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SOCIAL AND BEHAVIORAL SCIENCES. Health Care Sciences

ORIGINAL RESEARCH

Conceptualizing a Model for the Use of Software as a Service to Improve the Dynamic Capabilities of Small and Medium Enterprises in Healthcare Sector

Authors' Contribution:
A – Study design;
B – Data collection;
C – Statistical analysis;
D – Data interpretation;
E – Manuscript preparation;
F – Literature search;
G – Funds collection

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Abstract

Background and Aim of Study: *To remain competitive in today's digital society, Small and Medium Enterprises (SMEs) in the healthcare sector need to consider effective ways to improve their dynamic capabilities (DCs) using Software as a Service (SaaS). SaaS and DCs are current key issues in both academia and practice.*
The aim of the study: to develop the conceptual model for the use of SaaS to improve the DCs of healthcare SMEs in South Africa.

Material and Methods: *The study employed Task-Technology Fit (TTF) and Fit Viability Model (FVM) as a lens to develop a model for the use of SaaS to improve the DCs of healthcare SMEs. To achieve the aim of the study, a deductive approach was followed. The study population was healthcare SMEs, in South Africa. The sampling frame was 384 randomly selected SMEs, in a self-administered survey.*

Results: *The study results show that customer service (β=0.125, $p<0.05$), sharing information (β=0.132, $p<0.05$), internet access (β=0.057, $p<0.05$), data security (β=0.022, $p<0.05$), top management support (β=0.427, $p<0.05$), competitive pressure (β=0.178, $p<0.05$), viability (β=0.325, $p<0.05$) and task-technology fit (β=0.032, $p<0.05$) are highly significant on the use of SaaS to improve the DCs of healthcare SMEs. While finance (β=0.235, $p>0.05$) and infrastructure (β=0.052, $p>0.05$) were found to be less significant.*

Conclusions: *The conceptual model was developed to identify and explain the factors influencing the use of SaaS to improve the DCs of healthcare enterprises. This model is based on TTF, FVM and external constructs (organisational and environmental characteristics) that are key to improving the DC of South African healthcare SMEs.*

Keywords: *dynamic capabilities, fit viability model, software as a service, small and medium enterprises, healthcare sector, South Africa*

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Introduction

In recent years, healthcare Small and Medium Enterprises (SMEs) have become an essential instrument for individuals in many countries across the globe (Fahmi et al., 2022; Raimo et al, 2023; Salisu et al., 2021). Additionally, healthcare sector SMEs improve the economy by providing services to patients, eradicating poverty, and generating new job opportunities (Balta et al., 2021; Moretti et al., 2023). Nonetheless, several scholars (Enesi & Ibrahim, 2021; Salisu et al., 2021) reported that the advent of COVID-19 caused significant harm to various enterprises across the globe. In support of this viewpoint, empirical studies conducted globally reported that 60% of SMEs face the challenge of liquidation and about 50% have stopped operating because of the lockdown measures (Bularafa & Adamu, 2021; Trawnih et al., 2021).

According to a plethora of research (Bularafa & Adamu, 2021; Khurana et al., 2022), while the COVID-19 pandemic impacted various sectors, the healthcare SMEs have witnessed a severe impact due to their lack of technological resources. Consequently, healthcare sector SMEs must use technology to enhance their performance and survive in the face of exogenous shocks (Preko & Boateng, 2020; Zimmermannova et al., 2022). In recent years, enterprises' use of Cloud services and digital products (Pypenko, 2019) has become widespread (Aceto et al., 2020; Moyo & Loock, 2021; Suhendi et al., 2020). The Internet enables healthcare organisations to communicate with patients anytime and anywhere (Deloitte UK's Centre for Health Solution, 2020; Raimo et al., 2023). One of those Cloud services is Software as a Service (SaaS) (Majengo & Mbise, 2022; Mokwena & Hlebela, 2018; Moyo & Loock, 2021). A plethora of scholarly literature elucidates that SaaS is viewed as a tool for facilitating communication mechanisms and drawing people together through sharing content (Alassafi, 2021; Loukis et al., 2019). Extant research refers to SaaS as a Cloud service model that enables various sectors to rent information and communication technology (ICT) services from a Cloud Service Provider (CSP) on the Internet (Khaki & Khan, 2023; Majengo & Mbise, 2022; Suhendi et al., 2020).

