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RESEARCH ARTICLE

Influential Characteristics and Benefits of Cloud ERP Adoption in New Zealand SMEs: A Vendors' Perspective

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This work involved human subjects or animals in its research. Approval of all ethical and experimental procedures and protocols was granted by the Massey University Human Ethics Committee.

ABSTRACT Cloud enterprise resource planning (ERP) systems are hosted services offering opportunities for small and medium-sized enterprises (SMEs) that often lack IT resources. Few studies have examined the adoption of cloud ERP systems in SMEs, specifically, from the perspective of cloud ERP vendors who are the domain experts. Drawing on vendors' perspectives in the New Zealand (NZ) context, this paper evaluates the influential characteristics for adopting cloud ERP systems in SMEs. The paper uses an integrative model combining the technological, organizational, and environmental (TOE) framework with the unified theory of acceptance and use of technology (UTAUT) based on individual dimension for a holistic evaluation. Findings reveal novel characteristics including system reliability and data security that influence adoption of cloud ERP. Further, benefits are identified such as reduced cost and time for deployment, increased scalability, and improved accessibility. The paper presents new insights that can help SME managers successfully adopt cloud ERP in their firms in addition to providing practical guidelines for adoption in NZ. The development of a theoretical model integrating TOE and UTAUT is a novel approach, substantially contributing to the body of knowledge.

INDEX TERMS Cloud ERP systems, cloud ERP vendors, SMEs, TOE framework, UTAUT framework.

I. INTRODUCTION

Enterprise resource planning (ERP) systems comprise a set of integrated functional modules such as sales and distribution, materials management, human resources, production and manufacturing planning, finance and cost accounting, production and manufacturing planning, and supply chain management [1], [2]. ERP systems enable an organization combine and optimize business processes to improve the working of the whole organization [3], [4]. In the last three decades, on-premise ERP systems, which require the organization to install hardware and ERP software on in-house computers, have been identified as ERP systems in general [5]. However, currently in the cloud computing era, the ERP systems have evolved into cloud ERP systems, which store the organizational data in a cloud database. From an international standpoint, adoption of cloud ERP is increasing worldwide showing dramatic growth with companies moving from on-premise technology to expand network access, increase on-demand service, and achieve business efficiencies. The growth rate of cloud ERP adoption is 21% globally with a success rate of 88% [6]. In 2022, 53% of all ERP implementations used cloud technology with the spending having reached $226.9 billion [7]. These cloud-based systems are specifically helpful for small and medium-sized enterprises (SMEs), which are limited in resources facing technical, managerial, and financial difficulties compared to large enterprises [8], [9]. Additionally, cloud ERP systems possess several benefits over on-premise systems: low upfront costs, automatic upgrades and updates (which are

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provided by CSPs), the capacity to handle change and growth, and quick reconfiguration based on customers' requirements [10]. Further, cloud ERP systems can be accessed within an organization or remotely from anywhere via a Web browser as long as Internet access is available.

SMEs in New Zealand (NZ) are defined as firms having 50 staff or fewer and make up 99% of all businesses [11]. These firms are the backbone of NZ economy and contribute significantly to the gross domestic product (GDP) of the country. To overcome competitiveness, SMEs must improve operational efficiencies, which can be achieved by adopting ERP systems. For enhancing efficiencies and reducing costs, a cloud ERP system can be appropriate to deploy as these systems are more cost-effective to install and maintain compared to on-premise systems [12]. These systems allow users to log-in through a Web browser or deploy it as a hosted system operated and maintained by CSPs. SMEs can face difficulties with cloud ERP deployment as they typically experience a higher failure rate for any IS adoption [13] due to insufficient technical knowledge [14], poor organizational planning and low financial abilities [15]. Lack of managing standard procedures and informal strategies in decision-making can further dampen IS adoption successes in SMEs [16]. In a survey of 1000 businesses on the uptake of cloud ERP in NZ, found 21% SMEs to have implemented these systems [17]. The specific concerns that NZ SMEs face include high budgets, enabling a mobile workforce that can work remotely, creating the ability to align with partners/ customers, have data access in real time and improve system performance. The vendors of ERP have designed their current cloud ERP products to align with these needs of SMEs.

However, an understanding of the factors that influence successful adoption of cloud ERP in SMEs, specifically from a NZ perspective, is mostly lacking in the literature. Research in this area is limited, therefore will be of importance for existing companies as well as for future SMEs who venture into this, which motivates the investigation of the influential factors for cloud ERP adoption in NZ SMEs.

Information systems (IS) have rapidly developed over time and are playing an essential role in supporting cloud ERP adoption. In terms of IS adoption, there are two levels that can be investigated: organizational and individual [18]. At an organizational level, the technology organization environment (TOE) framework is appropriate to investigate IS adoption as it enables researchers to examine the three dimensions of technology, organization and environment [19]. At an individual level, the unified theory of acceptance and use of technology (UTAUT) framework is proposed by Venkatesh et al. [20], which has been successfully utilized and widely deployed to investigate technology innovation adoption and diffusion scenarios [21]. However, cloud ERP systems are an emerging technology which require more research from an adoption viewpoint, especially in the context of SMEs in NZ, as there are few studies conducted in this environment. Therefore, this study investigates the cloud ERP adoption in NZ SMEs by proposing an integrated model comprising technology, organization, environment, and individual dimensions. This model also provides the comprehensive characteristics for cloud ERP adoption holistically in NZ SMEs.

Although there have been many studies on the determinants of cloud computing adoption e.g., [22], [23], [24], little research has been conducted on the adoption of cloud ERP, especially in NZ SMEs. Prior studies that have looked into adoption of cloud ERP systems have investigated either from an organizational or individual context. This study addresses these gaps in the literature with an aim to investigate the technological, organizational, and environmental dimensions in an organizational context (using the TOE framework) and the individual dimensions in an individual context (using the UTAUT framework) for cloud ERP adoption in NZ SMEs.

This study is based on the vendors' perspective to capture insights from practitioners who are most knowledgeable in this domain and applies an integrative model combining the TOE and UTAUT frameworks. Several studies in the context of cloud ERP systems have focused on the decision makers' and users' perspectives e.g,. [15], [25], [27], but there has been little attention paid to the vendors' perspective e.g,. [28], [29]. Vendors' views are essential to provide insights as experts in the field for enhancing understanding of the factors that impact cloud ERP adoptions since they have multiple implementation experiences and knowledge from different industries.

The use of an integrative model to investigate cloud ERP adoption in SMEs is limited, especially focusing on both the organizational and individual levels e.g., [30], [31], [32]. Prior studies have investigated adoption of cloud ERP systems in either an organizational or individual context [25]. Using a lens that analyses both the organizational and individual aspects would be beneficial to provide a holistic picture for cloud ERP adoption. The objective of this study is to investigate the influential characteristics for cloud ERP adoption in NZ SMEs by integrating the technological, organizational, environmental and individual dimensions (using TOE and UTAUT frameworks) to capture insights based on the vendors' perspective. Adoption of IS in this study applies to pre-implementation i.e., the decision-making stage. The research questions addressed in this study are a) *what are the technological, organizational, environmental, and individual characteristics for adopting cloud ERP in SMEs, and b*) *what are the benefits of cloud ERP adoption for SMEs?*

The findings on the multi-dimensional characteristics that influence adoption of cloud ERP systems in SMEs and the benefits such as lower upfront investment, reduced IT staff, rapid implementation, and improved system availability, provide novel insights from a vendors' perspective who are experienced and have deployed these systems in numerous

companies in NZ. While there are studies that have looked at IS adoption using integrative models (integrating frameworks such as TOE and UTAUT). This is one of the few studies that investigates the adoption of cloud ERP systems by developing an integrative model (using the TOE and UTAUT frameworks). This is also one of the first studies focused on NZ SMEs that captures perceptions of cloud ERP vendors who are the specialists in this field. These insights will assist SME decision makers and users to better understand the critical attributes of these systems and their deployment to plan and adopt successfully. These are major contributions that help in enhancing the understanding of cloud ERP adoption in SMEs.

This paper is structured in seven sections. The first section has introduced the paper. Section two reviews the literature on cloud computing, adoption of cloud ERP in SMEs, the theoretical foundation for IS adoption leading to the development of a proposed integrative model comprising the TOE and UTAUT frameworks for cloud ERP adoption. Section three discusses the research methodology, section four presents the findings, section five discusses these findings. Section six presents the conclusions, implications, and finally section seven is limitations, and future work.

II. LITERATURE REVIEW

This section reviews the theoretical foundations for IS adoption, the different types of cloud computing models, the adoption of cloud ERP systems, and the development of an integrative model for cloud ERP adoption.

A. THEORETICAL FOUNDATIONS

Use of a theoretical framework is desirable in IS research as it provides conceptual richness and methodological guidance [33], [34]. In this research, prior to selecting the theoretical frameworks, relevant theories in IS research were investigated, and are discussed below.

Several IS adoption theories have been used in literature focusing on various dimensions at the organizational and individual levels. At the organizational level, DOI, which has formed the foundations for the expansion of several theoretical frameworks such as TOE [35], [36], is the most popular and frequently employed framework for technological innovation [25], [37]. Most of the IS frameworks are technologically oriented to explain technological characteristics which influence the adoption decisions [38]. As such, DOI examines only one dimension of the characteristics, namely technology. Similarly, organizational capability theory (OCT) is also used for the adoption of new innovative technologies at the organizational level. The OCT framework investigates only one dimension i.e., organizational dimension. The fit-viability model (FVM), which was introduced by [39], is another framework to examine the organizational level. To solve the issues regarding limited view from a single lens of each model and to understand the entire context, a comprehensive picture is required of all the influential characteristics, such as the environmental and organizational characteristics, which have not been considered in the DOI, OCT and FVM frameworks [40]. The TOE framework has been proposed that provides a multi-dimensional view comprising the technological, organizational, and environmental dimensions under one lens to evaluate IS adoption and is identified as suitable for this study.

At the individual level, frameworks such as the theory of reasoned action (TRA) [41], technology acceptance model (TAM) [42], the theory of planned behavior (TPB) [43] and UTAUT are well-established for determining individual characteristics in IS adoptions [36]. TAM is a widespread framework to investigate IS adoptions such as cloud ERP [32], [44]. The TAM framework examines perceived usefulness and perceived ease of use which are the two main characteristics of technology acceptance and use [45]. Though, there are more theories adapted into IS research (e.g., with roots in social psychology such as social representation theory by Moscovici [46]), contributions of the above theories have been more extensively and successfully deployed by several studies on technology adoption (such as cloud ERP) [21], [47].

