AI Adoption in the Printing Industry: an FVM Perspective

Muhammad Yusuf Masod 1, Siti Farhana Zakaria 1, Ruslan Abdul Rahim 1

1 Faculty of Art & Design, Universiti Teknologi MARA (UiTM), Malaysia, myusuf252@gmail.com

Introduction

- Malaysia’s manufacturing sector is moving towards a higher value-added process, with digitisation, advanced manufacturing technologies and efficient resource utilisation. All this is meant to ensure the manufacturing sector remains relevant and competitive both locally and globally
- Artificial intelligence, among other innovations, has been recognized as the enabling technology for Industry 4.0
- AI offers solutions that are becoming crucial tools in organisational management assistance, especially as regards improvements in decision-making processes. Therefore, AI solutions are expected to bring a new dimension to the industrial environment, resulting in a dramatic increase in industrial productivity

- This evolution looks to include the rapidly-changing global print manufacturing landscape, which is seeing growing calls for printing firms to re-evaluate their current approaches and strategies so as to remain relevant and competitive. Currently, the Malaysian printing industry is operating in survival mode
- due to its participants' inability to invest large sums to import the latest, and thereby expensive machinery, leaving small firms unable to compete against the giants [1].

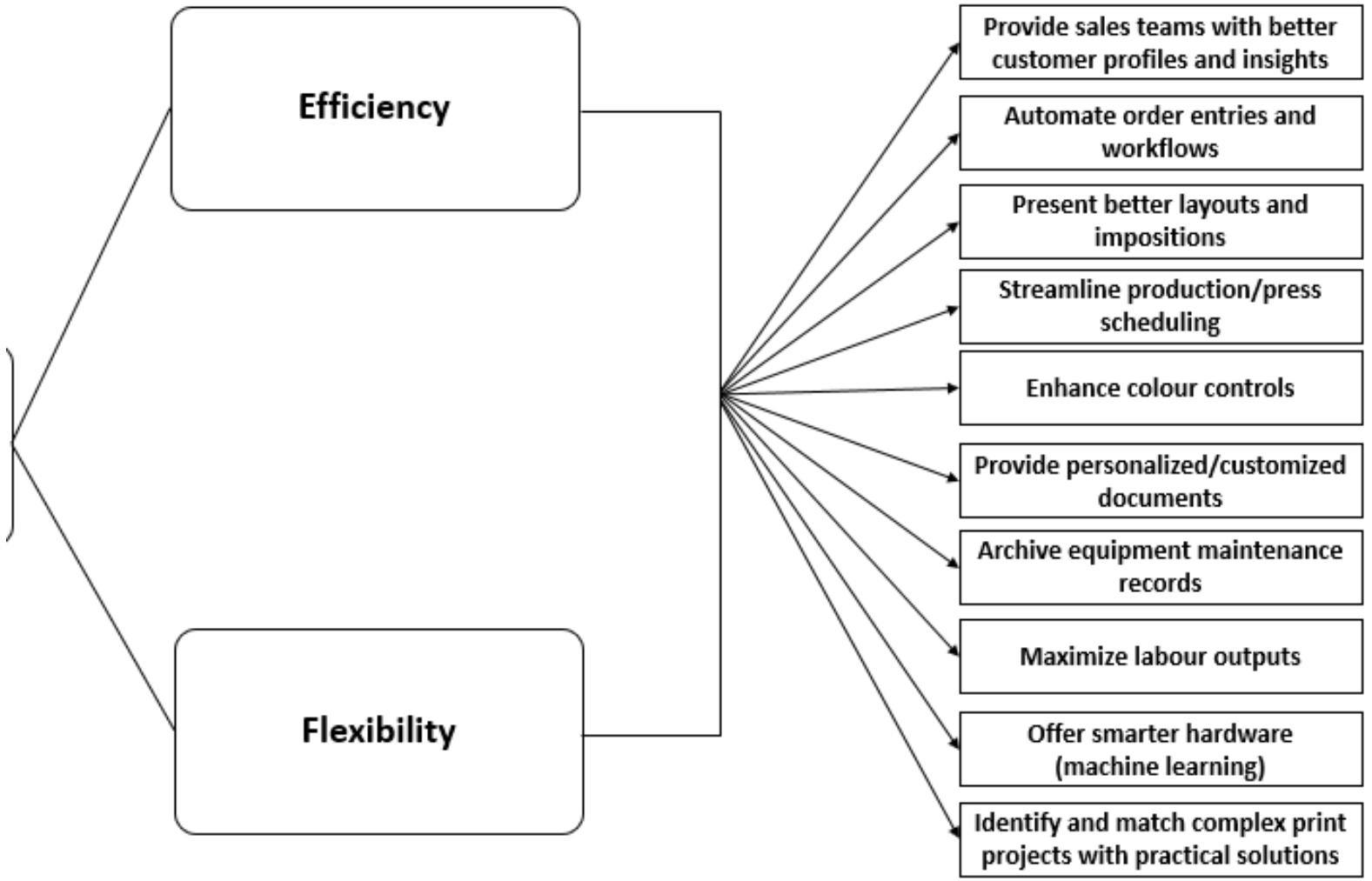
Research questions

- This paper thus aims to fill this gap by answering the following research questions:
    - ***What theoretical framework can be used in studying the printing industry's adoption of artificial intelligence solutions in Malaysia?***
    - ***What are the identifying factors that may affect the adoption of AI solutions in the printing industry?***

