Gender & Behaviour, Vol. 22(1), 2024 **ISSN:** 1596-9231

A SYSTEMATIC REVIEW OF MOBILE INTELLIGENCE SYSTEM ADOPTION BY MICRO ENTREPRENEURS IN SOUTH AFRICA

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Abstract

To uncover the influencing factors that impact the adoption of MoIS by Micro entrepreneur and the challenges they face throughout the adoption process, an investigate into the micro-tasked embodied within the adoption process was conducted through the review of existing literatures on MOIS adoption. To achieve this, a qualitative research approach was used consisting of systematic review to scoop related literatures from diversified and robust database systems related to Micro entrepreneurs operating in different industries and particularly in South Africa. The paper selection process followed a multifaceted stage with the first stage having an overwhelmingly total of 1 439 papers from four prestigious databases, namely Science Direct, IEEE Xplore, Springer, ACM Digital Library using the North-West University Library portal. With further pruning using various inclusion and exclusion criteria, a total of 180 papers were selected for the review in the second stage. The third stage of selection sees the application of various logical operators to keywords and year of publication. The outcomes of the literature analysis reveal that the primary factors affecting the adoption of MoIS by Micro entrepreneur in South Africa are the high costs of MoIS devices and applications, insufficient skills and expertise, and the perceived complexity of the technology. Furthermore, the adoption process is plagued by resistance to change, limited resources, and a lack of support from stakeholders. Our study concludes that there is a need for further education and awareness about the benefits of MoIS and for the development of more affordable and user-friendly MoIS solutions for Micro entrepreneur business owners. These findings have significant implications for Micro entrepreneurs' MoIS solution providers, and policymakers, and can contribute significantly to the literature on MoIS adoption by entrepreneur globally.

Keywords: *Micro entrepreneurship adoption, Mobile intelligence system adoption, small scale business adoption, South Africa businesses, intelligence systems adoption, technology adoption for business.*

1.0 INTRODUCTION

Intelligence systems first appeared in the early 1960s as some of the earliest examples were developed by IBM and other mainframe companies. These systems were designed to give managers access to information stored in corporate database. Mobile intelligence systems (MoIS) first appeared in the late 1990s as a result of improvements in information systems and technology [1,2]. MoIS is a group of technological tools that enables organizations or entrepreneurs to gather, combine, and analyze data stored in data warehouses in order to better understand their prospects, strengths, and limitations [3,4]. MoIS support decision processes by i) allowing the systematic integration, management, and increased aggregation of unstructured and structured data, ii) coping with large volume of data, iii) giving end consumers more processing power so they can learn new information [5], and iv) providing ad hoc queries, reporting, and forecasts, as well as analysis solutions [6]. MoIS are like decision support systems (DSS), because they support varieties of users making decision

capabilities [7], reduce ambiguity in the decision-making process and to assist decision maker to be effective and efficient as part of the broader category of management support systems (MSS) [8]. Data warehouses (DW), online analytical processing (OLAP), and dashboards are examples of tools among others that are integrated into MoIS. While DW stores the needed data from various sources [9], OLAP aggregates multidimensional analysis in real time, for example products, customers, dates, countries, and region and dashboards provides a data visualization and reporting tools [7,10].

MoIS has become a major player in the information and communication technology (ICT) revenue gains. While in South Africa, ICT market was valued at US$33.49 billion in 2022 which is expected to reach US$45.10 billion in 2027 using compounded annual growth rate (CAGR) of 6.14% and the global artificial intelligence market was US$ 137 billion in 2022 and it is estimated to reach US$1,812 billion in 2030 using a CAGR of about 38%. In spite of these figures, many businesses do not benefit from MoIS as over 60% of MoIS programmes do not produce the results that were anticipated [11,12] and results in little or no advantages for businesses [13]. The best method to maximize the benefits of MoIS is to ensure its implementation at the grassroot level, that is, targeting the low-income earners and traders availing them affordable products that are ICT embedded.

Various researchers are investigating the most appropriate method to adopt MoIS by various enterprises for example, MoIS studies from 2000 to 2015 were analyzed to better understand the procedures by which firms can benefit from MoIS [12]. From 1997 to 2006, MoIS studies concentrated on research techniques [14]. From 2000 to 2011 50% of MoIS studies focused on defining and explaining the architecture of MoIS under a single framework while others focused on MoIS integration with other profession [15]. MoIS research has been undertaken extensively over the past 20 years, thousands of individual studies in the areas of adoption, use, or success at the organizational and personal levels have been published [13,16,17]. However, no significant research exists on adoption readiness of MoIS by micro-entrepreneurs as these group of traders are the lowest link and closest to the consumers in local communities and municipality and although, poor but possess significant purchasing power of consumable products. Research directions in MOIS adoption at the lowest level of entrepreneurship will not only assist in poverty reduction but will contribute immensely to improvement in health and wellbeing of the ordinary people. There is no single resource that contains research in MoIS adoption strategies hence this paper is aimed at providing a single source of references of MoIS by micro-entrepreneurs' adoption readiness and providing future research directions on MOIS adoption strategies.