Within the various sectors, SaaS has taken a substantial role in healthcare SMEs (Deloitte UK's Centre for Health Solution, 2020; Moyo & Loock, 2021; Raimo et al., 2023). Recent scholarly literature indicates that the use of digital technologies (DTs) such as SaaS enables the healthcare SMEs to improve healthcare services, reduce costs, and have access to electronic health records (Meri et al., 2019; Moretti et al., 2023; Moyo & Loock, 2021; Raimo et al., 2023; Suhendi et al., 2020). Additionally, several scholars (Moyo & Loock, 2021; Raimo et al., 2023) posit that DTs such as tele-health, electronic communications, web and Cloud-based services, if implemented in a targeted manner, have the potential to minimize health inequalities and improve people's lives through a substantial change in the way in which healthcare services are provided to patients (Balta et al., 2021; Moretti et al., 2023; Spanò et al., 2023). Furthermore, other scholars posit that Cloud services can contribute to SMEs' dynamic capabilities (Engelmann, 2024; Khurana et al., 2022; Moyo & Loock, 2021; Suhendi et al., 2020). According to recent scholarly literature (Drydakis, 2022; Khurana et al., 2022), DCs are substantial because they enable SMEs to quickly detect market changes before their rivals do (Warner & Wäger, 2019). Extant research found that in the SME sector, the development of DCs relies on sensing, seizing and reconfiguring (Khurana et al., 2022; Engelmann, 2024). From a business perspective, sensing focuses on discovering opportunities, seizing aims to utilize the opportunities, and reconfiguring improve business models (Drydakis, 2022). With the help of SaaS, healthcare sector SMEs can sense the opportunity to collaborate with patients on the Internet (Suhendi et al., 2020; Spanò et al., 2023). Furthermore, SaaS can enable healthcare sector SMEs to seize the opportunity of doing business on the Internet (Johnston et al., 2023). Moreover, SaaS can help healthcare sector SMEs to transform by reconfiguring their business models (Engelmann, 2024; Majengo & Mbise, 2022).

In the epoch of the digital economy, web and Cloud-based services may be tools to promote innovation and enhance enterprises' performance (Moyo & Loock, 2021; Suhendi et al., 2020). Empirical studies conducted globally (Deloitte UK's Centre for Health Solution, 2020; Nicolau et al., 2022; Raimo et al., 2023; Statista, 2023) affirm that the use of web and Cloud-based services (SaaS) can help healthcare organisations to improve the way in which they provide healthcare services to patients (Balta et al., 2021; Moretti et al., 2023; Spanò et al., 2023). Yet, within South Africa, there are limited studies on the use of SaaS to improve the DCs of healthcare SMEs.

The aim of the study. To develop the conceptual model for the use of SaaS to improve the DCs of healthcare SMEs.

The following study model was conceptualised from by triangulating the two theoretical models that were used as lenses for this study. The two theoretical models underpinned by this study included Task-Technology Fit (TTF) and Fit Viability Model (FVM). The study hypotheses (H1–H10) are shown in Figure 1.

Materials and Methods

To explain DCs and the use of SaaS by healthcare sector SMEs, positivism was identified as the most suitable paradigm for the study. A plethora of research (Creswell & Creswell, 2018; Hall et al., 2022; Hasan, 2016) pointed out that positivist studies are associated with quantitative research approach that test hypotheses. The present study utilized a survey questionnaire to collect data. The survey questionnaire used a five Likert scale method with anchors starting from 1 (strongly disagree) to 5 (strongly agree). Healthcare SMEs that had used SaaS form the population of this study. A survey conducted by Small Enterprise Development Agency (SEDA, 2021) reported that the registered number of SMEs in South Africa during the first quarter of 2021 was projected to be close to 786,027.

