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The impact of advancements in digital technology on traditional methods of conducting retail business activities

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Abstract: The research paper is based on a secondary data analysis of data gathered from 180 retail business enterprises operating in three regions of the City of Johannesburg (Eastgate, Fourways and Rosebank) as part of a survey conducted by Worku and Muchie (2019: 349-362).The aim of research was to assess the level of efficiency in the optimal utilisation of digital technology for conducting retail business activities. The level of utilisation of appropriate digital methods and applications to conduct retail business activities was measured by using a composite index introduced by Nankervis, Connell, Montague and Burgess (2021). The study found that 71 of the 180 retail businesses in the survey (39.4%) were capable of using appropriate digital methods of conducting retail business activities optimally. The ability to use appropriate digital methods of conducting retail business activities optimally was significantly influenced by3 factors. These 3 factors are the level of awareness about the benefits of using digital methods for conducting retail business, the level of ICT skills, and the use of online methods for marketing and networking. The survey showed the need for administrative, technical and financial support to poorly resourced retail businesses.

Keywords: Retail businesses, digital methods, ICT skills, Adoption of digital technology

Introduction and background to study

Nankervis, Connell, Montague and Burgess (2021) have shown that retail businesses must be able to use appropriate digital methods of marketing, networking and conducting retail business activities as a means of lowering the cost of doing business, reaching out to enough customers who might show interest in their goods and services, and in the interest of remaining relevant, competitive and profitable in the market.

South African surveys conducted by Mhlanga and Moloi (2020), Olaitan, Issah and Wayi (2021) and Ocholla and Ocholla (2020) have shown that poorly resourced South African retail businesses are unable to use digital methods of retail business due to obstacles such as lack of skills in ICT, inability to pay for costly telecommunications services (voice, data and text messages), lack of awareness about the benefits of using digital and online methods of marketing and networking, and poor entrepreneurial skills. The authors have pointed out the need for tangible support to poorly resourced retail business enterprises that operate in South African locations, townships and cities.

The survey by Andreoni, Chang and Labrunie (2021:330-370) has provided a summary of opportunities and difficulties that are closely associated with the advancement of ICT and digital technologies that are currently being used for conducting, promoting and marketing goods and services. The major obstacles in developing communities are lack of awareness about the numerous benefits of digital technologies, difficulty in embracing and adopting new ideas, insecurity, poor technological and ICT skills, difficulty in using digital platforms, systems, processes and applications due to lack of technological skills, lack of ICT infrastructure, and the high cost of telecommunications services. The authors have suggested that the installation of essential infrastructural requirements is essential for digital technologies to be embraced by users. Doing so is the main responsibility of local municipalities and governments.

Ayentimi and Burgess (2019:641-652) have shown that digital technologies in Sub-Saharan African nations are inadequate due to lack of resources, lack of technical skills and the high cost of telecommunications and ICT services. The survey conducted by the researchers has found that national and local governments must be politically committed enough to lay out the infrastructure required for benefiting from digital technologies in all economic sectors.

Bousdekis, Apostolou and Mentzas (2019:57-62) have argued that the promotion of digital technologies by local and national governments is highly beneficial for growing revenue and creating employment opportunities from general service and retail activities. These services and activities can be performed more effectively by using digital technology. To do so, local, regional and national governments and municipalities must be willing to pay the cost of setting up the necessary infrastructure. Once such infrastructure is installed, it must be maintained regularly. Education needs to be provided to the general population so that people use the infrastructure effectively and appropriately and achieve socioeconomic benefits.

Literature review

Ryan, Van der Burg and Bogaardt (2022:493-507) have highlighted the implications of rapid advancement in the field of digital technology and the 4th industrial revolution. The authors have shown that advancements made in robotic engineering and artificial intelligence have enabled employers to replace human labour by machines in labour-intensive economic sectors such as agriculture, food processing, manufacturing, mining and retail business. Berx, Decre, Morag, Chemweno and Pintelon (2022:493-507) have identified areas in which humans and robots can work together to minimise risk at the workplace. The authors have shown that advancement in the 4th industrial revolution and digital technology will continue to enable employers to replace human beings by robots and that people who rely on low-skill and labour-intensive jobs stand to lose their employments in large numbers in the next several years. The authors have discussed the numerous socioeconomic benefits of promoting collaboration between machines and humans.

