EPiC Series in Education Science

Volume 4, 2022, Pages 57–76

Proceedings of NEMISA Summit and Colloquium 2022: The Future of Work and Digital Skills

The Adoption of Digital Work in Developing Countries: Systematic Mapping of Studies

Ntombiyokusa Nyoni, Patrick Ndayizigamiye and Stella Bvuma

University of Johannesburg, Johannesburg, R.S.A
ntombz@gmail.com, ndayizigamiye@uj.ac.za,stellab@uj.ac.za

Abstract

This paper explores the current challenges, motivations for adopting digital work, the technology acceptance models/ theories used to research digital work and the benefits of adopting digital work identified in primary research articles. Digital work is one of the Fourth Industrial Revolution (4IR) products and is perceived to be a solution to addressing unemployment. There is a need to find a method to address unemployment in developing countries because of the socio-economic challenges. The methodology of this study is a systematic mapping of papers. Identifying gaps in the literature for future research in web-based digital work in developing countries. Through the mapping of the selected articles, the paper identified the challenges, drivers and benefits of web-based digital work. The gap identified is that the research must be conducted to create a framework to adopt web-based digital work. There is a need for research on how small companies in developing countries can benefit from outsourcing digital workers. Research to create frameworks to promote the adoption of digital work in developing countries and the companies within developing countries.

1 Introduction and Background

The adoption of digital work is evident in various developing countries (Heeks, 2017). The adoption of digital work is mainly due to increased technological growth (Ponelis & Holmner, 2015) and high unemployment in developing economies, which motivates the need to search for unconventional means to obtain employment. The result is increased research on the adoption of digital work. Several studies (Onkokame et al., 2018) have explored the adoption of digital work.

Digital work is one of the Fourth Industrial Revolution (4iR) products (de Ruyter, Brown & Burgess, 2018). The rise of digital work was due to un/underemployment, the need to outsource services to reduce cost and increased connectivity (Galpaya, Perampalam, & Senanayake, 2018). Due to the rising discussions regarding the 4th Industrial Revolution (4IR), there are concerns about specific jobs becoming redundant; however, the 4IR also created new job opportunities (de Ruyter et al., 2018).

H. Twinomurinzi, N. Msweli and T. Mawela (eds.), DigitalSkills2022 (EPiC Series in Education Science, vol. 4), pp. 57–76

Some issues in developing countries include unemployment, corruption, lack of skills, and infrastructure (Galpaya et al., 2018; Ponelis & Holmner, 2015). In this regard, the increase in unemployment motivates the search for unconventional solutions to address unemployment. There is a need to investigate the findings and results of the studies on adopting digital work to identify research gaps. These research gaps assist in identifying future research to mitigate challenges while embracing the benefits of digital work.

This paper presents a systematic mapping of studies conducted to explore digital work adoption in developing countries. The paper presents the challenges, benefits, drivers of digital work adoption and the theoretical frameworks depicted in the studies. This paper is structured as follows: first, the paper describes terms and concepts related to digital work. Secondly, the paper will discuss the adoption of digital work in developing countries. Thirdly, the methodology and the findings of the mapping will be outlined. Lastly, the conclusion and recommendations will be presented.

2 Overview of Digital Work

Digital work encompasses several online activities ranging from minute tasks to projects assigned to humans online and performed online or at particular locations (Cherry, 2016; Chidoori & Van Belle, 2020; Graham & Anwar, 2018). Sison and Lavilles (2018) refer to digital work as the gig economy or online work. According to de Ruyter et al. (2018), digital work is divided into two main categories, location-based and web-based work which Chidoori and Van Belle (2018) refer to as on-demand gig economy and digital gig economy, respectively. Location-based digital work requires the workers to be in a particular location to deliver the service or product (Johnston, 2020). On the other hand, web-based digital work is when individuals obtain and conduct work online (Johnston, 2020). Figure 1 depicts the types of digital work.

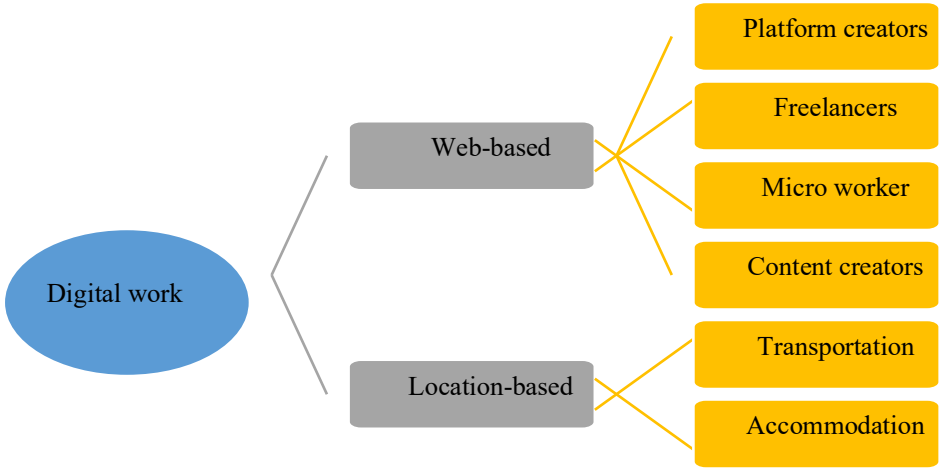

Figure 1: Types of digital work (de Ruyter et al., 2018)

This paper focuses on reviewing studies conducted on web-based digital work. As depicted in Figure 1, web-based is divided into four categories, platform creators, freelancers, micro workers, and content creators.

2.1 Types of web-based digital workers

Online freelancers are digital workers who usually work on a project basis. They typically conduct web design, digital marketing, and graphic design tasks. Micro workers usually perform short and small jobs such as transcription, data collection and short surveys. Content creators create their content on YouTube and Facebook. They are also referred to as influencers.

Digital work is usually mediated through digital work platforms such as Upwork, Uber, Fivver and other digital work platforms. These platforms' role is to connect the potential 'employers' with the likely workers (Schulte, Schlicher & Maier, 2020). Platform creators manage the digital work platforms.

3 Digital Work and Developing Countries

Digital work is perceived to have the potential to contribute to developing countries' economies, which are plagued by numerous developmental issues (Graham, Hjorth & Lehdonvirtan, 2017; Rani & Singh, 2019). The problems include extreme employment in the informal sector and unemployment in developing countries (Anwar & Graham, 2020b; Calvão & Thara, 2019). However, there are challenges associated with the adoption of digital work. Moreover, there are complaints regarding the exploitation of digital workers in developing countries compared to their counterparts in developed countries (Heeks, 2017).