Several researchers e.g,. [48], [49], [50] have indicated that the TAM has various weaknesses. Firstly, it delivers inadequate insight into the individual contexts with new systems (such as cloud ERP systems). Secondly, it directly examines only the characteristics of perceived usefulness and perceived ease of use. Finally, it disregards the relationship between social environments and user attitudes [48]. For these reasons, Venkatesh et al. [20] proposed the UTAUT framework, which is an alternative to TAM, for the individual dimension. UTAUT has frequently been deployed to evaluate IS adoption, evolving from eight separate adoption frameworks: the motivational model, TPB, TAM, TRA, combined TPB/TAM, DOI, social cognitive theory (SCT), and model of personal computer utilization (MPCU) [20]. The UTAUT framework, which comprises comprehensive views of information to investigate individual technology adoptions [51], has been successfully and widely utilized by many prior studies of innovation and new technology implementation and adoption in IS (such as cloud ERP systems) [52]. Therefore, UTAUT is considered the most suitable for this study when investigating the individual characteristics. This paper uses both TOE and UTAUT as the theoretical foundation for developing the model to investigate the different characteristics for cloud ERP adoption in SMEs. Table 1 summarizes the IS theoretical frameworks classified at the two main organizational and individual levels [36].

B. INTEGRATIVE MODEL FOR IS ADOPTION

Several researchers have proposed approaches which integrate multiple theoretical frameworks to examine the IS adoption of innovative technologies e.g., [19], [88], [89]. Each of the theoretical frameworks focusing on either the individual or organizational levels may not be comprehensive enough on their own because each neglect to emphasize

TABLE 1. IS theoretical frameworks for SMEs.

IS theories	Level	Description	Ref.
TOE (Tornatzky and Fleischer [35])	Organizational	Examines how processes of implementing technological innovations are influenced by technological, organizational, and environmental contexts	[56]
FVM (Tjan [39])	Organizational	Examines fit and viability dimensions to evaluate Internet initiatives	[57]
OCT (Nelson [58])	Organizational	Examines resource-based view theory and suggests that a firm must develop its own capabilities for performance improvement	[59]
DOI Rogers [60]	Organizational	Examines how, why, and at what rate new ideas and technology spread	[61]
TAM Davis [42]	Individual	Examines basis for unveiling the impact of external characteristics on IS adoption	[62]
TRA Ajzen and Fishbein [41]	Individual	Examines the prediction of behavioral intention or behavior	[63]
UTAUT Venkatesh et al. [20]	Individual	Examines user intentions to use an information system and subsequent usage behavior	[64]
TPB Ajzen [43]	Individual	Examines psychological characteristics that link beliefs to behavior	[65]
SCT Heffernan [66]	Individual	Examines social interactions and outside media influences	[67]

TABLE 2. The single frameworks based on focusing and neglecting dimensions.

Single framework	Focusing level	Neglecting dimensions
TOE	Organizational	Individual
FVM	Organizational	Partial organizational (environmental) and individual
OCT	Organizational	Partial organizational (technological and environmental) and individual
DOI	Organizational	Partial organizational (organizational and environmental) and individual
TAM	Individual	Organizational (technological, organizational, and environmental)
TRA	Individual	Organizational (technological, organizational, and environmental)
UTAUT	Individual	Organizational (technological, organizational, and environmental)
TPB	Individual	Organizational (technological, organizational, and environmental)
SCT	Individual	Organizational (technological, organizational, and environmental)

dimensions at both individual and organizational levels [90], [91]. Table 2 highlights the focusing and neglecting dimensions for each of the IS adoption frameworks. The UTAUT framework can contribute to users' understanding of acceptance of innovative information technology (IT) [20]. In the same way, the TOE framework is recommended for analysis of the relevant characteristics when using Internet technologies and adopting IS [51], [53].

As TOE and UTAUT focus at different levels (organizational and individual), investigations based on such theories may only provide limited information [54], [55].

From previous research, it is clear that the TOE is a frequently used framework which has been employed to combine with other frameworks as shown in Table 3. Ali et al. [68] combined TOE and DOI frameworks to study the characteristics which influence the adoption of cloud computing in 149 Australian SMEs. The result of this study showed that relative advantage, quality of service and awareness characteristics were more significant than security, privacy and flexibility for cloud computing adoption. Albar and Hoque [25] examined the characteristics that affect the adoption of cloud ERP systems in Saudi Arabia based on DOI and TOE frameworks. Their research discovered that relative advantage, competitive environment, observability, complexity, IT infrastructure, regulatory environment, top management support and IT skills are the characteristics which have a significant impact on cloud ERP adoption. Gangwar et al. [69] developed an integrative model to examine external characteristics of TAM, and technological and environmental characteristics of the TOE framework. They identified that relative advantage, complexity, compatibility, top management commitment, training and education and organizational readiness are essential characteristics for affecting cloud computing adoption. Ahn and Ahn [70] integrated TOE, DOI and model of innovation resistance (MIR) frameworks to investigate characteristics that impact the decision for cloud ERP adoption. Their study pointed out that five factors (regulatory environment, organizational culture, trialability, relative advantage, and vendor lock-in) much influence the adoption of cloud ERP.

In another study, Tom et al. [71] proposed an integrative model founded on DOI and TOE to evaluate the factors for cloud computing adoption in Higher Education Institutions in Nigeria. Their results discovered that cost savings, competitive pressure, relative advantage, and service provider support influence the adoption of cloud computing for Nigerian universities. In yet another study, Abied and Ibrahim [72] integrated TOE, DOI and human organization technology (HOT) frameworks to characterize the critical factors for cloud adoption in Libyan e-government. Their study revealed thirteen characteristics, which are security concern, IT infrastructure, cost, privacy, size, organizational readiness, government regulation, top management support, compatibility, technological innovativeness, cloud knowledge, relative advantage, and complexity. The integrative model includes technological, environmental, organizational, innovation and human dimensions and can investigate important characteristics hindering cloud computing adoption in government organizations. Similarly, Lutfi et al. [73] proposed an

TABLE 3. Integrative models for IS adoption.

Integrative models	Dimensions	Characteristics	Authors
TOE, DOI and MIR	Technological, organizational, and environmental	Relative advantage (DOI), complexity (DOI), trialability (DOI), observability (DOI), cloud ERP skill (TOE), organizational culture (TOE), regulatory environment (TOE), data security (MIR), vendor lock-in (MIR) and customization (MIR)	[70]
TOE and DOI	Technological, organizational, and environmental	Relative advantage (DOI), quality of service (TOE), security (TOE), privacy and flexibility (TOE), competitors (TOE), market (TOE), industry type (TOE), organizational size (TOE), and regulations and service (TOE)	[68]
TOE and DOI	Technological, organizational, and environmental	ICT skills and ICT infrastructure (TOE), top management support (TOE), organizational culture (TOE), regulatory environment (TOE), competitive environment (TOE), relative advantage (DOI), compatibility (DOI), complexity (DOI), trialability (DOI) and observability (DOI)	[25]
TOE and DOI	Technological, organizational, and environmental	Relative advantage (DOI), compatibility (DOI), complexity (DOI), value creation (DOI), technology readiness (TOE), security concerns (TOE), technical barriers (TOE), top management support (TOE), enterprise readiness (TOE), enterprise size (TOE), enterprise status (TOE), competitive pressure (TOE), government support (TOE), infrastructure/telecommunication (TOE)	[76]
TOE and DOI	Technological, organizational, and environmental	Relative advantage (DOI), compatibility (DOI), trust (TOE), security (TOE), top management support (TOE), cost savings (TOE), competitive pressure (TOE) and service provider support (TOE)	[71]
TOE, DOI and IF	Technological, organizational, and environmental	Relative advantage (DOI), compatibility (DOI), organizational readiness (TOE), top management support (TOE), training (TOE), competitive pressure (TOE), government support (TOE), financial performance (IF) and marketing performance (IF)	[73]
DOI and OCT	Technological, organizational, and environmental	Perceived cost reduction (DOI), perceived possibility for remote access (DOI), security concerns (DOI), personnel innovativeness (OCT), managerial innovativeness (OCT)	[77]
TOE and DOI	Technological, organizational, and environmental	Relative advantage (DOI), compatibility (DOI), trust (TOE), security (TOE), top management commitment (TOE), cost saving (TOE), competitive pressure (TOE), service provider support (TOE)	[78]
TOE, DOI and HOT	Technological, organizational, and environmental	Relative advantage (DOI), compatibility (DOI), complexity (DOI), cost (TOE), privacy (TOE), security concern (TOE), IT infrastructure (TOE), organizational readiness (TOE), top management support (TOE), government regulation (TOE), technical innovativeness (HOT) and cloud knowledge (HOT)	[72]
TOE and DOI	Technological, and individual	Compatibility (DOI), relative advantage (DOI), complexity (DOI), image and security and trust (TAM)	[79]

integrated model that includes TOE, DOI and institutional factor (IF) to examine ERP adoption in Jordan SMEs. The results of this study show that relative advantage, organizational readiness, top management support, government support, training, competitive pressure, service provider support and compatibility influence ERP adoption for Jordan SMEs.

Few researchers have proposed integrating the TOE and UTAUT models to investigate the IS adoption e.g., [74], [75] Awa et al. [74] proposed a ten-factor framework based on TOE and UTAUT to investigate the technology adoption. Their study pointed out that perceived simplicity, perceived compatibility, performance-expectancy, management support, size of enterprises, scope of business operations, normative pressure, mimetic pressure, and subjective norms are significant for technology adoption. Similarly, Rosli et al. [75] presented a new individual-technology-organization-environment (I-TOE) model as a combination of TOE and UTAUT frameworks, to investigate the acceptance of computer-assisted-auditing techniques and tools (CAATTs) in audit companies. Their results revealed that I-TOE model (comprised of technology cost-benefit, technology risk, technology-task fit, size, readiness, top management support, client's complexity, performance expectancy, effort expectancy, social influence and facilitating surrounding) can contribute in evaluating the acceptance of new audit technology from every aspect of individual, technology, organization and environment.

Salimon et al. [80] integrated TOE, TAM3, and UTAUT2 and frameworks to examine m-commerce adoption in Malaysian SMEs. Their results revealed computer self-efficacy, result demonstrability, computer anxiety, m-commerce knowledge, pressure from trading partners, and pressure from competitors characteristics influence the adoption of m-commerce in Malaysian SMEs. Lee and Lee [81] proposed an integrated model based on DOI, TOE and UTAUT for the adoption of the big data system. Their results indicated that costs, security concerns, firm size, top management support, competitive pressure, regulatory support relative advantage, complexity, compatibility, performance expectancy, effort expectancy social influence and facilitating conditions influence behavioral intention and usage behavior for adoption of the big data system.

However, some researchers proposed the integrative model based on other frameworks which exclude the TOE framework (such as DOI and OCT [77] or DOI and TAM [79]). Stieninger et al. [79] developed the integrative model based on DOI and TAM as a reconceptualization of affecting factors for cloud computing adoption. The study identifies five factors (compatibility, relative advantage, complexity, image and security and trust) that influence cloud computing adoption. Polyviou et al. [77] combined DOI and OCT to

TABLE 4. Integrative models based on organizational and individual levels for IS adoption.