2.0 BACKGROUND

2.1 Adopting New Technology

Ashlyn and Muleya [18] conducted a study that established factors that influence BIS adoption by SMMEs and then developed a framework to guide implementation. A pilot study was carried out by the researchers with 10 participate to test the viability of the method conducted using questionnaires. A total of 300 questionnaires were later used for the study with 275 analyzed using SPSS. The results shows that 86.7% of the SMMEs are in the class of Micro, very small, and Small Enterprises, while 11.3% were classified as Medium. Their conclusion shows that adopting BIS enhances the value of business operations and clients see the business as innovative.

Chikohora and Esiefarienrhe [19] conducted research among SMEs in Namibia on the adoption of BIS for the day-to-day operations of their business activities. They recommended the development of BIS readiness assessment tool for entrepreneurs to utilize in measuring their readiness to adopt BIS before undergoing the process of adoption. They went further to develop the BIS assessment software for evaluating entrepreneurs' adoption readiness.

Integrated model of the modified technology readiness index (TRI) with the extended expectation-confirmation model, in the context of information technology (E-ECM-IT) was used by

Humbani et. al. [20] in explaining mobile payment system where factor analysis statistical method was used to analysis data collected from 426 mobile app users. Their results indicate 81% of adoption variance and 78.5% of users intending to continue the use mobile payment services.

To mitigate SMME failure, Bushe [21] conducted interviews among supply chain professionals in 14 organizations and the results culminated to suggestions on how to strengthen entrepreneurs in their various businesses. They suggested that three factors may be responsible for failure of SMME namely entrepreneur incapacity, environmental inauspiciousness, and enterprise incompetency.

Developing a pathway for technological supply chain, making use of recent technological devices, and appointing capable personnel to manage an enterprise are key factor that should be managed when adopting technology according to the research conducted by Hartley et. al. [22] in the manufacturing and service sector.

Using a qualitative approach, Tlili et. al., [23] looked at the value placed on relevance with regard to organizational capital and adoption of integrated reporting in South Africa. Their research concluded that the mandatory IR adoption had a strong impact on the value relevance of OC. On the other hand, Moonasar et. al., [24] adopted a qualitative approach using in-depth interviews to examine the adoption of integrated reporting by the port industry in South Africa. They conducted sixteen interviews with recommendation that IT managers including decision makers should endeavor to utilize evidence-based principle to determine their maturity of cloud adoption. While Ochara et. al. [25] employed an interpretive, qualitative methodology using a case study of the ports authority adoption of mobile intelligence in South Africa.

To understand institutional resource pressure on adoption of big data with AI, Bag et. al., [26] conducted research in the automotive and allied industries in South Africa and the results indicated that such pressure can have moderating effects on organizational flexibility and industry dynamism.

Using Durban and Pietermaritzburg in South Africa, Ndayizigamiye and Khoase [27] studied the e-commerce adoption option relating it to SMEs business operations. The security of the internet was identified as key mitigating factor to e-commerce adoption.

2.2 Adoption Models

At various times, different theories, framework, and models have been developed to explain technology adoption with [19] going further to develop a blueprint and software for entrepreneurs to assess their readiness to adopt technology. Innovative technology adoption were investigated using Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), Theory of Planned Behavior (TPB), Diffusion of Innovation (DOI), and the TOE framework [4,19,28,29,30,33]. Even with the availability of these models, micro-entrepreneurs are still faced with challenges in adopting mobile technology which may be because of the challenges inherent in their environment and maybe cultural differences. Also, most authors mentioned the resistance of users, users fear of privacy violations, trust related issues and no clear benefits derivable from adoption in relation to investment cost may also likely be potential hindrances to adoption, Kim and Eunil [34] and Chikohora and Esiefarienrhe [19].

Inadequate data management is another category of risk considered to be present in the adoption process, according to Khan et al., [36]. The difficulty of setting up a technology and project costs, according to Najib and Fahma [30], is one of the major hazards that could prevent the acceptance of innovative technology and later render the use of planned technology ineffective. Igwe et al. [37] highlighted organizational competencies, such as a lack of top-management support and adequate technical, human, and temporal resources, competitiveness and supplier pressure, are potential barriers to the successful execution of technological and innovative projects adoption within organization [38].