Countries like Nigeria, Malaysia, Bangladesh, and Kenya have initiated interventions to encourage digital work (Rani & Furrer, 2019). The interventions include training programs in South Africa, Kenya, Nigeria, and the Philippines (Eskelund, Heeks & Nicholson, 2018; Eskelund, Heeks & Nicholson, 2019; Romke & Sayed, 2018). Nevertheless, there is a need for policies, infrastructure, skilling, and internet access affordability to ensure digital work adoption (Rani & Furrer, 2019). Rani and Furrer (2019) further emphasize the need for policies to assess the quality of digital work in terms of working conditions and content. Moreover, they suggest the need for strategies that delineate how to reap the benefits of online technology rather than blindly embracing it or rejecting it.

The purpose of this paper is to present a systematic mapping of studies that explored the adoption and uptake of digital work in developing countries. This paper will investigate the current challenges, benefits, and drivers of digital work adoption in developing countries. In addition, the paper presents the technology acceptance models used in the selected studies for mapping. The underlying research questions for this paper are as follows:

RQ1. What are the current challenges in adopting digital work in developing countries?

RQ2. What are the current drivers of the adoption of digital work in developing countries?

RQ3. What technology acceptance models/ theories have been used in digital work research in developing countries?

RQ4. What are the benefits of digital work in developing countries?

4 Methodology

The methodology for this paper is systematic mapping, also known as scoping studies. According to Pet-ticrew and Roberts (2008), systematic mapping or scoping studies involves searching previous primary studies within a particular field to answer research questions. The search determines the types of studies, geographical location of the study, the outcomes and populations targeted, and the databases used to search for articles. Systematic mapping studies are mainly conducted to provide a structure for a particular research area driven by research questions (Petersen, Vakkalanka, & Kuzniarz, 2015). In addition, a mapping study aims to identify trends and gaps in a specific research area (Kitchenham &

Charters, 2007). This paper identifies trends and gaps for future research in digital work adoption through scoping studies focusing on developing countries. The underlying research questions for this paper are used to determine the trends and the gaps.

This paper follows the guidelines and process of mapping studies suggested by Petersen, Feldt, Mujtaba and Mattsson (2008). Figure 2 illustrates the steps followed for performing systematic mapping studies:

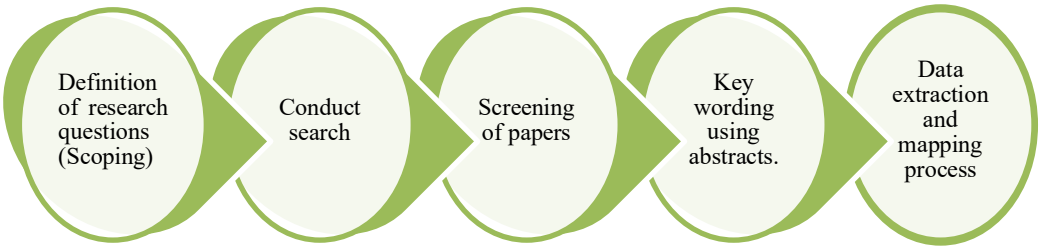

Figure 2: Stages of Systematic Mapping (Petersen et al. 2008)

These steps will be explained in the sections that follow.

4.1 Step 1: Defining research questions (Scoping)

This step entails assessing the validity, need and feasibility of mapping studies about a particular topic. The research questions reflect an overview and drive the mapping of the study (Kitchenham & Charters, 2007; Petersen et al., 2008). In this paper, the research questions directed the search for papers in digital work. There is a need to identify gaps in digital work research because of its potential to provide unconventional means of creating employment in developing countries, where unemployment is high (Anwar & Graham, 2020a; Calvão & Thara, 2019; Rani & Singh, 2019). The gaps identified will assist researchers in identifying topics that need to be researched in digital work. Moreover, recommendations of policies may assist in addressing prevalent challenges in digital work. The research questions for this mapping study are as follows:

1. What are the current challenges in adopting digital work in developing countries?
2. What are the current drivers of the adoption of digital work in developing countries?
3. What technology acceptance models/ theories are used in digital work research in developing countries?
4. What are the current benefits of digital work in developing countries?

The search strategies used for this paper were the automated search and the forward snowballing search strategies. The search strategies are defined in steps 2 and 4.

4.2 Step 2: Searching for primary studies.

The automated search, also known as database search, was used for this study (Petersen et al., 2015). The automated search was conducted by searching the key terms' microwork', 'crowd work, 'freelancing online' and 'digital gig economy and the date range 2016 to 2020 in the digital databases and indexing systems. The databases used in this study were Science Direct, IEEE and EBSCOHOST. The indexing system used was Scopus. These databases and indexing system were used to ensure that the selected papers were double peer-reviewed. Clusters of articles to be reviewed and search strategies are also identified at this stage.

The search words used for this study were digital work (which was discarded because the phrase was ambiguous, thus producing some results not related to the targeted papers), microwork, freelancing online, crowd work and the digital gig economy. The results were filtered by limiting results to papers published between 2016-2020. Table 1 presents the search results.

DATABASE	SEARCH WORDS	TOTAL RESULTS	2016-2020 RESULTS
Scopus	Microwork	34	21
	Crowd work	100	76
	Freelancing online	51	40
	Digital gig economy	168	155
Science Direct	Microwork	84	29
	Crowd work	43	37
	Freelancing online	2 427	833
	Digital gig economy	461	233
IEEE	Microwork	9	3
	Crowd work	4	2
	Freelancing online	7	7
	Digital gig economy	6	6
EBSCO	Microwork	195	33
	Crowd work	167	87
	Freelancing online	85	27
	Digital gig economy	97	46
Total			**1633**

Table 1 Databases, search strings and results

The researcher uploaded the results into a folder on RefWorks, and the selection of the studies was conducted. RefWorks is a web-based reference management tool that imports and manages references from various databases (Reichardt, 2010). To add on, RefWorks assisted in the automatic removal of any title duplicates. Moreover, it allowed for manual removal of articles when sorted according to author names. The articles' titles were screened and removed from this database using the exclusion and inclusion criteria stated in step 3.

Database	Search words	2016-2020
Scopus	Digital Work benefits	2979
	Digital work challenges	7855
	Digital work drivers	749
	Digital work	54 811
	Platform work	50 990
Science Direct	Digital Work benefits	78 795
	Digital work challenges	85 544
	Digital work drivers	22 302
	Digital work	221587
	Platform work	234 095
IEEE	Digital Work benefits	593

Database	Search words	2016-2020
	Digital work challenges	1 775
	Digital work drivers	222
	Digital work	13 276
	Platform work	12 174
EBSCO	Digital Work benefits	55
	Digital work challenges	132
	Digital work drivers	6
	Digital work	9 784
	Platform work	10 949

Table 2: Search words

4.3 Step 3 Screening of papers

In this step, the inclusion and the exclusion criteria are defined. Articles that did not focus on developing countries were excluded. The selection criteria adopted in this study are outlined in Table 3.