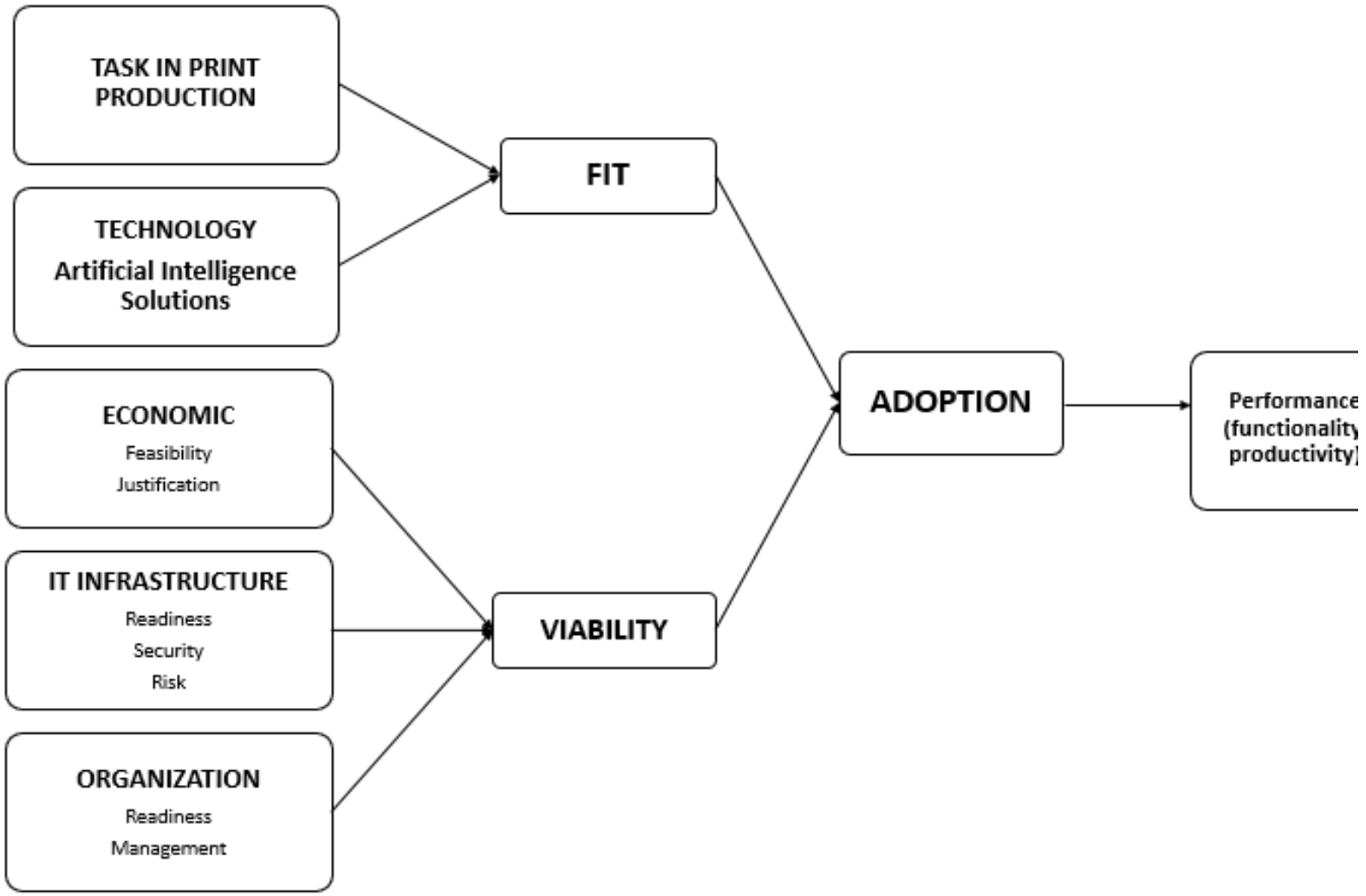
AI in the printing industry

While aiming to enhance the efficiency and flexibility of an organisation, AI also opens up new opportunities for

- greater efficiency ;
- greater protection;
- greater automation;



The characteristics and economic value of AI solution.



FRAMEWORK FOR ADOPTING ARTIFICIAL INTELLIGENCE FROM THE FIT-VIABILITY MODEL

Discussion And Conclusion

- The purpose of this ongoing research is to conceptualize a framework to investigate AI solutions implementations in the printing industry
- We recognize that AI is an enabling technology for Industry 4.0, and in order to support government initiatives to enhance productivity in the manufacturing sector, particularly in the printing industry, we feel it is necessary and critical to look at the organisational and task/technology characteristics of today‘s global business environment
- As with any other IS implementations, AI solutions implementations comprise technology as well as human involvement.
- 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. Thus, in this research, the importance of studying systems’ viability and fit prior to adoption is stressed. Therefore, the proposition of this study is to perform the required tasks-to-technology needs analysis to determine a good fit for the required tasks. In addition, viability and fit should have positive effects on the organisation’s performance, which can be measured by functionalities and productivity

