UNDERSTANDING TECHNOLOGY ADOPTION FROM A FIT-VIABILITY PERSPECTIVE

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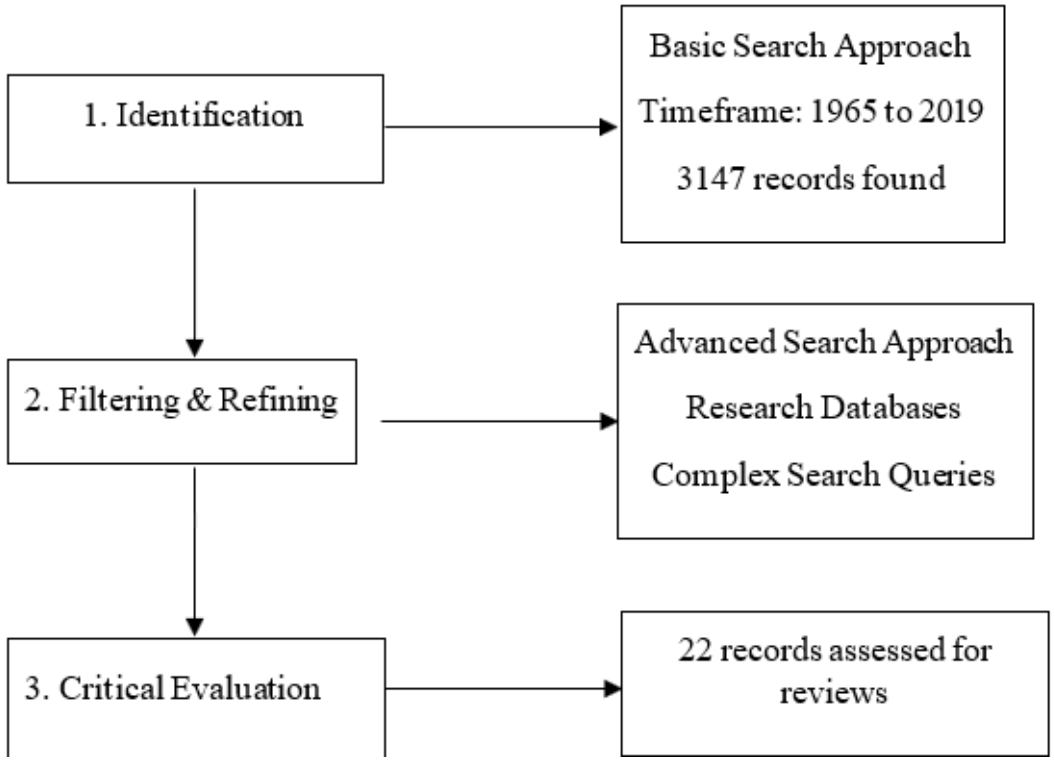
Introduction

- As technology rapidly progresses, it is important for an organisation to keep up with the latest developments or face increasing pressures from customers and competitors. However, as adopting these new technologies comes with certain risks, organisations need to recognise the inherent long term implications (Du Plessis and Mwalemba, 2016), including both operational and financial ones, depending on the type of technology.
- Numerous studies, covering a wide range of fields, have attempted to explain technology adoption (van Oorschot, Hofman and Halman, (2018) and Salahshour Rad, Nilashi and Mohamed Dahlan, (2018)) Thus far, these studies have primarily focused on understanding, predicting and explaining the variables affecting adoption in terms of behaviour and use at both the individual and organisational levels (Gangwar, Date and Raoot, 2014).

- This structured literature review examines how the Fit-viability model has been used in research on technology adoption and how this research was conducted in terms of philosophical frameworks, methodologies and precise methods and best research-based professional practices for collecting and analysing research data.
- Research on technology adoption utilising fit-viability model are reviewed. A key synthesis matrix is presented, with the aim of demonstrating that for an application to be successful, an organisation needs to evaluate not only the fit between task and technology (fit dimension) but also its organisational viability (viability dimension). A fit viability model for Artificial Intelligence adoption for printing industry is proposed. Implications, potential contributions to research and suggestions for future study are discussed

Methodology

This study followed the approach/guidelines and policies suggested by Campbell Collaboration, the Cochrane Handbook for Systematic Reviews and intervention(Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, 2019), in conducting the SLR.