DESCRIPTION	INCLUSION	EXCLUSION
Country of focus	Developing countries, as described by the World bank	Developed countries as defined by the World bank
Words in the Abstract, or title or keywords	Implementation, adoption uptake, benefits, challenges, and theoretical frameworks	Any papers without implementation, adoption uptake, benefits, challenges, and theoretical frameworks
Subject	Work obtained and conducted online. Platform work, web-based work, the digital gig economy	Location-based work, on-demand economy work
Language	Papers in English	The papers written in a different language
Research type	Papers that conducted primary data collection	Literature reviews and systematic reviews

Table 3: Exclusion and inclusion criteria

4.4 Step 4 Keywording of Abstracts (Classification Scheme)

Studies were selected based on titles, abstracts, and full-text reading. Forward snowballing was also used to search for more papers on Google scholar. Forward snowballing is identifying new papers that cited a particular article (Wohlin, 2014). The search was conducted by finding studies on the adoption of digital work in developing countries using papers identified in the databases mentioned in Table 1.

The selection process and the number of selected papers are shown in Figure 3 and Table 4:

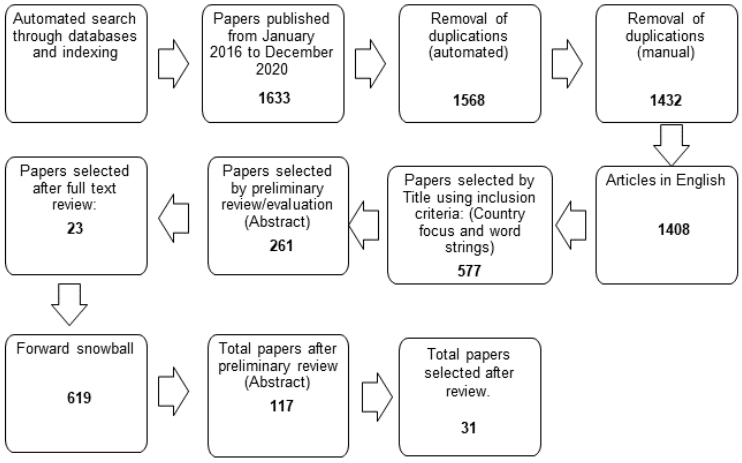

Figure 3: Selection process and number of papers in each stage

The selected studies are depicted in Table 4.

NO	AUTHORS	PUBLICATION TYPE	YEAR	ISSUE
1	Agrawal, Lacetera & Lyons	Journal Article	2016	Trade between D.C. employers and L.D.C. employees online
2	Chidoori & Van Belle	Conference Paper	2020	Attitude and motivations towards digital labour
3	Eskelund et al.	Conference Paper	2018	Impact of freelancing jobs
4	Fardany et al	Conference Paper	2019	Portraying online workers in Indonesia
5	Galpaya et al	Book Chapter	2018	Potential of online freelancing and microwork in Sri Lanka
6	Gandhi et al	Conference Paper	2018	Intention/ motivation to become gig workers
7	Graham et al	Journal Article	2017	Concerns of digital workers
8	Idowu & Elbanna	Conference Paper	2019	Career path for digital workers
9	Idowu & Elbanna	Journal Article	2020	Experience of digital workers
10	Krishnamoorthy et al	Journal Article	2016	Influences of adopting digital work
11	Malik et al	Conference Paper	2017	Motivation and needs of digital workers
12	Mtsweni et al	Conference Paper	2016	Improving task allocation
13	Nawaz et al	Journal Article	2020	Value and stress faced
14	Rani & Furrer	Journal Article	2020	Use of algorithms to assign work
15	Romke & Sayed	Journal Article	2018	The connection between freelancing and unemployment
16	Roomaney et al	Conference Paper	2018	Experiences of mobile digital workers

17	Sison & Lavilles	Conference Paper	2018	Practices of online software developers
18	Soriano & Cabañes	Journal Article	2020	Finding meaning for digital workers
19	Sultana & Im	Journal Article	2019	Self-efficacy and entrepreneurship
20	Wang et al	Journal Article	2020	Experiences of crowd workers
21	Wood et al	Journal Article	2019a	Job quality of the remote economy.
22	Wood et al	Journal Article	2018	Collective organization of online workers
23	Wood et al	Journal Article	2019b	Job quality of remote economy
Selected from Forward Snowball				
24	Anwar & Graham	Journal Article	2020a	The role of Africans in Artificial Intelligence (A.I.)
25	Anwar & Graham	Journal Article	2020b	Role of digital work in African countries
26	Anwar & Graham	Journal Article	2020c	Digital work in African countries
27	Eskelund et al	Conference Paper	2019	Employability of people with disabilities online
28	Graham & Anwar	Journal Article	2019	Presenting global work
29	Malik et al.	Journal Article	2020	Institutional voids in digital work
30	Olsen	Journal Article	2018	Presenting implementation of initiatives to promote digital work
31	Soriano & Cabañes	Book Chapter	2019	Meaning of digital workers

Table 4: List of selected papers

4.5 Step 5. Data extraction and Mapping studies

The papers were extracted using the template illustrated in Table 4:

ATTRIBUTE	VALUE	RESEARCH QUESTIONS
Article Title	Name of title	
Author name (s)	Set of names of the authors	
Country	The country where the study was conducted	
Research questions	The list of research questions	
Challenges	Challenges identified through the study	RQ. 1
Drivers	Drivers identified through the study	RQ. 2
Technology Acceptance Model/ Theory	Technology Acceptance Model/ Theory used for the study	RQ. 3
Benefits	The benefits identified through the study	RQ. 4

Table 5: Data extraction template

The selected papers were used to conduct a forward snowball.

5 RESULTS AND DISCUSSION

The results and analysis of the data extracted from the selected papers are presented in this section. Firstly, the research methodologies used, year of publication, where the research was based, and the publication types will be presented. Then the papers are mapped to the corresponding research questions.

5.1 Research Methods and distribution per year

Most of the selected articles were published in 2018. Figure 2 illustrates the number of papers per research method and the years of publication.

