is a key expectation of employers. Communicating effectively across digital media has also been identified as a key skill that employers actively look for (MN et al., 2020). Moreover, researchers suggest moving towards broader digital competency models. This is primarily because competence-based notions take into effect the progressing nature of digital technologies (Falloon, 2020). Thus, while a digitally literate person may be work-ready today, a digitally competent person will be work-ready at all points in the future.

4.2 Why?

The next theme that emerged from the articles was *Why digital skills have become increasingly important to sustain one's employability in today's landscape*?A focal point of all employability research is knowledge, skills and competencies possessed by an individual (Berntson & Marklund, 2007; De Cuyper et al., 2008; Mäkikangas et al., 2013; Pitan & Muller, 2019; Rothwell & Arnold, 2007). The competence-based conceptualisation of employability given by Van Der Heijde and Van Der Heijden (2006) emphasised the use of skills for acquiring and maintaining employment. Their focus was on both specific (occupational expertise) as well as generic competences (anticipation and optimization, personal flexibility, corporate sense, and balance). Competence based employability models emphasise the need to align one's skill set to market

requirements. Bejaković and Mrnjavac(2020) contend that employability is highest when individuals possess skills like digital literacy, Information and communication technology (ICT) skills, readiness for lifelong learning etc. The digitally literate will be able to perform work-related tasks better and have a richer learning experience throughout life (Anthonysamy et al., 2020).

Digital skills have been described as central to employability and obtaining employment (Chetty et al., 2018; Gouda, 2020; Lissitsa & Chachashvili-Bolotin, 2019; Vrana, 2016). Green (2017) states that a basic level of digital literacy is now essential for employment. It has been postulated that a lack of such skills negatively impacts productivity, compensation, appraisal, and employment opportunities (Bejaković & Mrnjavac, 2020) etc. in relationship with employability and digital literacy.

Graduate employability has been a key concern for researchers and policy makers in the last few years. Many scholars have focussed their research efforts in this direction and found that digital literacy capabilities are a key concern when it comes to students' employability (Peacock & Bacon, 2018). Digital literacy has been identified as a key competence to prepare them for surviving in the uncertain business environment (Anthonysamy et al., 2020). In a study on marketing professionals, social media proficiency was a skill found to be of great importance to employers (Sutherland et al., 2020). Valdés et al., (2018) conducted a training program wherein students were encouraged to recognise, internalise and utilise the potential of technology in their respective fields of study. It was found that the training program allowed students to improve their employability. In a study conducted by Torres-Coronas and Vidal-Blasco (2015) it was found that the level of digital competence as perceived by students is different from that perceived by the employers, indicating that that employer expectations are not being met.

Digital skills have been identified as crucial not just for employed persons and students, but also the unemployed who are seeking to join the labour force (Mwakatumbula & Moshi, 2020). Sousa and Wilks (2018) in identifying key skills for the future lay emphasis on digital skills as well as agility to adapt to new technology and its consequences. Lestari and Santoso (2019) found digital literacy to positively and significantly influence work-readiness. Since organization's competitiveness and innovation capacity depends on the quality of its employees, employers increasingly look for candidates who are digitally prepared (Prezioso et al., 2021; van Laar et al., 2018). The use of information technologies and digital skills have emerged as key career skills for employability (Andrews & Russell, 2012; Lindsay, 2005; McQuaid & Lindsay, 2005; Soares & Mosquera, 2020; van Laar et al., 2019).

In essence, we find that the increasing importance of *digital skills to sustain one's employability can be attributed to the fact that digital skills a) have become a mandatory eligibility condition for entry into the labour market, b) help develop agility required to adapt quickly to the changes in the labour market, and c) facilitates development of entrepreneurs necessary to drive the economy.*

A list of definitions of Employability and digital literacy have been provided in Table 5.

Author (Year)	Construct	Definition
(Lo Presti & Pluviano, 2015)	Employability	"a personal resource that individuals develop across their working lives aimed at increasing one's own career success, both attaching importance to (i.e., employability orientation) and committing to (i.e., employability activities) making sense of past work experiences and envisioning one's own professional future, acquiring valuable competencies and skills, improving their formal and informal career-related networks, exploring their social environment in search of opportunities and constraints to their own career pathway"
(Pruijt, 2013)	Employability	"empowerment in matters of career development"
(Van Der Heijde & Van Der Heijden,	Employability	"the continuous fulfilling, acquiring or creating of work through the optimal use of competences"

(2006)		
(Forrier & Sels, 2003)	Employability	"an individual's chance of a job in the internal and/or external labour market"
(Knight & Yorke, 2002)	Employability	"A set of achievements, understandings and personal attributes that make individuals more likely to gain employment and be successful in their chosen careers"
(Hillage & Pollard, 1998).	Employability	"the capability to move self-sufficiently within the labour market to realise potential through sustainable employment"
(Littlejohn et al., 2012)	Digital Literacy	"the capabilities required to thrive in and beyond education, in an age when digital forms of information and communication predominate."
(Anthonysamy et al., 2020)	Digital Literacy	"the ability and awareness to use emerging digital technologies to perform tasks while demonstrating proper attitude in a digital learning environment"
(Peacock & Bacon, 2018)	Digital Literacy	'the capabilities which fit someone for living, learning, and working in a digital society'
(Jones-Kavalier & Flannigan, 2006)	Digital Literacy	"a person's ability to perform tasks effectively in a digital environment; digital means information represented in numeric form and primarily use by a computer, and literacy includes the ability to read and interpret media, to reproduce data and images through digital manipulation and to evaluate and apply new knowledge gained from digital environments"
(Hidalgo et al., 2020)	Digital divide	"the unequal access to and use of information and communication technologies (ICT)"

TABLE 5: Widely Used Definitions.

4.3   How?

The third theme that emerges from the literature is how can such digital skills be developed in the labour force. With any technological advancement, there runs the socio-economic risk of aggravating inequalities and unemployment. In such situations it is imperative for nations to skill, reskill and upskill vulnerable workers (Lissitsa & Chachashvili-Bolotin, 2019). Governments can aid in this process by providing a framework for implementing such training programs that equip these underrepresented workers with the necessary digital skills (Lyons, 2019). It has also been highlighted that these adult training programs should be aimed at strengthening workers' resilience to such changes in the technological landscape and keep them employable even in the age of digitization (Bode & Gold, 2018). For ensuring human capital readiness, countries must encourage apprenticeships and on the job training to prepare workers for a digital workplace (Mwakatumbula & Moshi, 2020). A collaborative international body can also be set up to advance digital literacy, training and retaining efforts (Lyons, 2019). The responsibility of training also lies with employers. Uber, for example, as part of their recruitment process mandates its drivers to attend digital training (Mwakatumbula & Moshi, 2020). Cetindamar Kozanoglu and Abedin (2020) suggest that by assessing digital literacy levels of their employees, managers can achieve the right fit between employee capabilities and digital technologies that support further digital transformation efforts. Gouda (2020) places the onus on individuals to advance their digital literacy in order to obtain employment.

Since much of the research has been focused on students, a lot of onus has been placed on educational institutions to impart the necessary digital skills to students (MN et al., 2020). Specifically, the role of lifelong learning and self-regulated learning to enhance digital competence cannot be understated (Anthonysamy et al., 2020; Bode & Gold, 2018). Schech et al. (2017) also find that relational skills adapted to digital spaces are paramount for developing global employability and hence must be accorded high priority. Lestari and Santoso (2019) suggest that universities can enhance digital literacy by necessitating collection of information through various digital sources as part of the culture. Following from Norway's example, digital

literacy can also be embedded into a countrywide school curriculum (Belshaw, 2011). Simultaneously, to produce digitally adept, employable graduates, it is important that the curriculum be consistent with market requirements. Authors emphasise the need for all three stakeholders- students, employers and educational institution to be involved in the process of curriculum review (MN et al., 2020; Torres-Coronas & Vidal-Blasco, 2015). In order to align student and employee perceptions of digital competence in the employability process, it is important that all three stakeholders are active participants (Torres-Coronas & Vidal-Blasco, 2015). It follows from here that efforts are required at governmental, educational institution, employer and individual levels to develop these digital skills.

Researchers have also suggested that digital skills may improve employability of workers, but it will have limited advantage a world where training becomes obsolete so quickly (Loh & Chib, 2019). A degree of self-management and pro-activeness (Clarke, 2018; Lin, 2015; Qenani et al., 2014) on the part of individuals is required for favourable outcomes, both economically and socially (Bridgstock, 2009).

Succinctly, digital skills are viewed as a gateway skills to improving one's employability and obtaining sustainable employment (Vrana, 2016). They are comprised of an individual's ability to perform tasks successfully in a digital setting(Jones-Kavalier & Flannigan, 2006; Peacock & Bacon, 2018). Digital skills extend beyond using technology effectively to communicating in an online environment, creating digital content, solving digital problems, managing information, etc. (Bejaković & Mrnjavac, 2020; Hinojo-Lucena et al., 2019; Sutherland & Ho, 2017). To ensure human capital readiness in this digital age, all stakeholders- nation, organization, educational institutes and individuals- have a part to play (MN et al., 2020; Mwakatumbula & Moshi, 2020; Torres-Coronas & Vidal-Blasco, 2015). With collective efforts from all, a digitally ready workforce can be developed.