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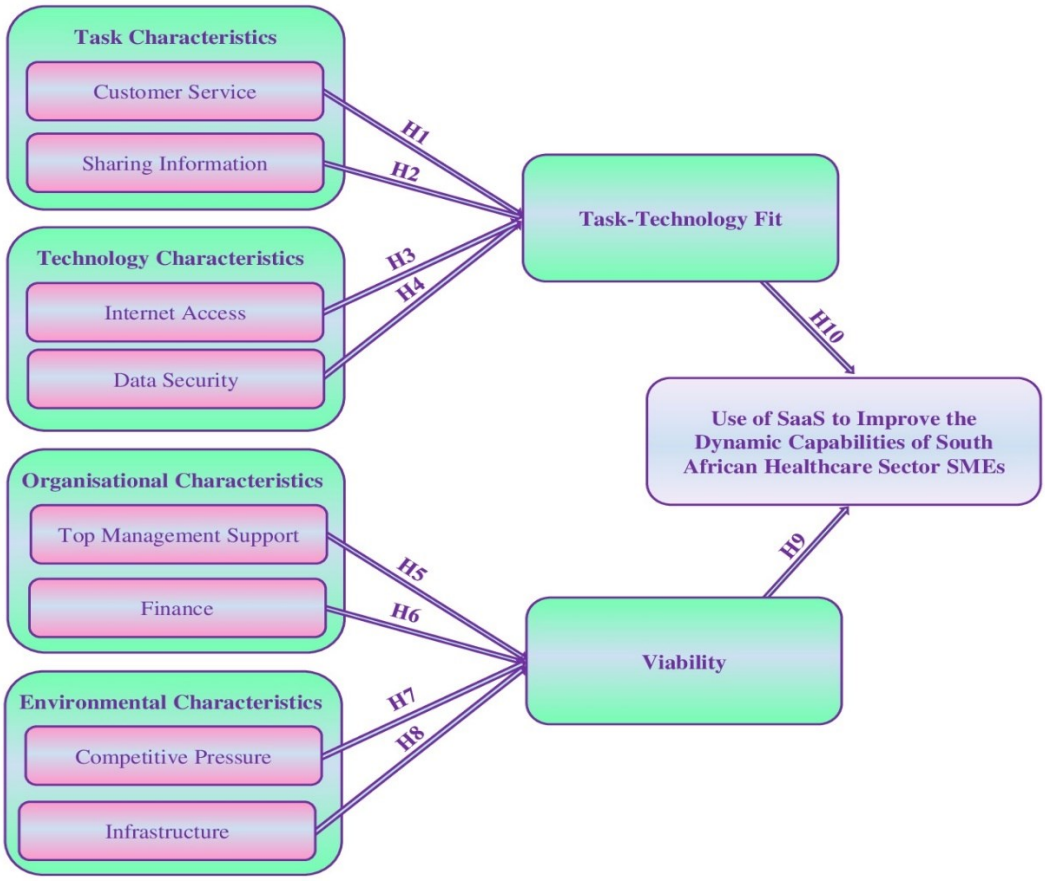
Figure 1

Conceptualized Study Model for the Use of SaaS to Improve the DCs of Healthcare SMEs



Note.

H1: Customer service influences the use of SaaS to improve the DCs of healthcare SMEs.
H2: Sharing information influences the use of SaaS to improve the DCs of healthcare SMEs.
H3: Internet access influences the use of SaaS to improve the DCs of healthcare SMEs.
H4: Data security influences the use of SaaS to improve the DCs of healthcare SMEs.
H5: Top management support influences the use of SaaS to improve the DCs of healthcare SMEs.
H6: Finance influences the use of SaaS to improve the DCs of healthcare SMEs.
H7: Competitive pressure influences the use of SaaS to improve the DCs of healthcare SMEs.
H8: Infrastructure influences the use of SaaS to improve the DCs of healthcare SMEs.
H9: Viability influences the use of SaaS to improve the DCs of healthcare SMEs.
H10: Task-Technology Fit influences the use of SaaS to improve the DCs of healthcare SMEs.

Scholarly work undertaken by Krejcie and Morgan (1970) noted that a population that is between 75,000 and 1,000,000 is represented by a sample size of 384. As a result, the sample size of this present study was 384. To evade non-respondent issues when collecting data. The research team distributed 500 questionnaires to healthcare sector SMEs. A 60.0% response rate was attained from these questionnaires, with the participants answering 300 of the questionnaires. The collected data were analyzed using SPSS version 28.

Reliability Analysis

In this stage, a reliability test was conducted. Recent scholarly works (Hair et al., 2019; Hall et al., 2022; Salah & Ayyash, 2023) point out that the principal reason for performing a reliability test is to examine the level of consistency of the questionnaire. Additionally, scholarly work by Hall et al. (2022) posit that the questionnaire is considered reliable if Cronbach's alpha meets a value of more than 0.7. As shown in Table 1, Cronbach's alpha meet the threshold requirements.

Table 1

Reliability Result of the Data Collection Instrument

Reliability results		
Cronbach's alpha	Cronbach's alpha based on standardized items	Number of items
0.886	0.886	78

Healthcare SMEs in South Africa were the target respondents. The study envisioned to obtain data from five hundred (500) SMEs. Three hundred 300 responded accordingly.