Castelo-Branco, Oliveira, Simoes-Coelho, Portugal and Filipe (2022) have outlined the main requirements and indicators of benefiting from digital technologies. Key among these requirements and indicators are the acquisition of technical skills, the availability of resources (Hirschi, 2018), the availability of digital and ICT equipment and infrastructure (Kayembe and Nel, 2019), the availability of enough resources to pay for maintenance and upgrade (Malatji and Mabeba, 2022), the ability to expand digital and telecommunications infrastructure (Mhlanga and Moloi, 2020), the provision of skills-based training services to potential users and stakeholders (Mkansi and Landman, 2021), and the ability to educate the youth on how to use and benefit from digital technology(Mtotywa, Manqele, Manqele, Moitse, Seabi & Mthethwa, 2022:265-279). Aspects of recommendations made by these authors require amendment to the educational curriculum as well as the provision of both theoretical and practical education (Elayyan, 2021:23-30). In this regard, Penprase (2018:978-981) and Min, Kim, Lee, Jang, Kim and Song (2019:400-408) have shown that theoretical lessons are not enough and that theoretical lessons must be strengthened by the provision of practical lessons until essential skills are mastered by learners. Yingi, Hlungwani and Nyagadza (2022:213-229) have achieved a similar finding based on a survey conducted in Zimbabwe.

Smuts, Van Der Merwe and Smuts (2021:423-438) have pointed out that poorly resourced and poorly skilled operators need to upgrade their level of competence in the use of ICT and digital methods on a regular basis. Due to the evolution that is occurring continually, it has become essential to upgrade skills in the use of digital technology on a regular basis. Poorly resourced retail businesses lack the resources for upgrading their technical skills, and require assistance from regional and national government agencies. Surveys carried out in various South African cities, townships and locations by Worku and Muchie (2019:349-362) and Serumaga-Zake and Van der Poll (2021:1-31) have found that emerging retail businesses lack the financial and technical capacity for acquiring and maintaining appropriate ICT and digital equipment and technology due to lack of formal education, lack of technical expertise and the high cost of telecommunications services. The authors have pointed out the need for practical support, close supervision, mentoring and coaching of novice entrepreneurs.

The survey by Postelnicu and Calea (2019:195-206) shows that there are challenges and difficulties that are commonly experienced by retail businesses. These difficulties and challenges undermine the pace and ease of adoption of advanced digital methods and applications among retail business operators globally. This is especially true in Sub-Saharan African countries. The main socioeconomic difficulties are financial and technical inequality among competitors in the same market, the fear of hacking, the fear of cyber threats, the theft and abuse of data, and disruptions that occur in traditional methods of conducting business. The other problem is difficulty in ensuring satisfactory ethical conduct among all stakeholders and competitors in similar markets. The survey by Saniuk, Grabowska and Grebski (2022:423-438) shows that socioeconomic difficulties such as inequality, fear of hacking and cyber threats, the theft of valuable data and personal information belonging to clients, customers, business partners and suppliers, disruptions caused in traditional methods of conducting business and difficulty in ensuring satisfactory ethical conduct by all stakeholders are challenges that undermine the extent to which digital technologies are adopted by emerging retail businesses.

Roblek, Thorpe, Bach, Jerman and Mesko (2020:1-27) shows that the future of retail businesses is bound to change radically due to advancements made in digital technology, artificial intelligence, automation, and the need to save operational cost. Trade unions stand to lose their level of influence in future due to rapid advancements made in digital technology, robotic engineering and artificial intelligence. Rapanyane and Sethole (2020:489-501) have shown that South African jobs in labor-intensive economic sectors such as mining, retail, the auto industry and manufacturing stand to lose traditional jobs significantly due to advancements made in digital technology, robotic engineering and artificial intelligence.