Papers that cover at least two of the three themes have been given in Table 6.

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Authors / Themes	(Torres-Coronas & Vidal-Blasco, 2015)	(Vrana, 2016)	(Schech et al., 2017)	(Bode & Gold, 2018)	(Picatoste et al., 2018)	(Sousa & Wilks, 2018)	(Lestari & Santoso, 2019)	(Lissitsa & Chachashvili-Bolotin, 2019)	(Van Laar et al., 2019)	(MN et al., 2020)	(Gouda, 2020)	(Cetindamar Kozanoglu & Abedin, 2020)	(Anthonysamy et al., 2020)	(Bejaković & Mrnjavac, 2020)	(Mwakatumbula & Moshi, 2020)
THEME 1: What constitutes as digital competencies?	✓	✓	✓	✓	✓	✓			✓	✓		✓	✓	✓	✓
Operational Skills	✓	✓	✓	✓	✓	✓			✓	✓		✓	✓	✓	✓
Generic Skills	✓	✓	✓		✓	✓			✓	✓				✓	✓
Analytical Skills	✓	✓		✓	✓	✓			✓			✓		✓	✓
Social media Skills														✓	
THEME 2: Why digital competencies for employability?	✓	✓		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
Mandatory eligibility		✓			✓		✓	✓	✓					✓	
Agility to adapt	✓			✓		✓		✓				✓	✓		✓
Developing Entrepreneurs						✓									
THEME 3: How to develop digital competencies to foster employability?	✓	✓	✓	✓			✓	✓	✓			✓	✓	✓	✓
Governmental effort				✓				✓							✓
Educational Institution effort	✓	✓	✓				✓					✓		✓	
Employer effort	✓	✓											✓		
Individual effort	✓											✓	✓	✓	

TABLE 6: Key Themes across the Top Articles.

5. FUTURE RESEARCH AGENDA

Through our review, we find that there is a clear dearth of employability research in developing nations (Akkermans & Kubasch, 2017; S. Kim et al., 2015) and especially so in the context of India. There is a need to develop an integrative theory of employability (Forrier et al., 2015). This can be realized with digital comeptence at its core. In this section we detail the possible areas for future research that follow from the themes that emerged in our review. In context to the first theme, **what** *constitutes as digital competencies*, we find there is present a laundry list of digital skills. There were however, very few articles that empirically studied the relationship of digital skills with employability, even less so in the Indian context. We also opine that the digital skills required for people in different professions to be employable can vary greatly, Thus, it may be prudent in the future to define digital skills specific to job domains in order to foster a workforce that is work-ready. Future researchers may direct their efforts in this direction.

With respect to our second theme, **why** *digital competencies for employability*, we propose the following areas of future research. There is a need to align micro-level perspectives with meso-level perspectives. This is to say that, studies that map industry skill requirements with individual perceptions of industry skill requirements are necessary in order to bridge the gap between what is and what ought to be. Such an alignment is also essential at macro and meso levels. Thus, studies that map national level policies regarding skill development and employability with industry requirements and school curricula are requisite, as they will, going forth, determine the quality of our workforce . Qualitative approaches may be used in this context.

In regards to the third theme, **how** *to develop digital competencies to foster employability, we highlight the following areas for future research.*Institutes of learning have a central role to play here as they are responsible for shaping the workforce of tomorrow. Thus, researchers can try to study the different interventions used by educational institutes at both secondary and tertiary levels to adjudge the state of conditions and define a path going forward. A country-wise comparison of these different initiatives may prove to be very insightful for practitioners as well as policy makers. In fact, an institute wise comparison, say for example, Tier 1 institutes vs Tier II institutes may also prove helpful in this regard.

Keeping in mind the evolving nature of work, the individual's role in shaping his own employability cannot be discounted. In this vein, indulging in career self-management behaviours such as self-profiling, impression management, investing in one's social capital, and developing one's human capital (Hirschi et al., 2018)may be fruitful. These career management behaviors and resources are easily transferable to different work contexts and not job-specific in nature. Self-leadership (Manz, 1986), which is an ability of the individual to self-direct and self-motivate can also aid in the development of digital competencies and employability. The impact of career self-management resources and self-leadership in enhancing both digital competencies and employability, thus, must be studied. Interventions that can be employed to enhance these digital and employability at the organizational level must be a key area of concern for future researchers. Researchers may also try to identify other such variables, that can be crucial to development of lifetime competencies and enhanced through intervention like voluntary learning behaviour, protean career orientation, lifelong learning, etc.

6. CONCLUSION AND IMPLICATIONS

This review paper integrates the literature on employability in the digital age. The articles have been selected using the PRISMA framework. In this article we synthesise and analyse the extant literature on employability in the digital age. Based on our review and analysis we have identified the top 5 bibliographic sources and the key themes on which articles are situated in this context**:** What constitutes as Digital Skills? Why Digital Skills are important for Employability? How can these Digital Skills be developed to enhance employability? Digital literacy emerges as a key skill to be employable in this day and age.

The present day labour market is highly volatile, excruciatingly competitive and fraught with uncertainties.As the workspaces have become more and more connected, employer interest in candidates possessing digital skills has risen (Mwakatumbula & Moshi, 2020). In this changing business environment, employees are especially vulnerable and must be infused with optimism and confidence in self so they don't harbour negativity towards the unstable labour market. In fact, fostering employability is necessarily seen as a joint responsibility of all stakeholders (Pruijt, 2013). This is in line with conceptualisations from SCCT, wherein employability is a function of both personal and contextual factors (Álvarez-González et al., 2017). Thus, enhancing employability of the workforce to equip them for this digital era should be a shared goal for policy makers, organizations, higher education institutions as well as the individuals themselves.

At the government level, effective strategies for ensuring digital literacy for all should be implemented. In India too, such a trend has been witnessed with the term 'employability' making it into key policy drafts. 'Skill India' and 'Digital India' underscores this vision of an employable India in the digital age. The National Education Policy (2020) identifies digital literacy as a fundamental skill for students at both- school and higher education levels. However there still exists a huge digital divide, and employability of the workforce needs to be enhanced.At theeducational institution level, teacher support has been identified as critical for employability development of students (Zhao et al., 2021). More digital-oriented content in teacher knowledge transfer can help students to acquire digital skills that further build their employability. University faculty can also contribute to employability development by organizing employer-matching activities and facilitating practical work experience so that students can get first-hand digital exposure (Álvarez-González et al., 2017). Further, perceived reputation as well as employability promotion by the institution have an influence on the employability of students. This necessitates that educational institutions build a reputation for being a contemporary university adept at equipping students with 21st century skills. The essentiality of teacher and institution support finds its underpinning in SCCT which lays emphasis on external support received for employability development.

At an organizational level, employees must be readily provided with support, advice, and requisite skills, so they develop coping resources, competitive edge and contribute positively to the organization and society. By investing in the employability of their employees, employers will be able to establish their reputation as an attractive employer and boost employee commitment (Pruijt, 2013; Van der Heijde et al., 2018). At the individual level, it is important that appropriate career self-management resources are present. Especially in times of change, perceived threats may become many and confidence in employability can be shaken easily. Individuals, in general, are not sensitized to accept or handle failure. It has become imperative to equip them with the ability to lead themselves through adversity and towards success. Career self-management is crucial to career resilience (Despina et al., 2015). Self-managers will be able to take their own decisions and carve their own career path in the corporate world.

Thus, a focus on digital competences and abilities is irrefutably essential in employability literature in this age of digitization. Further, sustaining employability in this digital era asks for a more self-reliant approach. Sustaining employability now depends on how well one manages the career resources. As the age-old adage goes- "Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime." Similarly, employability can only be truly fostered by investing in their digital literacy, and sustained by developing the career self-management resources of the employees. By providing a support mechanism, organizations, governments and universities can thereby facilitate the journey of the workforce towards sustained employability in this digital landscape.

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Sustainability: Future Orientation Through Engagement of MSME's

Deepti Prakash *deeptimprakashl@gmail.com*
Assistant Professor, HR-OB
University School of Management Studies
GGSIP University (State University under Delhi Government)
Dwarka, New Delhi-110078, India

Parul Manchanda *manchanda91@gmail.com*
Research Scholar
University School of Management Studies
GGSIP University (State University under Delhi Government)
Dwarka, New Delhi-110078, India

Twinkle Arora *arora.twinkle05gmail.com*
Research Scholar
University School of Management Studies
GGSIP University (State University under Delhi Government)
Dwarka, New Delhi-110078, India

Abstract

Purpose: Enterprises have been facing a concern from the government to take an initiative in the various environmental maintenance and in the implementation of various sustainable practices laterally with the satisfaction of the customer demands. Thus, the enterprises are enforced to implement sustainable ways of doing business, which would help them achieve competitive advantage in the long run. This paper intends to institutionalise the various sustainability measures (through the leadership approaches and the theoretical approaches) in the various Micro, Small and Medium Enterprises (MSME's)

Design/methodology/approach: This research paper is a general review for highlighting the varied reasons and unreason's behind the various enterprises practising sustainability initiatives in the real business scenario. A thorough and wide exploratory search was made from the existing literature with the help of online databases. The results are presented in the form of descriptive findings.

