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The Role of Dynamic Cloud Capability in Improving SME's Strategic Agility and Resource Flexibility: An Empirical Study

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Abstract: This research explores how the cloud's technological capability helps small and medium enterprises (SMEs) adapt to challenging business environments, providing long-term sustainability and strategic agility. The article uses a theoretical and quantitative empirical approach, known as the positivist research paradigm, in offering a unique capability called dynamic cloud capability that leverages the cloud's technological capabilities. Based on the quantitative analysis of 222 Australian Information and Communication Technology (ICT) SMEs, dynamic cloud capability favourably improves the flexible allocation of resources (resource fluidity) and the ability to adapt business models (strategic agility). Additionally, because of the successful mediating effect of resource fluidity, it is inferred that dynamic cloud capability allows for the flexible allocation of resources leading to improved strategic agility. Hence, adopting dynamic cloud capability in an organisation's strategy would be particularly appealing to ICT SMEs as it has been verified to enhance adaptability to a challenging business environment and flexible allocation of resources.

Keywords: dynamic cloud capability; strategic agility; resource fluidity; organisational capabilities; cloud computing; sustainability; SMEs

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1. Introduction

Some of the current challenges small businesses face are the emerging digital economy, technological innovations, and globalization, to name a few. Moreover, global phenomena such as the COVID-19 pandemic force enterprises to rethink their business strategy to mitigate the virus's disruptive effects. Small businesses need to align their business model in response to changing business environments from a strategic and long-term perspective. A business that ignores these global and local disruptive threats faces wasted opportunities, loss of business, and shrinking profits [1]. Most authors recommend that businesses possess strategic agility (SA) to survive long-lasting external effects. SA's definition is "a firm's ability to think and act uniquely, developing new business models and continual innovation" [2].

A key concept in understanding SA is the organisational capabilities businesses must possess to enable them to change their business models. As an organisation grows from a start-up or SME to a larger organisation with significant internal and external resources, its business model becomes rooted and inflexible [3,4]. Hence, this rigidity makes changing business models to adapt to a dynamic business environment challenging. Additionally, business success creates a blind side to disruptive developments in macroeconomic factors [1,3].

Rauffet et al. [5] mention that 'reengineering,' 'rightsizing,' and 'total quality' to reduce costs, downsizing risks, and standardizing practices are not enough to overcome the challenges posed by the business environment. A more recent approach, such as

using organisational and technological capabilities, looks at optimally building on internal resources to create meaningful assets [5].

Additionally, most literature points toward a set of capabilities as a framework for achieving SA. Organisational capability is "a set of differentiated skills, complementary assets, and routines that provide the basis for a firm's competitive capacities and sustainable advantage in a particular business" [6]. Simply, a capability could relate to how organisations continuously monitor the business environment to change. Alternatively, it could relate to how organisations make strategic changes to the business model, giving them a lasting advantage.

Illustrating the process in which an enterprise makes decisive changes leading to business advantage can be related to an organisation that revolutionized the communication industry. Skype used a freemium business model pattern to disrupt the telecommunication sector by offering free calls over the Internet. Skype's main product was Skype software; users can make voice calls free when it is installed on a computer or a smartphone. Skype did not need to maintain infrastructure, unlike the other telecommunication service providers, as Skype used peer-to-peer technology, which used users' devices and the Internet. Skype earned its profits by offering a service to users for calling phones and landlines for a small fee [7]. In May 2011, Microsoft acquired Skype in the largest-ever acquisition of 8.5 billion USD. At that point, Skype had 663 million registered users [8].

Two essential observations from Skype's example are that Skype used an innovative business model to capture customers and earn profits. Skype offered free voice calls for Skype-to-Skype calls with a prepaid subscription, i.e., Skype-out for Skype phone calls. Hence, Skype gathered a large user base and profited from the low-cost service. The second observation from Skype's example was that it disrupted the telecommunication industry by eating up lucrative international calling profits. The telecommunication operators had to adapt their business models by becoming data-driven or offering new services. Therefore, it is evident that changes to business models play a significant role, be it overcoming disruptive effects or capturing an opportunity. Theoretically, there is strong evidence that organisational capabilities play a vital role in realizing SA [9–11].