TAM, DOI and TOE	Technological, organizational, environmental, and individual	Perceived usefulness (TAM), perceived ease (TAM), relative advantage (DOI), compatibility (DOI), security concern (TOE), technological readiness (TOE), top management support (TOE), firm size (TOE), external pressure (TOE), service providers' support (TOE)	[82]
TAM and TOE	Technological, organizational, environmental, and individual	Relative advantage (TOE), compatibility (TOE), complexity (TOE), organizational competency (TOE), training and education (TOE), top management support (TOE), perceived usefulness (TAM) and perceived ease of use (TAM)	[69]
TOE and UTAUT	Technological, organizational, environmental, and individual	Perceived simplicity (TOE), perceived compatibility (TOE), performance-expectancy (TOE), management support (TOE), size of enterprises (TOE), scope of business operations (TOE), normative pressure, mimetic pressure (TOE), subjective norms (UTAUT) and hedonistic drives (UTAUT)	[74]
TOE and UTAUT	Technological, organizational, environmental, and individual	Technology cost-benefit (TOE), technology risk (TOE), technology-task fit (TOE), size (TOE), readiness (TOE), top management support (TOE), client's complexity (TOE), performance expectancy (UTAUT), effort expectancy (UTAUT), social influence (UTAUT) and facilitating surrounding (UTAUT)	[75]
TOE, TAM3 and UTAUT2	Technological, organizational, environmental, and individual	Computer self-efficacy (TAM2), result demonstrability (TAM2), computer anxiety (TAM2), m-commerce knowledge (TOE), pressure from trading partners (TOE), pressure from competitors (TOE) and hedonic motivations (UTAUT)	[80]

evaluate influencing factors for decision-making to adopt cloud computing. The findings of their study revealed that perceived cost reduction, perceived possibility for remote access, and personnel innovativeness are influencing the adoption of cloud computing. Table 4 presents the existing integrative models used for analyzing IS adoption based on both levels (organizational and individual).

C. CLOUD COMPUTING SYSTEMS

With growth in cloud computing, cloud-based applications have evolved from the traditional on-premise systems deployed on company's servers, and operated and managed by in-house IT staff of the company. In a cloud-based setting, the clients leave the tasks of centrally managing, updating, upgrading, storing, and maintaining the system to the CSPs [83]. Cloud computing has three service models: infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS). The different attributes of these models are shown in Figure 1.

IaaS refers to the infrastructural resources which can be accessed by a client's system manager in a virtual computer such as a service application, service operation system, integration, updating, security, and database used to support an organization's operations. For IaaS, the clients need to create and control all of these infrastructural services [84]. In the case of PaaS, the application is run on a cloud platform by the client which includes integration, updating and system support [85]. This service is developed and deployed through a platform of applications including networking, hardware, storage, databases, and security by the CSPs [86], [87]. To employ IaaS and PaaS, the client company must have adequate IT staff or programmers to control and manage the systems, which sometimes may not be suitable for SMEs since these companies may not have the competence to perform all of these activities [86].

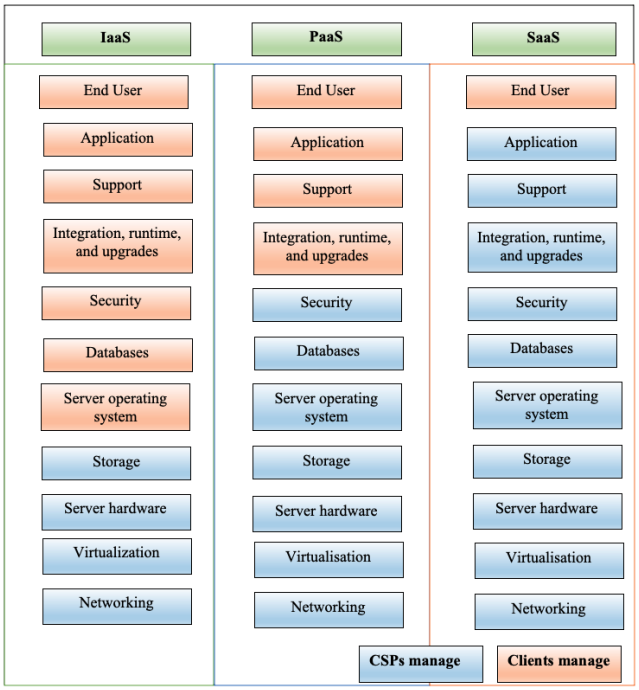

FIGURE 1. Three models in cloud computing (adapted from Satyanarayana [92]).

In the case of SaaS, the services can be accessed through a Web-based software in a browser with the facility of adding customizations based on specific industry requirements. In this model, the clients usually rent out the service or application on a recurring fee basis with the deployment of server-centric data across the network from the CSPs or third party [10], [88], [89]. This has become a popular application model in SME [90], [91]. Figure 1 highlights the areas managed by the clients or CSPs in the three service models.

D. ADOPTION OF CLOUD ERP IN SMEs

Cloud ERP systems are hosted by CSPs incorporating virtual IT resources and support [93], allowing SMEs to possess the privileges and benefits of the system without the requirements of installing the software in-house on organizational computers and local servers [94]. A cloud-based environment eliminates the need for SMEs to employ and retain IT staff for managing the ERP. These systems need less upfront investment and SMEs only pay for the cloud services based on their use [95]. Therefore, the cloud ERP technology is typically more effective for SMEs as it provides benefits of low implementation, licensing and support costs, fast implementation processes and increased agility, facilitating these companies to change and adjust to the organizational and market requirements. The cost of customization of cloud ERP systems is 15% lower than on-premise, and in operating the SaaS model, the implementation time decreases by 50% to 70% [96]. As the cloud-based ERP systems continue to provide benefits, these systems will become more understood and accepted by the SME organizations.

The benefits of cloud ERP adoption in SMEs have been revealed in some global studies. Vidhyalakshmi and Kumar [97] in their study in an Indian context found that the adoption of cloud ERP systems can lead micro, small and medium-sized organizations (MSMEs) to reduce upfront investments and on-going costs and enhance efficiency and flexibility. Further, in an Indian context, Sandu et al. [98] pointed out that the adoption of cloud ERP can improve organizational performance of SMEs. Their study identified that the adoption success of a cloud ERP system depends on innovation characteristics, i.e., relative advantage to current system, compatibility with existing systems, data security and cost of cloud ERP system. Awan et al. [31] highlighted that the use of cloud ERP is advantageous to Pakistani SMEs. They highlighted the challenges of adopting cloud ERP system, including customization limitation, data security, awareness, external pressure, vendor competence, lack of knowledge, and resistance to change are the main issues to be mentioned when adopting this system.

In a Swedish study, the users of cloud ERP benefited in being able to enhance their business to go mobile, run their business more globally, decrease large up-front investment costs, save on-going technology costs and remove the need for maintenance, and management of the cloud ERP [99]. Further, Razzaq and Mohammed [100] found that the adoption of cloud ERP systems in Malaysian SMEs can have several benefits, such as low implementation costs, reduced staff to support and maintain the system, and reduced implementation time of IT projects. Isma'ili et al. [101] deployed the diffusion of innovations (DOI) and TOE frameworks to examine the adoption of cloud ERP systems in Australian SMEs and their study revealed that organizational factors (top management support, firm size, IS knowledge and innovativeness of the organization), technological factors (relative advantage to current system, trialability to test performance of the system, cost saving and compatibility), and environmental factors (external computing support and market scope) were found to have a positive impact. Furthermore, Krishnan and Verhaart [102] revealed that the adoption of cloud ERP systems in New Zealand SMEs reduced cost, improved performance, and enhanced accessibility and mobility of users.

Ahn and Ahn [70] proposed an integrated model based on TOE, DOI and MIR frameworks for cloud ERP adoption in Korean SMEs. Their study found that organizational culture, regulatory environment, relative advantage, trialability, and vendor lock-in were significant characteristics for cloud ERP adoption in SMEs Al-Shboul [76] integrated TOE and DOI frameworks to evaluate the cloud ERP adoption for SMEs in developing economies (Jordan, Lebanon, King Saudi Arabia, Bahrain, Qatar, Emirates, Egypt, Oman, Kuwait and Turkey). The outcomes of their study revealed that compatibility, technology readiness, technical barriers, management support, enterprise readiness, enterprise size and competitiveness influence the cloud ERP adoption in SMEs. Bhatti [103] combined TOE and DOI frameworks to examine the adoption of cloud-based ERP systems in the United Arab Emirates (UAE) SMEs. Their results identified that relative advantage, top management support, technology readiness, competitive pressure and trading partner pressure were key determinants for the adoption of cloud-based ERP systems in SMEs.

Christiansen et al. [104] employed SLR to identify the influential characteristics for adoption of cloud ERP systems in SMEs. Their study recommended to combine the TOE and DOI frameworks, which comprise of system quality, security, vendor lock-in, data accessibility, financial advantage, top management support, competitive environment, regulatory environment, relative advantage, compatibility, complexity, trialability and observability, to investigate the adoption of cloud ERP system in SMEs. Mohammed and Burhanuddin [105] proposed a conceptual model based on TOE and DOI frameworks for adoption of cloud ERP systems in SMEs. The results of this study revealed that compatibility, relative advantage, complexity, availability, security, reliability, trust, privacy, top management support, Internet speed and accessibility, organizational readiness, competitive pressure, vendor support and physical location characteristics play an essential role to adopt cloud ERP systems.

Jayeola et al. [86] developed a holistic model based on TOE, task-technology fit (TTF) and resource-based view (RBV) to investigate the adoption of cloud ERP systems in Malaysian SMEs. Their study identified the key characteristics (feature-task match, top management support, government support and competitive advantage) which influence the cloud ERP adoption in SMEs. Lee et al. [30] integrated the TOE framework with TRA for cloud ERP adoption in Taiwanese SMEs. Their study summarized

TABLE 5. Integrative models used to investigate cloud ERP adoption in SMEs.

Integrative models	Dimensions	Characteristics	Authors
TOE and DOI	Technological, organizational, and environmental	Relative advantage, compatibility, complexity, value creation, technology readiness (TR), security concerns, technical barriers, top management support (TMS), enterprise readiness (ER), enterprise size, enterprise status, competitive advantage, government support and infrastructure/telecommunication	[76]
TOE and DOI	Technological, organizational, and environmental	Relative advantage (DOI), compatibility (DOI), complexity (DOI), size, top management support, technology readiness, competitive pressure and trading partners	[103]
TOE and DOI	Technological, organizational, and environmental	System quality, security, vendor lock-in, data accessibility, financial advantage, top management support, competitive environment, regulatory environment, relative advantage, compatibility, complexity, trialability and observability	[104]
TOE and DOI	Technological, organizational, and environmental	Relative advantage, compatibility, complexity, availability, reliability, security, privacy, trust, Internet speed and accessibility, top management support, organizational readiness, organizational size, competitive pressure, vendor support, physical location	[105]
TOE, DOI and MIR	Technological, organizational, and environmental	Organizational culture, regulatory environment, relative advantage, trialability, and vendor lock-in, information and communications technology skill, complexity, observability, data security, and customization	[70]
TOE, TTF and RBV	Technological, organizational, and environmental	Feature-task match, top management support, government support and competitive advantage	[86]
TOE and TRA	Technological, organizational, environmental, and individual	System quality, financial benefits, trust, industry pressure, government support and attitude of transfer to cloud ERP	[30]

that system quality, financial benefits, trust, industry pressure, and attitude of transfer to cloud are significant characteristics of cloud ERP adoption in SMEs. Table 5 summarizes the integrated models for cloud ERP adoption in SMEs.

