NEMISA NPC
National Electronic Media Institute of South Africa

UNISA university of south africa

NEMISA SUMMIT AND COLLOQUIUM 2022

The Future of Work and Digital Skills

Radisson Blue Hotel, Granger Road, Waterfront, Cape Town

Cape Peninsula University of Technology

Centre for Communication Studies
in the Faculty of Informatics and Design

NEMISA Summit and Colloquium 2022

The Future of Work and Digital Skills

HOSSANA TWINOMURINZI

JUSTINE DARAMOLA

TENDANI MAWELA

ISBN Electronic: 978-0-620-94922-4

ISBN Print: 978-0-620-94921-7

15-17 February 2022

Radisson Blu Hotel, Granger Bay, Cape Town

National Electronic Media Institute of South Africa (NEMISA)

and

University of South Africa (UNISA)

ISBN Electronic: 978-0-620-94922-4
ISBN Print: 978-0-620-94921-7

NEMISA Summit and Colloquium 2022

The Future of Work and Digital Skills

Copyright ©the Authors

All rights reserved. Permission to make digital or paper copy of part or all of these works for personal or classroom use is granted without fee provided that the copies are not made or distributed for profit or commercial advantage and that copies: 1) bear this notice in full; and 2) give the full citation on the first page. It is permissible to abstract these works so long as credit is given. To copy in all other cases or to republish or to post on a server or to redistribute to lists requires specific permission and payment of a fee. Contact info@nemisa.co.za to request redistribution permission.

ISBN Electronic: 978-0-620-94922-4

ISBN Print: 978-0-620-94921-7

Published by:

National Electronic Media Institute of South Africa (NEMISA)

and

University of South Africa

21 Girton Road
Parktown
Johannesburg
2193
South Africa

Phone: +27 11 484 0583

Email: info@nemisa.co.za

Printed in the Republic of South Africa

Acknowledgements

The proceedings have been made possible by funding from the National Electronic Media Institute of South Africa (NEMISA) in collaboration with the Knowledge for Innovation Unit (K4I) at the University of South Africa (UNISA).

We thank each of the NEMISA CoLabs and academic fraternity for the submissions and the efforts in making the NEMISA Summit and Colloquium, and the associated Postgraduate Symposium, a success.

We further thank the following organizations for financial and logistics support:

- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- Microsoft South Africa (MSA)

ISBN Electronic: 978-0-620-94922-4
ISBN Print: 978-0-620-94921-7

List of Reviewers

We wish to thank the following reviewers for their contributions to the Proceedings. Each of the reviewers blind-peer reviewed at least two submissions. None of the authors or the editors were involved in reviewing their own submissions.

Arthur Emil van der Poll	University of South Africa
Belinda Mutunhu	University of South Africa
Bongisizwe Buthelezi	University of Johannesburg
Chinedu Okonkwo	University of Johannesburg
Edzai Kademeteme	University of Johannesburg
Elias Tabane	University of South Africa
Emmanuel Udekwe	Cape Peninsula University of Technology
Justine Daramola	Cape Peninsula University of Technology
Khensani Xivuri	University of Johanneburg
Khulekani Sibanda	University of Johanneburg
Lateef Amusa	University of Johanneburg
Lucas Gumbi	University of Johannesburg
Naomi Isabirye	Witwatersrand University
Nkosikhona Theoren Msweli	University of South Africa
Ntombiyokusa Nyoni	University of Johannesburg
Olutoyin Olaitan	Walter Sisulu University
Siphe Mhlana	University of South Africa
Tendani Mawela	University of Pretoria
Tobi Fadiji	University of Johannesburg

ISBN Electronic: 978-0-620-94922-4
ISBN Print: 978-0-620-94921-7

List of Editors

Hossana Twinomurinzi	University of Johannesburg
Justine Daramola	Cape Peninsula University of Technology
Tendani Mawela	University of Pretoria