2.3 Adopting BI Systems

The various tools, techniques, and software

programs known as BI systems are used to save, analyze, and display corporate data that is important for effective decision-making [39]. BI systems have grown to be essential to business because it offers organizations knowledge and information that, when applied appropriately will have a significant beneficial impact on micro-entrepreneurs. Various authors have concentrated on various stages of BIS implementation in business for instance, Hung et al. [40] used TOE determinants to study BIS implementation success factors among Taiwan's firms that took part in BIS implementation. They identified two key impacts of BIS adoption on user satisfaction and overall system efficacy while a study by Lautenbach et al. [41] examined the level of business intelligence and analytics (BI&A) utilization across 72 South African organizations. In their investigation of the effects of six TOE variables on the use of BIS. Lautenbach et al. found that half of them were important, including factors like data-related infrastructure capabilities, top management support, and external market influence. Owusu et al. [42] discusses how the TOE factors affected 120 private institutions in Malaysia's adoption of BIS by using five BIS adoption stages namely IS usage, data warehouse (DW) usage, DW and analytics usage, analytics and strategic tools usage, and real-time usage. While Owusu et al. concentrated on TOE determinants, Puklavec et al. [43] conducted a thorough literature analysis and qualitative research based on ten in-depth interviews with BIS and IT specialists working inside various European SMEs to identify 11 possibly impacting TOE variables on BIS adoption.

Despite BI systems adoption in various businesses is receiving increased attention in the scientific community, research on potential BI systems adoption hazards in SMEs has not been given much attention except for authors in [40,41] who briefly discussed the detrimental effect of observed variables on BI systems adoption. The effect of MOIS adoption on business deserves further research mostly as it affects micro-entrepreneurs.

3.0 RESEARCH METHODOLOGY

This research utilized the Systematic Literature Review (SLR) methodology which according to Esiefarienrhe et al., [44] involves scooping of reputable articles from various sources including the internet and major research and educational databases. The SLR has also been used for software-based articles [45] and have guidelines as set out in [46].

This SLR involved a thorough and exhaustive review of numerous studies that were related to MoIS and adoption readiness. As such, a rigorous search of four databases - Science Direct, IEEE Xplore, Springer, ACM Digital Library and NWU Library – were conducted with the aid of key terms namely: 1). Business intelligence, 2). Mobile systems and 3). The key terms apart from been used individually, we concatenated them according to the research topic, the research aim and objectives using logical operators (OR, AND) as follows: (“analytics“ OR “apparatus“ OR ‘‘business analysis” OR “business intelligence” OR “analytics reporting”) AND (‘‘portable system’’ OR ‘‘fluid system’’ OR ‘‘moving system’’ OR ‘‘wireless system” OR “versatile system” OR “active system”) AND (“Adoption readiness“ OR ‘‘adoption’’ OR ‘‘readiness’’ OR ‘‘adoption level’’). This strategy resulted in the retrieval of 242 papers from the above databases.

Ensuring that the papers meet the specific requirement for this review, an inclusion criterion was formulated based on the papers' ability to either address mobile intelligence adoption readiness, availability of the required keywords in the paper's title or in the keywords of the articles found. As a result of the application of the inclusion criteria on the retrieved papers, only 180 papers were selection out of the 242 initial papers. Furthermore, an exclusion criterion was applied targeting papers that only provided information on conference proceedings details without the full papers e.g papers with only abstracts, or had only a table of contents, or papers written in languages other than English were excluded resulting in a total of 84 papers. At this point, we needed to ensure that these 84 papers were of sufficient quality to be considered for the final review. To this end, a quality assessment procedure was carried out, which involved distributing the papers among different researchers along with a quality assessment checklist. This

checklist, developed by Kitchenham as shown in table 1 contained a series of questions that pertained to the presence of required outcomes (i.e., adoption readiness activities) in the papers.

Table 1: Kitchenhams' Quality assessment checklist [46]

S.No	Question	Answer
1	Is the goal of the paper be easily understood?	Yes/No/Partially
2	Do the findings hold credibility and importance, and are they presented clearly?	Yes/No/Partially
3	Are the prediction techniques employed adequately described and justified?	Yes/No/Partially
4	Does the research expand existing knowledge and understanding?	Yes/No/Partially
5	Has the research examined diverse perspectives and contexts?	Yes/No/Partially
6	Are the connections between data, interpretation, and conclusions apparent?	Yes/No/Partially
7	Is the level of detail, depth, and complexity of the data effectively communicated?	Yes/No/Partially

The process was highly collaborative, with each of the 84 papers randomly allocated to 14 Honors, Masters and PhD researchers within our research group in the department to thoroughly read and assessed. The 84 papers were numbered serially, and the numbers were written on a small piece of paper and compressed to hide the number written on them. The pieces of paper were kept inside a container, mixed, and each researcher was asked to take a piece and only take another piece when others have taken resulting in each of the 14 researchers picking 6 pieces of papers. The numbers written on the papers were then used to allocate the articles to be reviewed thus eliminating bias in allocation.