This article focuses on improving the SA of information and communication technology (ICT) SMEs in Australia using the cloud's technological capabilities. The research deeply explored the literature on SA and the dynamic IT capabilities theory [12–14] to develop the dynamic cloud capability (DCC). Additionally, the article used the positivist research paradigm [15] to create and verify the proposed concept. Further, the DCC's causality on resource fluidity (RF) capability and SA is verified using the SEM [16] in AMOS 27 software [17].

2. Background

2.1. Strategic Agility and the Organisational Capabilities

Businesses need to be strategically agile to counter the changes in the business environment. For example, Skype forced telecommunication operators to focus on monetizing data rather than calls. Thus, it is also essential to realize why SA is crucial to the discussion as opposed to individual success indicators such as profitability and growth. It can be inferred from the literature that organisations need to respond to new business environments, but these adaptations have to be aligned with an organisation's business model [2–4,18]. Whether it realizes it or not, every organisation has a business model by which it generates profits. The business model relates an organisation's product (value proposition) to various business model building blocks such as revenue streams, key resources, and critical partnerships [4,7].

On the other hand, if an organisation alters its operations to counter sagging profitability or any other success indicator over a long duration, the business loses its focus. This change would lead to a firm with a blurred vision of its strategic goals and a misaligned business model. Business models are the grassroots of an organisation with a long-term

vision and zeal to grow. Such organisations focus on the strategic goals and soundness of the business model.

Previous research on SA shows strong hints of an organisational-capability-based framework as an appropriate solution. Among the most noticeable suggestions proposed by different authors are a set of capabilities organisations should possess in response to variations in the business environment [4]. Doz and Kosonen [3] were two early researchers who proposed a set of capabilities to achieve SA when combined. Consequently, different authors broadened the theory and presented a comparative approach to address SA using organisational capabilities [2,10,18,19]. The most noticeable capabilities in the literature are RF, strategic sensitivity, and leadership unity, as defined below.

Resource fluidity is an organisational capability that enables organisations to reconfigure and redeploy resources rapidly [3]. According to Doz and Kosonen [3], several processes are suggested to achieve RF, including decoupling, modularising, disassociating, switching, and grafting (acquiring) resources.

Strategic sensitivity is an organisational capability that enables organisations to be more aware of strategic developments in the business environment [11]. Additionally, the authors suggest a set of processes under strategic sensitivity: anticipating, experimenting, distancing, abstracting, and reframing business strategies [3].

Leadership unity is an organisational capability that enables the leadership team to implement strategic changes beyond win–lose politics [12]. One author advocates discussing, revealing, integrating, aligning, and caring about organisational goals and strategies [3].

2.2. Dynamic Capabilities and DCC's Rational

A deeper look at the literature shows that Doz and Kosonen [3] were not the first to research the use of capabilities for an organisation's advantage. Theoretical research by Teece, Pisano, and Shuen [20] indicates that dynamic capabilities are integral to a firm's activity system. Teece argues that "three meta-capabilities—sensing (i.e., capability to identify external opportunities), seizing new opportunities (i.e., capability to grasp and convert new opportunities) and the ability to reconfigure resources (i.e., physical and human assets)—are necessary capabilities to adjust and innovate the business model" [21]. Doz and Kosonen's [3] work is influenced by the dynamic capabilities theory [9]. This argument establishes a link between dynamic capabilities and organisational meta-capabilities.

The other important concept that lays the foundations for this research is the resource-based view (RBV). Dynamic capabilities and RBV are favourable and interrelated concepts that help organisations realize innovation and strategic management [22]. According to Barney's [22] RBV theory, firms foster prolonged advantages using resources and capabilities. The RBV proposes that firms contend in light of heterogeneous resources and that the distinctions in resources cause performance differences [4,22].

Studies [23,24] also anticipate that dynamic capabilities allow analysing and using information and communication technologies to react to the external environment quickly. Moreover, their study found that dynamic capabilities and information technology could provide firms competitive advantage [23].