Result

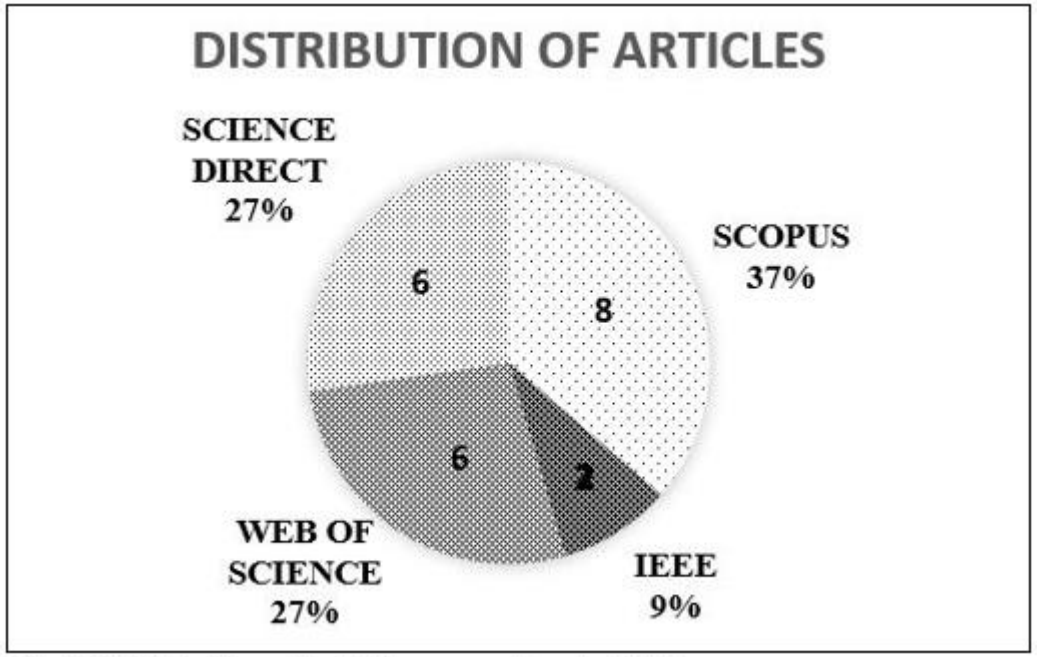


Fig. 3 Distribution of articles according to database

DATABASE	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	TOTAL
SCOPUS	1	0	0	2	0	0	0	0	1	1	1	0	0	0	2	0	8
IEEE	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
WOS	0	0	0	0	0	0	0	1	1	0	0	0	2	1	0	1	6
SD	0	0	0	0	0	0	0	0	0	0	1	2	0	2	1	0	6
overall	1	0	0	2	0	0	0	1	2	1	2	2	2	4	4	1	22

Fig. 4: Distribution of articles between 2004 to 2019

Analysis: Key Synthesis Matrix For The FVM Studies

Technology/ context	Source	Task characteristics / requirements within org.)	Fit Context Fit between technology and the intended task	Viability Context Fit between technology and its users	Approach
MOBILE COMMERCE Mobile commerce applications	Liang, T.-P., & Wei, C.-P. (2004).	capability of mobile technology to meet the requirement of the task	• relative advantage • localisation • time-critical • personal	• fit between technology and its users • general economic environment • users desire and their know-how • social infrastructure/environment	Questionnaire survey
MOBILE COMMERCE Adoption of mobile technology in business	Liang, T. P., Huang, C. W., Yeh, Y. H., & Lin, B. (2007).	matching task characteristics with technology	• relative advantage • timeliness • mobility	• economic feasibility • technical infrastructure • organisational factors	Multi-Case study Exploratory case studies
MOBILE COMMERCE Firms' perceived performance of mobile commerce determinants	Martín, S. S., López-Catalán, B., & Ramón-Jerónimo, M. A. (2012).	user's ability requirement to meet mobile commerce technology	• compatibility • technological competence	• organisational factors • environmental factors • competitive pressure	Quantitative
MOBILE COMMERCE Implementing mobile commerce in an organisation	O'Donnell, J., Jackson, M., Shelly, M., & Ligertwood, J. (2007).	mobile commerce capabilities to meet the requirement of the task	• relative advantage • critical mass compatibility • user technology	• economic environment or organization • social infrastructure • organisational readiness for the application • business model • legislative issues • new service acceptance • training and technical issues • availability and technology support of infrastructure	Multi-Case study Exploratory case studies
MOBILE COMMERCE Mobile adoption in enterprises	Alqahtani, M. M., Atkins, A. S., & Stanier, C. (2015).	mobile service targeted capabilities support enterprise goals	• relative advantage • location based services • instant access, communication and collaboration	• economic feasibility • technical infrastructure • organisational factors	Case Study