Findings: The research paper concludes that, sustainability is not a unitary concept, but involves a throng of efforts (to explain, the activities, actors and the resources employed). The MSME's require explicit thought, in case of business plans for sustainability as it is by one way or another not equivalent for the large firms. It has also been brought about that the MSME's require a different way to support sustainability in comparison to the various large organisationswhich hold a varied set profile and resources.

Practical implications: Sustainability, today is a concern for everybody in the civilisation, this is because of the changes in the climate that have been observed and the growing problem of global warming. This research work, may enable the MSME managers to reconsider the whole business strategy, and making sustainability as an important inclusive element of the same, and thus practising it too.

Research Limitations: Sustainability, has been an important concern to the society in general which points out that there can be plenty opportunities for various organisations to identify

strategies that will have a bearing and may positively advance the – social and environmental performance. However, this research work, does not provide an empirical evidence and support but offers insights on engaging MSME's in sustainability.

Originality/ Value: This research contributes to the area of literature by providing a review, for the various considerations and occasionsfor the various business strategies for sustainable development and its varied applications to the certainties of business operations in various MSME enterprises.

Keywords: MSME, Small and Medium Enterprises, Sustainable Development, Leadership Approaches, Business Sustainability, Environmental Management Practices.

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1. INTRODUCTION

Sustainability seems to be at the vanguard of all business operations in the contemporary times (Sloan et al., 2013). The conception of sustainability is very complicated (Faber et al., 2005). The general and the most widely accepted definition is the one given by World Commission for Economic Development in the year 1987. *"Sustainable development means meeting the needs of the present without compromising the ability of future generations to meet their own needs"* (Loucks et al., 2010; Hult, 2011; Sisaye, 2011; Mukherjee-Saha, 2011; Elliott, 2012). Macro climate changes have evolved a concern for sustainable development. People from various countries are working together to accomplish a way out to this growing problem. The concern regarding the same, was also highlighted two decades back in the Brundtland Commission Report (WCED, 1987) and later by Gibson B.R in the year 2001 which stated that "*Continuing environmental degradation was leading not only to local and regional resource depletion and damage to essential ecological functions, but also it is leading to cumulative global effects*". Sathaye et al. (2006) has delineated that in the developing countries it has been observed that discussions relating to sustainable development often lie on the trade-off between economic prosperity and the maintenance of the environment. The indications and the budding problems have led to the ruining of various natural resources like the biodiversity, soil, forests etc. which is further aggravating to the problem of climate change.

World Wildlife Fund in the year 2008 in their report 'The Living Planet' stated that, earth's capacity to aid a flourishing diversity of the species which also includes humans is very limited (p.2) and thus it becomes vital for enterprises to get involve in implementing more sustainable practices. The notion of sustainability has been embraced by industry as a principal concept intended to define and incorporate a broad assortment of practices (Loucks et al., 2010). There is a growing acceptance relating to the fact that, sustainability practices can be a key reason to the success of any business enterprise (Kuosmanen and Kousmanen, 2009).

A period back in time, sustainability efforts focussed primarily on curbing the environmental emissions laterally with particular degradation concepts. But in the latest times, the complexity in the business environment is ever challenging, thus forcing the enterprises to adopt a new set of approaches that are environmentally and socially more conscious, and enabling them to increase their profitability and decrease risks (Agnihotri & Tripathi, 2015). But in the latest times, the complexity in the business environment is ever challenging, thus forcing the enterprises to adopt a new set of approaches that are environmentally and socially more conscious, and enabling them to increase their profitability and decrease risks (Agnihotri & Tripathi, 2015).

1.1 The Missing Link
The companies appear to be focused on their core business but unreasonably the value creation is unsatisfactory in regard with stakeholder management. The companies all this while have been managing stakeholders in the hierarchical model, where in one aims to win and the other one loses. Whereas, in a structure based on sustainability, the focus is purely on mutual gains and

strengthening the relationship which helps in the long run. The obstacles have potential leads and new business development opportunities and there is a kind of synchronization between all types of objectives that the firm and its stakeholders want to attain. There are many industry leaders that give highest priority to sustainability and see it as a key to achieve business gains. A few examples would be Philips, Toyota, Lafarge, and General Electric etc. Such companies have been able to simplify the most complex things and have found answers to some of the toughest questions that existed in the environment since new competitive landscape has evolved.

Therefore, it has been observed from the literature that, there arises a need for people, who have the ability to lead differently and manage the stakeholders of the organization with proper conduct and a defined approach. Which in turn would require, to work in coordination with the various stakeholders to reengineer the solutions that might bring sustainability into the system. They have gradually entered into a phase where safety of individuals and environment is the most important thing.

However, in context of the MSME Sector, which is one of the major contributors in the world economy and is set to have a key influence on the futurity of business and the planet (Loucks et al., 2010) the chances of prioritizing these factors are very less. The MSM Enterprises remain either unaware of the above-mentioned safety factors or their priority for value maximization for stakeholders is not letting them pursue these safety factors while making critical organizational decisions.It has been revealed by (Bianchi and Noci, 1998) that MSME's incline to be reactive in their approach, when it comes to adopting sustainability practices. This occurrence is very much unlike the large organisations, which are considerably more proactive in adopting various sustainable practices. Dressen, (2009) concluded that sustainability practices are complex and that the MSME's have a restrictive access to the various financial and other resources required. It has also been concluded that the pressure mounting on the MSME's to practice sustainable business methods, is comparatively less by the external stake holder's vis-à-vis large companies. Orth and Kohl, (2013) in their scholarly work stated that, the number of enterprises emphasizing on sustainability has increased considerably in the recent years, but its implementation still remains a question especially in the context of MSME's. It has also been observed through various studies, MSME's which engage themselves into sustainable practices are much more flexible and are able to embrace the various inventive practices (Loucks et al., 2010). All this while, the MSME sector and the starring role performed by the entrepreneurs of these enterprises have not received due attention, though they have always been a crucial component in the sustainability discussions. The MSME's are holding up in comparison to the various large enterprises in assimilating various environmental management practices into theircommercial policies (Revell *et al.*, 2010). Many descriptive studies showed that SME managers display optimistic or beneficial attitudes towards industry and care about the social burden of others in terms of their business activities (Loucks et al., 2010). The MSME sector needs to endeavour such sustainable practices which helps them to become sustainable in long run. Therefore, this paper intends to institutionalise the various sustainability measures (through the leadership approaches and the theoretical approaches) in the various Micro, Small and Medium Enterprises (MSME's).

2. RESEARCH METHODOLOGY

A thorough and wide exploratory search was made from the existing literature with the help of online databases for delivering an inclusive list of journal articles.For traversing the relevant studies for the same, Google Scholar was used. At the later stage, papers were extracted from the online databases like*Emerald Management, Elsevier'sBusiness,* Academy of Management *and EBSCO host.* The online databases that have been referred to are one of the most extensively used in the field of business and sustainability. The databanks scanned were available for research in the National Capital region of Delhi, India in the various state and central universities. Additional caution was taken to include the most recent research in the area. Efforts were also laid to incorporate research which signifies the conception of sustainability in the

MSME sector. The key words used for screening and identifying the relevant literature for this paper from among the various journals are: "sustainability", "sustainable development", sustainability in MSME", "environmental practices", "business sustainability", "leadership approaches". The query led to 98 papers, which were further evaluated. The detailed procedure can be referred from figure 1. To begin with, non-English papers were rejected. This led to 95 papers. Out of which, some papers were assessed and rejected on the basis of not directly related to the study. Afterwards, a final list of 81 papers was obtained.
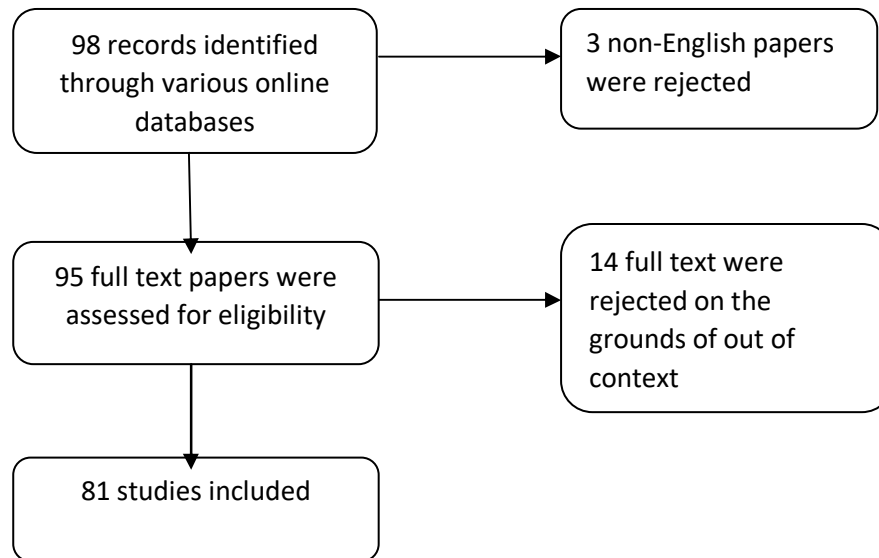

FIGURE 1: Search and Selection process.