Moreover, an exciting approach to studying the cloud's effect on SA is realizing the cloud as an organisational capability. The idea stems from previous theories such as dynamic capabilities [21] and dynamic IT capabilities (DITC) [24]. Furthermore, Djaja and Arief [25] have studied DITC's effect on SA and found it favourable based on a study of 129 ICT SMEs in Indonesia. Hence, this article extends DITC to the cloud by proposing dynamic cloud capability (DCC).

A closer look at the literature on DITC shows that Xiaobo et al. [26] and Xiao [27] were the first to use the term DITC in their work. They linked DITC to the firm's agility, the RBV, and the dynamic capabilities theories. Hence, firms should possess different IT capability levels and develop them dynamically to meet the changing business environment [24]. The article extends the DITC theory to formulate the DCC based on the arguments above.

DCC's definition is as follows:

DCC: is defined "as the ability to integrate, build, and reconfigure cloud-based information technology (IT)/information system (IS) resources with flexibility to meet the demands of a rapidly changing business environment"; adapted from [4,20,27,28].

To further develop the DCC concept, this study uses Bharadwaj's [28] idea that a technological capability combines interactive resources to form an ability. Hence, based on this idea, the most logical way to formulate the capability would be to classify and enlist the cloud's IT/IS resources. The article builds on the already tested DITC theory, which uses four central IT resources and is relevant to cloud computing by applying inductive reasoning [29,30]. However, out of the four resources, the article adapts three resources: (a) cloud human resources (CHR), (b) cloud intangible resources (CIR), and (c) cloud configurability (CC). The research dropped infrastructure from the theory as cloud computing allows organisations to realize hardware in services, eliminating the need to procure hardware, which consumes time and money. As the hardware equates to the cloud's configuration, the research considers hardware part of CC resources.

The three DCC components can be summarised as follows:

CHR relates to cloud IT/IS team skills, such as technical skills matching industry trends; teams' managerial skills with an ability to communicate and collaborate; and the ability to create new assets by reallocating and training teams.

CC is the flexibility of an organisation's cloud assets, services, and products, such as the ability to configure cloud assets to match changing market needs. It also refers to the ability to integrate and combine different cloud services to create innovative products and services and the ability to expand or shrink assets based on demand and simultaneously abandon resources with minimum budgetary impact.

CI refers to those resources and services that are not apparent at first but provide lasting benefits to the organisation, such as prioritizing customer interest, knowledge assets, and sharing assets across departments. Additionally, it allows for examining and adjusting cloud/IT resources and establishing the firm's brand, legacy, and customer base.

2.3. Cloud Computing Usage by Australian ICT SMEs

An exploratory review of the literature made it clear that cloud adoption is not a significant challenge Australian SMEs face at the time of this investigation. As cloud computing becomes more mature and organisations realize the technology's benefit, the adoption rate grows. This is evident from the fact that in 2012 the cloud adoption by Australian SMEs was at 21% [31], and by 2015, the adoption was 40% [32,33]. Furthermore, a quick look at the challenges faced by Australian SMEs towards adoption were a lack of skilled personnel, implementation issues, security and privacy, and a lack of understanding [32,34].

Rather than investigating cloud adoption, this research looks at leveraging the benefits of cloud computing in improving the SA and SMEs' response to the disruptive business environment. As the research progressed, it led to developing a capability, leveraging the benefits of cloud computing, named DCC.

3. Research Design

3.1. Dynamic Cloud Capability

Firstly, cloud characteristics by abductive logic allow us to relate DCC's effects on RF, in which cloud characteristics are "(1). The illusion of infinite computing resources available on-demand, (2). Elimination of an up-front commitment, (3). Pay for the use of computing resources" [35].

Given that cloud computing allows for the flexible acquisition and release of computational and storage resources on demand, SMEs could create new IT services and destroy them when not needed. The creation and destruction of such IT services have negligible hardware and financial impacts on the organisation and is referred to as shifting risk [1]. Moreover, Arbussa et al., point out that SMEs, by nature, need more resources, be they human, financial, or technical [2]. That said, cloud computing will be particularly appealing

to SMEs as it allows for the efficient use of IT resources. Firstly, cloud computing will enable organisations to start with minimal IT resources and increase them as demand increases, hence offering no upfront commitment and allowing the efficient use of IT resources. Secondly, SMEs can benefit from financial flexibility using the pay-for-usage model most public cloud service providers offer.