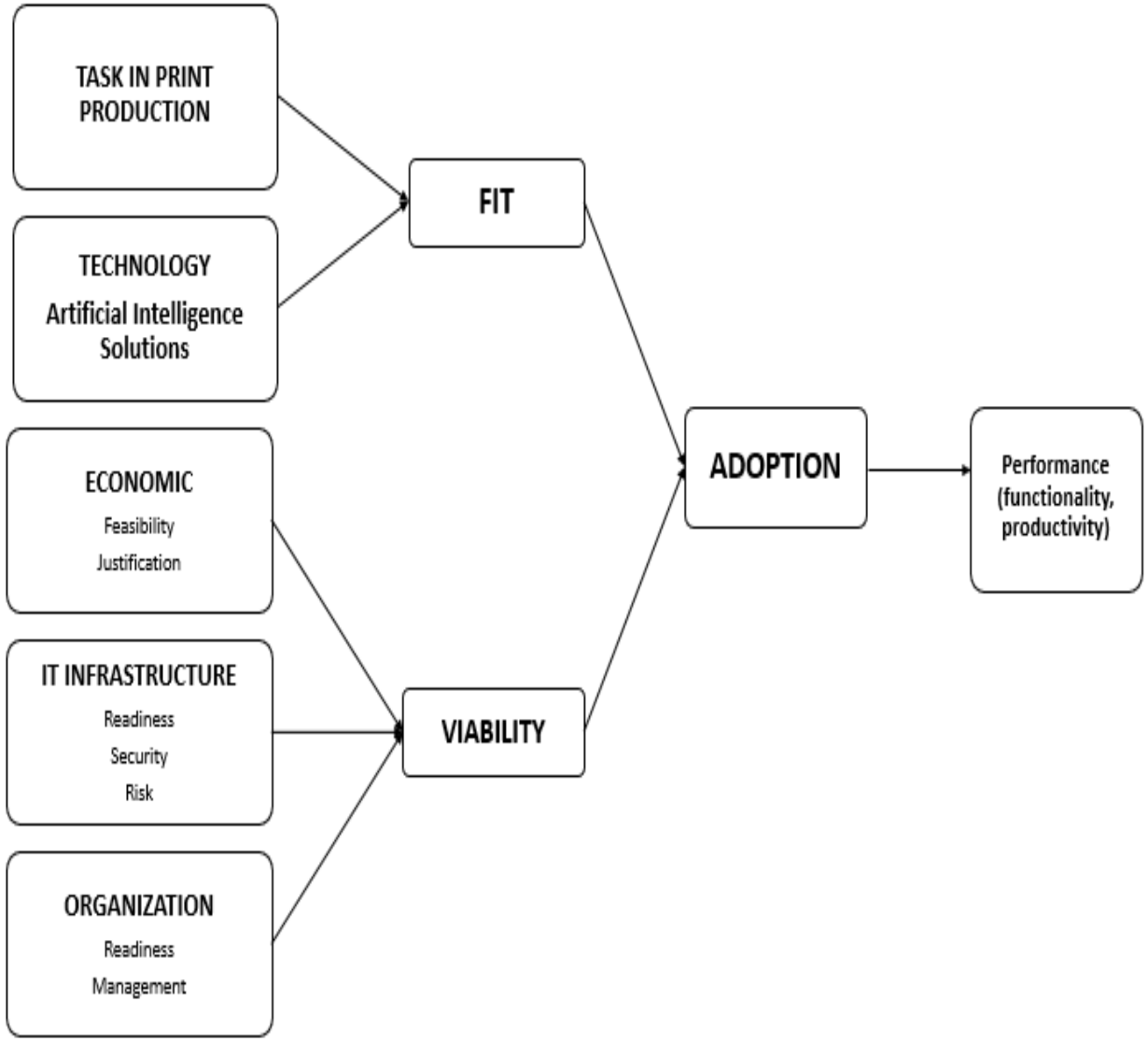
			• personalised services • user experience		
MOBILE COMMERCE Outpatient informatics adoption on consumer	Alqahtani, M. M., & Atkins, A. S. (2017).	consumer smartphone capabilities and their related solutions with alignment to eHealth Strategic Objective (Ministry of Health)	• relative advantage • location based services • instant access • communication and collaboration • personalised services • user experience	• economic feasibility • technical infrastructure • organisational factors	Case Study, Balanced Score Card approach
ENTERPRISE SYSTEM Cross-cultural ERP implementation in diverse cultures	Muhamma, I., Seitz, J., & Wickramasinghe, N. (2013).	ERP functionalities meets requirements of the organisation	• compatibilities • data format, operating procedure, and output format	• national factors • political and social • economical • environmental • infrastructure /technology • organisational factors • leadership • management style • policies information • sharing training and learning • technical staff • user behaviour • economic	N/A
ENTERPRISE SYSTEM E-viewer system implementation	Wickramasinghe, Nilmini *et al.* (2018)	E-Viewer system-related functionalities meet organization requirements	• compatibility data format, operating procedures, and output format	• national factors • organisational factors	Qualitative, Case Study
ENTERPRISE SYSTEM Manufacturing Resource Planning (MRP) System adoption in an organisation	Tan, S.-Y., et al. (2012).	MRP capabilities meet the requirement of task	N/A	• organisational aspect • financial readiness • user readiness • organisational factors • infrastructure readiness	Quantitative