3. MSME SECTOR AND BUSINESS SUSTAINABILITY
3.1 Sustainability
Stead & Stead (1994) arguedthat in the era of 21st century, there is a need to change firm's fundamental assumptions and their operational relations with the natural environment. This would by far mean, integrating the ecological conduct to the strategic and operational planning of the enterprise and at the same time, commissioning market research to identify the changing consumer behaviours and attitudes concerning environmental issues, adopting to the new functional principles and altering the performance. The latest expansions offered in the UN report, IPCC WGI (2007) Fourth Assessment Report emphasizes on the crucial need of making more efforts in the field of sustainability. It lays emphasizes on the natural and the human drivers pertaining to a change in the climate, climate processes and approximations of projected climate change elevating a subsidiary quest for business sustainability.

Thus, the term "business sustainability" is frequently denoted as the total effort that is put in by the company - taking into account its demand and logistic network – to lessen the influence on the Earth's life and the ecosystem to reduce the total e-footprint (Svensson and Wagner, 2011a). It has been brought about, empirical evidences are required for practices in business sustainability as the previous research work has only given minor attention to it (e.g.,Svensson and Wagner, 2011b, c). Effectivesupervision of business sustainability may thus involve a proper coordination, of the various operations that are to be managed in any product life cycle (Hong et al., 2009). The various business sustainability aspects may actually comprise of any of the following: dropping the raw material waste, water pollution, safety in the various manufacturing operations, harvesting of the rain water, energy consumption and designing of better warehouse management services, reducing packaging and augmenting safety thus keeping in mind the

probable social influence of working hours, improving transportation etc. which in turn can eliminate various kinds of wastage and emissions.

Thus many business firms have started realising a fact, that it is essential to achieve business sustainability in the long run (Turner, 2009) and it is something they cannot achieve in isolation but by the cooperation of the various intermediaries that are involved in the supply chain network of the various business operations. Achieving business sustainability is no longer seen as a costlier affair, but as an essential element to any business strategy making it competitive in the current scenario (Mahler, 2007). A.T. Kearney in his study revealed that firms which have started with sustainability initiatives, are largely benefiting from the same in the form of better brand names or distinguishing their products (Mahler, 2007). Thus, it is essential that the business enterprises take a charge and perform their obligations to alter the existing business practices. The approach of each firm towards sustainability, is something which can vary, hence the business enterprises, should take the initiative of learning about the social and the environmental practices, which are most significant for the respective business and its varied stakeholders.

3.2 Sustainability Dimensions at a Glance
3.2.1. Environmental
For variouspeople and establishments, those who are new to the concept of sustainability, often regard the various environmental concerns or issues as a synonym for the same (Berns et al. 2009; Montiel 2008). It has been often observed that in many organisations, the "responses" to the various environmental concerns is merely because of the pressure that is being imposed on to them. Thus, this is gradually driving an increased pressure, for the changes in the internal process operations and in the cost savings (Siebenhüner and Arnold 2007; Wilkinson et al. 2001). Over the recent few years, it has been seen that the firms have been reactive in their approach to environmental decisions, though it can be attributed under managed circumstances businesses can earn good number of profits by approving of the firms' various environmental practices (Siegel, 2009). These environmental initiatives can be grouped into the following three categories:

- Conservation: Businesses often focus on conservation through their various efforts to Lessen the dependence on various resources like water, energy, etc.(Pullman et al. 2009) which is only possible by involving the varied marketing and supply chain functions to have a successful conservation and management of resources.
- Usage Reduction: It basically involves, making efforts to reduce waste, the release of the various greenhouse gases, aggregating recycling activities and managing the products the disposal of products at the end stage (Barros et al. 1998; Clelland et al. 2000; Parthasarathy et al. 2005). Businesses may look for various instances through which they can lessen or even eliminate the not so necessary or the various poisonous by-products from the manufacturing processes. They can opt for various waste management activities initiated through the processes like lean manufacturing (Gordon 2007; King and Lenox 2001; Zhu and Sarkis 2004).
- Business Management Practices: Firms can be sustainable in their business practices crosswise departments and thus can create a more positive environmental impact. They can follow various practices like, having a strong association with the various network partners and designing the products much more efficiently (Guide et al. 2003; Linton and Jayaraman 2005). Thus, this collaborative effort, can result in new friendly activities.

3.2.2. Social
Sustainability initiatives in the social context, aims at managing the labour workforce. The managerial talent are developed and skilled to replace the present employees. The social initiatives, can be further understood in the following three aspects:

- Employee Relations: This dimension primarily focuses upon aspects like work life balance and quality of work life (Kelliher and Anderson 2008; Wilkinson et al. 2001) encouraging employees to have a healthy lifestyle (Corbett, 2004).
- Talent Development: Understanding firm sustainability means paying emphasis on the human competency and agility (Boudreau and Ramstad 2005). It comprises of a wide range of firm capabilities and experiences (Colbert and Kurucz 2007). Efforts should be made to ensure that employees possess the necessary soft skills required in complementary to the technical skill set they possess to sustainably meet the requirements across the various geographical boundaries, where the firm may choose to operate (Colbert and Kurucz 2007).
- Business Management Practices: While the firms possess an internal expertise of duly meeting the customer demands in the changing scenario and efficiently supporting the global supply chain, it becomes all the more important to extend this further to the various supply chain constituents. Initiating, supplier training programs and to make the suppliers understand the context of firm sustainability (Business and the Environment 2010; Goodman 2000).

3.2.3. Economic

To reduce the overall cost of supply chain and aggravate the total benefit constant push is required. The economic sustainability dimension follows the above-mentioned statement with the running business of the organization which is equally complimented by other initiatives responsible for the marketing and financial strategy formulation.

- Internal Management: This category is solely aimed at various approaches like Kaizen which clearly means continuous improvement. It also involves approaches like maximum productivity with minimum effort and other strategic measures to achieve maximum efficiency in almost everything if we think from supply chain's point of view.
- External Management: This involves creation of new markets and management of the stakeholders if we think from supply chain's point of view. External management compliments the internal management by taking various measures to help internal management reduce total cost and improve sustainability of the organization.
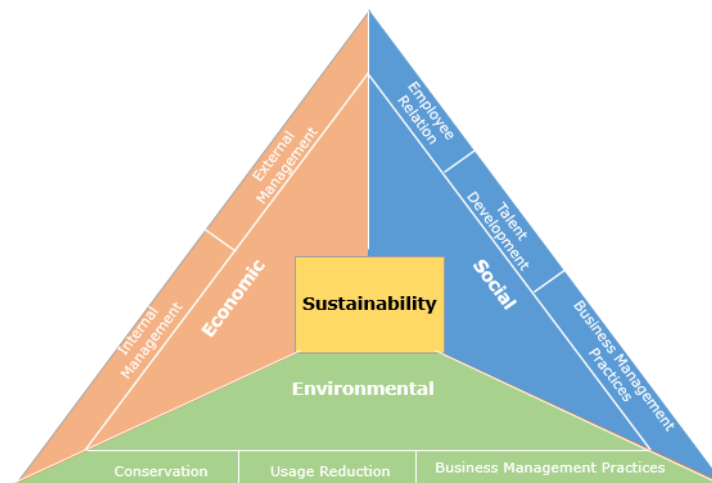

FIGURE 2: Sustainability Dimensions.

3.3. The Micro Small Medium Enterprises

The significance of MSME is quite well known. MSME's have been encouragingthe individuals by providing thosejobs; helping them with innovation and helping them identify the entrepreneur within themselves for overall development of the economy. It has also been observed that there is

no standard definition that has been set for defining MSME's. The (Table No. 1) presented below, highlights regarding the various parameters that are often taken into consideration while defining MSME's across the various countries. The parameters are defined as, i) the number of employees working in the enterprise; ii) the industry which it belongs to; iii) the capital investment that has been made into the enterprise; iv) the extent to which it distinguishes between the micro, small and medium enterprises.

Country	No. of Employees	Industry	Assets/Turnover/ Capital/Investment	Definition distinguishes between MSME
Argentina	✓	✓	✓	✓
Brazil	✓			✓
Canada	✓	✓	✓	✓
India		✓	✓	✓
Russia	✓		✓	✓
Singapore	✓	✓	✓	
South Africa	✓	✓	✓	✓
UK	✓		✓	✓
USA	✓	✓	✓	✓

(Source: Kushnir, K. (2010). How do economies define micro, small and medium enterprises (MSMEs), *Companion Note for the MSME Country Indicators*, *66*)

TABLE 1: Definition MSME in various countries, based on various parameters.

3.3.1. MSME's: Key to Overall Growth of the Nation
MSME's have been playing an essential part in taking the country to an aimed level. SMEs provide employment, contribute to country's GDP and improve any problems which may arise or which have been there for a long. Because MSMEs are considered to be the major contributor to the nation's GDP, it requires more attention from the policy makers. As per various economic surveys, MSMEs are inviting more investments and providing employment opportunities to the youth as well (Gade, 2018). SMEs are really active these days with digitizing their day-to-day operations and other organizational activities. This helps them save time, improve efficiency and enhance productivity. SMEs are extremely important for attainment of Sustainable Development Goals by encouraging innovation, promoting gender equalities and employing the unemployed. SMEs as part of their CSR initiatives have worked on addressing issues like poverty, child mortality etc and promoting good health and well being (Verma &Nema, 2019).