The results from the literature review show that the integrative TOE and DOI frameworks are popularly deployed to investigate the adoption of cloud ERP systems in SMEs. These integrated models are focused on the organizational level but could not examine at the individual level. Nevertheless, there is limited research that investigates integrated models focused on both the organizational and individual levels e.g. [30]. Therefore, this study proposes an integrative model which can examine the adoption of cloud ERP for SMEs at both organizational and individual levels.

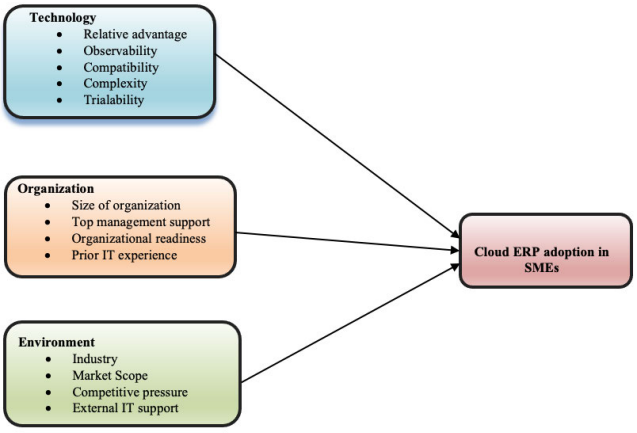

FIGURE 2. TOE framework for cloud ERP adoption in SMEs. (adapted from Ramdani et al. [106]).

E. TOE FRAMEWORK FOR CLOUD ERP ADOPTION IN SMEs

For this study, the technological dimension represents the external/internal and new/current technologies deployed in the client SMEs. The TOE framework also comprises other essential characteristics such as organizational (size of organization, top management support, organizational readiness, prior IT experience) and environmental aspects (industry, market scope, competitive pressure, and external IT support), as illustrated in Figure 2.

The technological dimension comprises both present and future technologies focusing on the characteristics that have a positive impact on the adoption of cloud ERP systems. The characteristics of the technological dimension are:

- Observability, which refers to the level at which the result of deploying cloud ERP systems is obvious to others. An obvious positive result of exploring these systems can motivate their adoption [60].
- Compatibility, which refers to the degree to which cloud ERP systems are perceived as compatible with existing environments and includes technological and organizational compatibility [107]. The compatibility of technology means that its alignment with current systems (such as computer aided design (CAD)) is evaluated.
- Complexity, which refers to the degree of difficulty for users in understanding and employing cloud ERP systems. Complexity is crucial because it is defined as a barrier to the adoption of cloud ERP systems [108].

- Trialability, which refers to the ability of cloud ERP systems to be trialed on a limited basis [109].

The organizational dimension of TOE describes characteristics concerning the resources of a firm including:

- The size of an organization, which influences the adoption of cloud ERP systems [110], [111].
- Top management support, which can influence the adoption of cloud ERP systems. Commonly, top management support is an important characteristic for potential change through a clear vision by delivering signals highlighting importance of the innovation to colleagues in the organization [104].
- Organizational readiness which refers to financial and IT resources including human and technology that influence the adoption of a cloud ERP system [112]. Technology infrastructure is related to installing the enterprise system and network technologies which offer a platform for the cloud ERP system. IT human resources refer to skills and knowledge in order to adopt cloud ERP which, in turn, are related to IT applications [113]. Financial resources represent an organization's capital to invest in IS adoption (such as cloud ERP) [19].
- Prior IT experience, which refers to the range of the professional's experience comprising prior IT systems (such as on-premise ERP systems) and current practice (such as cloud ERP systems) [111].

The environmental dimension examines the characteristics which are related areas in operating an organization and may also be linked to associated elements such as competitive pressure and the industry itself.

- Industry refers to the business segment the company belongs to [111].
- Market Scope refers to the market area which a company selects to operate in from national to international markets [111].
- Competitive pressure refers to the level of competitiveness felt by the organization from rival companies within the industry [111].
- External IT support refers to the availability of assistance by the provider for the cloud ERP adoption and use of these systems [15].

Several researchers have employed the TOE framework to investigate cloud ERP adoption [91], [111], [114]. Valdebenito and Quelopana [91] proposed a conceptual model based on the TOE framework to examine SaaS cloud ERP adoption for SMEs. Their study reveals seven characteristics (security concerns, perceived value, configurability and customization, top management support, competitive pressure, organizational readiness and vendor's qualities) which contribute to the success of the SaaS ERP adoption Zamzeer et al. [111] highlight the influential characteristics based on the TOE framework for cloud ERP adoption in SMEs in Jordanian context. Their study is conducted with cloud ERP vendors and SMEs, which are divided into four groups of participants (cloud ERP vendors, SMEs who have implemented cloud ERP, SMEs who intend to adopt cloud ERP and SMEs who do not intend to adopt cloud ERP). The study discovered ten characteristics (service provider support, management support, compatibility, relative advantage, innovativeness, trialability, cost, size, server location, and political situation) that influence cloud ERP adoption in SMEs in Jordan.

TABLE 6. Studies using TOE framework for cloud ERP adoption in SMEs.

Type of industry	Main findings	Authors
SMEs	The perceived value, security concerns, configurability and customization, organizational readiness, top management support, competitive pressure, and vendor qualities are the characteristics that influence cloud ERP adoption in SMEs	[91]
Jordan SMEs	The service providers and top management support play a significant role for cloud ERP adoption in SMEs	[111]
Malaysian SMEs	The top management support characteristic is significant for cloud ERP adoption in manufacturing and service SMEs	[114]
Healthcare	The characteristics are different between small-sized and large-sized healthcare companies, as well as the perceptions of finance managers and IT managers in cloud ERP adoption decisions.	[115]

In another study done in the Malaysian context, Qian et al. [114] proposed TOE framework to evaluate the influencing characteristics for cloud ERP adoption in SMEs. The study employed a quantitative approach in evaluating the manufacturing and service sector. Interestingly, their study highlighted that top management support is the most significant characteristic for cloud ERP adoption in Malaysian SMEs.

In yet another study, Damali et al. [115] deployed TOE framework to investigate influential characteristics in small healthcare companies. This study used a qualitative approach through semi-structured interviews with finance managers and IT managers. This study identified that relative advantage, compatibility, and size of organization as the characteristics essential for cloud ERP adoption in small healthcare organizations. Table 6 summarizes the previous studies with TOE framework for cloud ERP adoption in SMEs.

F. UTAUT FRAMEWORK FOR CLOUD ERP ADOPTION IN SMEs

For this study, the UTAUT framework provides the opportunity to investigate the individual adopter's characteristics [74]. The UTAUT framework includes five characteristics which are performance expectancy, effort expectancy, social influence, facilitating condition and behavioral intention [20]. As shown in Figure 3, while three characteristics (performance expectancy, effort expectancy

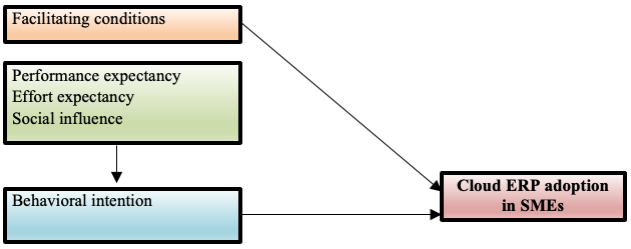

FIGURE 3. UTAUT framework for cloud ERP adoption in SMEs. (adapted from Venkatesh et al. [20], Tan and Lau [116].

and social influence) influence the behavioral intention which impacts cloud ERP adoption, one characteristic (facilitating conditions) directly impacts cloud ERP adoption [116].

- Performance expectancy refers to the level of cloud ERP performance expected by the adopters (owners/key managers) while considering deployment of the system [117].
- Effort expectancy refers to the level of ease expected in deploying the cloud ERP by the adopters while considering adoption [20], [117].
- Social influence refers to the level at which users perceive their colleagues/managers influence on deployment and adopters of cloud ERP systems [117], [118].
- Facilitating conditions refer to the level at which adopters consider the current organizational and technical infrastructure helpful in the deployment of cloud ERP [117], [119].
- Behavioral intention refers to adopters' intention for adoption and use of cloud ERP system in the future [44], [74].

Several researchers have deployed UTAUT framework for ERP [118], [120], [121] and Accounting Information System (AIS) adoption [64] Roffia and Mola [118] deployed UTAUT framework to investigate ERP adoption during the COVID-19 pandemic. This study was conducted with 147 SMEs in the Italian contexts using a quantitative method. The findings showed that performance expectancy, effort expectancy and facilitating conditions influence ERP adoption.

Mayaram et al. [120] proposed the use of UTAUT framework to identify the influential factors of ERP adoption of SMEs in Mauritius. This study used questionnaires through a quantitative approach to identify the significant characteristics. The study discovered that performance expectancy, effort expectancy and social influence impact the behavioral intention, which has a positive influence on ERP adoption. Facilitation conditions also had a positive impact on ERP adoption.

Adam et al. [121] used the UTAUT framework to evaluate influential factors of ERP systems in small South African manufacturing companies. This study used a mixed method approach using textual, theme, and descriptive data analysis to investigate the influential factors. Four factors (performance expectancy, effort expectancy, social influence and facilitation conditions) were found to impact the behavioral intention, which had a positive influence on ERP adoption in small manufacturing enterprises in South Africa.

TABLE 7. Studies using UTAUT framework for IS adoption in SMEs.

Type of industry	Main findings	Authors
Veneto SMEs (Italy)	The performance expectancy and facilitating conditions impact the behavioral intention which influence ERP adoption	[118]
Mauritius SMEs	The performance expectancy, effort expectancy, social influence and facilitating conditions affect behavioral intention which impact ERP adoption	[120]
Jordanian SMEs	The performance expectancy and effort expectancy are the most important characteristics for cloud computing adoption	[64]
Small manufacturing enterprises in South Africa	The performance expectancy, effort expectancy, social influence and facilitating conditions are important for adoption of ERP system for small manufacturing firms in South Africa	[121]

Lutfi [64] also identified the characteristics influencing AIS used by SMEs in the Jordanian context by deploying the UTAUT framework. This study used a questionnaire to collect data from 236 respondents in Jordan. The outcome revealed that performance expectancy, effort expectancy and social influence had an impact on the behavioral intention, which influenced ERP adoption. The facilitating conditions were also found to be directly significant for AIS adoption in Jordanian SMEs. Table 7 summarizes previous research on use of UTAUT framework for IS adoption in SMEs.

Literature has revealed that most research has focused on ERP and cloud computing adoption through the quantitative approach. There is limited research that has explored adoption of cloud ERP using the qualitative method. Thus, this study fills this gap by deploying UTAUT framework and using a qualitative approach for investigating cloud ERP adoption in SMEs.