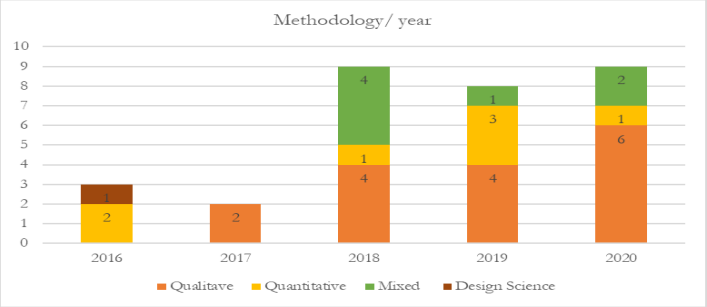

Figure 4: Research methodology per year

5.2 Distribution of Papers per country and publication type

Most selected papers were based on digital work platforms, and only 31 focused on developing countries. The finding is aligned with the observation made by Wood et al. (2018), who stated that studies on digital work tend to focus on platforms rather than particular contexts. The distribution of papers shows that eight studies were conducted in Africa (South Africa 3; Nigeria 2, African countries, 3). Fifteen studies were conducted in Asia (China 1; Philippines 5; Sri Lanka 1; Malaysia 2, Pakistan 3, Bangladesh 2), three both Sub-Saharan Africa (South Africa, Kenya, and Nigeria) and Southeast Asia (Philippines and Vietnam). One paper (Rani & Furrer, 2020) investigated algorithms' effect on assigning work not specific to a particular developing country. Most documents that reported their findings from an African perspective focused on microwork rather than online freelancing. This report concurred with Idowu and Elbanna (2019), who pointed out that most papers in Africa focused on microwork, thus requiring more research on online freelancing. The extent to which freelancing is adopted in African countries is raised. The selected were primary peer-reviewed research. The papers were distributed as follows: Book chapters: 1, Journal Articles: 20 and Conference papers: 10.

COUNTRY	TITLE OF THE ARTICLE	REFERENCE
Developing countries	Does standardized information in online markets disproportionately benefit job applicants from less developed countries?	Agrawal, Lacetera and Lyons (2016)
African countries (S.A., Ghana, Nigeria, Uganda, and Kenya)	Digital labour at economic margins: African workers and the global information economy	Anwar and Graham (2020)
	Hidden transcripts of the gig economy: labour agency and the new art of resistance among African gig workers	Anwar and Graham (2020)

COUNTRY	TITLE OF THE ARTICLE	REFERENCE
	Between a rock and a hard place: Freedom, flexibility, precarity and vulnerability in the gig economy in Africa	Anwar and Graham (2020)
South Africa	Attitudes Toward and Experiences of Digital Labour in South Africa	Chidoori & Van Belle, (2020)
Philippines	Development outcomes of training for online freelancing in the Philippines	Eskelund et al. (2018)
Philippines	Exploring an impact sourcing initiative for a community of people with disabilities: A capability analysis	Eskelund et al. (2019)
Indonesia	Discovering Indonesian digital workers in online gig economy platforms	Fardany et al. (2019)
Sri Lanka	Investigating the Potential for Micro-work and Online-Freelancing in Sri Lanka	Galpaya et al. (2018)
Indonesia	Exploring people's intention to become platform-based gig workers: An empirical qualitative study	Gadhi et al. (2018)
Sub-Saharan Africa and Southeast Asia	Digital labour and development: impact of global digital labour platforms and the gig economy on worker livelihoods	Graham et al. (2017)
African countries (SA, Kenya, Nigeria, and Uganda)	The global gig economy: towards a planetary labour market?	Graham & Anwar (2019)
Nigeria	Digital Platforms of Work and the Crafting of Career Path: The Crowd workers' Perspective	Idowu & Elbanna (2020)
Nigeria	Bright I.C.T. and Unbounded Employment: Typology of Crowd workers and Their Lived and Envisaged Career Trajectory in Nigeria	Idowu & Elbanna (2020)
Malaysia	Intention to Adaption and Influence of Using Online Freelance Portal Among Malaysians	Krishnamoorthy et al. (2016)
Pakistan	Understanding the development implications of online outsourcing	Malik et al. (2017)
Pakistan	Digital platform labour in Pakistan: institutional voids and solidarity networks	Malik et al. (2020)
South Africa	A Profile-Aware Micro tasking Approach for Improving Task Assignment in Crowdsourcing Services	Mtsweni et al. (2016)
Pakistan	Freelancers as Part-time Employees: Dimensions of F.V.P. and FJS in E-Lancing Platforms	Nawaz et al. (2020)

COUNTRY	TITLE OF THE ARTICLE	REFERENCE
Kenya and Malaysia	Characteristics of Walled Garden Crowdsourcing Platforms for Global Development	Olsen (2020)
Developing countries	Digital labour platforms and new forms of flexible work in developing countries: Algorithmic management of work and workers	Rani and Furrer (2020)
Developing countries	Digital platforms, data, and development: Implications for workers in developing economies	Rani and Singh (2019)
Bangladesh	The Impact of Freelancing on the Socio-economic Development of Bangladesh: A Study	Romke and Sayed (2018)
South Africa	Mobile microwork in South Africa: Attitudes, experiences, and barriers	Roomaney et al. (2018)
Philippines	Software Gigging: A Grounded Theory of Online Software Development Freelancing	Sison and Lavilles (2018)
Philippines	Between "World Class Work" and "Proletarianized Labour": Digital labour imaginaries in the global South	Soriano & Cabañes (2019)
Philippines	Entrepreneurial Solidarities: Social Media Collectives and Filipino Digital Platform Workers	Soriano & Cabañes (2020)
Bangladesh	Do I.T. freelancers increase their entrepreneurial behaviour and performance by using I.T. self-efficacy and social capital? Evidence from Bangladesh	Sultana & Im (2019)
China	In Their Shoes: A Structured Analysis of Job Demands, Resources, Work Experiences and Platform Commitment of Crowd workers in China	Wang et al. (2020)
Asian and African countries	Workers of the Internet unite? Online freelancer organization among remote gig economy workers in six Asian and African countries	Wood et al. (2018)
Southeast Asia and Sub-Saharan Africa	Good gig, bad gig: Autonomy and algorithmic control in the global gig economy	Wood et al. (2018)
Southeast Asia and Sub-Saharan Africa	Networked but commodified: The (dis) embeddedness of digital labour in the gig economy	Wood et al. (2019)

Table 6: Selected Articles

5.3 Current challenges of digital work in developing countries (RQ. 1)

The challenges faced in adopting digital work as identified in the selected papers are categorized into barriers associated with up-taking digital work, challenges related to being a digital worker, and challenges associated with adopting digital work in the long run. The challenges related to the inability to adopt digital work are lack of internet access due to lack of infrastructure (Eskelund et al., 2018; Galpaya et al., 2018; Malik et al., 2017; Romke & Sayed, 2018) and slow internet bandwidth (Roomaney et al. 2018). Accessing the internet was a barrier because of the high data costs (Eskelund et al., 2018; Roomaney et al., 2018). The studies further pointed out that the limited and lack of electricity was a challenge because it affected meeting deadlines for client service delivery. (Malik et al. 2017; Galpaya et al., 2018).