3.3.2. MSME's: Towards a better standard of living and social status
MSME's have been a major source employment opportunity in the 35-member country cooperation i.e., OECD (Refer Table No. 2). They are considered to be responsible for more than 95% of the jobs in the OECD area and also, they are equally responsible for great value creation. Almost 50% of employment is generated by SMEs in the emerging nations while they account for

one third of the GDP (OECD, 2016b). The table below represents, the relative contribution made by the MSME sector in the GDP of the economy, which is quite a large percentage in context to countries like Taiwan (85%), Italy (68%) and so on. The other section of the table elaborates upon the % of employment generated by the MSME's, which again stands high in context of Canada (90%), Italy (80%) and has been significantly contributing for the various other economies too.

Country	MSME Contribution to the GDP (in % terms)	Employment generated by MSME (in % terms)
Argentina	25	15
Brazil	22	67
Canada	27	90
France	59	63
Germany	54	62
India	8	21
Italy	68	80
Russia	35	23
Singapore	50	70
South Africa	57	74
Taiwan	85	78
UK	50	52
USA	48	53

(Source: The new wave Indian MSME: An action agenda for growth. A Report by KPMG and CII, Year 2016)

TABLE 2: Contribution of MSME Sector in the GDP and the Employment generated by the MSME Sector.

3.3.3. MSME's: Realize the importance of innovation
Practising innovation into business operations has been observed as a general trend in today's scenario and MSME's are well aligned towards this approach. They enable the small unrecognized ideas / initiatives of universities and other research focused organizations (Baumol, 2002; OECD, 2010a) to come to light and be identified by potential investor or government to promote and utilize the same (Eurostat, 2014).

3.3.4. MSME's:Fundamental role in achieving sustainability
The role of MSME's has been quite significant in keeping the environment safe for everyone. They are engaged in a lot of activities which are ultimately aimed at achieving sustainability. The collective effect of MSME's can be considered hazardous for the environment as they have been extensively using resources which are leading to waste and various kinds of pollution (OECD, 2013a). These enterprises for a while have been trying to follow the ideal steps for a greener environment but the cost, lack of education, lack of technical knowhow stops them from contributing to a greener surrounding. Also, lack of skills and necessary competencies in the employees of an SME leads to loss of revenue and loss of future business opportunities(Mazur, 2012; EaP Green, 2016). However, in many ways MSMEs are helping in urbanization by making inclusive practices and projects which lays emphasis on urban regeneration and SME development (Kamal, 2017). With their diverse range of operations, MSMEs are helping in making sustainable communities by engaging in solid waste management , waste recycling etc.

3.3.5 Why MSME's have not been excluded till now?
- Labonne (2006) has evaluated both large and small firms for their environmental sustainability and found out that due to financial limitations and heavy cost related factors, small firms are less likely to track their environmental assessment.

- The SME adoption of sustainability is highly influenced by lack of financial knowledge and employee resources (Condon2004). Bianchi and Noci (1998) found, large firms are more likely to be engaged in pre-emptive sustainability strategies whereas small firms implementthese practices only under strongpressures from stakeholders.
- Hillary (2000) in her book on "SMEs and the environment", reviewed an edited collection of articles and concluded that SMEs tend to be "largely ignorant" about their environmental impact and regulation; "less concerned about the importance of sustainable development;" "cynical about the benefits" of assessment tools designed to improve environmental performance; and "difficult to reach, mobilise, or engage" on environmental topics.
- Dressen (2009) pinpointed the possible reasons of less inclination of SMEs towards sustainability such as limited financial resources, less pressure from external stakeholders and the perception of complicity of engagement of sustainability practices.
- Bradford and Fraser (2008) have highlighted the need of advisors and their support for framing sustainability strategies of SMEs related to their businesses. Furthermore, many SMEs still consider environmental issues as a secondary and expensive to address.
- Structures of SMEs businesses are rather diverse as they run with very different budget sizes, objectives, personnel structures and strategies.Researchers have established that tools of sustainable development were shaped with larger firms in mind and are challenging for SMEs to implement (Jones and Tilley, 2003; Rutherfoord et al., 2000; Spence and Schimdpeter, 2003; Hillary, 2004; Jenkins, 2004, 2006; Fassin, 2008; Bradford and Fraser, 2008; Perrini et al., 2007).

3.4 Institutionalisation of Sustainability in MSME's: Proactive Measures
3.4.1. Leadership Approaches to Implementing Sustainability in Organisations

It has been observed that the various enterprises, may take a different approach when it comes to addressing sustainability, the major practical reasons behind the same lies in the fact that, there are differences in the capabilities of the firm, their area of operations, the size of operations and the positioning of the firm in the global context may vary (e.g., Kärnä et al. 2003). Thus the commitment levels offered by the various organisations can be categorized into the following three heads: Reactor, Contributor and Innovator (Table No. 3). The table represents the various leadership approaches that might be followed by any enterprise. The perspective of each approach varies from one to another, the Reactor Approach, lays emphasis on sustainability as an irrelevant dimension, thus adhering to only the legal obligations. The Contributor Approach lays emphasis on sustainability as a strategic concern for supply chain networks, thus taking initiatives to suggest their channel partners on how to build green supply chain networks. The Innovator Approach gives sustainability a strategic primacy and try to initiate activities, which in turn help the organisations, reap long term benefits.

Leadership Approaches →	Reactor	Contributor	Innovator
Perspective	• A firm is concerned about the finances. • They view the sustainability dimension as an irrelevant one or give less priority.	• Firms consider the strategic relevance of sustainability and their supply chain networks.	• Firms create sustainability as a strategic primacy. • Sustainability activities are frequently regarded as longer-term firm investments
	• These firms often adhere to the rules	• These firms, may often rely on the	• These firms, often use

Orientation	and regulations, but rare is the case that they will engage themselves in sustainability activities which are outside the compliance.	various sustainability initiatives which are often referred elsewhere. • They take an initiative to analyse their channel partners and suggest ways on how can they synergistically work.	sustainability in the context to bring a positive change for the stakeholders, communities and industry. • It is often viewed as longer-term firm investments.

(Source: Closs, D. J., Speier, C., & Meacham, N. (2011). Sustainability to support end-to-end value chains: the role of supply chain management. Journal of the Academy of Marketing Science, 39(1), 101-116.)

TABLE 3: Leadership approaches for implementing Sustainability.

3.5 Theoretical Approaches to Implementing Sustainability in Organisations
3.5.1. Institutional Theory

Institutional theory explains the impact of external pressure on organizational actions (Hirsch, 1975; Sarkis et al., 2011). The three drivers in institutional theory namely; normative, coercive and mimetic drivers act as diverse isomorphic forms (DiMaggio and Powell, 1983; Sarkis et al., 2011). Environmentally friendly practices have been adopted by European manufactures for a long because of normative, coercive and mimetic pressures from either government, local communities, customers or other external stakeholders. Since the Single European Act of 1987 sustainable development was announced as a definite goal of the European Community. On the other hand, economic performance is the deciding factor for companies to apply environmental management practices in the developing countries (Zhu and Sarkis, 2004). For understanding the pressure from either internal or external stakeholder, identifying the kind of industry is also important. According to the institutional theory (Zhu and Sarkis, 2007; Sarkis et al., 2010, 2011; Tate et al., 2010; Sarkis et al., 2011; Walls et al., 2012), regulatory pressures should also encourage companies to adopt specific EMPs.

These firms view sustainability through an economic sense and hence apply reactor leadership approach. Reactor firm tends to comply rules and regulations which are required for sustainability standards, but these firms do not take any initiative beyond the minimum compliance (Closs et al., 2010).

3.5.2. Win-win Principle

Win-Win principle is an ecological modernization theory which explains the relationship of a firm's environmental performance with other financial/non-financial performances. Researchers have formulated certain opinions on the win-win hypothesis: (i) companies can foster innovation by following environmental regulations and standards to balance regulatory costs (Montabon et al., 2007; Sarkis et al., 2011). It will have a positive impact on company's performance. ii) Manufacturers who are environmentally active can reduce their operational costs by putting more emphasis on technological innovation like recycling waste for increasing demand of eco-friendly products. Firms which implement innovator leadership style, gives equal consideration to economic and non-economic dimensions. They have a long-term perspective regarding their economic impact while taking sustainability decisions. Innovator firms exhibit greater concern for stakeholders along with maintaining strong financial performance (Closs et al., 2010).

3.5.3. Complexity Theory

Complexity theory can be best described through environmental factors in the organizational context. It includes factors such as suppliers, customers, governmental regulations, and technological advancements (Chakravarthy, 1997). The theory states that pre-involvement of the suppliers in eco-product designs can impact the firm's performance. Also, standardising and assessing the supplier's environmental management system, eco designs, return policies also possess an impact on firm's performance. (Koufteros et al., 2007, Sarkis et al., 2011; Vachon and Klassen, 2006).

3.5.4 Diffusion Theory of Innovation

The diffusion theory states that social members play avital role in diffusing innovation. Those who adopt the innovation early are called as first adopters and they can have the additional benefits (Sarkis et al., 2011). Diffusing environmentally friendly products can also be considered as an innovation process. Huber (2008) in his "Eco-innovation and global diffusion model" stated that pioneering countries and its rooted industries are first adopters of regulatory and innovation technologies in global innovative competition. On the other hand, other countries can either adopt or only intend to do so. However, first adopters take more advantage as compared to imitative adopters. Sweden has long been accredited for employing good environmental practices, while other countries like China and India have just started to develop environmentally friendly manufacturing practices.These firms tend to apply innovator leadership approach and balance out the economic and environment dimensions of sustainability.