The scoring scale for the questions in the quality assessment checklist was based on three categories: Yes, Partially, and No, with Yes receiving a score of 1, Partially receiving a score of 0.5, and No receiving a score of 0. For each paper, the scores for each of the questions were accumulated, with papers whose accumulated values fell between 0.5 and 1 were chosen for the final review.

After completing the quality assessment procedure, we found that the accumulated score of 41 papers fell below 0.5, rendering them unsuitable for further consideration. Thus, only 43 papers were deemed worthy of a more thorough examination, with the hope that they would yield valuable insights into mobile intelligence adoption readiness for micro-entrepreneur.

INFORMATION EXTRACTION

In order to gather data for analysis, a rigorous process was undertaken. First, data from each of the selected papers were extracted based on various parameters such as data source (i.e., the database), title, publication type (i.e., whether it was a journal article, conference paper, book chapter, or thesis), the name of the conference, journal, book, or thesis, publication year, author names, methodology applied in the paper, and mobile intelligence adoption readiness activities. The data extraction form used for this purpose is presented in table 2, which contains detailed fields related to each of the parameters.

Table 2: Information Extracted

Field	Data Extracted
Data Source	Science Direct (MDPI)
Title	Conceptualising a Cloud Business Intelligence Security Evaluation Framework for Small and Medium Enterprises in Small Towns of the Limpopo Province, South Africa
Author(s)	Moyo and Moses
Publication Year	2021
Pub. Type	Journal
Journal Name	Improving Cybersafety Maturity of South African Schools
Methodology	They used three online survey questionnaires to collect data and validated their findings at different stages of this study.
Findings	A significant association between the overall relevance of components and suggested activities of the Cloud BI security evaluation framework and the overall score of all measured aspects at $p < 0.05$.

The process of data extraction was quite arduous and required significant effort from the research team. A comprehensive metadata record was created for each paper, which included information on all the extracted data points. These metadata records were maintained in an organized manner.

Overall, the data extraction process was critical to the success of this study and helped to ensure that all relevant information was captured in a structured and consistent manner. By following this rigorous approach, we were able to create a comprehensive dataset that served as the foundation for our subsequent analyses and findings.

DATA SYNTHESIS

We meticulously and laboriously engaged in the arduous task of meticulously extracting pertinent data from every carefully-selected paper based on a myriad of meticulously-determined fields, including but not limited to the data source (database), title, publication type (journal, conference, book chapter, thesis), conference/journal/book/thesis name, publication year, author's name, methodology employed in the paper, and mobile intelligence adoption readiness activities. This herculean effort involved much diligence and tenacity, with every detail being painstakingly recorded in a comprehensive data extraction form (as shown in Table 2). The metadata for each paper, which was diligently and painstakingly maintained and recorded. An extensive array of microtasking activities, will be presented and thoroughly scrutinized in the results section.

RESULTS AND DISCUSSION

In this particular section of the paper, we share our findings in regards to the distribution statistics of studies based on various parameters such as databases, years and publication types. This is followed by the presentation of mobile intelligence adoption readiness activities, along with their respective categories.

OVERVIEW OF FINAL PAPERS

The distribution of the final review papers among the five databases in which they were retrieved as shown in figure 2 shows that the highest retrievals were from ACM database followed by NWU database, Science Direct and Springer and IEEE having the same numbers of papers. This SLR covers papers published between 2018 to 2023 as shown 1, as seen in figure 1.