INFORMATION SYSTEM Adopting Collaboration 2.0 Tools for virtual group decision making	Turban, E., et al. (2011).	capability of the tool relative to the activity (decision task)	• relative advantage • information sharing • idea generation and innovation • selection and implementation of the solution	• economic feasibility • IT infrastructure • organisational readiness • national factors	N/A
INFORMATION SYSTEM Adoption of web-based group decision support systems	van Hillegersberg, J., & Koenen, S. (2014).	web-based group decision support systems capabilities meet decision task	• relative advantage • benefits and impact of the task with the technology • its benefits and advantage • perceived value of the technology	• organisational readiness • IT problems • implementation process • decision making	Exploratory case studies
INFORMATION SYSTEM Adoption of internet-based collaboration tools	Wahl, L. and A. Kitchel (2016).	web-based digital tools related features matches the decision task (activity)	• relative advantage • compatibilities • security concerns	• organisational readiness for adopting new technology • cost of technology relative to project • IT infrastructure support the web based digital tools	Systematic Literature Review
INFORMATION SYSTEM Adopting Multi-Criteria Decision Support System with Negotiation Process for Vehicle Technology Selection	Al-Alawi, B. M., & Coker, A. D. (2018).	Multi-Criteria Decision Support System capabilities match the decision task	• relative advantage	• organisational factors	Multi-criteria preference analysis
RENEWABLE ENERGY Feasibility study of renewable energy technology implementation	Arshad, A., Ibrahim, H., Anuar, S., & Shukrie, A. (2014).	renewable technology capabilities to produce energy	• relative advantage • available technology • potential energy	• social environment • economy impact • geographical features	N/A
CLINICAL INFORMATION SYSTEM Point of Care (PoC) System implementation and adoption	Muhammad, I. and Wickramasinghe, N. (2018)	PoC system functionalities meet healthcare organisation's requirements	• compatibility • data format, operating procedures, and output format	• external environmental factors • national policy/interest • internal environmental factors • organisational readiness	Qualitative, Exploratory case study
INFORMATION AND COMMUNI-CATION TECHNOLOGY	Larosiliere, G. D. and Carter, L. D. (2016)	government-related task characteristics government-related technology characteristics	N/A	• economic • organisation • IT infrastructure	Quantitative