ISBN Electronic: 978-0-620-94922-4
ISBN Print: 978-0-620-94921-7

Colloquium Organizers

Organising Committee

Ms Munira Allie	Cape Peninsula University of Technology
Ms Nkosikhona Msweli	University of South Africa
Ms Victoria Tau	NEMISA
Prof Hossana Twinomurinzi	University of Johannesburg

Summit and Colloquium Chairs

Prof Tembisa Ngqondi	University of Mpumalanga
Prof Hossana Twinomurinzi	University of South Africa

Postgraduate Chairs

Ms Nkosikhona Msweli	University of South Africa
Prof Nic Theo	Cape Peninsula University of Technology

Programme Committee

Ms Munira Allie	Cape Peninsula University of Technology
Ms Nkosikhona Msweli	University of South Africa
Ms Victoria Tau	NEMISA
Prof Hossana Twinomurinzi	University of Johannesburg
Prof Nic Theo	Cape Peninsula University of Technology
Prof Tembisa Ngqondi	University of Mpumalanga

ISBN Electronic: 978-0-620-94922-4
ISBN Print: 978-0-620-94921-7

Preface

The NEMISA Summit and Colloquium 2022, and the associated Postgraduate Symposium, was held on 15-17 March 2022 at the Radisson Blu Hotel, Granger Bay, Cape Town. It was hosted by the Cape Peninsula University of Technology (CPUT) in collaboration with the Knowledge for Innovation unit (K4I) at the University of South Africa (UNISA) and the National Electronic Media Institute of South Africa (NEMISA).

A total of 319 delegates (102 physically and 217 virtually using Zoom) attended the three collocated events (Summit, Colloquium and Postgraduate), bringing together thought leaders and experts from the international community, government, industry and academia to address the future of work and digital skills in South Africa. The virtual delegates joined from 3 continents and 13 countries (excluding South Africa): Belgium, Côte d'Ivoire, Eswatini, Ethiopia, Germany, Ghana, Kenya, Malawi, Namibia, Spain, Switzerland, United States and Zimbabwe. 11 of the 26 universities in South Africa participated.

The theme for the events was "*The Future of Work and Digital Skills*". The 4IR caused a hollowing out of middle-income jobs (Frey & Osborne, 2017) but COVID-19 exposed the digital gap as survival depended mainly on digital infrastructure and connectivity. Almost overnight, organizations that had not invested in a digital strategy suddenly realized the need for such a strategy and the associated digital skills. The effects have been profound for those who struggled to adapt, while those who stepped up have reaped quite the reward.

Therefore, there are no longer certainties about what the world will look like in a few years from now. However, there are certain ways to anticipate the changes that are occurring and plan on how to continually adapt to an increasingly changing world. Certain jobs will soon be lost and will not come back; other new jobs will however be created. Using data science and other predictive sciences, it is possible to anticipate, to the extent possible, the rate at which certain jobs will be replaced and new jobs created in different industries.

Accordingly, the collocated events sought to bring together government, international organizations, academia, industry, organized labour and civil society to deliberate on how these changes are occurring in South Africa, how fast they are occurring and what needs to change in order to prepare society for the changes.

The Honourable Deputy Minister of the Department of Communications and Digital Technologies (DCDT), Mr Philly Mapulane, delivered the opening keynote where he lamented on the worrying employment rates, especially among the youth. He noted the importance of digital skills to advance South Africa in the digital economy and identified how the changes that digital technologies are causing at the social and economic levels have had a ripple effect on other sectors such as health and education. The Deputy Minister also announced the partnership between the ministry and the ITU, ILO, and UNDP to develop digital skills for decent jobs for youth and people not in employment, education, or training (NEET).

ISBN Electronic: 978-0-620-94922-4
ISBN Print: 978-0-620-94921-7

The host and Vice-Chancellor of the Cape Peninsula University of Technology (CPUT), Prof Chris Nhlapo, welcomed everyone to the Smart CPUT 3.0. This 2030 vision aims for smart people in a smart community – *umunye* – oneness – where individuals embrace community amid times of volatility, uncertainty, complexity and ambiguity. He prided in CPUT's recent satellite constellation launched at SpaceX in California, whose data is being harvested at the their Belville ground station.