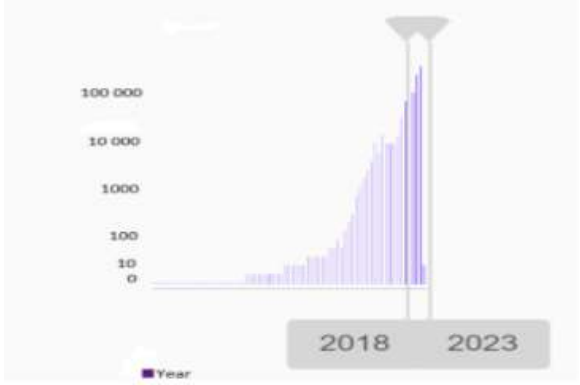

Fig 1: Years of Studies

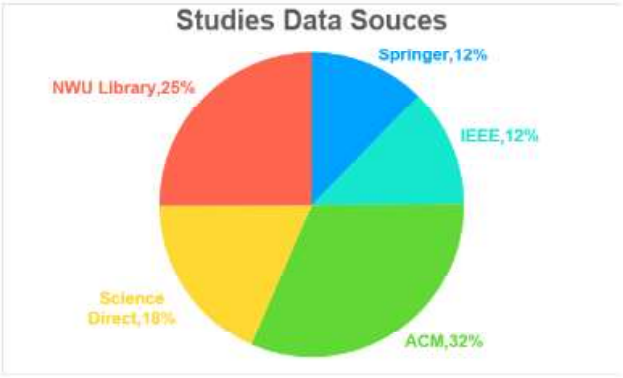

Fig 2: Studies Data Sources

Looking into the publication type, out of the 43 studies, 19 papers are from proceedings in peer review conferences, 17 were published as articles in journals, 4 papers presented in Book chapters, 1 paper each from early access articles (pre-print) Standards and Magazines as shown in figure 3.

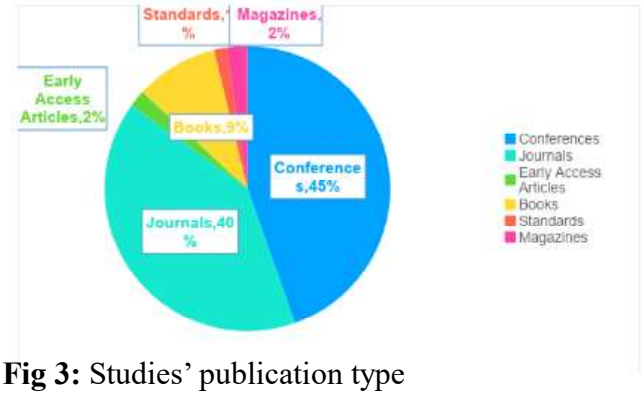

Fig 3: Studies' publication type

VALIDATION

The experts were consulted to validate the mobile intelligence adoption readiness activities and their categories identified in the context of business intelligence adoption readiness. Four experts, including two from academia and two from reputable business intelligence organizations, were selected based on their in-depth knowledge of technology adoption and mobile systems. The experts verified the uniqueness of mobile intelligence adoption readiness functionalities and their positioning under relevant categories. Additionally, they identified some duplications and suggested giving brief descriptions of each micro-task. The experts also recommended merging some activities with similar meanings and giving them a generic name, and creating a link between each micro-task and its relevant category through a short description.

After conducting an SLR and making recommended changes based on expert review, a total of 69 unique micro-tasking activities related to mobile intelligence adoption readiness were identified and grouped into their respective categories. These validated micro-tasking activities and their categories are presented in detail in Table 3.

Table 3: Micro-tasking Activities

1	Assessing organizational readiness	Define objectives and goals	Organizations should define the objectives and goals they aim to achieve through MoIS adoption. These objectives should be specific, measurable, achievable, relevant, and time-bound (SMART). This helps to ensure that the organization's MoIS efforts are focused and aligned with its overall strategy.
		Conduct a data audit	Organizations must conduct a thorough data audit to identify the types of data they have, where it is stored, and its quality. This helps to ensure that data is accurate, complete, and consistent across all sources to facilitate analysis.

		Evaluate existing technology infrastructure	Organizations must evaluate their existing technology infrastructure, including hardware, software, and network infrastructure, to ensure that it can support MoIS adoption. This includes assessing whether the organization has the necessary resources, such as computing power, storage capacity, and bandwidth, to support MoIS activities.
		Assess data management capabilities	Organizations must assess their data management capabilities, including data governance, data quality, data integration, and data security. This helps to ensure that data is properly managed and secured throughout the MoIS adoption process.
		Evaluate business processes	Organizations must evaluate their current business processes to determine whether they support or hinder MoIS adoption. This includes identifying any gaps or inefficiencies in current processes that may impact the success of MoIS initiatives.
		Identify key stakeholders	Organizations must identify key stakeholders who will be involved in MoIS adoption, including business users, IT staff, and executive management. This helps to ensure that all stakeholders are engaged and aligned with MoIS objectives.
		Develop a roadmap	Based on the results of the above activities, organizations should develop a MoIS adoption roadmap that outlines the steps required to achieve their MoIS objectives. This should include timelines, resource requirements, and key milestones.
		Establish a change management plan	Organizations must establish a change management plan that outlines how they will manage the changes that result from MoIS adoption. This should include strategies for communicating changes to stakeholders, addressing resistance to change, and ensuring that users are adequately trained and supported.
		Monitor progress	Organizations must monitor their progress towards MoIS adoption goals and objectives to ensure that they are on track. This may involve regularly reviewing key performance indicators (KPIs) and adjusting the MoIS roadmap as necessary.
2	Defining business objectives	Conduct stakeholder interviews	Conduct interviews with stakeholders, including senior executives and business leaders, to gain an understanding of the organization's goals and objectives. This will help to ensure that MoIS efforts are aligned with the organization's overall strategy.