Table 2 presents the demographical statistics of respondents. The demographic variables include gender, age (years), education and use of SaaS.

Table 2
Demographical Statistics of Respondents

Variables		Frequency		
		Person	Percentage	Cumulative percentage
Gender	Male	187	63.3	63.3
	Female	113	37.7	100.0
	Total	300	100.0	-
Age (years)	20 – 30	222	74.0	74.0
	41 – 50	64	21.3	95.3
	Above 50	14	4.7	100.0
	Total	300	100.0	-
Education	Matric	20	6.7	6.7
	Diploma	46	15.3	22.0
	B-tech	170	56.7	78.7
	Master's	58	19.3	98.0
	PhD	6	2.0	100.0
	Total	300	100.0	-
Use of Saas	Yes	264	88.0	88.0
	No	36	12.0	100.0
	Total	300	100.0	-

As shown in Table 2, 63.3% (187) of participants representing healthcare SMEs were males, whilst 37.7% (113) were females. Furthermore, the findings in Table 2 reveal that 74.0% (222) of participants were between the ages of 20 to 30, 21.3% (64) were between 41 to 50 and 4.7% (14) were above 50 years.

Regarding education, 56.7% (170) of participants had a B-tech, followed by 19.3% (58) who had a master's, 15.3% (46) had a diploma, 6.7% (20) had a matric and only 2.0% (6) had a PhD.

Concerning the use of SaaS, 88.0% (264) of participants revealed that they are using SaaS, whilst 12.0% (36) alluded that they are not using SaaS.

Measurement Model Analysis

Before assessing the structural model, measurement model analysis was conducted. A plethora of research (Khan et al., 2021; Kikawa et al., 2022; Maroufkhani et al., 2020; Steenkamp & Maydeu-Olivares, 2023; Yusoff et al., 2020) point out that measurement model analysis is performed by using factor loadings (FL), composite reliability (CR), and average variance extracted (AVE). As recommended by Hair et al. (2019) for the measurement model test results to be acceptable, FL and CR must meet a value of more than 0.7 and AVE a value of more than 0.5. As displayed in Table 3, all the FL, CR, and AVE values meet the threshold requirements.

Table 3
Loadings Reliability and Validity Statistics

Constructs	Number of items	Factor loadings	Composite reliability	Average variance extracted
CUS	3	0.788–0.920	0.721	0.742
SHI	3	0.645–0.747	0.903	0.682
IEA	3	0.726–0.888	0.836	0.667
DAS	3	0.673–0.934	0.903	0.755
TMS	3	0.709–0.854	0.907	0.762
FIC	3	0.738–0.834	0.894	0.681
CMP	3	0.683–0.809	0.894	0.689
IFT	3	0.685–0.925	0.904	0.664
VAB	3	0.826–0.920	0.758	0.685
TTF	3	0.826–0.880	0.825	0.725

Note. CUS – customer service; SHI – sharing information; IEA – internet access; DAS – data security; TMS – top management support; FIC – finance; CMP – competitive pressure; IFT – infrastructure; VAB – viability; TTF – task-technology fit.

Assessment of Structural Model

In this stage, structural equation modelling (SEM) was utilised. According to recent scholarly literature (Al-Mamary, 2022; Kikawa et al., 2022; Steenkamp & Maydeu-Olivares, 2023), SEM is used in research studies to test the hypotheses.

As displayed in Table 4, the SEM results show that the hypotheses CUS (β=0.125, p<0.05), SHI (β=0.132, p<0.05), IEA (β=0.057, p<0.05), DAS (β=0.022, p<0.05), TMS (β=0.427, p<0.05), CMP (β=0.178, p<0.05), VAB (β=0.325, p<0.05) and TTF (β=0.032, p<0.05) have a positive effect on the use of SaaS. Whilst the hypotheses FIC (β=0.235, p>0.05) and IFT (β=0.052, p>0.05) have a negative effect on the use of SaaS.