4. CONCLUSION

This research work is intended to provide a review, for the various considerations and the opportunities available with the MSME's to alter their business strategies. The sources used here are not exhaustive and some significant sources might have been overlooked. The work in a much-synchronised manner has been detailing about the various essential aspects, explaining the need for sustainability in the ever-new evolving competitive environment. Further, emphasising on the missing links between MSME's and the sustainability efforts or in other words, the various environmental management practices adopted by the MSME's. It talks in context of the efforts that are done by the various large enterprises, in comparison to the other enterprises. Additionally, it lays emphasis on sustainability, thus providing the intricate details regarding the various sustainability dimensions. Taking into consideration the essence of the MSME sector for any economy and highlighting on the various facets on which MSME's are defined across the world.

This paper acts as a supplementary source of reference for the various stakeholders, to mention a few the governments, the academicians, the research scholars, the owners of various enterprises and etc. As this work provides important insights relating to a much widely discussed concept. It details about the various sustainability practices proactively taken by the firm. The same have been elaborated, through the Leadership and the Theoretical Approaches. To draw out main conclusions from this review, MSME's need to reframe their strategies as per the sustainable development because it differs for larger firms. Furthermore, tools for sustainability differ for different resources and as per size of the firm.

Indeed, the diversity of the business ideas are being reflected by the scale of diversity among MSME's. The orientation of companies regarding the sustainable development does vary significantly as compared to their competitors. Many societal issues can be addressed under sustainable development which implies that there exists a wider scope and many opportunities for the companies as per which they have the liberty to formulate their strategies. These will not only impact their operational performance but will also improve their social and environmental performances as well. Therefore, as a member of community, MSMEs are obliged to follow and implement sustainability in order to get competitive advantage and contribute for the betterment of the planet as well.

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Human Technology Interaction Amidst Covid-19

Rajiv Kumar   *rajivtamak@gmail.com*
Associate Professor
Haryana School of Business
Guru Jambheshwar University of Science & Technology
Hisar, Haryana, Hisar, 125001, India

Reena Kukreja   *reenakukreja28@gmail.com*
Research Scholar
Haryana School of Business
Guru Jambheshwar University of Science & Technology
Hisar, Haryana, Hisar, 125001, India

Abstract

Being isolated from the world, technology is sustaining the humanity. From online meetings to online announcements, from online consultation to personalized treatment, from digital tracking of risky areas to robotic treatment of corona virus infected patients; the technology is everywhere. The current trendy terminology, like Isolation, Quarantine and Social Distancing; has alienated humans from humans. The only connecting link is the technology. In other words, being physically apart, the technology is keeping humans close to friends, relatives, business, government and the health experts. A tweet announcing lockdown, the concept of telemedicines, Arogya setu app, Cowin vaccination app, and covid resources dashboard; all these means are result of the technology. In the pandemic time, humans, with the help of the technology, are sustaining the world. As the relation between humans and technology is strengthening, the world is getting closer to the next Industrial revolution i.e. 5th Industrial Revolution. Humans being homebound are trying to exploit the technology to ease the life. They are designing websites containing details of vacant beds, oxygen availability, ventilators and blood plasma. Government is preparing digital platform to vaccinate the world. Health services are being provided digitally. The current paper emphasizes intensifying human involvement with the technology in the healthcare arena, which is inconspicuously giving rise to the 5th Industrial Revolution. Humans are prime mover in Industry 5.0.

Keywords: Technology, Covid-19, Industrial Revolution 5.0.

1. INTRODUCTION

Multiple cases of pneumonia were identified in Wuhan city of China in early December, 2019. The spreading infection was later identified as SARS-CoV-2, severe acute respiratory syndrome based coronavirus 2. In a few months it engulfed around 190 countries of the world. World Health Organization declared public health emergency in January 2020 due to proliferating infection and further the COVID-19 manifested into a worldwide pandemic in March 2020, annihilating lives of people across the globe (Mohan & Nambiar, 2020)**.** The Corornavirus is the cause of the downfall in the world since December 2019. Along with the unbearable socio-economic loss, the pandemic has disrupted the entire health care system rendering the public devoid of basic healthcare services, owing to skyrocketing cases of Novel coronavirus all at once. Masses have been scrambling to access oxygen beds, ventilators, Medical guidance, masks and PPE kits. In the time of turmoil, technology has come out to rescue. New revolution technology is panacea at the time of physical distancing, isolation and lockdown. The paper attempts to bring forth the intensifying interaction between humans and technology at the time of pandemic in the healthcare

system. Humans across all fields are bringing revolutionary changes being locked in the 4 walls. Rightly said, geniuses don't blame the situations, they work out solutions. With optimum determination and creativity, humans are constantly working out digital solutions despite the abnormal conditions. The moment humans start innovatively playing with various facets of the technology, a new revolution ushers in. This is the idea behind the 5th Industrial Revolution. This is how the pandemic is taking the world closer to the 5th Industrial Revolution (Hanif & Ifthikar, 2020)**.** Since the outbreak of the pandemic, social distancing and housebound are the most important preventive measures. Isolation of the infected person is the crucial factor which can spread or stop the spread further. The circumstances have necessitated the adoption of technology as the action of last resort which is sustaining the quality life. Digital technology is prominently used in medical activities classified as diagnosis, surveillance and prevention. A research reveals that 50 kinds of software and 15 types of hardware technologies are used in managing the coronavirus disease i.e. COVID. The hardware technology based equipments used in healthcare are computerized tomography machines, mobile devices, robotics, wearable devices, video devices, sensors and 3D machines. Software based technology includes video conferencing based communication platforms like- Zoom, Facetime, Whatsapp, Facebook messenger. Computer based applications like Google apps, email, social media platforms like YouTube, facebook, twitter are significantly contributing in the healthcare service. The underlying motive behind all the technological based hardware and software are -monitoring patients, diagnosing patients, consulting medical experts, communicating, contactless delivery, maintaining and upgrading database for analyses (Vargo et al., 2020). Industry 5.0 is about the skillful use of latest technologies by citizens to better the life. It is offering solutions to complications brought by the pandemic. The hallmarks of Industry 5.0 are personalization and human collaboration with machines. Personalized therapy during covid spread, to meet needs of individual patients and, remote health monitoring have well justified the advent of new technological revolution. The root technologies behind Industry 5.0 are digitalization based technologies involving Artificial Intelligence (AI), Big Data, Block Chain, Cloud Computing, 3D Printing, Internet of Things (Sarfraz et al., 2021).

2. LITERATURE REVIEW

"It is imperative that we work together as an international community to ensure all people are connected and respected in the digital age," said Keng Thai Leong, Director-General (International Affairs), Info comm. Media Development Authority, Singapore

The innovative technologies are playing key roles in manufacturing of medical equipments, diagnosing the virus, keeping an eye on patients in the hospitals, keeping track of unnecessary movements in the streets, managing data of infected and non infected people, handling supply of essential health care instruments, communicating preventive guidelines and remote discussions among health experts. All the activities are taking place with the help of the technologies (Javaid, Haleem, Vaishya, et al., 2020). The innovative applications of the technologies are being adopted by humans at global level. The smart applications of the technologies in healthcare sector can be identified with the help of literature-

2.1 Strengthening Human Technology Interaction

Technologies are confronting strongly to the pandemic, this can be elaborated by an analyses done on 4830 start ups working on technology driven solution to ensure remote healthcare and public safety. There are companies developing remote healthcare solutions for patients like telenursing and telemedicine services. Inside hospitals- interactive real time mobile apps, disinfectants, sanitizing machines, hospital Robots, 3D Printed Ventilator Valve, Artificial Cough Device and AI Algorithms for monitoring patients are among the effective technologies which are keeping doctors connected with the patients following the social distancing norms. Chatbots and symptom checking mobile applications are also blessings of the technologies, which are playing apt role in disseminating the right information to the right place and at right time. CORD-19 (Covid-19 open research database) is catering to the information needs of millions of users. The

store house of data comprises publications, preprints and archived material on historical viruses (Wang, et al., 2020)**.** The easy access to data is helping the researchers and doctors who are working tirelessly to find the curative medicines and the preventive vaccines. The intervention of humans with the technologies like Artificial Intelligence and Machine Learning is proving significant in the pandemic time. Storing and managing patient details is of big help to the medical staff and the government (Tosheva, 2020). CCTV cameras with face recognition technologies are helping in tracking the infected people who are quarantined. DeepMind is a computer program based company which was acquired by Google in the year 2016. Google's deepMind has created an artificial intelligence based program named 'AlphaFold' which can accurately predict 3D models of the protein structures of the virus. The technology is sufficiently helping in identifying the structure of proteins in the Coronavirus which would help in finding an effective treatment and a preventive vaccines by health institutes (Computational predictions of protein structures associated with COVID-19, 2020) (Senior et al., 2020).