	Identify key performance indicators (KPIs)	Identify KPIs that are relevant to the organization's goals and objectives. This involves identifying metrics that can be used to measure the performance of the organization and track progress towards achieving its goals.
	Define data requirements	Identify the data that is needed to support the KPIs and other metrics that have been identified. This involves defining data requirements for both internal and external data sources.
	Assess data availability and quality	Assess the availability and quality of the data that is needed to support the organization's goals and objectives. This includes identifying any gaps in data availability and assessing the quality of the data that is currently available.
	Identify MoIS use cases	Identify specific use cases where MoIS can support the achievement of the organization's goals and objectives. This involves identifying specific business processes or functions where MoIS can be used to drive insights and inform decision-making.
	Prioritize MoIS initiatives	Prioritize MoIS initiatives based on their potential impact on the organization's goals and objectives. This involves assessing the potential benefits of each initiative, as well as the level of effort required to implement them.
	Define success metrics	Define metrics that can be used to measure the success of MoIS initiatives in supporting the organization's goals and objectives. This involves defining metrics that can be used to track progress and assess the impact of MoIS efforts.
	Establish a governance framework	Establish a governance framework for MoIS that ensures that MoIS efforts are aligned with the organization's overall strategy and goals. This involves defining policies and procedures for MoIS, as well as roles and responsibilities for MoIS stakeholders.
	Develop a MoIS roadmap	Develop a roadmap for MoIS that outlines the initiatives that will be undertaken to support the organization's goals and objectives. This includes defining timelines, resource requirements, and milestones for MoIS initiatives.
3 Identifying data sources	Identify stakeholders	Identify stakeholders who have knowledge of the data that is generated within the organization. This includes business leaders, IT staff, data analysts, and subject matter experts.

		Review business processes	Review the organization's business processes to identify the data that is generated by each process. This includes reviewing operational processes, financial processes, and sales processes.
		Review data models	Review the organization's data models to identify the data that is stored in each database. This includes reviewing conceptual, logical, and physical data models.
		Conduct data inventory	Conduct an inventory of the organization's data sources to identify the location and type of data that is available. This includes reviewing databases, spreadsheets, and other data sources.
		Review data governance policies	Review the organization's data governance policies to understand the requirements for managing data. This includes reviewing policies related to data security, data quality, and data privacy.
		Identify external data sources	Identify external data sources that can be used for MoIS analysis. This includes data sources such as market research reports, government data, and social media data.
		Conduct data profiling	Conduct data profiling to understand the quality and completeness of the data that is available. This includes reviewing data for missing values, outliers, and inconsistencies.
		Analyze data relationships	Analyze the relationships between data sources to understand how data is connected across the organization. This includes identifying primary keys and foreign keys in databases.
		Prioritize data sources	Prioritize data sources based on their relevance to the organization's goals and objectives. This includes assessing the value of each data source and its potential impact on the organization's performance.
		Document data sources	Document the data sources that will be used for MoIS analysis, including the location, type, and characteristics of each data source. This includes creating a data catalogue or data dictionary to make it easier to access and use the data for MoIS analysis.
4	Implementing MoIS tools and systems	Identify MoIS requirements	Identify the MoIS requirements for the organization, including the types of data that will be analyzed and the types of analysis that will be performed. This includes identifying the business questions that need to be answered using MoIS.