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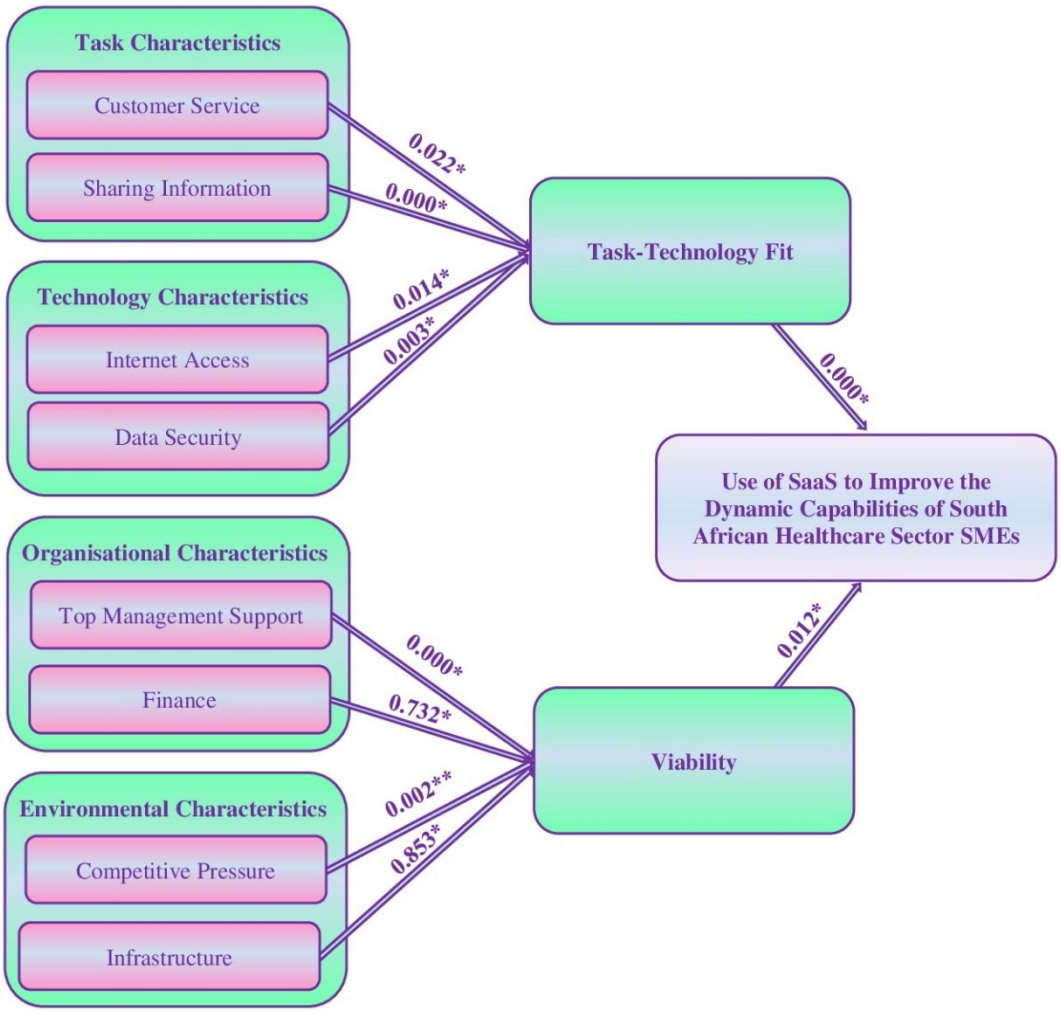
Table 4
Hypotheses Testing

No	Constructs	Std. Beta (β)	p-values	Decision
H1	CUS	0.125	0.022*	Supported
H2	SHI	0.132	0.000*	Supported
H3	IEA	0.057	0.014*	Supported
H4	DAS	0.022	0.003*	Supported
H5	TMS	0.427	0.000*	Supported
H6	FIC	0.235	0.732*	Not Supported
H7	CMP	0.178	0.002**	Supported
H8	IFT	0.052	0.853*	Not Supported
H9	VAB	0.325	0.012*	Supported
H10	TTF	0.032	0.000*	Supported

Note. *p<0.05; **p<0.01; CUS – customer service; SHI – sharing information; IEA – internet access; DAS – data security; TMS – top management support; FIC – finance; CMP – competitive pressure; IFT – infrastructure; VAB – viability; TTF – task-technology fit.

As displayed in Table 4 and Figure 2, eight hypotheses (H1, H2, H3, H4, H5, H7, H9, and H10) were supported because they have a p-value of less than <0.05, while two hypotheses (H6 and H8) were not supported because they have a p-value of greater than >0.05.