Lack of resources is another barrier identified in the uptake of digital work (Eskelund et al., 2018; Rani & Furrer; 2020; Wang et al., 2020). The lack of resources (laptops or computers) is linked to a lack of financial resources to obtain these assets. In some countries, although public internet access might be available, there is an issue of curfew in some areas, which could be a problem where a client requires work to be delivered within a specific time frame, thus the need for skills in time management (Eskelund et al. 2018; Nawaz et al., 2020). Lack of technical and interpersonal skills is one of the barriers to adopting digital work in the long run (Agrawal et al., 2016; Malik et al., 2017; Roomaney et al., 2018). Lack of skills can be further propelled by a lack of academic and technical education, as Roomaney et al. (2018) stated.

Some challenges of digital adoption in developing countries are the negative perceptions associated with digital work compared to the traditional 9-5 office jobs: digital workers are perceived as unprofessional because they do not go to the office (Galpaya et al., 2018). Moreover, there is a stigma against online freelancing in Asian countries (Anwar & Graham, 2020b; Galpaya et al.,2018; Romke & Sayed, 2018). These perceptions emanate from the cultural perception that when one is at home, they are not working, and thus one must go to an office to work (Galpaya et al., 2018; Romke & Sayhed, 2018). Some negative perceptions are further impelled by the required experience to undertake digital work (Galpaya et al., 2018; Idowu & Elbana, 2019; Romke & Sayhed, 2018). The most common are related to working conditions on digital work platforms. The working conditions identified are depicted in Table 7:

WORKING CONDITIONS	EXPLANATION
No perks and benefits	Lack of Health benefits and retirement perks on digital work platforms. (Nawaz et al., 2020)
Disempowerment	Workers cannot negotiate their remuneration. Moreover, there are no contracts, meaning the 'client' can cancel work. There is also a lack of role clarity where the worker does not know the other processes of the client's business, which could improve the delivery of quality work. (Agrawal et al. 2016; Anwar & Graham 2020a; Graham et al. 2017; Graham & Anwar 2019; Nawaz et al. 2020; Soriano & Cabañes 2020)
Unequal relationship with the 'client.'	The micro workers are perceived as independent contractors, but the relationship is like employer and employee. Thus, there is an exploitation of some digital workers (Graham et al. 2017; Malik et al. 2017; Malik et al. 2020; Roomaney et al. 2018)
Non-payment/ low payment	Some workers are not paid when the 'client' rejects the work. Sometimes there are no explanations for rejecting the work.

	(Fardany Faisal et al. 2019; Graham et al., 2017; Malik et al. 2020; Rani & Furrer 2020)
Work pressure and physical demands	In some cases, the workers may have pressure from the clients. Anwar and Graham (2020b); Wang et al. (2020)

Table 7: Work conditions

Furthermore, digital workers do not have consistent income because there is no guarantee that someone will hire them (Anwar & Graham, 2020c; Galpaya et al., 2018; Rani & Furrer, 2020). Roomaney et al. (2018) also mentioned that mobile phone digital workers obtain lower pay than traditional jobs in the South African context. The inadequate compensation is because digital workers on the digital work platforms are more than the jobs assigned (Graham et al., 2017; Graham & Anwar, 2019; Olsen, 2020). Galpaya et al. (2018) state that inconsistent income also results in the inability to access financial services such as loans.

Payment methods used by the digital work platforms are usually not aligned with the financial institutions' systems in some developing countries. For example, most digital platforms use PayPal to pay digital workers; however, no banks in some countries are linked to PayPal (Galpaya et al., 2018; Malik et al., 2017; Nawaz et al., 2020).

Discrimination is evident in some job requirements where certain nationalities and genders are excluded (Graham et al., 2017; Malik et al., 2017). This discrimination could be due to complaints about the quality of work from the online workers in developing countries, which impedes the prospects of hiring online workers from developing countries (Mtsweni et al., 2016; Romke & Sayhed, 2018). Mtsweni et al. (2016) suggest a need for new ways of assessing digital workers to ensure the alignment of tasks and the profile of the digital workers.

According to Sultana and Im (2019), social media communication with family and acquaintances is perceived to distract from digital work adoption. Social media is usually used to communicate and motivate digital work through forums; however, some workers may be distracted when accessing social media due to interaction with friends and acquaintances (Sultana & Im, 2019).

The lack of a defined career path and awareness of digital work may also challenge the adoption of digital work (Galpaya et al., 2018). Some digital workers remain in the same position without training, thus lacking career progress. However, Idowu and Elbana (2018) have an opposite perception, depicted in the benefits of digital work adoption section.

5.4 Current drivers of the adoption of digital work in developing countries (RQ. 2)

The drivers of digital work can be categorized into social, infrastructure, intrinsic/ personal drivers, and resources.

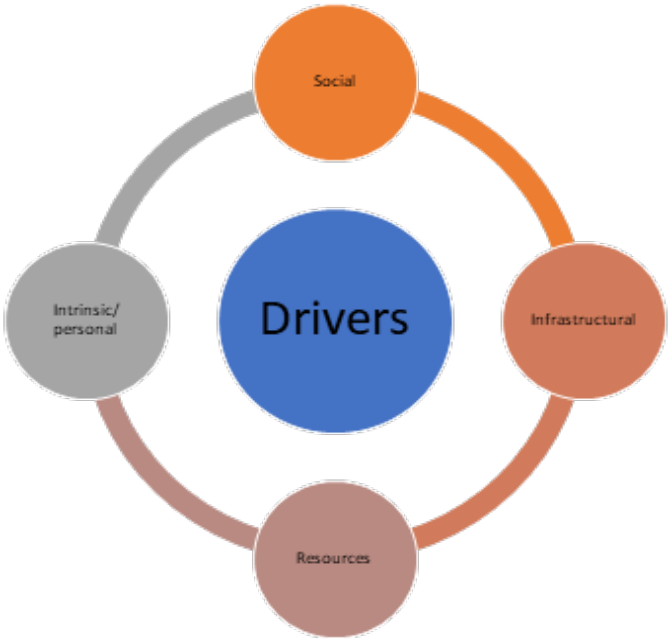

Figure 5: Drivers of adopting digital work

Social drivers

One of the identified social drivers is communication with clients and other digital workers (Anwar & Graham, 2020b; Chidoori & Van Belle, 2020; Galpaya et al., 2018; Idowu & Elbana, 2020; Wood et al., 2018). According to Galpaya et al. (2018), communications through social media platforms allowed for peer learning and networking, which assisted some digital workers in transitioning from low-value jobs to high-value jobs (Galpaya et al., 2018; Gandhi et al., 2018; Malik et al., 2017). Sultana and Im (2019) concur with this notion. They state that digital workers receive tips, encouragement, and hacks to build their digital work career as freelancers through social media networking platforms.