	Research MoIS solutions	Research MoIS solutions that are available on the market and evaluate them against the organization's requirements. This includes researching MoIS platforms, data warehousing solutions, and data visualization tools.
	Conduct vendor evaluations	Conduct evaluations of MoIS vendors to determine which vendor offers the best solution for the organization's needs. This includes conducting product demonstrations, reviewing vendor references, and assessing the vendor's financial stability.
	Define data integration strategy	Define the strategy for integrating data into the MoIS solution, including the types of data that will be integrated and the methods that will be used for data integration.
	Design data architecture	Design the data architecture for the MoIS solution, including the data warehouse schema and data models. This includes designing the physical data storage infrastructure and defining data extraction, transformation, and loading (ETL) processes.
	Develop data governance policies	Develop data governance policies for the MoIS solution, including policies related to data quality, data security, and data privacy.
	Configure MoIS tools	Configure the MoIS tools and systems to support the organization's MoIS requirements. This includes configuring the data warehouse, setting up data integration processes, and configuring the MoIS reporting and visualization tools.
	Test MoIS solution	Test the MoIS solution to ensure that it meets the organization's requirements and that the data is accurate and consistent. This includes testing data integration processes, data quality, and data visualization capabilities.
	Train users	Train users on how to use the MoIS solution, including how to access and analyze data, and how to create reports and dashboards. This includes developing training materials and conducting training sessions.
	Monitor and maintain MoIS solution	Monitor the MoIS solution to ensure that it is performing as expected and that data quality is maintained over time. This includes monitoring performance, data quality, and data security, and implementing maintenance processes to ensure that the MoIS solution remains up-to-date and relevant.

5 Data integration and preparation	Identify data sources	Identify the data sources that will be used for MoIS analysis. This includes both internal and external data sources, such as customer data, sales data, and market data.
	Develop data integration strategy	Develop a strategy for integrating data from multiple sources into a single data warehouse or data mart. This includes defining the methods and tools that will be used for data integration.
	Define data quality requirements	Define the data quality requirements for the MoIS solution, including data accuracy, completeness, and consistency. This includes identifying any data cleansing or data transformation processes that need to be performed.
	Design data architecture	Design the data architecture for the MoIS solution, including the data warehouse schema and data models. This includes designing the physical data storage infrastructure and defining data extraction, transformation, and loading (ETL) processes.
	Perform data profiling	Perform data profiling to assess the quality of the data and identify any data quality issues. This includes reviewing data for missing values, outliers, and inconsistencies.
	Develop data cleansing rules	Develop rules for data cleansing, including data standardization and data normalization. This includes identifying any data cleansing tools that will be used to automate the process.
	Perform data transformation	Perform data transformation to prepare the data for analysis. This includes performing calculations, aggregations, and data formatting.
	Validate data	Validate the data to ensure that it is accurate and consistent across all sources. This includes comparing the data in the MoIS solution to the original data sources to ensure that the data has been integrated correctly.
	Document data preparation process	Document the data preparation process, including the methods and tools used for data integration, cleansing, and transformation. This includes creating a data dictionary or data catalog to help users understand the data.
	Monitor and maintain data quality	Monitor the quality of the data over time to ensure that it remains accurate and consistent. This includes implementing data quality checks and data governance policies to maintain the quality of the data.

6	Developing and deploying MoIS dashboards and reports	Identify data sources	Identify the data sources that will be used for MoIS analysis. This includes both internal and external data sources, such as customer data, sales data, and market data.
		Develop data integration strategy	Develop a strategy for integrating data from multiple sources into a single data warehouse or data mart. This includes defining the methods and tools that will be used for data integration.
		Define data quality requirements	Define the data quality requirements for the MoIS solution, including data accuracy, completeness, and consistency. This includes identifying any data cleansing or data transformation processes that need to be performed.
		Design data architecture	Design the data architecture for the MoIS solution, including the data warehouse schema and data models. This includes designing the physical data storage infrastructure and defining data extraction, transformation, and loading (ETL) processes.
		Perform data profiling	Perform data profiling to assess the quality of the data and identify any data quality issues. This includes reviewing data for missing values, outliers, and inconsistencies.
		Develop data cleansing rules	Develop rules for data cleansing, including data standardization and data normalization. This includes identifying any data cleansing tools that will be used to automate the process.
		Perform data transformation	Perform data transformation to prepare the data for analysis. This includes performing calculations, aggregations, and data formatting.
		Validate data	Validate the data to ensure that it is accurate and consistent across all sources. This includes comparing the data in the MoIS solution to the original data sources to ensure that the data has been integrated correctly.
		Document data preparation process	Document the data preparation process, including the methods and tools used for data integration, cleansing, and transformation. This includes creating a data dictionary or data catalogue to help users understand the data.
		Monitor and maintain data quality	Monitor the quality of the data over time to ensure that it remains accurate and consistent. This includes implementing data quality checks and data governance policies to maintain the quality of the data.