Avelino and Ismail (2021:2038-2055) and Coldwell (2019) have assessed factors that hinder the adoption of digital technology among learners and entrepreneurs. Both surveys have shown that the level of readiness to use appropriate digital teaching and learning methods and techniques is undermined by a combination of logistical and humane factors. The main obstacles are lack of commitment from leaders and administrators, lack

of technical, logistical, human and financial resources that are required for practical teaching and demonstrations, poor leadership, poor planning, poor motivation, income inequality and inadequate ICT and telecommunications infrastructure. Brondoni and Zaninotto (2018) have pointed out that the successful adoption of digital technology is hampered by inability to train employees by using appropriate teaching methods, shortage of experts who know how to teach, inability to purchase equipment required for digital technology, wrong perceptions such as the fear of losing jobs, lack of aptitude to learn new skills and techniques, and a negative attitude towards embracing change.

Bowers and Kirchberger (2021:613-636) have shown that digital technology is not so disruptive if proper coaching, supervision, teaching and mentoring services are provided to beginners. Workplace training services are highly effective in alleviating such obstacles. Avis (2018:337-363) has outlined key requirements for an effective vocational education and training involving digital technology. The main requirements are well-functioning digital equipment, power supply, software that are essential for providing routine services, reliable telecommunications and ICT services, and a reliable access to the internet. According to the author, meeting such requirements requires effective leadership and sound planning.

The survey by Benassi, Grinza, Rentocchini and Rondi (2022:112-136) indicates that the adoption of digital technology is hampered in most developing nations due to inability to pay for infrastructure. In Sub-Saharan African nations, the adoption of digital technology is undermined due to poor technological infrastructure, inability to embrace change, inability to pay for costly telecommunications services, difficulty in having reliable access to the internet at an affordable cost, difficulty in finding technical experts who could resolve digital and technical problems at an affordable cost, difficulty in sharing valuable information and technology, poor competency in science, ICT and numeracy, inadequate leadership and poor planning.

Objective of research

The objective of research was to assess the level of efficiency in the optimal utilisation of digital technology for conducting retail business activities. The level of utilisation of appropriate digital methods and applications to conduct retail business activities was measured by using a composite index introduced by Nankervis, Connell, Montague and Burgess (2021).

Methods and materials of study

The research paper is based on a secondary data analysis of data gathered from 180 retail business enterprises operating in three regions of the City of Johannesburg (Eastgate, Fourways and Rosebank) as part of a survey conducted by Worku and Muchie (2019: 349-362). The aim of research was to assess the level of efficiency in the optimal utilisation of digital technology for conducting retail business activities. The level of utilisation of appropriate digital methods and applications to conduct retail business activities was measured by using a composite index introduced by Nankervis, Connell, Montague and Burgess (2021).

Statistical methods of data analyses

Discriminant analysis (Hoffmann, Bertram, Mikut, Reischl and Nelles, 2019) was used for identifying influential predictor variables. The method was used to classify the 180 retail businesses into 2 groups with regards to their ability to optimally utilise digital technology for conducting retail business activities (Adequate, Inadequate). The reliability of measurement tools was ensured by using the Cronbach-Alpha test (Hair Jr, Wolfinbarger, Money, Samouel & Page, 2015). Coefficients obtained from the Cronbach-Alpha statistic were larger than 0.77, thereby confirming that they were accurate enough for measuring the variables of study in the research. Content validity was ensured by conducting a pilot study before conducting the actual study.

Results of study

Table 1 displays descriptive results about the 180 participants of research. About 39.4% of participants were capable of utilizing digital technology optimally based on the criteria defined by Nankervis, Connell, Montague and Burgess (2021).Businesses owned by families accounted for 44.44%. Private business enterprises accounted for 36.67%. Public business enterprises accounted for 8.89%. Other types of business enterprises accounted for 10%. The majority of participants were male (73.33%). In terms of age distribution, the largest age group (37.22%) belonged to participants with ages of 31 to 40 years. The second largest age group (35.56%) was for participants with ages of 21 to 30 years. The third largest age group was for participants with ages of 20 years or less. The smallest age group was for participants with ages of 41 to 50 years.

The participants of research had levels of educational qualifications that are commensurate with the average e-commerce operator in a developing economy. Just under 42% of participants had Master's degrees. Just above 33% of participants had Bachelor's degrees. The percentage of participants with certificates or lower academic qualifications was just under 24%. Businesses owned by families accounted for about 44% of all

businesses. Privately owned enterprises accounted for 37% of all businesses. Public business enterprises accounted for 9% of all businesses. Other types of businesses accounted for 10% of all businesses. About 5.56% of participants had worked for 12 months or shorter at the time of the survey; 31.67% of them for 13 to 48 months; 15% of them for 49 to 60 months; 47.78% of them for 61 months or longer. The duration of retail operation of the businesses was equal to the length of use of digital methods of conducting retail business activities.