G. PROPOSED MODEL FOR CLOUD ERP ADOPTION IN SMEs

The TOE framework is focused on the technology, organizational and environmental dimensions, and has underpinned many IS inquiries [122], [123]. Although it is comprehensive in nature [124] has the limitation of not including the individual dimension for decision makers in IS adoption [69], [74], [125]. The TOE framework can rarely investigate emotional perceptions of the technology's effortlessness and usefulness which are based on the individual dimensions (UTAUT) [126]. Therefore, to obtain a complete picture, the TOE framework needs integration with an individual framework, such as UTAUT, to make the framework more holistic [20], [74], [125]. The integrative model combining TOE and UTAUT can fulfil both, the organizational levels of

TABLE 8. Comparing the integrative models based on TOE and UTAUT frameworks.

Authors	Characteristics																
	RA	OS	CP	CPL	TR	SO	TMS	OR	PR	ID	MS	CPR	ES	PE	EE	SI	FC
Rosli et al. [75]	✓	×	✓	✓	×	✓	✓	✓	×	×	×	×	×	✓	✓	✓	✓
Awa et al. [74]	×	×	✓	✓	×	✓	✓	×	×	×	✓	✓	✓	✓	✓	✓	×
Proposed model	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Note: RA is relative advantage, OS is observability, CP is compatibility, CPL is complexity, TR is trialability, SO is size of organization, TMS is top management support, OR is organizational readiness, PR is prior IT readiness, ID is industry, MS is market scope, CPR is competitive pressure, ES is external IT support, PE is performance expectancy, EE is effort expectancy, SI is social influence and FC is facilitating conditions.

TOE as well as the individual levels of UTAUT and assists in the evaluation of cloud ERP system adoption in entirety.

Previously, only two studies [74], [75] have combined the TOE and UTAUT as an integrative model to include dimensions at both the organizational and individual levels for a holistic evaluation of technology adoption. These models, however, are not suitable for this study for the following reasons. Firstly, the integrative model based on Rosli et al. [75] is not modelled to investigate SMEs. The characteristics are chosen to focus on large firms. For example, the researchers have stated that "audit firm has to really know the characteristics of CAATTs" [75], which is usually not expected from SMEs. SMEs may not recognize or know the characteristics of adopting cloud ERP systems because they may have little experience or not have expertise in cloud ERP adoption compared with a large company. Secondly, in the integrative model based on Awa et al. [74], several limitations around the characteristics of each dimension are identified. Their model captures only the critical characteristics in literature, and neglects significant characteristics (such as, prior IT experience, external IT support, competitive pressure, and industry) for cloud ERP adoption from the original models. Therefore, the two integrative models from Rosli et al. [75] and Awa et al. [74] are not considered relevant to investigate IS adoption in SMEs, as shown in Table 8. However, the prior studies revealed that the integrative models based on TOE and UTAUT offer opportunity to expatiate several characteristics including the above significant characteristics and provide explanations to deliver extended theoretical strength.

Therefore, this study examines the cloud ERP adoption in NZ SMEs by proposing an integrative model combining the two adoption-related TOE and UTAUT theoretical frameworks. The proposed is a holistic model comprising all the characteristics from TOE and UTAUT, as shown in Figure 4. This integrative model would explain technology adoption from an organizational and user adopter's viewpoint to comprehensively inform on the various aspects of both the individual level (for users) and the organizational level (for decision makers) [127].

In the proposed integrative model, the TOE framework has been adapted from Ramdani et al. [106] (Figure 2) as this was used to investigate enterprise systems adoption in SMEs. For the individual level, this study has deployed UTAUT, based on work of Venkatesh et al. [20], Tan and Lau [116] (Figure 3) who investigated comprehensive views of individual characteristics in SMEs [128]. However, factors such as gender, age, experience, and voluntariness of use have been excluded since the sample (vendors) are relatively homogeneous (professionals in the field).

TABLE 9. Interview participants profiles.

No	Cloud ERP vendor firms	Position	Experience
1	Company A	Cloud ERP sales manager	3 years 8 months
2	Company B	Senior business development manager	4 years 6 months
3	Company C	Cloud ERP sales manager	9 years 8 months
4	Company D	Chief executive	20 years 10 months
5	Company E	Business development manager	2 years
6	Company F	Senior consultant	12 years 9 months

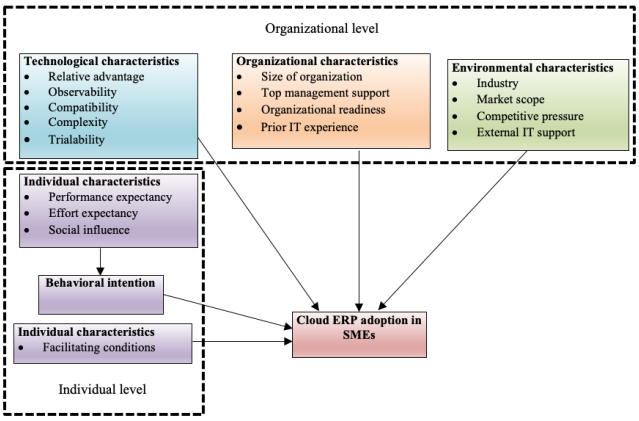

FIGURE 4. Integrative model for cloud ERP adoption in SMEs.

III. RESEARCH METHODOLOGY

This research investigates the influential characteristics for cloud ERP adoption in NZ SMEs and their benefits by developing an integrative model based on the technological,

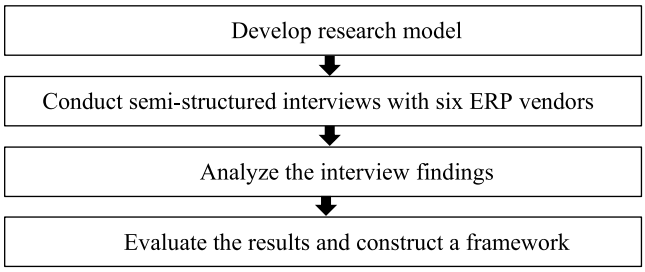

FIGURE 5. Research stages.

organizational, environmental, and individual dimensions. A qualitative research approach is used to create a deep understanding of cloud ERP adoption characteristics and conduct an in-depth analysis in NZ SMEs [127]. In the NZ SMEs environment, the current status of cloud ERP systems is in implementation stage, with 21% companies having implemented so far [17].

This research uses case study as the research strategy for an enriched view of the characteristics for cloud ERP adoption. Yin [129] has defined the case study strategy as allowing ''investigators to retain the holistic and meaningful characteristics of real-life events'' [129], enabling the researcher to obtain insights through a variety of data collection processes [130]. In this study, data are collected from ERP vendors', who are the experts of these systems, through semi-structured interviews to gain insights on the different characteristics for adopting a cloud ERP at the organizational and individual levels.

As recommended by Tharenou et al. [131], this study begins with the identification of the research questions and then articulates the research design around it. In this study, the technological, organizational, environmental, and individual dimensions assist in creating a better understanding of cloud ERP adoption and their benefits in SMEs. The research stages are shown in Figure 5.

This research employs a post-positivist paradigm, which necessitates empirical investigations to examine the adoption of cloud ERP systems via a theoretically developed conceptual framework. This paradigm provides a realist approach based on the varying viewpoints of the participants, combining theory with practice. To improve the credibility of our qualitative study, we addressed four rigorous criteria: internal validity, external validity, dependability, and confirmability [132].

Internal validity was examined by carefully selecting the vendor companies and the interview subjects appropriate to the issue at hand, applying reliable data collecting techniques, selecting suitable theory, and conducting literature reviews pertinent to the phenomenon of cloud ERP adoption. External validity was addressed by interviewing important people linked with cloud ERP adoption across different firms, which increased the generalizability of the overall study findings. The dependability or reliability of the interviews was assessed by employing a similar semi-structured format for all and completing a pilot study with two participants from two different firms, A and B to review whether the interview questions required refinement. After the pilot research, a few questions were modified. Finally, confirmability was addressed by using multiple data sources (interviews, organizational documents and Web sites) and reviewing with literature and theories [133].

A. SAMPLE AND CRITERIA FOR SELECTION

Cloud ERP vendor companies and participants were identified and selected through LinkedIn. This study deployed a criterion sampling strategy for selecting the vendor companies and participants based on a set of criteria [134]: (1) the companies must be vendors of cloud ERP systems, (2) the participants from these companies must have at least two years' experience in implementing cloud ERP systems, and (3) the companies must be in NZ and must sell products for SMEs.

Semi-structured interviews were conducted to collect the initial data from six ERP vendors who are involved in cloud ERP adoption and implementation projects. Six vendors were considered sufficient for this study since they are experts and the most knowledgeable in this domain with extensive experience in adopting and implementing cloud ERP systems. Creswell and Poth [135] have recommended that a small sample size (of about six participants) is acceptable in cases where the participants are highly specialized and factors such as time or cost are applicable. In addition, six represent approximately 25% of all cloud ERP vendor companies in New Zealand. The informants (one from each firm) were interviewed between April and June 2020. Prior informed consent was obtained from the study participants, and the human ethics processes were followed. Table 9 presents the profiles of the participants.

B. DATA COLLECTION

Data were collected using semi-structured in-depth interviews, either via Zoom or face-to-face. Interviews ranged from 45 to 90 minutes in length. All informants were recruited as a result of their response to the invitation to participate. Based on the integrative model, questions were asked to investigate the technological, organizational, environmental, and individual characteristics on the adoption of cloud ERP systems in SMEs and the benefits. The interviews were audio recorded and transcribed verbatim.

C. DATA ANALYSIS

The condensation approach presents ''the experience of the participants as expressed by themselves, rather than exploring possible underlying meaning of what was said'' [136]. Moreover, this approach can analyze the data when the number of participants are limited. Thus, the condensation approach was deployed for data analysis in this study [136].

This approach condensed the findings into specific contexts based on the units of analysis employed to analyze the data [136]. The units of analysis for this study are the technological, organizational and environmental dimensions (at the organizational level), and the individual dimensions

(at the individual level) based on the holistic model (shown in Figure 4) for the adoption of cloud ERP systems in NZ SMEs. The condensation approach was applied using the following steps: (1) the framework (Figure 4) was used as a coding plan which included pre-defined groups comprising the constructs of the technological, organizational, environmental and individual dimensions; (2) the thematic analysis was applied to develop themes based on the insights collected from the informant responses identifying repeated patterns from the data obtained [137]; (3) the data were categorized and positioned into the thematic groups aligned to the dimensions of the integrative model; and finally, (4) a second order analysis was conducted consolidating the themes and building a sequence of events to answer the research question. Additionally, the data bias was controlled by keeping an open mind to contradictory findings and divergent views and review of alternative explanations in the evaluation [127].

IV. FINDINGS

The findings from the six cloud ERP consultants on the influence of the technological, organizational, environmental, and individual characteristics for the adoption of cloud ERP systems, and the benefits of deployment are presented in this section.