E-Government maturity determinants					
INFORMATION AND COMMUNI-CATION TECHNOLOGY The adoption of Information Technology tools on social media and humanitarian logistics	Crumbly, J., & Carter, L. (2015).	social media-related task and technology characteristics	N/A	• New Service Development (NSD) capability • NSD process focus • market acuity • NSD strategy • IT experience	Quantitative
CLOUD COMPUTING Higher education institution cloud computing adoption	AlAjmi, Q., Arshah, R. A., Kamaludin, A., Sadiq, A. S., & Al-Sharafi, M. A. (2017).	e-learning-related activities meet higher education institution requirements	• security concern • information integrity • information formality • information control and information proactiveness	• decision makers' support • cost reduction • IT readiness	Quantitative
CLOUD COMPUTING Adopting Cloud-based Education as a Service (CEaaS)	M. Qasem, Y. A., Abdullah, R., Atan, R., ah Jusoh, Y. Y., Qasem, Y. A. M., Abdullah, R., Jusoh, Y. Y. (2018).	CEaaS-related tasks meet higher education institution requirements	• relative advantage • potential	• higher-education • technical readiness	Quantitative
CLOUD COMPUTING E-government implementation	Mohammed, F., et al. (2017).	e-government related tasks and their requirements	• relative advantage • value-added potential of using cloud computing in e-government	• public sector • organisational • environment readiness for cloud computing	Quantitative
CLOUD COMPUTING The performance of cloud computing in organisation	Yoo, S.-K. and B.-Y. Kim (2019).	user's ability to meet cloud computing technology requirements	• relative advantage • the capabilities of cloud computing technology meet the requirement of task	• economics • IT infrastructure • organisational factors	Quantitative
CLOUD COMPUTING e-Government cloud adoption in government agencies	Liang, Y., Qi, G., Wei, K., &	e-government related tasks and their requirements	• relative advantage • technology driving	• environmental stimulus • policy and regulation	Qualitative case study

	Chen, J. (2017).		• comparative advantage • technological concern • cloud provider support • characteristics • competence • presence • security concern • cloud trust • initial trust • perceived benefit-based trust	• industry standards • competition pressure • requirement of citizen • best practice • financial fund • organisational readiness • top management support • organisational inertia • the scale and complexity of information resource	

A fit-viability model for AI adoption



DISSCUSSION

- **Managerial and theoretical implications**
- • This study looked at diverse views and interpretations of concepts, applications and development of the FVM and defined the fit and viability aspects of technology adoption, particularly new technology. It also considered technological characteristics (fit) and organisational readiness (viability) as extended from TTF, which uses factors that predict new technology usage and performance in an organisation (van Hillegersberg and Koenen, 2014).
- • This critical study serves as a basis for further investigations into the influence of Industry 4.0-related technologies in achieving smart manufacturing. Moreover, it can serve as a guidance for decision makers to make precise decisions before adopting new technologies.

DISSCUSSION

- **Validation and implications of methodological approach**
- A qualitative multi-case study in conjunction with qualitative research methods to add to the robustness of the study. A multi-case study allows for further exploration on how AI solutions can be implemented successfully in a diverse group of printing industry segments.
- Researchers define different factors to measure the fit dimension. If it can be concluded that researchers measure fitness by defining specific tasks or requirements, then multiple-case studies may offer richer data sets to understand this.
- Under these circumstances it is important to investigate the impacts of task characteristics, technology characteristics, economics and IT infrastructure factors on the organisational decision-making process.
- This study recommends an introductory model based on the findings from the literature review and conceptual reasoning. The descriptive and analytical power of the model will be validated by and adapted to a set of printing industry case studies in the next phase.

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