Table 1: Demographic characteristics of participants of research (n=180)

Variable of study	**Percentage**
Ability to utilise digital technology optimally	Adequate: 71 (39.4%) Inadequate: 109 (60.6%)
Rosebank region Eastgate region Fourways region	60 (33.33%) 60 (33.33%) 60 (33.33%)
Businesses owned by families Private business enterprises Public business enterprises Other types of business enterprises	80 (44.44%) 66 (36.67%) 16 (8.89%) 18 (10.00%)
Sex of participant of research	Male: 132 (73.33%) Female: 48 (26.67%)
Age of participant of research	Less than or equal to 20 years: 21 (11.67%) 21 to 30 years: 64 (35.56%) 31 to 40 years: 67 (37.22%) 41 to 50 years: 20 (11.11%)
Educational level of qualification	Level of certificate or less: 43 (23.89%) Level of diploma: 12 (6.67%) Bachelor's degree: 42 (23.33%) Master's degree: 75 (41.67%) Doctoral degree: 8 (4.44%)
Length of operation of retail business	12 months or shorter: 10 (5.56%) 13 to 48 months: 57 (31.67%) 49 to 60 months: 27 (15.00%) 61 months or longer: 86 (47.78%)
Length of use of digital methods of conducting retail business activities	12 months or shorter: 10 (5.56%) 13 to 48 months: 57 (31.67%) 49 to 60 months: 27 (15.00%) 61 months or longer: 86 (47.78%)

Table 2 shows that 5.56% of participants were administrative managers. Senior employees accounted for 41.11%. Junior employees accounted for 29.44%. Support employees accounted for 23.89%. Based on the criteria set out in the study by Nankervis, Connell, Montague and Burgess (2021), about 11.11% of participants possessed good skills in digital technology. About 27.22% of participants possessed above-average skills. About 30.56% of participants possessed average skills. About 23.89% of participants possessed below-average skills. About 7.22% of participants possessed poor skills.

The percentage of participants with good level of ICT skills was 11.67%. The percentage of participants whose level of ICT skills were aboveaverage was 26.67%. The percentage of participants whose level of ICT skills was average was 31.11%. The percentage of participants with below-average level of ICT skills was 23.23%. The percentage of participants with poor level of ICT skills was 7.22%. The level of competence of participants with regards to working with computers was fairly similar to the the level of competence of participants with regards to using the internet for marketing goods and services and networking with other retail business operators and customers.

Table 2: Assessment of skills in the use of computers and the internet (n=180)

Variable of study	**Percentage**
Responsibility of participant in business	Administrative manager: 10 (5.56%) Senior employee: 74 (41.11%) Junior employee: 53 (29.44%) Support employee: 43 (23.89%)
Level of skills based on criteria set out by Nankervis, Connell, Montague and Burgess (2021)	Good: 20 (11.11%) Above average: 49 (27.22%) Average: 55 (30.56%) Below average: 43 (23.89%) Poor: 13 (7.22%)
Level of ICT skills of participants	Good: 21 (11.67%) Above average: 48 (26.67%) Average: 56 (31.11%) Below average: 42 (23.23%) Poor: 13 (7.22%)
Level of competence in working with computers	Good: 22 (12.22%) Above average: 47 (26.11%) Average: 55 (30.56%) Below average: 42 (23.33%) Poor: 14 (7.78%)
Level of competence in using the internet for marketing and networking	Good: 22 (12.22%) Above average: 47 (26.11%) Average: 55 (30.56%) Below average: 42 (23.33%) Poor: 14 (7.78%)

Table 3 shows estimates obtained from crosstab tests (Beh and Lombardo, 2021) in which 5 factors that are closely related to the optimal utilisation of digital technology in retail businesses are identified. The table shows that the optimal use of digital technology for conducting retail business is signficantly dependent upon 5 factors. These 5 factors are the level of awareness about the benefits of using digital methods for conducting retail business, the level of ICT skills, the use of online methods for marketing and networking, the duration of business operation, and the level of
entrepreneurial skills.