A. TECHNOLOGICAL CONTEXT

The technological dimension comprises the relative advantage, observability, compatibility, complexity and trialability characteristics based on the integrative model (Figure 4). This study has further revealed two new characteristics – reliability and data security – for cloud ERP adoption as reported by the participants within the technological context. The following sections discuss the findings on all these dynamics.

1) RELATIVE ADVANTAGE

Informants from all companies agreed that cloud ERP systems are superior to on-premise as cloud-based systems are Internet-enabled and browser-based. The participant from Company C noted that a major element of a cloud ERP system is that the company does not require high performing computers, or servers, or specialists to handle the infrastructure. Therefore, the company can save time and money in running the system. The Company C participant further highlighted that ''the cloud ERP features run via a cloud database which is controlled by CSPs who provide the service, which allows users to adopt without the need of any major IT infrastructure''.

The benefits of cloud ERP are in minimizing the number of IT staff required. The users must only use a cloud ERP via Web browser on their computers and allow the service provider to provide the system. The running of a cloud ERP system does not require IT staff monitoring the server such as required in on-premise systems on a continuous basis. A cloud ERP offers better scalability in a timely manner based on users' demand, therefore the system is flexible and can expand when required or easily reduced when the requirements are not necessary anymore. All vendor participants believed that understanding the relative advantage of cloud ERP systems over on-premise systems, such as in areas of meeting current technological trends, plays a crucial role in motivating decision makers to adopt the system, particularly from an SME perspective.

2) OBSERVABILITY

All informants agreed that the success of cloud ERP implementations encourage decision makers to adopt these systems even more. When the decision makers see the results and benefits of deploying cloud ERP systems from exemplar and test cases, this creates an acceptance and inspires them to adopt.

Cloud ERP systems are pre-configured and are thus quicker to implement taking only three to six months, as the servers, storage and operations are handled by CSPs who regularly maintain and upgrade the system. The informant from Company C noted that

''cloud ERP systems are much easier to adopt and offer a faster implementation because these systems take a fraction of the time to implement compared to the traditional server-based implementation. Additionally, an organization can deploy a new ERP much more quickly because it is a cloud-based application which has been pre-setup before implementing''.

The informant further stated that SMEs must recognize and have a clear vision of the future benefits in deploying a cloud ERP. They must be aware of the possibilities through adoption as the achievements can be observed, encouraging the organization to adopt. CSPs facilitate cloud ERP enhancements incrementally and continuously by releasing regular service packs and system update/upgrades on designated ERP modules. Thus, observing the results can significantly influence the decision makers and the company management in adopting the system as confirmed by many informants.

3) COMPATIBILITY

All informants concurred that cloud ERP systems must be compatible in order to integrate with existing technologies such as e-commerce, payroll or Eftpos. The manager of Company E highlighted that currently 20 to 30% of SMEs have moved from on-premise to cloud ERP systems and are looking to combine some of their business systems with the new system. But, if the new system faces any issues or complexities in integrating with the current systems, the adoption may take a longer time. They further noted that

''cloud ERP systems can be connected with existing systems; there can be on-premise systems like Eftpos or barcode scanning which can be connected. But for example, if the SME has ten systems and they only want to connect with three of them and if CSPs cannot integrate those three into the cloud ERP system, the adoption would be more complex than the previous one''.

Thus, all participants agreed that compatibility is essential for cloud ERP adoption in SMEs.

4) COMPLEXITY

Most of the informants (from companies A, B, D, E and F) stated that cloud ERP systems are user-friendly and easy to use. The participant from Company F explained that these systems are simple to use and can be accessed through a username and password over a Web browser. However, the adoption can face complexities if the staff are not trained before deploying the system; if they do not have prior IT experience. The participant from Company F emphasized that

''cloud ERP companies try to make the system super simple for users. If they know how to browse and perform transactions on a Web site, complexity and difficulty for cloud ERP users are overcome by just training; they just have to do the training. They have to test the system themselves and actually do some practice before they go live''.

Though, the informant of Company C noted that the cloud ERP system can become complex to deploy in scenarios such as during the COVID period with CSP support remotely through Zoom or Skype. Findings also suggest that if the adoption gets complicated with many steps and tasks to complete, some SMEs may reject to adopt the system. The informant from Company C further stated that

''when a decision maker is looking for a cloud ERP and finds that a particular system is too complex to adopt, and requires a lot of development and scripting, sometimes, the decision maker may say goodbye and find another simpler system.''

Therefore, findings highlight that simplicity is important for cloud ERP systems for SMEs.

5) TRIALABILITY

Most of the informants (from companies A, C, D, E and F) agreed that trialability is a significant characteristic for decision makers before adopting all the functions of a cloud ERP system and going-live. The participant from Company E noted that trialability of cloud ERP can improve the decision-making for the SMEs before they purchase or adopt the system. Some CSPs allow their potential customers to trial through a demonstration system (which can be a full or limited version) before purchasing. These trials can improve the certainty about the cloud ERP usability by enabling users to understand how to insert the data and use these systems. The participant from Company E explained that

''we come over to the client senior managers who are the decision makers for doing a demo, and then when we get into the demo, this is where you are getting into the usability of it. And so, we get their information and we put it into the system, and so they see their data in the system before they can actually try it''.

However, one ERP vendor did not agree. They said that trialability might not be significant for a cloud ERP system because some vendor companies do not allow clients to access trial editions of these systems. The decision makers need to have confidence in the ERP vendor regarding their product. These senior managers must decide and select an appropriate system based on the trustworthiness of the products in the market. The informant from Company B pointed out that

''for our ERP products, we do not provide demonstration to clients, and they have to believe in us to adopt the system. So, I think trialability does not influence the adoption of cloud ERP systems''.

However, most participants suggested that trialability is essential for a cloud ERP adoption in SMEs.

6) RELIABILITY

This study has pointed out that reliability of cloud ERP systems is an important characteristic within the technological context. The reliability of a cloud ERP system refers to an uninterrupted availability of the system without downtime, leading to trustworthiness of CSPs. The informant from Company C noted that

''commonly, users need 100% availability of a cloud ERP system. These systems run via an Internet platform which may face network failure from the CSPs, but users expect an interruption-free system''.

This finding is also in agreement with participants from companies F and D. The participant of company F stated:

''the users of cloud ERP systems want this system to work smoothly, especially during peak times and seasons. For example, for the retail sector, on Good Friday or Boxing Day, the users should be able to work on the cloud ERP systems without any issues.'' Hence, the cloud ERP adopters always search for a system which is very robust, reliable, and continually available.

7) DATA SECURITY

The data in cloud ERP systems are stored by CSPs. Hence, the vendors have noted that SMEs are concerned about the security and control of their data. The informant from Company A noted that

''the client's companies negotiate terms and conditions with CSPs which certify the protection of confidential information which are stored in the cloud. The agreement clearly defines and outlines the categorization of information and their secure storage''.

Therefore, data security plays an important role in cloud ERP adoption. Moreover, CSPs deliver well-defined plans, policies and strategies including plans for recovery backup and restoration which relates to availability and disaster recovery.

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policies and strategies including plans for recovery backup and restoration which relates to availability and disaster recovery.

B. ORGANIZATIONAL CONTEXT

The organizational context relates to the structure and resources of client firms, which comprise the size of the clients' organization, top management support, technology readiness and prior IT experience. This study has revealed new characteristics including financial capability, cultural aspects, and project champion for adopting a cloud ERP in SMEs as reported by the participants.

1) SIZE OF ORGANIZATION

Informants from all companies felt that the size of an organization is significant for adopting a cloud ERP in SMEs. The Company D chief executive noted that ''small businesses lack the resources and knowledge to adopt an ERP system and they often do not actually define or understand the outcomes that are to be achieved''. He further explained that generally the professional practitioners in SMEs face knowledge gaps due to lack of experience, and are short in resources, both human and financial. Originally, SMEs used manual systems such as Microsoft Excel, and they did not understand the costs, challenges, or how to successfully adopt cloud ERP systems. Further, SMEs usually did not comprehend the results that needed to be accomplished when employing a cloud ERP system.

Therefore, the size of an organization is of importance in adopting a cloud ERP, especially when the company lacks human, technological, or financial resources.

2) TOP MANAGEMENT SUPPORT

All informants agreed that top management support is vital for adopting a cloud ERP system in an organization. The vendor from Company C stated that top management support influences ERP adoption in SMEs as the senior management has the overall view of the adoption process and can aid wherever necessary. Additionally, they can assign sufficient resources for the adoption since they are involved in the project management and have been part of the business case development much before the adoption of the cloud ERP system. The sales manager of Company C highlighted that

''top management support is essential to facilitate the adopting and implementing processes. The top management support acts as a conduit between the company and the vendors to fix any issues or provide resources during the adoption and implementation process''.

Therefore, top management support is crucial for SMEs to adopt a cloud ERP system, particularly in providing resources required by the adoption team.

3) ORGANIZATIONAL READINESS

Most of the participants (from companies A, B, C, D, and F) confirmed that organizational readiness influences the adoption of cloud ERP systems in SMEs. The manager from Company A pointed out that the SMEs should be ready in terms of IT (which includes the installation and networking of the enterprise software packages that can offer a platform for the cloud ERP application) since, before adoption, the client's company trials the cloud ERP system through the product demonstration version to test their usability requirements. The client's company must ensure technology readiness before the cloud ERP system is employed. The informant of Company A stated that

''before adopting the actual cloud ERP system, several SME client companies trial and test these systems, so the technology in SMEs is developed and made available to run these systems. Therefore, organizational readiness influences the adoption of cloud ERP systems for SMEs''.

Findings from the participant of Company C highlighted that the organizational readiness in terms of financial resources influence the adoption of cloud ERP system. SMEs usually lack in resources, particularly in having sufficient budget when compared with large companies, therefore a cloud ERP must be available at a cost that SMEs can afford. The vendor participants, however, highlighted that

''a cloud ERP environment offers cost of ownership advantages for SMEs as this system is maintained and managed by CSPs. In a cloud ERP deployment, the SMEs can reduce the time of implementation because they do not have to substantially invest and provide extensive resources in their IT department''.

Additionally, in terms of a cloud ERP deployment, SMEs can work out financial arrangements contractually with CSPs for structured payment settlements and licensing fees for users. The structured settlement and payment schedule for user fees allow SMEs to be able to afford adoption of the system.

The manager of Company E, however, emphasized that organizational readiness in terms of technology may not influence the adoption for SMEs because the CSPs have the responsibility for deployment, and they install the required technology at that time. The deployment requires an average level of IT capability such as use of Microsoft Excel. The CSPs support and assist SMEs in adopting the cloud ERP software by executing the deployment process. They further emphasized that

''we (CSPs) deploy the change and technology at the same time. During the deployment of a cloud ERP system, the client's company may use normal IT performance software such as Microsoft Office. So, the company does not need to be technologically ready. I do not think anyone is ever technologically ready, and it changes so fast, anyway, that no one can keep up anymore''.

Therefore, organizational readiness is essential to adopt a cloud ERP as SMEs must be ready with the IT infrastructure and financial resources before adopting the system.