Following the discussion on theoretical underpinning, causality between DCC and RF is anticipated as DCC derives from dynamic IT capabilities. Additionally, the following hypothesis is derived for DCC and has three components: CHR, CIR and CC.

Hypothesis 1 (H1). *DCC positively affects RF capability.*

3.2. Strategic Agility

The research anticipates a causal relationship between DCC and SA constructs using the following arguments. Djaja and Arief [25], in their study involving 129 Indonesian ICT SMEs, have established a positive and direct relationship between DITC and SA [25]. Hence, the study uses inductive reasoning to anticipate that DCC positively impacts SA.

In their research, Teece et al. [20] also point out how dynamic capabilities relate to strategic management. They also mention that organisations can build capabilities to achieve strategic changes, hinting at SA [20]. In addition, since DITC builds on the dynamic capabilities theory by deductive reasoning, the article relates to the possibility of DCC influencing SA. Additionally, the value proposition innovation (VPI) [36] relates to the propensity of SA. Furthermore, flexibility [37] and responsiveness [38] constructs are used as measures of SA. Hence, the H2 hypothesis is as follows:

Hypothesis 2 (H2). *DCC positively affects the Australian ICT SMEs' SA.*

3.3. Resource Fluidity

This study infers the relationship between RF and SA from multiple sources. According to Adler [2], SA is a multi-dimensional construct of complementary organisational capabilities. Building on the idea, the study identified superior organisational capabilities such as RF, strategic sensitivity, leadership unity, etc. According to the literature analysis of organisational capabilities, RF is a frequent and prominent capability.

Doz and Kosonen [3] realized RF as a set of processes and leadership agendas for flexible organisational resources. This includes gaining flexibility by realizing resources as smaller chunks rather than one extensive resource and functionality. Moreover, gaining RF allows resources to disassociate from operational tasks and policies, allowing strategic changes [2]. Additionally, RF is a capability that enhances SA [2,10,11]. Hence, RF directly improves SA.

Moreover, few studies have quantitatively verified the effect of organisational capabilities such as RF on SA [39]. Thus, this study explicitly affirms the impact of RF on SA using SEM for a new population, Australian ICT SMEs. Adler [2] and Doz and Kosonen [3], in their studies, characterize RF as consisting of three sub-constructs: resource mobility (RM), finance reallocation (FR), and interdepartmental collaboration (IDC). Hence, H3 is as follows:

Hypothesis 3 (H3). *RF positively affects an Australian ICT SME's SA.*

3.4. Mediation Effect of Resource Fluidity

The mediation effect of RF can be anticipated based on the following arguments. Given the theoretical discussion, SA is a multi-dimensional construct of complementary organisational capabilities such as RF, sensitivity, and leadership unity [4]. Along with the anticipated relationship between DCC and RF as organisational capabilities for SA, as hypothesised in H2 and H3, it is plausible to test the mediation effect of RF between DCC and SA. Verifying the mediating role tests, DCC's ability to interact with other

capabilities (RF), hence verifying the multi-dimensional nature of organisational capabilities in improving SA as described by Adler [4].

Additionally, there is a rarity of literature that quantitatively verifies the mediating role of organisational capabilities on another capability in improving SA. Hence, the article aims to study how RF mediates DCC in improving SA, and the hypothesis H4 is as follows:

Hypothesis 4 (H4). *RF has a mediating effect between DCC and SA.*

Based on the hypotheses, the research derives the research model as shown in Figure 1. The figure shows the relationships between RF, SA, and DCC. The figure also outlines the sub-constructs under each central construct.

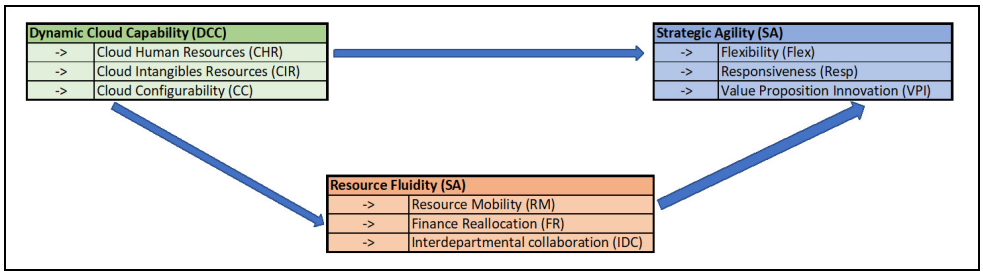

Figure 1. Research Model.