7	Establishing a MoIS governance framework	Define the scope and objectives	Define the scope and objectives of the MoIS governance framework. This includes identifying the business areas and data sources that will be included in the governance framework and the specific objectives for the governance framework.
		Identify stakeholders	Identify the stakeholders who will be involved in the governance framework. This includes identifying the business owners, data owners, IT staff, and other stakeholders who will have a role in the governance framework.
		Develop policies and procedures	Develop policies and procedures for data access, security, and quality control. This includes defining the roles and responsibilities of stakeholders and establishing processes for data classification, access control, data security, and data quality control.
		Establish a data governance council	Establish a data governance council to oversee the MoIS governance framework. This includes identifying the members of the council, defining the council's responsibilities, and establishing meeting schedules and agendas.
		Implement data governance tools	Implement data governance tools to support the governance framework. This includes selecting and implementing tools for data classification, access control, data security, and data quality control.
		Develop a communication plan	Develop a communication plan to ensure that stakeholders are aware of the MoIS governance framework and their roles and responsibilities. This includes establishing communication channels, developing communication materials, and conducting training and awareness sessions.
		Monitor and enforce policies	Monitor and enforce the policies and procedures established in the governance framework. This includes conducting regular audits, identifying areas of non-compliance, and taking corrective actions as needed.
		Review and update the governance framework	Review and update the governance framework on a regular basis to ensure that it remains effective and relevant. This includes incorporating feedback from stakeholders, identifying changes in the business environment, and making updates as needed.
		Align the governance framework with other frameworks	Align the MoIS governance framework with other frameworks, such as IT governance and enterprise risk management, to ensure that it is integrated with other business processes and activities.

		Measure and report on the effectiveness of the governance framework	Measure and report on the effectiveness of the MoIS governance framework to ensure that it is meeting its objectives. This includes defining performance metrics, collecting data, and reporting on the results.
8	Providing MoIS training and support	Identify user training needs	Identify the training needs of users who will be accessing and using the MoIS tools and systems. This includes identifying the specific skills and knowledge required to effectively use the tools and systems.
		Develop training materials	Develop training materials that address the identified training needs. This includes developing user manuals, tutorials, videos, and other training materials that are easy to follow and understand.
		Conduct training sessions	Conduct training sessions for users that cover the use of the MoIS tools and systems, as well as any relevant data analysis techniques. This includes providing hands-on training and allowing users to practice using the tools and systems.
		Provide ongoing support	Provide ongoing support to users to ensure that they can effectively use the MoIS tools and systems. This includes aiding with troubleshooting and answering any questions that users may have.
		Develop a community of practice	Develop a community of practice where users can share their experiences and best practices for using the MoIS tools and systems. This includes providing a forum for users to ask questions, share insights, and provide feedback.
		Conduct user surveys	Conduct user surveys to gather feedback on the effectiveness of the training and support provided. This includes asking users about the quality of the training materials, the effectiveness of the training sessions, and the level of support provided.
		Provide advanced	Provide advanced training for users who require more advanced skills and knowledge. This includes providing training on advanced data analysis techniques and the use of more advanced MoIS tools and systems.
		Provide ongoing communication	Provide ongoing communication to users about updates and changes to the MoIS tools and systems. This includes providing regular updates about new features and functionality, as well as any changes to policies and procedures.

	Evaluate training and support effectiveness	Evaluate the effectiveness of the training and support provided to users. This includes monitoring user adoption of the MoIS tools and systems, measuring the impact on business outcomes, and making improvements as needed.
	Align training and support with business goals	Ensure that the training and support provided align with the organization's overall business goals and objectives. This includes identifying the specific MoIS insights that will support the organization's goals and ensuring that the training and support provided helps users to effectively leverage those insights.

CONCLUSION AND FUTURE WORK

In this study we focused on identifying technology adoption readiness activities related to the readiness to adopt mobile intelligence using a systematic review method. Five digital libraries were explored to gather data from 47 studies and a total of 79 microtasks related to MOIS were identified which were classified into 8 categories. These microtask were validated through an expert review, resulting in a list of 79 unique microtasks. The findings of this study could assist future researchers, mobile intelligent organizations, and their clients in selecting the right adoption strategy for a specific micro entrepreneur business owner. Further research can explore the potential ways of finding mobile intelligence adoption readiness strategies and identify additional technology adoption readiness activities and categories. Given the increasing prevalence of technology adoption efforts in MoIS, it is imperative to explore the potential benefits and drawbacks of automated MoIS. A future research opportunity lies in the development of an MoIS adoption model capable of decomposing automated MoIS into micro-tasks. This could unveil the effects of automated MoIS on micro-tasked related activities and ultimately on mobile intelligence adoption readiness.

ACKNOWLEDMENT

The authors would like to thank the MaSIM Research entity and the Postgraduate office, North-West University for their assistance.

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