References

REFERENCES

1. Willy, A. M. (2018). **Malaysian print media business model a dying breed in digital age , says HLIB Research**. Retrieved April 24, 2019, from The Edge Markets website: https://www.theedgemarkets.com/article/malaysian-print-media-business-model-dying-breed-digital-age-says-hlib-research
2. Masod, M. Y. Bin. (2018). **Reinventing Printing Business towards Industry 4.0**. *Journal of Printing Science and Technology*, *55*(6), 566–569
3. Melnikov, A. V., & Semenyuk, E. P. (2014). **The information revolution and the modern printing industry.** *Scientific and Technical Information Processing*, *41*(1), 1–11. https://doi.org/10.3103/S0147688214010031
4. Kipphan, H. (Ed.). (2001). ***Handbook of Print Media***. https://doi.org/10.1007/978-3-540-29900-4
5. Hultén, P., Viström, M., & Meitoft, T. (2009). **New printing technology and pricing**. *Industrial Marketing Management*, *38*(3), 253–262.
6. Li, B., Hou, B., Yu, W., Lu, X., & Yang, C. (2017). **Applications of artificial intelligence in intelligent manufacturing: a review**. *Frontiers of Information Technology & Electronic Engineering*, *18*(1), 86–96.
7. Bodrow, W. (2017). **Impact of Industry 4.0 in service oriented firm**. *Advances in Manufacturing*, (November).
8. Reiner, A. (2014). **Industrie 4 . 0 - Advanced Engineering of Smart Products and Smart Production**. *International Seminar on High Technology*, (October), 1–14.
9. Soja, P., & Paliwoda-Pekosz, G. (2009). **What are real problems in enterprise system adoption?** *Industrial Management and Data Systems*, *109*(5), 610–627.
10. Petr, S. (2018). **Towards Autonomous AI Systems for Resource Management: Applications in Industry and Lessons Learned**. In Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) (pp. 12–25).
11. Ding, Y., & Qu, W. G. (2014). **a Multi-Level Model of Enterprise Systems Adoption**. *Proceedings - Pacific Asia Conference on Inform Ation Systems, PACIS 2014*, 2019.
12. Awa, H. O., Ukoha, O., & Emecheta, B. C. (2016). **Using T-O-E theoretical framework to study the adoption of ERP solution**. *Cogent Business and Management*, *3*(1), 1–23.
13. Xu, Z., Brown, D., & Stevenson, M. (2017). **ES Adoption in Chinese SMEs: Policy Effects on Users and Providers**. *AMCIS 2017 - America's Conference on Information Systems: A Tr Adition of Innovation, 2017*, 1–23
14. Karlovits, I. (2017). **Technologies for using Big Data in the paper and printing industry.** *Journal of Print and Media Technology Research*, *6*(July), 75.
15. Roos, A. (2016). **Business Models and Strategy finding for the Printing Industries**. *International Circular of Graphic Education and Research*, (9), 71–82.