Lack of traditional work opportunities, which leads to increased unemployment rates, also drives the adoption of digital work (Chidoori & Van Belle, 2020; Idowu & Elbanna, 2020; Malik et al., 2017; Sison & Lavilles, 2018). Awareness about digital work also drives individuals to participate in digital work (Galpaya et al., 2018). The government and other agencies run awareness campaigns and training to promote the adoption of digital work (Eskelund et al., 2018). Flexibility drives caretakers to adopt digital work because they can care for family members while earning income (Malik et al., 2017; Sison & Lavilles, 2018). Moreover, the perceived freedom that comes with the nature of the work motivates individuals to participate in this work (Malik et al., 2017; Sison & Lavilles, 2018).

Resources owned by digital workers.

The resources include financial and material resources (Eskelund et al., 2018). The resources allow digital workers to access job opportunities and perform their assigned work consistently.

Intrinsic/ personal drivers

The skills of the individuals also motivate them to adopt digital workers (Anwar & Graham, 2020b; Chidoori & Van Belle, 2020; Eskelund et al., 2019; Gandhi et al., 2018; Krishnamoorthy et al., 2016; Soriano & Cabañes, 2020). These skills give the digital workers the confidence to conduct the tasks assigned on the digital work platforms (Eskelund et al., 2018). According to Eskelund et al. (2018), training individuals who need employment may promote the uptake and adoption of digital work. The

training should also focus on equipping digital workers with psychological resources, which entails consistent reskilling of digital workers (Galpaya et al., 2018). The training motivates potential digital workers to adopt digital work because they become more confident due to the skills they obtained from the training (Galpaya et al., 2018).

Sultana and Im (2019) and Soriano and Cabañes (2020) revealed that entrepreneurial behaviour in unstable environments leads to better performance in digital work, thus leading to sustainable adoption of digital work. The desire to obtain income encourages individuals to uptake digital work (Chidoori & Van Belle, 2020; Eskelund et al., 2018; Gandhi et al., 2018; Malik et al., 2017; Wang et al., 2020), the freedom and ability to work from anywhere (Anwar & Graham 2020b; Eskelund et al. 2019) also motivates the digital workers.

Infrastructural drivers

According to Krishnamoorthy et al. (2016), a safe and secure system motivates digital work adoption. Infrastructure includes electricity and telecommunications infrastructure that promotes bandwidth and internet access because digital work relies on this infrastructure (Malik et al., 2017; Galpaya et al., 2018).

5.5 Technology Acceptance Models/ Theories (RQ. 3)

Table 8 provides the theoretical frameworks used in the studies.

TECHNOLOGY ACCEPTANCE MODEL/THEORY	DESCRIPTION	AUTHORS
Self-Determination Theory (S.D.T.)	The theory proposes that humans are driven to change by three intrinsic and universal psychological needs: Autonomy, competence, and relatedness	Chidoori and Van Belle, 2020 Nawaz et al. 2020
Technology Acceptance Model (T.A.M.)	It was developed by Davis (1989) and asserted that people's behaviour is influenced by attitude. The decisions are essentially controlled by Perceived usefulness and Perceived Ease of use	Chidoori and Van Belle, 2020 Krishnamoorthy et al., 2016
Theory of Reasoned Action (T.R.A.)	The theory was developed by Fishbein and Ajzen (1967). The theory attempts to explain the relationship between behaviour and attitudes. According to this theory, one's behavioural intention is influenced by attitude and subjective norms towards the behaviour.	Chidoori and Van Belle, 2020
Choice Framework	This theory was developed by Klein (2010) to analyse the effects of I.C.T. policies on the targeted beneficiaries and attempt to implement eh capabilities approach (C.A.).	Eskelund et al. 2018; Eskelund et al 2019
Super's model	It is a career framework that predicts career development stages outlined as Growth, Exploration, Establishment, Maintenance and Decline.	Idowu and Elbanna, 2019

TECHNOLOGY ACCEPTANCE MODEL/THEORY	DESCRIPTION	AUTHORS
The Job Demands-Control model	The theory was developed by (Karasek & Theorell, 1990) to illustrate how job demands can cause stress for individuals and how they can gain control and autonomy in their work using the stressors	Wang et al. 2020
Sustainable Livelihoods Framework	The Sustainable Rural Livelihoods Advisory Committee developed the framework. The framework depicts the factors influencing people's livelihood and relations between the elements.	Malik et al., 2017
Human capital theory	The Human capital theory attempts to measure the returns/ benefits of investing in education, experience, and skills of individuals	Nawaz et al., 2020
Theory of Planned Behaviour	It started as the Theory of Reasoned Action and attempted to predict human behaviour at a particular time and place. The six constructs of the theory are attitudes, behavioural intention, social norms, perceived power, and perceived behavioural control	Gandhi et al. 2018; Sultana and Im, 2019
Grounded theory	It is the systematic method of formulating a theory using the findings of the research (Charmaz, 2003)	Sison and Lavilles, 2018
Conceptual Framework	The use of literature and other theories to formulate a framework.	Malik et al. 2020; Romke and Sayed 2018
The following did not mention any theory or model for their research: (Agrawal et al. 2016; Anwar & Graham 2020a, b,c; Fardany Faisal et al. 2019; Galpaya et al. 2018; Graham et al., 2017; Olsen 2018; Rani & Furrer 2020; Rani & Singh 2019; Soriano & Cabañes 2020; Wood et al. 2018)		

Table 8: Technology Acceptance Models/ Theories

5.6 Current benefits of digital work in developing countries (RQ4)

One identified benefit of adopting digital work is obtaining secondary income for those already employed in the traditional 9-5 jobs (Galpaya et al., 2018; Roomaney, 2018). Graham et al. (2017) and Soriano and Cabañes (2020) state that one of the benefits of digital work in some developing countries is higher income than traditional jobs.

Digital work attracts some individuals to participate because it is flexible; it allows home-based caretakers to obtain income, thus enabling them to have a work-life balance (Graham et al., 2017; Nawaz et al., 2017). The home-based caretakers include those who care for the disabled, elderly and stay-at-home mothers (Graham et al., 2017). Moreover, there is less discrimination than in traditional employment (Graham et al., 2017). Discrimination is usually experienced by immigrants, the disabled, the less educated, less work experienced, and redundant skills (Galpaya et al., 2018).