2.2 How Globe confronted COVID-19 with the help of the technology?

Technologies have significantly contributed in saving lives of people. The early adopters of technical advancement remained successful in maintaining low mortality rates. Big data and AI(Artificial Intelligence) have been of significant help in china in tracking movement of the people in the pandemic epicenter area. China is successfully using AI based data analytics and predictive modelling techniques to get insights of the virus, the results are informational to the medical experts. The AI based tools are also contributing in differentiating normal cold and flu from Covid-19, hence ensuring that only the needful cases are tested for the Covid. The AI based predictive analytics and visual representations not only aware public of the spread but also help the government to adopt the preventive policy measures (StartUs Insights, 2021). Another AI based solution is being provided by Baidu, inc a Chinese multinational technology company. It is indulged in screening the people with the fluctuating body temperature, which further help in isolating the sick people from spreading the disease to others (Cio & Manjunath, 2020). China smartly employed the digital technologies to minimize the physical involvement of humans. By extracting the real time location details of people from migration map, mobile payment apps and social media; Chinese authorities could easily track movement of the people who visited Wuhan, the most infected place in China. Infrared thermal cameras have found pronounced use in detecting people with fever and the cloud based screening has been very useful in directing the individuals to the required resources. Chinese authorities also initiated a QR code system in which people have to fill symptoms survey and record the body temperature. The QR code served as a health status certificate and a travel pass, in which the red colour signified self Isolation for 14 days and the green colour indicated prone to least risk. CloudMinds is a cloud based company in Beijing, it's AI platform, HARIX, devised bracelets and rings which can monitor the patient's signal like temperature, blood oxygen, heart rate.

South Korea used the concept called contract tracing using security camera footage, facial recognition technology, bank card records, and global positioning system (GPS) data from vehicles and mobile phones to provide the real-time data regarding date and time of people's travel, resultantly South Korea is the country with lowest death rates. Singapore has launched a mobile phone application that exchange short distance Bluetooth signals and store the data for 21 days. Ministry of health could access the persons who came in contact with an infected person. There is a UK initiative which is pooling resources to help the health servants in printing PPE kits, head visors, masks and ear guards (Westgarth, 2020). The collaboration of the humans and technologies and an early adoption of the innovative technologies into daily life, both the factors have been of great help in mitigating the loss of lives at the time of the spread of the ghastly virus. Stanford medical scientists in California are looking forward to diagnose and prognose the illnesses and the virus infections using the wearable devices like smart watches (Armitrage, 2020)**.**

CDC central epidemic command centre (CECC) in Taiwan is combining health data with the travel data, to build a monitoring system which provides real-time alerts. For example, it sends automatic alerts during the clinical visits, if the patients have travelled to the infected vicinity. In India, the telecom operators like Jio, BSNL, Airtel, and more, are using the caller tunes to spread awareness about the pandemic. Various non profit organisations in India are forming groups on the social media platforms like facebook, whatsapp, Instagram etc and smartly using the network to match demand and supply of the crucial COVID resources. Consequentially the efforts are successfully ensuring the right supplier to the right place at the right time. The Facebook page named "Adopt a healthcare worker", is among the appreciable initiatives in the countries like USA and Queensland, which is helpful in assisting the healthcare worker in managing the home duties along with the work. An overwhelming initiative where anyone can volunteer to help the family of a healthcare worker in any possible way while the health care workers can sincerely perform the job (Javaid, Haleem, Singh, et al., 2020).

The efficacious response of the tech-driven countries can inspire the other countries to deal with the horrendous virus using the weapon of technology (Whitelaw et al., 2020).

2.3 Industry 5.0 and Healthcare System
Chris Wellise, Chief Sustainability Officer, Hewlett Packard Enterprise, pointed out that, "The disruption of COVID-19 is accelerating the need for agility, adaptability and transformation, not just in terms of the workforce moving online, but in the use of AI and edge to cloud technologies for a more sustainable economic recovery."

The punch of the 5th Industrial revolution is that humans would imagine, program machines and the machines would perform the imaginative tasks. The humans and the machines would partner up to ensure a sustainable world, in which the humans are innovative thinkers and the machines are the performers. The combo is wonderfully applied to its best use to get the world out of the life threatening virus. The technology is boon to the disease stricken world. Smart alliance of the humans with the machines is helping in superb hospital management. There is a real time evaluation and scanning of the patients. The new revolution, which is called Industry 5.0, is already suggesting that repetitive and dangerous tasks would be handled by machines/robots meanwhile the humans would indulge in the innovative areas. In the time of COVID -19, the peculiar features of the new revolution, are used on large scale to protect the spread of virus, by employing robots to monitor the health of the patients. Robots are reaching in the wards where the health workers can't. In the month of February (2020), China began the first Robot run ward to prevent hospital staff from exposure to risk (O'Meara, 2020). Drones and the robots are finding new uses by acting as the suppliers of medicines and deliverer of food; no wonder they are patrolling the streets, announcing necessary guidelines and spraying disinfectants (Marr, 2020). Biosensors are used for diagnose and analyses of the disease. Artificial Intelligence based devices are imitating the human tasks with an algorithm based intellect; as a result the doctors' burden is reduced. The doctors by employing the AI based tools in the field are devoting their time to more needful patients. Medical equipments are digitally supplied to the right place at an appropriate time. IR 5.0 technologies are resulting in better cooperation between patients and doctors despite the mandatory social distancing norms. The technology called cloud computing is facilitating exchange of data in healthcare arena. Hospitals and medical staff are burdened; there is chaos and panic all around. Different patients with different health complications are in need of quick medical consultation and treatment. In the time of urgency paramedical staff is heavily relying on innovative IR 5.0 technologies. The IR 5.0 technologies which are helping the healthcare sector are-

> **Internet of Everything**- The technology helps in connecting people, process and machines. It helping in interchange of information about patient to health experts for better treatment and to administration so that right preventive measures can be broadcasted.

- **Big Data**- It manages huge data of patients to know the count of those who caught infection, to list those who have history of foreign travel and accordingly mark the risky areas.
- **4D CT and 4D MRI**- Four-dimensional computed tomography (4D CT) are diagnostic tools which capture the body's breathing, movement of organs and tumors. Magnetic Resonance Imaging (4D MRI) help clinicians to visualize the blood flow in heart.
- **Smart Sensors**- Used in thermal scanning.
- **Holography**- It is the process which converts information of body into digital form. The holographic images are 3d images which can be magnified with utmost clarity, thus help in quick detection and treatment of problem. Holograms store high resolution image of internal organs and tissues (Javaid, Haleem, Vaishya, et al., 2020).
- **Virtual Reality**-It enables real time exchange of information
- **Internet of Medical Things**- In it there is interconnection of medical devices, applications with medical information technology. This way limited resource like ventilators are shared with multiple patients.
- **Artificial Intelligence**- Tracking the spread of virus, predicting the risky areas.
- **Humanoid robots**- delivering food, medicines, examination of patients and collecting samples.
- **Smart Inhalers**- These are helpful for asthmatic patients by signalling them to take timely medicine.
- **3D Printing**- used for designing masks, face shields, ventilators and other medical equipments.
- **3D Scanning**- use to scan human body with high dimension. In the pandemic time the technology is helpful in diagnosing and determining coronavirus.
- **Machine Learning and Computing**-   used to detect disease, forecast the growth of pandemic, and formulate strategies to manage the pandemic.
- **4D Printing**- used to manufacture medical equipments with smart materials like in 3D Printing, with an additional element time. It enables the designed output to change shape with changing time and environmental condition, thus results in innovative treatment (Javaid, Haleem, Vaishya, et al., 2020).
- **Drones**- flying machines assigned task of surveillance, delivery of essentials and broadcaster of crucial information.
- **Telemedicine**- Telephonic consultation is an easy example to understand the term.

- **Smartphone Technology**-Endowed with features like- camera, video recording, GPS, navigation, gaming, Email, web browsers it is used in audio/video communications. The technology is used in contact tracing, marking risky zones. To one's surprise, the technology is also involved in detecting virus. The main uses are in covid 19 monitoring, remote teleconsultation, counselling, education, managing mental health, arogya setu covid tracking etc (Iyengar et al., 2020).

- **Cloud Computing**- Helps in management of patient's record, providing better services to patients, carrying out backend operations, creation and maintenance of health apps. It has also facilitated work from home. Advent of block chain technology in cloud computing has solved cyber security issues and ensure higher data integrity while data exchange. E.g. IBM Company is taking steps to provide access to AI based research output (Singh et al., 2021).
- **Robotics-** Intellectual helpers which tend to substitute humans. The robots are rigorously aiding health sector by monitoring, supplying medicines and essentials to the patients infected with contagious virus.
- **Nanomedicines**- The nano based antimicrobial technology. It is helping preventing, diagnosing, treating and vaccinating (Vahedifard & Chakravarthy, 2021).

2.4 ICT and Pandemic

Sunil Bharti Mittal, Founder & Chairman, Bharti Enterprises, succinctly summed up one of the session's key themes: "I am sure we all agree that we would not be able to imagine a world without connectivity during this vital time Mohamed Maleeh Jamal, Minister of Communication, Science and Technology, Maldives, echoed the importance of ICTs in facilitating the response to the pandemic, providing information, social and economic activities to citizens throughout the island country even as usages levels doubled. Connectivity was "the most effective tool in keeping people virtually together and physically distant."