4) PRIOR IT EXPERIENCE

All participants agreed that prior IT experience positively affects the adoption of cloud ERP in SMEs. The Company A informant noted that the client company users should have

some previous IT experience or at least used one module (such as an accounting or inventory system) either in an on-premise or cloud ERP environment. For example, they noted that ''if users have used an accounting system; it does not need to be an on-premise ERP system, but any accounting system, they will understand what they are using the system for [sales invoices and turnover, purchase expenses and liabilities, accounts payable, payroll and so forth]''.

Thus, prior IT experience will be beneficial for an SME to adopt a cloud ERP.

5) CULTURAL ASPECTS

The degree of willingness by employees to adopt a cloud ERP in SMEs largely depends on a company's culture. The cultural aspects contribute in motivating staff to accomplish the aims and initiatives of a company which can include adopting a cloud ERP system. The informant of Company C stated that '' if a company's culture is conducive to new technology adoption and digitization, this would promote adoption and use of a cloud ERP system''.

This finding is also in alignment with the informants from companies A and B. The informant from Company A emphasized that

''the adoption of cloud ERP system changes the company work structure, and all the users need to learn the use of the new system. Thus, the culture of the company is critical that can contribute to all users achieving the same goals of the company and their own work goals.'' Therefore, cultural aspects are necessary to facilitate adoption of a cloud ERP as the SME employees must be willing to adopt this system.

6) PROJECT CHAMPION

Project champion refers to a key staff member who usually leads the execution of the project. The informant from Company B pointed out that

''the champion supervises the entire cloud ERP adoption process with responsibilities in dealing with issues in the deployment or usability; monitoring the project progress until completion''.

The informants of companies C and D also agreed that project champion is an important characteristic for cloud ERP adoption. The participant of Company C pointed out:

''the company has to have a project champion promoting the benefits of cloud ERP system and possessing solid leadership skills during implementation.''

Consequently, having a project champion is considered necessary for adoption success.

C. ENVIRONMENTAL CONTEXT

The environmental dimension refers to the characteristics which are related to external forces acting upon a clients' firm. From a cloud ERP adoption dimension, the associated environmental aspects include external IT support, competitive pressure, market scope and the industry influence. This study has revealed a new environmental characteristic – government funding support – applicable for cloud ERP adoptions as reported by the participants. Findings of the environmental factors are discussed next.

1) INDUSTRY

All participants concurred that the nature of industry influences the adoption of cloud ERP systems. The Company A informant noted that there are specific requirements for the adoption of a cloud ERP in each industry, which may have different needs, tasks, or problems based on the type of business. For example, the clients in the manufacturing or agricultural sectors may have their own requirements or scope and may need different modules to be adopted. The Company A informant noted that

''some cloud ERP systems are industry specific, and each adoption will have different requirements. We would say that we are actually building certain industry editions such as we are currently developing a manufacturing edition, agriculture and farming services edition, and a construction edition. So, it is especially important that there are these industry-specific options''.

Thus, type of industry as a characteristic is significant for cloud ERP adoption.

2) MARKET SCOPE

All the informants agreed that the market scope influences the adoption of a cloud ERP system as SMEs operate not only locally, but also globally. The informant of company B stated that the market scope can be seen from two perspectives. Firstly, when the scope of work is wider, the inhouse coordination cost can rise as the nature of work will be more complex administratively and require more information processing. Consequently, the digitization of work (such as adopting a cloud ERP system) will decrease these costs. Secondly, the external costs (such as market research costs and inventory holding costs) will rise when an organization is looking to expand the market scope. Thus, the adoption of cloud ERP systems for SMEs can reduce these costs. The Company B informant pointed out that:

''the market scope influences the adoption of a cloud ERP system because the company wants to reach the domestic and international customers. To reduce operational costs, the adoption of a cloud ERP system will be the best solution for the company''.

Therefore, market scope influences the adoption of cloud ERP systems for SMEs as the companies expand their market reach to national and international customers.

3) COMPETITIVE PRESSURE

Most informants believed that competitive pressure has a positive impact on the adoption of cloud ERP systems. Competitive pressure refers to the level of pressure that SMEs feel from external forces such as competitors in the industry, and they become increasingly aware of and follow their competitors in adopting a cloud ERP system. Such pressure can strongly motivate SMEs to deploy a cloud ERP system since their competitors have already implemented

and so would like to maintain their competitiveness in the marketplace. By adopting a cloud ERP, SMEs can achieve higher operational efficiencies, better market visibility and more accurately collect data from dynamic markets. The Company C informant revealed that sometimes competitive pressure can be essential for SMEs to face rival companies. It could lead to a strategic necessity to adopt a cloud ERP to compete in the market. The informant further stated that ''competitors can contribute to enabling cloud ERP adoptions since a company wants to compete them, and cloud ERP system can assist in achieving superior firm performance''.

Therefore, competitive pressure is a substantial driving force for SMEs to adopt cloud ERP and derive significant benefits for competitiveness and survival.

4) EXTERNAL IT SUPPORT

All the participants agreed that external IT support (such as from CSPs) influences the adoption of cloud ERP systems in SMEs. Findings revealed that external IT support is vital since any issues that client managers may face during adoption or usage would need a quick resolution. The cloud ERP systems' adoption process is rapid since the SMEs do not need substantial infrastructure to handle the system as this is operated and supported by CSPs. Additionally, these systems do not require connecting the different features/modules of cloud ERP systems, only logging in a cloud ERP system via Web browser. Additionally, the CSPs train users and ensure they are satisfied with the ERP product. The Company A informant highlighted that,

''it [CSP support] is very important because, if users are not trained and supported well, then they will be very uncomfortable with the system if they have any queries and find it difficult to communicate with the service provider. For this reason, a company may not want to adopt and use the cloud ERP software''.

Therefore, external IT support is essential for SMEs to adopt a cloud ERP system as SMEs need CSPs to help them with issues during and after adoption.

5) GOVERNMENT FUNDING SUPPORT

As revealed by the study participants, government funding support can assist SMEs that face inadequate budget issues in adopting new technology such as cloud ERP systems. During the COVID pandemic, the Ministry of Business, Innovation and Employment in NZ proposed a funding of NZ$ 40 million to support SMEs adopt IT solutions for running their businesses via the Regional Business Partner Network (RBP) [138]. The objective of this funding is to encourage SMEs to adopt IT systems such as cloud ERP to run their business and enable staff work from home. Such government funding is deemed vital to cloud ERP adoption in SMEs. The informant of Company A stated that ''government funding is essential for SMEs as they can receive an additional budget to support their adoption of cloud ERP systems during COVID pandemic''.

The participants from companies C and E were also in agreement with the participant A that the government funding support has a strong influence, thus, is significant for cloud ERP adoption. The informant of Company C highlighted that:

''normally, SMEs are short on budget to adopt cloud ERP systems. If the NZ government funding support is available, SMEs would consider adopting cloud ERP systems more in their companies.''

D. INDIVIDUAL CONTEXT

The individual dimension refers to the four individual characteristics of performance expectancy, effort expectancy, social influence and facilitating conditions based on the integrative model (Figure 4). The findings on this dimension are presented next.

1) PERFORMANCE EXPECTANCY

All the participants believed that performance expectancy influences the adoption of cloud ERP systems. The company managers and adopters will have the behavioral intention to adopt a cloud ERP system if they believe that this could help in improving efficiencies in their daily tasks (such as procuring products from suppliers, managing inventory, or analyzing data and generating reports) and make their tasks easier to execute. The performance expectancy plays a significant role from the adopter's perspectives since these systems can enhance accessibility and mobility and provide real-time data from several locations/departments enhancing workflow in the company. The Company B informant explained that

''the functionality of cloud ERP definitely plays a crucial role on behavioral intention to adopt these systems because they are built for improving the workflow, for example you do not really have to extract data from multiple locations and bring them into one location''.

Therefore, performance expectancy affects the cloud ERP adoption from an individual dimension.

2) EFFORT EXPECTANCY

Most of the informants from A, B, C, D, and F companies believed that effort expectancy is significant to adopt cloud ERP systems. The informant from Company C emphasized that if the vendors must guarantee that these systems are less complex to adopt, company professionals can expect the process to be simple to deploy and increase their behavioral intention to adopt and use these systems. An expectation from professional practitioners is that the effort required in adopting and subsequently using the cloud ERP system minimal. The participant of Company C stated that

''ERP vendors must make sure that it is not going to be too complex with the adoption. The professional practitioners want to know how easy it is to set up. So, it is important that the effort required is very minimal when deploying an ERP solution. This can enhance their behavioral intention to adopt and use cloud ERP systems''.

However, the informant from Company E explained that effort expectancy may not affect the adoption as the training sessions will be provided before implementing. The findings have informed that training is necessary and is a part of the adoption process. Usually, ERP vendors provide an in-depth user training a week or so before the deployment. After the training, users usually fully understand the functionalities, benefits and the deployment process of the system reducing the effort expectancy.

3) SOCIAL INFLUENCE

The informant from Company D revealed that the social influence plays a key role in the adoption of a cloud ERP system. Sometimes, a cloud ERP is adopted due to pressure from colleagues or managers rather than the advantages of the system, and this can increase adopters' behavioral intention to adopt the system. The informant from company D noted that

"the adopters are able to raise their intention to adopt and use the cloud ERP system because its importance has been highlighted by their managers or colleagues. The pressure to adopt the system can force a company management to deploy, although the users do not fully recognize the benefits. This is the reason why this characteristic can influence the adoption".

Therefore, social influence has a major impact on the adoption of cloud ERP systems.

4) FACILITATING CONDITIONS

All the informants confirmed that facilitating conditions influence the adoption of cloud ERP systems. According to the Company D informant, facilitating conditions are important for SME clients' decision-making and deployment since they need support from CSPs with broad experience in areas of adoption capability and product knowledge, to fill the gap in their own limited resources and information. Occasionally, the adoption of a cloud ERP system is complicated for SMEs as they have limited resources, and they need specialists to support for a successful adoption. The informant from Company D noted that

"for small and medium companies, it is an influence on decisions by the chief executive officer (CEO) or key managers who lack resources and knowledge and need help from vendors to fill these gaps. As a result, they need experts to support deployment which heavily influences their decision".

Therefore, facilitating conditions are important for cloud ERP adoption.

Based on the above findings, the model for adoption of cloud ERP systems in SMEs is extended (Figure 6) with additional characteristics highlighted by the NZ vendors. Reliability and data security are added within the technological characteristics. Cultural aspects and project champion are included in the organizational characteristics. Government funding support is added in the environmental characteristics.

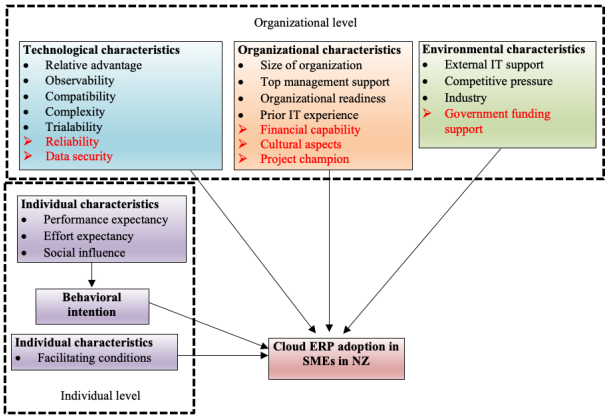

FIGURE 6. Extended model for adoption of cloud ERP systems in SMEs in NZ.