People starting their careers can acquire experience and skills by working on digital platforms (Graham et al., 2017). Idowu and Elbanna (2020) concur with this finding as their research also revealed that the skills obtained through digital work are transferable to traditional working environments. Additionally, through skills development, there is potential to build a career path through digital work (Idowu and Elbanna, 2019; Nawaz et al., 2020). This finding contradicts Galpaya et al. (2018), who state that digital work has no career path. Digital work allows the unemployed to find social value by building social value for themselves (Nawaz et al., 2020; Romke & Sayed, 2018). Moreover, digital workers can find hedonistic enjoyment by obtaining pleasure through conducting digital work (Nawaz, 2020).

Organizations also benefit from employing digital workers because digital workers improve productivity and costs in some organizations (Rani & Furrer, 2020; Wood et al. 2019a, 2019b). Nations can also obtain benefits by reducing unemployment and avoiding fraud and bribery(Romke & Sayed, 2018; Roomaney et al., 2018). In contrast to traditional work, where bribes and connections offer employment, corruption is evaded because there impartiality on the digital work platforms(Romke & Sayed, 2018). Moreover, there is a notion that digital work can develop and alleviate poverty in developing countries because it opens employment opportunities (Mtsweni et al., 2016; Rani & Singh, 2019; Roomaney et al., 2018; Soriano & Cabañes, 2020).

6 Conclusion

The purpose of this paper was to explore the current challenges of adopting digital work (RQ. 1), drivers/ motivations for adopting digital work (RQ. 2), and the technology acceptance models/ theories used to research digital work (RQ. 3) and the benefits of adopting digital work. The challenges identified were lack of resources due to high data costs and lack of devices used to conduct digital work. Furthermore, in some developing countries, lack of infrastructure was a challenge, and negative perceptions of digital work because of the lack of long-term contracts and adverse working conditions. The drivers for adoption were identified as social, infrastructure, and intrinsic/ personal motivations. The need for income, social value and entrepreneurial spirit motivates digital workers to continue working even when faced with challenges.

Benefits for individuals included income, the flexibility of freelancing online, employment opportunities and the social value of contributing through digital work. The benefits for companies included reducing costs through outsourcing; for countries, it is the reduction of unemployment. One of the gaps identified through scoping was the lack of frameworks to adopt digital work to benefit digital workers and companies in developing countries. In most studies, the clients or organizations benefiting from digital work are from developed countries. Table 9 provides a summary of the articles that were used to address the research questions:

RESEARCH QUESTIONS	AUTHORS
RQ 1 – Challenges of adopting digital work	Agrawal et al. (2016); Anwar & Graham (2020a, b); Eskelund et al. (2018); Fardany Faisal et al. (2019); Galpaya et al. (2018); Graham et al. (2017); Graham & Anwar (2019) Idowu & Elbanna 2019); Mtsweni et al., 2016 Malik et al. (2017); Nawaz et al. (2021); Rani & Furrer (2020); Romke, & Sayed (2018); Roomaney et al. 2018 Sultana & Im (2019); Wang et al. (2020)
RQ 2- Drivers for adopting digital work	Chidoori & Van Belle, (2020); Eskelund et al. (2018); Galpaya et al. (2018); Gandhi et al. (2018); Idowu & Elbanna 2019); Krishnamoorthy et al (2016) Malik et al. (2017); Rani & Furrer (2020); Romke, & Sayed

	(2018); Roomaney et al. 2018; Sison & Lavilles, 2018 Wood et al. (2018a); Sultana & Im (2019); Wang et al. (2020)
RQ 3- Technology Acceptance Models/ Theories	Chidoori & Van Belle, (2020); Eskelund et al. (2018); Gandhi et al. (2018); Graham and Anwar (2019); Idowu & Elbanna (2019); Idowu & Elbanna (2019) Idowu & Elbanna (2020); Krishnamoorthy et al (2016); Malik et al. (2017); Nawaz et al. (2020); Wang et al. (2020); Sultana & Im (2019)
RQ 4- Benefits of adopting digital work	Galpaya et al. (2018); Graham et al. (2017) Idowu & Elbanna(2019); Idowu & Elbanna (2020); Mtsweni et al., (2016): Malik et al. (2017); Nawaz et al. (2020); Rani & Furrer (2020); Romke, & Sayed (2018); Roomaney et al. 2018; Wood et al. 2018b

Table 9: Research questions and authors

References

Agrawal, A., Lacetera, N., & Lyons, E. (2016). Does standardized information in online markets disproportionately benefit job applicants from less developed countries? *Journal of International Economics, 103*, 1-12.

Anwar, M. A., & Graham, M. (2020a). Between a rock and a hard place: Freedom, flexibility, precarity and vulnerability in the gig economy in Africa. *Competition & Change,* , 1024529420914473.

Anwar, M. A., & Graham, M. (2020b). Digital labour at economic margins: African workers and the global information economy. *Review of African Political Economy, 47*(163), 95-105.

Anwar, M. A., & Graham, M. (2020c). Hidden transcripts of the gig economy: Labour agency and the new art of resistance among African gig workers. *Environment and Planning A: Economy and Space, 52*(7), 1269-1291.

Calvão, F., & Thara, K. (2019). Working futures: The I.L.O., automation and digital work in India. In *The ILO@ 100* (pp. 223-247). Brill Nijhoff.

Cherry, M. A. (2016). Beyond misclassification: The digital transformation of work.

Chidoori, C., & Van Belle, J. (2020). *Attitudes toward and experiences of digital labour in South Africa* doi:10.1007/978-3-030-64697-4_9

de Ruyter, A., Brown, M., & Burgess, J. (2018). Gig work and the fourth industrial revolution: Conceptual and regulatory challenges. *Journal of International Affairs, 72*(1), 37-50.

Eskelund, K., Heeks, R., & Nicholson, B. (2018). *Development outcomes of training for online freelancing in the Philippines* doi:10.1007/978-3-030-11235-6_8

Eskelund, K., Heeks, R., & Nicholson, B. (2019). *Exploring an impact sourcing initiative for a community of people with disabilities: A capability analysis.* Paper presented at the International Conference on Social Implications of Computers in Developing Countries, 51-62.

Faisal, A. L. F., Sucahyo, Y. G., Ruldeviyani, Y., & Gandhi, A. (2019). Discovering Indonesian digital workers in online gig economy platforms. In *2019 International Conference on Information and Communications Technology (ICOIACT);* 554-559)

Galpaya, H., Perampalam, S., & Senanayake, L. (2018). Investigating the potential for micro-work and online freelancing in Sri Lanka. *Digitized labor: The impact of the internet on employment*; 229-250

Gandhi, A., Hidayanto, A. N., Sucahyo, Y. G., & Ruldeviyani, Y. (2018). *Exploring people's intention to become platform-based gig workers: An empirical qualitative study.* Paper presented at the 2018 International Conference on Information Technology Systems and Innovation (ICITSI), 266-271.