ICT (Information and communication technology), has played a quintessential role in relieving the grief stricken population from stress and strain. The ICT technology is playing an important role in the healthcare sector in the form of various mobile applications and the AI based tools. Government is able to connect with the underprivileged and the vulnerable part of the population via digital means (Bajpai et al., 2020). Surprisingly the digital shift is running the economy in the tough times, as the investments in bandwidth expansion, network equipment, and cloud based software are increasing. Along with Cloud Computing, Artificial Intelligence and Internet of Things; Big Data is also used as means for secure exchange of data. The health records, medical data and the prescriptions are exchanged with utmost safety and originality. Despite so many advantages the digitalization is raising concerns like techno stress, online fraud, security and privacy issues (De' et al., 2020). Remote gene sequencing is another technical application helping in detection of the covid, unmanned cars are also spraying disinfectants in the isolation wards. Besides movable trolleys, online medical advice, and infrared temperature measuring tools are proving beneficial for the covid affected world (HT Brand Studio, 2020).

Information Technology is a field which encompass all the intricacies surrounding sharing of information over internet involving computer and technology. This involves hardware, operating systems, software, applications, storage, databases, servers etc. The healthcare system is significantly transformed with constant employment and up gradation of the new technologies happening with revolutionary shift. The technology based applications are everywhere- in the hospitals, in the laboratories, while communicating the urgent health guidelines, while handling the patient data, while monitoring the affected people and in the treatment of the disease (Nichols, 2021).

2.5 Collaborating with Tech Giant Microsoft to Deal with COVID-19

Collaboration is the buzz word in the current time. Collaboration with the technology is the only way linking the isolated people to the entire world. Another study exclusively highlighted the contribution of Microsoft, the multinational technology corporation and some other tech giants in ameliorating the health sector in times of spread of the gruesome virus worldwide. It's an AI based chatbot which is responsibly screening the patients by frequently asking questions based on CDC (Centres for Disease Control & Prevention) guidelines. The symptomatic patients are directed to the telehealth portal for further clinical advice. To respond to the severe paucity of ICU, Medical care unit of Oregon health and Service University brought the concept of virtual ICUs. Keeping in view the pandemic, GE Healthcare's mural virtual solution is also included in Microsoft's azure cloud. The digital service integrates data from multiple systems and provides it on a single screen. As a result the limited resources are optimally provided to the needful patients with least risk who would have otherwise needed physical visits by doctors and nurses. This way with the help of technology, warning scores indicate the patients who are at high risk and accordingly the critical patients get priority in treatment (GE Healthcare, 2020).

National Health Service in UK also resorted to Microsoft's HoloLens with 2 mixed reality headset having 'remote assistance'. This way only one medical staff is exposed to risk in room of the Covid patients while connecting to remaining team via headset. All the details are shared to different experts of the team without any physical visit. St. Luke's University Health Network (SLUHN) with the help of Microsoft 365 is transforming to the digital network assistance by

multiple experts. Using Microsoft teams, apps, dashboard the right clinical prescription is provided to the right patients (Microsoft, 2019). The technologies are playing crucial role in finding out the curative therapies and the preventive vaccines. Adaptive Biotechnologies Corp., partnered with Microsoft, using the AI technology to visualize how immune system respond to covid-19 leading to the ImmuneRACE Study (Immune Response Action to COVID-19 Events**)** (Uohara et al., 2020). Microsoft Binge launched a map called covid-19 tracker, to showcase the right information on active, recovered cases along with the statistics of people successfully vaccinated (Covid-19 Tracker, 2020).

Conclusively it can be said that humans embraced the technologies, by collaborating with technological corporation to face the global challenge and this collaboration is reinforcing the relation between humans and technology and smoothening way towards the next Industrial Revolution which is Industry 5.0.

2.6 Pandemic, Technology and Ray of Hope
The welfare activities are going online. Various charitable and relief funds platforms are designed to help the needy. Surprisingly, benevolent people are transferring funds online to aid refugees, while sitting at home. The Crowd funding websites are also of great help. Live streaming of Yoga classes and teletherapy are also results of coding based websites. GoFundMe has set up a page to help the covid affected people. 'Invisible hands' is a group of volunteers committed to fight covid by delivering groceries and essential items to the distressed ones (Invisible hands deliver, 2021)**.** Mental health practitioners have been complaining of increasing stress and anxiety level. Resultantly various apps have come up offering meditation techniques, relaxing sounds. Netflix has also added a new feature called Netflix party allowing people to watch movies with friend, family and relatives. According to an editorial in journal science of Robotics, Robots are getting more pronounced role in the pandemic time for preventing, monitoring and treating the virus. TikTok, a social forum has also collaborated with WHO (World Health Organization) to support the world struggling to defeat the COVID-19. It updates the users with the accurate information, reliable information, timely precautionary guidelines and proper health tips so that any misinformation is curtailed. Additionally there is a live streaming from WHO where users can enquire experts and clarify the doubts regarding ways to abstain and lessen the ill effects caused by the coronavirus. Apple in collaboration with CDC, White House and FEMA has launched screening website to give medical advice.

2020 was the year when the countries were heading towards sustainable development goals but the progress was suddenly intervened by a malicious virus which engulfed around 190 countries in no time. The crises did raise possibilities of working out innovative solutions using the technologies. The earlier pandemic which occurred in 1918 brought remarkable revolution in telecommunication likewise the current pandemic is also lighting the spark of innovative tech based solutions to confront the challenging time. The scenario isn't good but sitting idle, and being victim is no solution. Virus would have definitely locked people inside but technology (an innovative outcome of human thought) is roaming all around and helping every possible way to get out from the terrific time.

2.7 India, Technology and Pandemic
Government's guidance, health related services, the required medical assistance including supply of equipments, have shifted to online platforms and all dealings have gone digital. 'Observer' a research foundation collaborated with the Niti Aayog and organized a digital discussion with emphases on the deployment of the technology based solutions and governance innovations to help vulnerable people in the Pandemic time, while also helping to meet development and growth aspirations in the future. Amitabh Kant, Chief Executive officer of the NITI Aayog, appropriately expressed, "A pandemic like COVID-19 with its global reach, must be tackled by three interconnected level of frontline healthcare workers, infrastructure and medical facilities, and technology."

India's 'Swasth', is an example of a private sector-led government-enabled app. It is a collective effort involving private hospitals, diagnostic start-ups and e-commerce firms. With the guidance of over 200 certified and trained medical team, Swasth aid Indian citizens with digital health care products and services. Innovative tech-applications are significantly helping in the prognosis, diagnosis and treatment of afflicted population. E VBAB is another project with digital ideas connecting innovation and development by providing telemedicine facilities linking Indian schools, institutions and hospitals with those in Africa. (Jiang & Ryan, 2020).

India's contact tracing and syndrome mapping app, 'Aarogya Setu', is an example of successful public-private digital partnership led by the government. There are 135 million users and teams of medical specialists working sincerely to help public. The app is helping in relieving an overburdened health care system, by directing self diagnosis and prescribing isolation to the citizens on the basis of a short survey (Kant, 2020). Science Technology and Innovation (STI) approach is a globally acceptable approach which is helping to face COVID-19 (Paunov & Planes-Satorra, 2020).

3. CONCLUSION

Volunteers, Students technicians and health workers are smartly employing technology in designing appropriate PPE kits and Masks. Somewhere a data journalist is using visual designs to present the crucial COVID related information. Regional and local governments are also resorting to digitalization based technologies to address to the challenges posed by the devastating virus. The technology is skillfully used by local national and international ministry as means to provide the fundamental health guidelines, ensuring the flow of essential services and fulfilling the communication gaps. It is transmitting health related guidelines; diagnosing people with the coronavirus infection, treating the patients and what more. The smart usage of the technologies is of great help in monitoring and anticipating the spread of the disease. Those people, who are affected with the fear and negativity due to the scary virus, are engaged in social media, online gaming, yoga apps and meditation learning apps, e-trainings and many more. They are exploring new fields of knowledge on internet. Again, the credit goes to the technology. The technology has been shouldering crucial responsibility along with health workers in ensuring healthy globe, in terms of physical health as well as mental health. Further the increasing bond between humans and technology is taking the world close to the new technological revolution which is the 5th Industrial Revolution or Industry 5.0. The pandemic has opened various digital pathways to keep up the pace of life. The gift of technology is accompanied with the numerous challenges associated. The challenges involved in the digital shift are- protection of the human rights, safeguarding equality, overcoming the digital divide, dealing with the rising security concerns and coping with the privacy issues. Adopting digitalization based technologies while addressing the aforesaid concerns amidst the pandemic could restore the world to normalcy along with an indefinite gift of technologies (Vargo et al., 2020).

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The initial efforts helped to shape the editorial policy and to sharpen the focus of the journal. Started from Volume 13, 2022, IJBRM appears with more focused issues. Besides normal publications, IJBRM intend to organized special issues on more focused topics. Each special issue will have a designated editor (editors) – either member of the editorial board or another recognized specialist in the respective field.

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- Management Systems and Sustainable Business

- Business & Economics Education

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CONTACT INFORMATION

Computer Science Journals Sdn BhD

B-5-8 Plaza Mont Kiara, Mont Kiara

50480, Kuala Lumpur, MALAYSIA

Phone: 006 03 6204 5627
Fax: 006 03 6204 5628
Email: cscpress@cscjournals.org