Further, from the above findings, several benefits of adopting cloud ERP systems are listed below:

- Lower upfront investment
- Lower total cost of ownership and operating costs
- Reduced IT staff
- Rapid implementation
- Rapid updates and upgrades
- Focus on core competencies
- Enhanced accessibility, mobility, and usability
- Easier integration with other services
- Easier customizations based on specific industry needs
- Improved system availability and disaster recovery
- Increased scalability based on business needs
- Faster data exchanges and reports/information shared among departments

From an implementation perspective, the average deployments of cloud ERP range between 50-100 in NZ SMEs from these vendors. One vendor explained

"there is a 100% expectation that the deployment will be successful and none of the businesses have "pulled-the-plug" on an adoption after investing the money. There is a 'testing' phase of any implementation where the customer fully tests all business scenarios and outputs (document layouts, process documentation, etc.) and signs that they have fully tested and are happy to 'Go Live' with the system. If any issues come up during testing, these are addressed and either resolved or a work-around put in place".

Therefore, the NZ vendors claim a 100% success rate currently in NZ SMEs.

Further, the overall results from all vendor participants revealed relative advantage, observability, compatibility, top management support, organizational readiness, external IT support, government funding support and performance expectancy as the most influential characteristics that can lead to ERP adoption success in NZ SMEs. Thus, SMEs must focus on these characteristics for effectiveness of the cloud ERP adoption to achieve their goals.

V. DISCUSSION

The objective of this study was to understand the cloud ERP adoption in SMEs by evaluating the various influential

characteristics (technological, organizational, environmental at the organizational level and individual at the individual level) and their benefits from a vendors' perspective. This study has revealed significant findings within these characteristics that have an impact on the adoption of cloud ERP systems for SMEs in NZ, shown in Figure 6.

A comparison in the influence of technological, organizational, environmental, and individual characteristics for adopting cloud ERP systems for SMEs in NZ found many agreements between the empirical findings and literature, and also some additional characteristics, which are explained below.

In the technological context, findings from this study have revealed that the relative advantage from a cloud ERP can motivate its adoption in an SME due to decision makers' appreciation of the benefits expected from the new system that can enhance user's job efficiency. This finding is consistent with the study by Albar and Hoque [25] which also found the relative advantage of a cloud ERP as a key motivator for its adoption. In the context of observability, the finding that the evident result of using a cloud ERP system, such as rapid implementation, provision of servers and storage by CSPs and their operation and maintenance, inspires company managers to adopt. This finding is in alignment with Jaffa and Salim [139] in which such results of deploying cloud ERP systems could be used as a reference for SMEs and the success stories from CSPs could encourage SMEs to adopt the system. Compatibility is another important characteristic in the adoption of cloud ERP as these systems can integrate with existing technologies (e.g., electronic data interchange (EDI) or electronic funds transfer (EFT)) to automate processes for exchanging data from different locations. This finding shows that compatibility is a crucial characteristic, which is consistent with prior studies e.g., [103], [140]. Influence of complexity as a characteristic is found minimal since these systems are considered easy to adopt and use. Findings regarding complexity are similar to the results of prior studies e.g., [76], [140] in which cloud ERP systems were found to provide a lower level of complexity for users to adopt. In case of trialability, the findings have indicated that this is an advantageous practice for users to trial either with limited or all functions. The participants in this study as well as researchers from prior studies e.g., [141], [142] have strongly recommended this practice. They have suggested that this characteristic affects the adoption of cloud ERP systems due to an organization being able to test the performance before adopting and deciding to purchase the system.

For organizational dimension, the study participants, and researcher [90] concur that the size of an organization influences adoption of cloud ERP by SMEs since they are usually short on knowledge and resources such as human and financial. This study has disclosed that top management support affects cloud ERP adoption as the senior management, who are typically the team leaders or owners, possess comprehensive information about what resources (technological and human) are available in the company. They allocate the resources and provide relevant information to adopt the system. This finding is consistent with other studies e.g., [104], [110] in which top management support was also found significant in providing sufficient resources, commitment and vision for the innovation and the adoption of cloud ERP systems. In the case of organizational readiness, this study's findings align with a prior study [143] which highlighted that organizational readiness in organizations is essential. Organizational readiness involves installing technological infrastructure, financial and IT human resources, both before and during the adoption process, which influences the deployment of cloud ERP systems. In terms of prior IT experience, the findings from this study are consistent with findings from prior research [83], [111] highlighting that this characteristic is essential for cloud ERP adoption because staff should have some previous IT experience (such as on-premise ERP) which will enable a smoother and more efficient adoption.

In the context of environmental characteristics, similar to findings in literature [103], this study highlights that competitive pressure from rival organizations has a positive effect on the adoption of a cloud ERP system by SMEs. This finding further aligns with Gangwar et al. [69] in which this characteristic had an impact on an SMEs' intention to adopt a cloud ERP since their competitors had implemented, and the company wanted to increase its competitiveness in the market. The market scope influences the adoption of cloud ERP systems which is a similar finding to Ramdani et al. [144]. Their study reveals that when a company wants to broaden their market scope, the adoption of IT application can assist their dispersed markets more efficiently. Industry as an environmental characteristic is also consistent between participants and literature. The findings from this study align with Sayginer and Ercan [145] that the adoption of cloud ERP systems is specific to the business segment of the client company, since each business segment may have unique requirements and can face different issues during the adoption process.

In the individual dimension, performance expectancy has been influential in both this study as well as a study by Khayer et al. [117]. The adopter's behavioral intention for adopting a cloud ERP system increases if the system can help and support them as well as the organization to improve the performance. For effort expectancy, this study is in alignment with Khayer et al. [117] who also revealed that effort expectancy is a significant characteristic for cloud ERP adoption. Cloud ERP systems are validated by the vendors for their user-friendliness, which makes the adopters more inclined to adopt as they recognize its simplicity and ease of deployment. This study is in agreement with previous studies [146] in its findings around social influence, which is found as an important characteristic in cloud ERP adoption. Social influence can increase adopter's expectations and adoption intent as well as compel SMEs to deploy cloud ERP systems. The final important characteristic is facilitating conditions. The findings from this study are

in agreement with Keong et al. [119] that this characteristic with factors such as support from CSPs creates the necessary environment that much influences the adoption of cloud ERP in SMEs. Despite limited resources in NZ SMEs, these companies assist vendors in their pre-implementation consultation process in explaining their requirements and assisting vendors to identify problems for developing their proposal for a cloud ERP system [15]. They provide the environment for the vendors to directly observe their processes and allow access to relevant company documents. The vendors in turn submit a proposal for adopting their cloud ERP, which include times, budgets and modules.

This study has filled the gaps in investigating cloud ERP adoption through an integrative model based on the organizational (TOE) and individual (UTAUT) dimensions. This model overcame the limitations from previous TOE and UTAUT models [74], [75] that investigated IS adoption in a financial accounting context since these models fell short in investigating relevant characteristics such as external IT support, prior IT experience, and industry and competitive pressure for cloud ERP adoption. This study has included these characteristics as well as added new characteristics to the integrative model including system reliability, data security, cultural aspects, project champion, and government support. These novel characteristics build upon the existing dimensions that could enable successful cloud ERP adoption in SMEs. Thus, this study contributes to the existing literature in better understanding the technological, organizational, environmental, and individual dimensions for cloud ERP adoption in SMEs.

VI. CONCLUSION AND IMPLICATIONS

Insights from the NZ cloud ERP vendors highlight that the characteristics within the technological, organizational, environmental, and individual dimensions based on the TOE and UTAUT frameworks have significant impact in the adoption of cloud ERP systems. Further informed by the empirical study findings the developed model is extended to include new characteristics. Reliability and data security are added to the technological characteristics. Financial capability, project champion and cultural aspects are included in the organizational characteristics. Finally, government funding support is included in the environmental characteristics. These findings are essential additions to the literature highlighting important aspects that could enable cloud ERP adoption in SMEs. Further, many benefits of adopting these systems are revealed based on the characteristics investigated, such as reduced cost and time for deployment, less IT staff, increased scalability, rapid implementation, improved accessibility, and recovery backup and restoration which are correlated to any disaster situation. This is one of the few studies that has investigated the characteristics for cloud ERP adoption in SMEs based on a combined TOE and UTAUT model. The benefit of such an integrative model is in evaluating the individual dimensions, including the behavioral intention for cloud ERP adoption in SMEs, along with the technological, organizational, and environmental dimensions to provide a more holistic view. The results presented in this paper have numerous theoretical and practical implications, explained below.

A. THEORETICAL IMPLICATIONS

Cloud ERP systems have been in considerable demand for SMEs to survive in competitive markets, however, very few studies have been conducted so far on SMEs in NZ. This study has developed an integrative model using the TOE and UTAUT theories determining the important technological, organizational, environmental, and individual characteristics for cloud ERP adoption in SMEs. This integration of TOE with UTAUT is limited in research and is a significant theoretical contribution of this paper. The insights on these characteristics captured from the NZ vendors' viewpoint for cloud ERP adoption in SMEs enhance the body of knowledge and contribute to academia.

B. PRACTICAL IMPLICATIONS

This paper also has implications for user practitioners and vendors. For user practitioners, this paper presents insights on the cloud ERP characteristics which can help SME users successfully adopt cloud ERP in their companies by addressing the influencing attributes. The findings provide insights that can encourage the users to be comfortable in deploying and using a cloud ERP system. Further, this paper provides awareness in the deployment of cloud ERP systems to the owners/managers and decision makers in different SME sectors for utilizing the findings of this study to support their decision making. Furthermore, this paper encourages adoption of cloud ERP by highlighting the key benefits of these systems. The paper provides practical guidelines for the successful adoption of these systems and reduces the risk of failures in adopting cloud ERP for SMEs in NZ.

VII. LIMITATIONS, AND FUTURE DIRECTION

The focus of this study was to get rich perceptions from cloud ERP vendors, as such viewpoints of other stakeholders were not investigated. Additionally, the findings on influential characteristics may be different in other regions/countries.

This study investigates the cloud ERP adoption in SMEs by developing the extended model (Figure 6). However, this model has not added some characteristics based on conceptual model, such as risk [19], physical location [105], cost [112], supplier efforts [111]. Thus, future research may consider adding these characteristics into the extended for evaluating the cloud ERP adoption for SMEs. Further this study deployed a qualitative approach to investigates cloud ERP adoption in SMEs. Consequently, future research will use a quantitative approach to examine the cloud ERP adoption for SMEs by deploying the extended model. Moreover, this study deployed the extended model for adoption of cloud ERP systems in SMEs, but this model also can use for other IS adoption such as cloud computing or m-commerce.

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