16. Baray, S., Hameed, S., & Badii, A. (2008). **Analysing the factors responsible for effectiveness of implementation and integration of enterprise resource planning systems in the printing industry**. *Journal of Enterprise Information Management*, *21*(2), 139–161.
17. Dosilovic, F. K., Brcic, M., & Hlupic, N. (2018). ***Explainable artificial intelligence: A survey***. 210–215.
18. Mata, J., de Miguel, I., Durán, R. J., Merayo, N., Singh, S. K., Jukan, A., & Chamania, M. (2018). **Artificial intelligence (AI) methods in optical networks: A comprehensive survey.** *Optical Switching and Networking*, *28*, 43–57.
19. Murphy, K. P. (2012). **Machine Learning: A Probabilistic Perspective.**
20. Tan, K.-H., & Lim, B. P. (2018). **The artificial intelligence renaissance: Deep learning and the road to human-Level machine intelligence.** *APSIPA Transactions on Signal and Information Processing*, *7*.
21. Doshi-Velez, F., & Kim, B. (2017). **Towards A Rigorous Science of Interpretable Machine Learning.** *Towards a Rigorous Science of Interpretable Machine Learning*. Retrieved from
22. Goertzel, B., & Pennachin, C. (2007). **Artificial General Intelligence**. In Ben Goertzel & C. Pennachin (Eds.), Artificial General Intelligence.
23. Russell, S., & Norvig, P. (2018). ***Artificial Intelligence: A Modern Approach, Global Edition*** (3rd edition). Essex: Pearson Education Limited.
24. Li, B., Hou, B., Yu, W., Lu, X., & Yang, C. (2017). **Applications of artificial intelligence in intelligent manufacturing: a review**. *Frontiers of Information Technology & Electronic Engineering*, *18*(1), 86–96.
25. Naser, M. Z. (2018). **Deriving temperature-dependent material models for structural steel through artificial intelligence**. *Construction and Building Materials*, *191*, 56–68.
26. Renzi, C., Leali, F., Cavazzuti, M., & Andrisano, A. O. (2014). **A review on artificial intelligence applications to the optimal design of dedicated and reconfigurable manufacturing systems**. *International Journal of Advanced Manufacturing Technology*, *72*(1–4), 403–418.
27. Tjan, A. K. (2001). **Finally, a Way to Put Your Internet Portfolio in Order**. *Harvard Business Review*. Retrieved from https://hbr.org/2001/02/finally-a-way-to-put-your-internet-portfolio-in-order
28. Liang, T. P., Huang, C. W., Yeh, Y. H., & Lin, B. (2007). **Adoption of mobile technology in business: A fit-viability model**. *Industrial Management and Data Systems*, *107*(8), 1154–1169.
29. Goodhue, D. L., & Thompson, R. L. (1995). **Task-Technology Fit and Individual Performance**. *MIS Quarterly*, *19*(2), 213.
30. Zigurs, I., & Buckland, B. K. (1998). **A Theory of Task/Technology Fit and Group Support Systems Effectiveness**. MIS Quarterly, 22(3), 313.
31. Turban, E., Liang, T.-P., & Wu, S. P. J. (2011). **A Framework for Adopting Collaboration 2.0 Tools for Virtual Group Decision Making**. *Group Decision and Negotiation*, *20*(2), 137–154.