The representative of the British High Commissioner, Mr Anthony Phillipson, delivered a message of support for the events. He described the need for concerted efforts to ensure that the digital economy's growth in South Africa also needs to be inclusive of women, youth, and underserved communities and meet the growing demands of employment. He indicated that the work of the UK government in South Africa has grown with a focus on six areas in the digital economy: promoting digital literacy and skills, developing community networks and locally relevant content, enhancing policy and regulation to support the growth of the digital ecosystem, strengthening cybersecurity and resilience, innovating scalable solutions to improve business connectivity, and training and business development for SMEs and entrepreneurs.

Prof Chris Adendorff, the celebrated futurist, Presidential 4IR Commissioner and Board Member of NEMISA, gave the keynote highlighting predicted future changes that have happened faster than expected. He also offered what the futuristic models predict for the near future and the impact of new technological innovations on life and existing social and business models. Some of these include the end of what we understand as education and offices; these are predicted to be robot-human influenced. The digital skills needed to adapt to such a world depend more on dynamic judgement and decision making and the fluency of ideas.

Full Research Papers

.

Short Papers and Abstracts

Gugulethu Baduza & Caroline Pade-Khene brought to the fore the requirement for a scalability assessment framework for ICT for Development projects in the digital economy. The authors submit that the key themes that are essential for the assessment of the scalability of an ICT4D include: an understanding of the composition of stakeholders; the sustainability of resources; resilience; and model feasibility.

Issah Ngomane & Duduxile Masuku investigated the security challenges associated with Internet-of-Things (IoT) devices. In addition, the paper offers potential solutions for improving currently available mitigation strategies.

ISBN Electronic: 978-0-620-94922-4
ISBN Print: 978-0-620-94921-7

A systematic literature review on digital financial services in Kenya and how agents comply with the stipulated legislation and standards was conducted by Rebecca Njuguna & Adheesh Budree. Through this review, a conceptual framework that can be used for empirical compliance studies among digital financial services agents was proposed.

Annelie Jordaan & Antoinette Lombard designed a Media Literacy Framework that is informed by identified media literacy indicators within the South African context, which can be used as guidelines for the development of a Media Literacy curriculum.

Postgraduate Symposium

The Postgraduate Symposium offered exposure for a variety of research postgraduates. Zizipho Macanda investigated the notion of business process management in the South African government sector. Roger Wahl conducted an experiment to explore the prospects of innovations such as IoT and how IoT can be integrated into self-regulated vehicles and other applications.

Werner Richardt van Zyl, Sanchen Henning & John Andrew van der Poll developed a framework for knowledge management system (KMS) adoption in small and medium enterprises (SME). Through reliance on the Technology Organisation Environment (TOE) framework, the authors identified eight factors for KMS in SMEs from the information technology adoption literature.

Ephraim Thapedi Malope, John Andrew van der Poll & Ozias Ncube developed a framework to enable State Owned Entities (SOEs) in South Africa to adopt digitalization with the view to bring about efficiency, sustainability and profitability for the benefit of the government and its citizens.

Nosipho Mavuso proposes the application of big data analytics to support the career choices of high school learners. Mlungisi Nxumalo's aim is geared towards conducting a study that explores the effect of introducing interactive and collaborative social learning into an online learning environment on participation and successful completion of online courses.

Emil Arthur van der Poll focused on using gamification for collaborative learning within Information Systems education programmes. The study followed an action research methodology and advanced that gamification holds some promise for bridging relationships between people from different socio-cultural backgrounds and contributing to Information Systems education.

Moses Sithole's poster presentation tackled the role of ICT within the agricultural sector of South Africa. In particular, the research defines the concept of digital agriculture, explores the role of digital agriculture in ensuring sustainable agriculture and also examines the factors influencing the adoption of digital agriculture by smallholder farmers.

