**AI BASED DISCOURSE FOR BANKING INDUSTRY**

**Introduction**

Digital innovations in the modern banking landscape are no longer discretionary for fnancial institutions; instead, they are becoming necessary for fnancial institutions to cope with an increasingly competitive market and changing customer expectations (De Oliveira Santini, 2018; Eren, 2021; Hua et al., 2019; Rajaobelina and Ricard, 2021; Valsamidis et al., 2020; Yang, 2009). In the era of modern banking, many new digital technologies have been driven by artifcial intelligence (AI) as the key engine (Dobrescu and Dobrescu, 2018), leading to innovative disruptions of banking channels (e.g., automated teller machines, online banking, mobile banking), services (e.g., imaging of checks, voice recognition, chatbots), and solutions (e.g., AI investment advisors and AI credit selectors). The application of AI in banking is across the board, with uses in the front ofce (voice assistants and biometrics), middle ofce (anti-fraud risk monitoring and complex legal and compliance workfows), and back ofce (credit underwriting with smart contracts infrastructure). Banks are expected to save $447 billion by 2023, by employing AI applications. Almost 80% of the banks in the USA are cognizant of the potential benefts ofered by AI (Digalaki, 2022). Indeed, the emergence of AI has generated a wealth of opportunities and challenges (Malali and Gopalakrishnan, 2020). In the banking context, the use of AI has led to more seamless sales and has guided the development of efective customer relationship management systems (Tarafdar et al., 2019). While the focus in the past was on the automation of credit scoring, analyses, and the grants process (Mehrotra, 2019), capabilities evolved to support internal systems and processes as well (Caron, 2019).

**Literature Survey**

Adhering to the best practices for conducting a Systematic Literature Review (SLR) (see Khan et al., 2003; Tranfeld et al, 2003; Xiao and Watson, 2019), we began by selecting the appropriate database and identifying keywords, based on an in-depth review of the literature. Research papers were extracted from Web of Science (WoS) and Scopus. These databases were selected to complement one another and provide access to scholarly articles (Mongeon and Paul-Hus, 2016); this was also the frst step in ensuring the inclusion of high-quality articles (Harzing and Alakangas, 2016). The following query was used to search the title, abstract, and keywords: “Artifcial intelligence OR machine learning OR deep learning OR neural networks OR Intelligent systems AND Bank AND consumer OR customer OR user.” The keywords were selected, based on prior literature review, with the goal of covering various business functions, especially focusing on the banking sector (Loureiro et al., 2020; Verma et al., 2021; Borges et al., 2020; Bavaresco et al., 2020). The initial search criteria yielded 11,684 papers. These papers were then fltered by “English,” “article only” publications, and using the subject area flter of “Management, Business Finance, accounting and Business,” which resulted in 626 papers. In this study, we used the preferred reporting method for systematic reviews and meta-analyses (PRISMA) to ensure that we follow the systematic approach and track the fow of data across diferent stages of the SLR (Moher et al., 2009). After extracting the articles, each of the 626 papers was given a distinctive ID number to help diferentiate the papers; the ID number was maintained throughout the analysis process. The data were then organized using the following columns: “ID number,” “database source,” “Author,” “title,” “Abstract,” “keywords,” “Year,” Australian Business Deans Council (ABDC) Journals, “and keyword validation columns.” The exclusion of papers was done systematically in the following manner: a) All duplicate papers in the database were eliminated (105 duplicates); b) as a second quality check, papers not published in ABDC journals (163 papers) were omitted to ensure a quality standard for inclusion in the review,Query a practice consistent with other recent SLRs (Goyal and Kumar, 2021; Nusair et al., 2019; Pahlevan-Sharif et al., 2019); c) in order to ensure the relevance of articles included, and following our research objectives, we excluded non-consumer-related papers, searching for consumers (consumer, customer, user) in the title, abstract, and keywords; this resulted in the removal of 314 papers; d) for the remaining 48 papers, a relevance check was manually conducted to determine whether the papers were indeed related to AI and banking. Papers that specifcally focused on the technical computational process of AI were removed (4 papers). This process resulted in the selection of 44 articles for subsequent analyses.

In the Customer theme (, we uncovered the increasing use of AI as a methodological tool to better understand customer adoption of digital banking services. The sub-theme AI and Customer adoption (11 papers) covers the use of AI as a methodological tool to investigate customers’ adoption of digital banking technologies, including both barriers and motivational factors. For example, Arif et al. (2020) used a neural network approach to investigate barriers to internet-banking adoption by customers. Belanche et al. (2019) investigate factors related to AI-driven technology adoption in the banking sector. Payne et al. (2018) examine the drivers of the usage of AI-enabled mobile banking services. In addition, bank marketers have found an opportunity to use AI to better segment, target, and position their banking products and services. The sub-theme, AI and marketing (nine papers), covers the use of AI for diferent marketing activities, including customer segmentation, development of marketing models, and delivery of more efective marketing campaigns. For example, Smeureanu et al. (2013) proposed a machine learning technique to segment banking customers. Schwartz et al. (2017) utilized an AI-based method to examine the resource allocation in targeted advertisements. In recent years, there has been a noticeable trend in investigating how AI shapes customer experience (Soltani et al., 2019; Trivedi, 2019). The sub-theme of AI and customer experience (Papers 11) covers the use of AI to enhance banking experience and services for customers. For example, Trivedi (2019) investigated the use of chatbots in banking and their impact on customer experience. Table 1 highlights the number of papers included in the themes and sub-themes. Overall, the papers related to Processes (77%) were the most frequently occurring, followed by Customer (59%) and Strategy-based (48%) papers. From 2013 onward, there was an increase in the inter-relation between all three areas of Strategy, Processes, and Customers. Since 2016, there has been a surge in research linking the themes of Processes and Customers. More recently, since 2017, papers combining Customers with Strategy have become more frequent.

**Thematic analysis**

A thematic analysis classifies the topics and subtopics being researched. It is a method for identifying, analyzing, and reporting patterns within data (Boyatzis, 1998). We followed Chatha and Butt (2015) to classify the articles into themes and sub-themes using manual coding. Second, we employed the Leximancer software to supplement the manual classification process. The use of these two approaches provides additional validity and quality to the research findings. Leximancer is a text-mining software that provides conceptual and relational information by identifying concept occurrences and co-occurrences (Leximancer, 2019). After uploading all the 44 papers onto Leximancer, we added “English” to the stoplist, which removed words such as “or/and/like” that are not relevant to developing themes. We manually removed irrelevant filler words, such as “pp.,” “Figure,” and “re.” Finally, our results consisted of two maps: a) a conceptual map wherein central themes and concepts are identified, and b) a relational cloud map where a network of connections and relationships are drawn among concepts.

**Reference link**

* Journal of Financial Services Marketing
* Donepudi, P. K. (2017). AI and Machine Learning in Banking: A Systematic Literature Review. Asian Journal of Applied Science and Engineering, 6(3), 157-162.