31. Turban, E., Liang, T.-P., & Wu, S. P. J. (2011). **A Framework for Adopting Collaboration 2.0 Tools for Virtual Group Decision Making**. *Group Decision and Negotiation*, *20*(2), 137–154.
32. Davenport, T. H. (1998). **Putting the enterprise into the enterprise system**. *Harvard Business Review*, *76*(4), 121–131.
33. Tan, S.-Y., Rosnah, I., & Wong, W. P. (2012). ***Misfits between Manufacturing Resource Planning (MRPII) system and manufacturing environment: A Misfit-Inviability Model*** (Vol. 383–390, pp. 6784–6791). Vol. 383–390, pp. 6784–6791.
34. O'Donnell, J., & Jackson, M. (2007). **Solutions drawn from Australian case studies in mobile commerce.** *Conference Proceedings - 6th International Conference on the Management of Mobile Business, ICMB 2007*.
35. Kolbjornsrud, V., Amico, R., & Thomas, R. (2016). **The Promise of Artificial Intelligence: Redefining Management in the Workforce of the Future**. *Accenture Institute for High Performance and Accenture Strategy*, 1–23. Retrieved from https://www.accenture.com/_acnmedia/PDF-32/AI in Management Report.pdf%0Ahttp://0-search.proquest.com.catalog.lib.cmich.edu/docview/199816232?accountid=10181%5Cnhttp://sfxhosted.exlibrisgroup.com/cmich?url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:
36. Jones, G. R., & Hill, C. W. L. (1988). **Transaction cost analysis of strategy-structure choice.** *Strategic Management Journal*, *9*(2), 159–172.
37. Miller, K. D. (1992). **A Framework for Integrated Risk Management in International Business**. *Journal of International Business Studies*, *23*(2), 311–331.
38. Umble, E. J., Haft, R. R., & Umble, M. M. (2003**). Enterprise resource planning: Implementation procedures and critical success factors** European Journal of Operational Research, 146, 241–257.
39. Gupta, S., Misra, S. C., Kock, N., & Roubaud, D. (2018). **Organizational, technological and extrinsic factors in the implementation of cloud ERP in SMEs.** *Journal of Organizational Change Management*, *31*(1), 83–102.
40. Mohammed, F., Ibrahim, O., & Ithnin, N. (2016). **Factors influencing cloud computing adoption for e-government implementation in** developing countries. Journal of Systems and Information Technology, 18(3), 297–327.
41. Grublješič, T., & Jaklič, J. (2015). **Business Intelligence Acceptance: The Prominence of Organizational Factors**. *Information Systems Management*, *32*(4), 299–315.
42. DeLone, W. H., & McLean, E. R. (2003). **The DeLone and McLean model of information systems success: A ten-year update**. *Journal of Management Information Systems*, *19*(4), 9–30.
43. Poon, P., & Wagner, C. (2001). **Critical success factors revisited: Success and failure cases of information systems for senior executives**. *Decision Support Systems*, *30*(4), 393–418.
44. Bajwa, N. K., Singh, H., & Kumar De, K. (2017). **Critical success factors in electronic health records (EHR) implementation: An exploratory study in north India**. *International Journal of Healthcare Information Systems and Informatics*, *12*(2), 1–17.
45. Laudon, K. C., & Laudon, J. P. (2014). ***Management Information Systems. Managing The digital*** **(13th ed.).** Edinburgh: Pearson Education Limited.
46. Weill, P., & Vitale, M. (2002**). What IT infrastructure capabilities are needed to implement e-business models?** *MIS Quarterly Executive*, *1*(1), 17–34.
47. Zeng, J., Jackson, S., Lin, I.-J., Gustafson, M., Hoarau, E., & Mitchell, R. (2013). **Operations simulation of on-demand digital print**. *IEEE Conference Anthology*, 1–5.