Table 3: Significant two-by-two relationships (n=180)

Factors significantly associated with the optimal utilisation of digital technology in retail businesses	Observed chi-square value	P-value
Level of awareness about the benefits of using digital methods for conducting retail business	9.4076	0.000
Level of information communication technology (ICT) skills	7.8321	0.000
Use of online methods for marketing and networking	6.1158	0.000
Duration of business operation	5.5227	0.000
Level of entrepreneurial skills	3.8787	0.000

Table 4 shows estimates obtained from binary logistic regression analysis (Hosmer & Lemeshow, 2013). The table shows that the optimal use of digital technology for conducting retail business is signficantly dependent upon 3 factors. These 3 factors are the level of awareness about the benefits of using digital methods for conducting retail business, the level of ICT skills, and the use of online methods for marketing and networking.

Table 4: Estimates from ordered logit regression analysis (n=180)

Factors that affect efficiency in the transfer of skills	Odds Ratio	P-value	95% C. I.
Level of awareness about the benefits of using digital methods for conducting retail business	4.46	0.0000	(3.78, 5.04)
Level of information communication technology (ICT) skills	4.37	0.0000	(3.73, 4.99)
Use of online methods for marketing and networking	3.98	0.0000	(3.33, 4.58)

Interpretation of significant odds ratios

The odds ratio of the variable "Level of awareness about the benefits of using digital methods for conducting retail business" is equal to 4.46. This indicates that a person who is adequately aware about the benefits of digital methods is 4.46 times more effective in the use of digital methods in comparison with a person who lacks awareness.

The odds ratio of the variable "Level of information communication technology (ICT) skills" is equal to 4.37. This indicates that a person who has adequate ICT skills is 4.37 times more effective in the use of digital methods in comparison with a person who lacks ICT skills.

The odds ratio of the variable "Use of online methods for marketing and networking" is equal to 3.98. This indicates that a person who uses online methods for marketing and networking is 3.98 times more effective in the use of digital methods in comparison with a person who does not use online methods for marketing and networking.

Discussion of results

The aim of research was to assess the level of efficiency in the optimal utilisation of digital technology for conducting retail business activities. The level of utilisation of appropriate digital methods and applications to conduct retail business activities was measured by using a composite index introduced by Nankervis, Connell, Montague and Burgess (2021). The study found that 71 of the 180 retail businesses in the survey (39.4%) were capable of using appropriate digital methods of conducting retail business activities optimally. The study has also shown that the optimal use of digital technology for conducting retail business is significantly dependent upon 3 factors. These 3 factors are the level of awareness about the benefits of using digital methods for conducting retail business, the level of ICT skills, and the use of online methods for marketing and networking.

The ability to embrace change requires awareness campaigns and teaching in classrooms. The study conducted in Australia by Nankervis, Connell, Montague and Burgess (2021) shows that embracing new technology requires adequate funding for the procurement of ICT and telecommunications infrastructure. There is a need for sound strategic planning in most Sub-Saharan African countries. It is essential to promote awareness campaigns and change management in Sub-Saharan African countries including South Africa. The evolution in digital technology is evidenced by the extensive use of robotic engineering for cutting down the cost of labour, the ever-growing reliance on large data sets gathered from consumers, the use of artificial intelligence for replacing routine menial low-skilled labour, the use of cloud technology for storing valuable data, as well as the ever-growing demand for high speed mobile telecommunications and internet services in all economic sectors globally.

Bowers and Kirchberger (2021:613-636) have highlighted the ability to cope with disruptions in traditional methods of conducting routine business. The adoption of up-to-date digital technology often leads to disruption in the use of traditional methods. The authors have shown that the main causes of frustration are the cost of acquiring new digital technology, the effort that needs to be made to master new methods and techniques, and the need for spending massive resources on training and the purchase of digital equipment and software. Nankervis, Connell, Montague and Burgess (2021) point out that the business model is dynamic and that it evolves depending on advancements in digital technology. As such, retail businesses must keep up with developments in methods that are used for conducting business. According to the authors, such an effort is essential to remain relevant to markets and that it could be viewed as a necessary investment into the future.

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