Figure 2
A Model for the Use of SaaS to Improve the Dynamic Capabilities of South African Healthcare sector SMEs



Results and Discussion

The model (Figure 2) shows the factors that are significant to the use of SaaS to improve the dynamic capabilities (DCs) of South African healthcare SMEs.

Task Characteristics

The study results in Table 4 show that CUS (p=0.022<0.05) has a positive effect on the use of SaaS to improve the DCs of healthcare sector SMEs.

Therefore, H1 is supported. This outcome is in line with Raimo et al. (2023) who found that web and Cloud-services helped healthcare organisations in Italy to improve customer service. In addition, the present study proved that SHI (p=0.000<0.05) has positive effect on the use of SaaS. Therefore, H2 is supported. In support of this outcome, a plethora of research (Mokwena & Hlebela, 2018; Moyo & Loock, 2021; Raimo et al., 2023) point out that SaaS can help healthcare sector SMEs to share information with their patients.

Technology Characteristics

As displayed in Table 4, IEA (p=0.014<0.05) has a positive effect on the use of SaaS. Therefore, H3 is supported. Recent scholarly works (Johnston et al., 2023; Khaki & Khan, 2023; Raimo et al., 2023) have shown that having access to the internet can help organisations, particularly healthcare sector SMEs to improve the DCs (Hercheui & Ranjith, 2020; Pietronudo et al., 2022; Suhendi et al., 2020; Weaven et al., 2021). Similarly, the positive effect of DAS (p=0.003<0.05) on the use of SaaS is confirmed. Therefore, H4 is supported. This outcome is supported by Ganiga et al. (2018) and Mubarakali et al. (2020) who pointed out that Cloud services can help healthcare organisations to manage and protect the data of patients.

Organisational Characteristics

As displayed in Table 4, TMS (p=0.000<0.05) has a positive effect on the use of SaaS. Therefore, H5 is supported. This outcome is consistent with Nassoura (2020) who found that top management support (TMS) play a substantial role on the adoption of Cloud Computing in Jordanian healthcare organisations. However, the present study found that FIC (p=0.732>0.05) has a negative influence on the use of SaaS. Therefore, H6 is not supported. This outcome is consistent with Khurana et al. (2022) who argued that digital technologies (DTs) are not easy to adopt, because the majority of SMEs lack funding.

Environmental Characteristics

On the other hand, the present study found that CMP (p=0.000<0.05) has a positive effect on the use of SaaS. Therefore, H7 is supported. This outcome is in line with Raimo et al. (2023) who found that healthcare organisations use Cloud-services in reaction to the increase in competitive pressure (CMP) which is fueled by the danger of losing customers.

However, the study found that IFT (p=0.853>0.05) has a negative effect on the use of SaaS. Therefore, H8 is not supported. Recent scholarly works (Bolosha et al., 2022; Bvuma & Marnewick, 2020) reported that about 70.0-80.0% of SMEs in South Africa collapse because of inadequate infrastructure.

Viability

As displayed in Table 4, VAB (p=0.012<0.05) has a positive effect on the use of SaaS among healthcare SMEs. Therefore, H9 is supported.

This outcome is consistent with Liang et al. (2021) who found that viability play a substantial role in the adoption of Blockchain Technology among healthcare organisations.

Task-Technology Fit

The positive effect of TTF (p=0.000<0.05) on the use of SaaS is also confirmed. Therefore, H10 is supported. This outcome in line with Wang et al. (2019) who found that TTF play a substantial role in the use of Big Data Analytics (BDA) mobile cloud healthcare system.

Conclusions

In this paper, the conceptual model is proposed to identify and explain the factors influencing the use of Software as a Service (SaaS) to improve the dynamic capabilities (DCs) of healthcare SMEs. This model is based on Task-Technology Fit (TTF) and Fit Viability Model (FVM) and some external constructs (organisational characteristics and environment characteristics). The study results show that customer service (CSE), sharing information (SHI), internet access (IEA), data security (DAS), top management support (TMS), competitive pressure (CMP), viability (VAB) and task-technology fit (TTF) play a positive role on the use of SaaS to improve the DCs of healthcare SMEs. However, the present study also found that finance (FIC) and infrastructure (IFT) play a negative role on the use of SaaS to improve the DCs of healthcare SMEs. This paper concludes that SaaS is key to improving DCs of healthcare sector SMEs.

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Ethical Approval

The study obtained ethical clearance from the institution's Ethics Committee (Ref NO. FCRE/ICT/2022/03/001 (1).

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