ISBN Electronic: 978-0-620-94922-4
ISBN Print: 978-0-620-94921-7

Table of Contents

PRELIMINARY PART		
Description		**Page**
Acknowledgements		v
List of Reviewers		vi
List of Editors		vii
Colloquium Organizers		viii
Preface		x
Table of Contents		xv
RESEARCH PAPERS		
#	**Title and Author(s)**	**Page**
1	Developing Countries' Continuance Usage of E-Services after Covid-19 in the 4IR era *Billy Mathias Kalema*	1
2	Factors Affecting the use of Infomediaries in MHealth Interventions: Case of Maternal Healthcare in Rural Malawi *Priscilla Maliwichi and Wallace Chigona*	12
3	Swarm Control Mechanisms for Modelling Generic Swarm Intelligence Ontologies *Colin Chibaya*	31
4	Operationalizing the Future Of Work to Measure Job Susceptibility *Naomi Isabirye, Hossana Twinomurinzi and Trevor Rammitlwa*	44
5	SYSTEMATIC MAPPING OF STUDIES ON THE ADOPTION OF DIGITAL WORK IN DEVELOPING COUNTRIES. *Ntombiyokusa Nyoni, Patrick Ndayizigamiye and Stella Bvuma*	58

ISBN Electronic: 978-0-620-94922-4
ISBN Print: 978-0-620-94921-7

#	Title and Author(s)	Page
6	Towards the Conceptual Digital Skills Framework in South African Public and Privat Sector *Elias Tabane*	73
7	Skilling and Reskilling Students for Relevance in a 4IR Economy *Nosipho Mavuso and Olutoyin Olaitan*	84
8	Creativity in the 4IR Curricula with Artificially Intelligent Technologies *Norwell Zhakata*	97
EXTENDED ABSTRACTS AND SHORT PAPERS		
#	**Title and Author(s)**	**Page**
1	Data Analytics for South Africa's Sexual Crime Landscape *Olayemi S. Falope and Colin Thakur*	105
2	Digital skills development for digitally maturing South African Higher Education Institutions *Ilse Kariem*	109
POSTGRADUATE POSTERS		
#	**Title and Author(s)**	**Page**
1	Social Exclusion in Ai-Infused Gamification *Emil van der Poll*	113
2	Effective Utilisation of Human Resource Information Systems in the South African Health Sector *Emmanuel Udekwe, Chux Gervase Iwu, Andre Charles de la Harpe, Justin Olawande Daramola*	114

ISBN Electronic: 978-0-620-94922-4
ISBN Print: 978-0-620-94921-7

3	SMME Readiness Framework for Smart Manufacturing Adoption in South Africa *Lucas Gumbi*	115
4	Towards AI algorithmic fairness *Khensani Xivuri*	116
5	A blockchain solution to drugs counterfeiting in the South African pharmaceutical supply chain *Bongisizwe E. Buthelezi, Patrick Ndayizigamiye, Hossana Twinomurinzi, Shopee Dube*	117
6	Democratizing Data Science Education for the Non-Sciences Nkosikhona Msweli	118
7	Beyond Touch: An Educational Design Intervention to Investigate the Affordances of Embedded Tactile And Sensory Technology *Sarel Havenga, Izak van Zyl and Daniela Gachago*	119

ISBN Electronic: 978-0-620-94922-4
ISBN Print: 978-0-620-94921-7

RESEARCH PAPERS

ISBN Electronic: 978-0-6399275-6-5
ISBN Print: 978-0-6399275-5-8

EXTENDED ABSTRACTS AND SHORT PAPERS

ISBN Electronic: 978-0-620-94922-4
ISBN Print: 978-0-620-94921-7

POSTGRADUATE POSTERS

ISBN Electronic: 978-0-620-94922-4
ISBN Print: 978-0-620-94921-7

Author and Publisher: **The National Electronic Media Institute of South Africa**
Target Book Format: **Printed and Electronic Book**

Contact number: **011 484 0583**
Email: **info@nemisa.co.za**
Address: **21 Girton Rd, Parktown, Johannesburg, 2193**

9 780620 949224

9 780620 949217