Graham, M., Hjorth, I., & Lehdonvirta, V. (2017). Digital labour and development: Impacts of global digital labour platforms and the gig economy on worker livelihoods. *Transfer, 23*(2), 135-162.

Graham, M., & Anwar, M. (2019). The global gig economy: Towards a planetary labour market? *First Monday, 24*(4).

Heeks, R. (2017). Decent work and the digital gig economy: A developing country perspective on employment impacts and standards in online outsourcing, crowdwork, etc. *Development Informatics Working Paper;* 71)

Idowu, A., & Elbanna, A. (2019). *Bright I.C.T. and unbounded employment: Typology of crowd workers and their lived and envisaged career trajectory in Nigeria* doi:10.1007/978-3-030-20671-0_32

Idowu, A., & Elbanna, A. (2020). Digital platforms of work and the crafting of career path: The crowdworkers' Perspective. *Information Systems Frontiers.*

Johnston, H. (2020). Labour geographies of the platform economy: Understanding collective organizing strategies in the context of digitally mediated work. *International Labour Review, 159*(1), 25-45.

Mtsweni, J., Ngassam E. K., & Burge L. (2016). *A profile-aware micro-tasking approach for improving task assignment in crowdsourcing services.* Paper presented at the - 2016 IST-Africa Week Conference; 1-10.

Keele, S. (2007). No title. *Guidelines for Performing Systematic Literature Reviews in Software Engineering,*

Kitchenham, B. A. (2012). *Systematic review in software engineering: Where we are and where we should be going.* Paper presented at the Proceedings of the 2nd International Workshop on Evidential Assessment of Software Technologies, Lund, Sweden; 1–2.

Krishnamoorthy, R. A. L., Baharudin, A. S., & Karkonasasi, K. (2016). Intention to adaption and influence of using online freelance portal among Malaysians. *International Journal of Applied Engineering Research, 11*(19); 10020-10026.

Maidoki, M. L. (2018). Repositioning SOZECOM, Nigeria for navigating the digital economy. *International Journal of Zakat, 3*(3); 101-107.

Malik, F., Nicholson, B., & Heeks, R. (2017). *Understanding the development implications of online outsourcing* doi:10.1007/978-3-319-59111-7_35

Malik, F., Heeks, R., Masiero, S., & Nicholson, B. (2020). Digital platform labour in Pakistan: Institutional voids and solidarity networks.

Nawaz, Z., Zhang, J., Mansoor, R., Hafeez, S., & Ilmudeen, A. (2020). Freelancers as part-time employees: Dimensions of F.V.P. and FJS in E-lancing platforms. *South Asian Journal of Human Resources Management, 7*(1), 34-60.

Olsen, T. (2018). Characteristics of "Walled garden" crowdsourcing platforms for global development.

Onkokame, M., Schoentgen, A., & Gillwald, A. (2018). What is the state of microwork in Africa? A view from seven countries. *Policy Paper, 5*

Petersen, K., Feldt, R., Mujtaba, S., & Mattsson, M. (2008). *Systematic mapping studies in software engineering.* Paper presented at the 12th International Conference on Evaluation and Assessment in Software Engineering (EASE) 12, 1-10.

Petersen, K., Vakkalanka, S., & Kuzniarz, L. (2015). Guidelines for conducting systematic mapping studies in software engineering: An update. *Information and Software Technology, 64*, 1-18.

Petticrew, M., & Roberts, H. (2008). *Systematic reviews in the social sciences: A practical guide*. John Wiley & Sons.

Ponelis, S. R., & Holmner, M. A. (2015). *I.C.T. in Africa: Building a Better Life for All,*

Rani, U., & Furrer, M. (2020). Digital labour platforms and new forms of flexible work in developing countries: Algorithmic management of work and workers. *Competition and Change,*

Rani, U., & Singh, P. J. (2019). Digital platforms, data, and development: Implications for workers in developing economies. *Comp.Lab.L.& Pol'Y J., 41*, 263.

Reichardt, C. (2010). RefWorks: Http://Www. refworks. com. *Public Services Quarterly, 6*(4), 366-367.

Romke, R. A., & Sayed, M. A. (2018). The impact of freelancing on the socio-economic development of Bangladesh: A study. *A.S.A. University Review, 12*(2), 1-15.

Roomaney, Z., Van Belle, J. -., & Tsibolane, P. (2018). *Mobile microwork in South Africa: Attitudes, experiences and barriers.* Paper presented at the Americas Conference on Information Systems 2018: Digital Disruption, AMCIS 2018,

Sison, R., & Lavilles, R. (2018). *Software gigging: A grounded theory of online software development freelancing.* Paper presented at the International Conference on Information Systems 2018.

Soriano, C. R. R., & Cabañes, J. V. A. (2020). Entrepreneurial solidarities: Social media collectives and Filipino digital platform workers. *Social Media Society, 6*(2), 2056305120926484.

Sultana, R., Im, I., & Im, K. S. (2019). Do I.T. freelancers increase their entrepreneurial behavior and performance by using I.T. self-efficacy and social capital? Evidence from Bangladesh. *Information & Management, 56*(6), 103133.

Wang, Y., Papangelis, K., Lykourentzou, I., Liang, H. -., Sadien, I., Demerouti, E., & Khan, V. -. (2020). In their shoes: A structured analysis of job demands, resources, work experiences, and platform commitment of crowd workers in China. *Proceedings of the A.C.M. on Human-Computer Interaction, 4*

Wohlin, C. (2014, May). Guidelines for snowballing in systematic literature studies and a replication in software engineering. In *Proceedings of the 18th international conference on evaluation and assessment in software engineering* (pp. 1-10).

Wood, A. J., Lehdonvirta, V., & Graham, M. (2018). Workers of the internet unite? Online freelancer organization among remote gig economy workers in six Asian and African countries. *New Technology, Work and Employment, 33*(2), 95-112.

Wood, A. J., Graham, M., Lehdonvirta, V., & Hjorth, I. (2019a). Good gig, bad gig: Autonomy and algorithmic control in the global gig economy. *Work, Employment and Society, 33*(1), 56-75.

Wood, A. J., Graham, M., Lehdonvirta, V., & Hjorth, I. (2019b). Networked but commodified: The (dis) embeddedness of digital labour in the gig economy. *Sociology, 53*(5), 931-950.