4. Method

4.1. Data Collection Process and Sample

As this study intends to address the cloud's technological capabilities in the ICT SMEs, participant selection involved organisation size by employees and the sector being ICT. The participants were selected using the criteria limiting employees working in Australian ICT SMEs that use cloud computing. Additionally, the participants were selected from organisations with fewer than 500 employees, hence limiting them to SMEs rather than large organisations. The unit of measurement is ICT SME organisations in Australia that use cloud computing to realize their work.

Additionally, this research adopts a quantitative empirical approach based on three key considerations to address the problem. Firstly, the Australian Bureau of Statistics [40] data show that Australia has 23,249 ICT SMEs. Hence, a quantitative study is a good approach based on the population size. Secondly, positivist approaches to management research are associated with quantitative methods [41]. Daft [42] represented the views of many academics when they argued that, to expand the knowledge of organisational phenomena, research should collect quantitative data from large-scale studies rather than individual cases.

To evaluate the research model and the hypotheses, this study uses an online survey collection method using Qualtrics online platform [43]. The survey comprised 5-point Likert questions measuring the constructs as in the research model and demographic questions evaluating participant's profiles. Furthermore, the survey design was anonymous, collecting general participant demographics without personal identification. A pilot survey was conducted to assess the survey's readability before data collection. However, due to Australia's COVID-19 situation, response rates were low, with a high dropout rate. Hence, the study resorted to a paid service to collect the remaining 222 responses after filtering out partial and pilot survey responses. According to the literature on structural equation modelling (SEM) best practices, the authors of [44] argue that "one's sample should be at least five times the number of variables for a comprehensive SEM analysis". Following the suggestion, the research targeted a sample size ≥ 225, calculated as 5×45 (45 questions). The data collection marginally meets this criterion, and the statistical model converges well.

Table 1 shows the education, role, and number of employees related to participants and their organisations. The education demographics show that 56.8% of participants

have a university qualification, 23.9% are postgraduates, and 18% have vocational or technical college qualifications. The demographics indicate that most participants fall under the well-educated category and are appropriate for the survey. Additionally, Table 1 summarises the current organisational role of survey participants. The statistics indicate that most participants hold management positions, and some are technical staff. Hence, the statistics validate the suitability of participants for the survey. Finally, Table 1 shows the organisation's size by the number of employees. The range of organisation size is from 6 to 500, which is the ideal size for SMEs. Therefore, the statistics verify that the data relate to SMEs rather than larger organisations and that the participant demographics are suitable and relevant for the study.

Table 1. Summary of participant's demographics.

Variable	Level	Frequency	Percent	Variable	Level	Frequency	Percent
Education Qualification	University	126	56.8	Role	Middle management	76	34.23
	Postgraduate	53	23.9		Owner partner	33	14.86
	Vocational/technical college	40	18		Technical staff	30	13.51
	No answer	3	1.4		Senior management	24	10.81
	Total	222	100		C level executive	14	6.31
Number of Employees	51–100	54	24.32		President, CEO, Chairperson	12	5.41
	101–250	42	18.92		Supply manager	7	3.15
	251–500	39	17.57		Product manager	5	2.25
	11–25	31	13.96		Business administrator	4	1.80
	6–10	26	11.71		Director	4	1.80
	26–50	26	11.71		Project manager	4	1.80
	no answer	4	1.80		No answer	3	1.35
	Total	222	100		CTO	2	0.90
					HR manager	2	0.90
					Other non-management	2	0.90
					Total	222	100

4.2. Instrument

The measurement scale used in the study is detailed in Table 2. The questions in the survey are taken from previously validated scales following the advice of Heggestad et al. [45], and doing so provides statistical reliability and validity. The study indirectly measures the SA construct via VPI [36], flexibility [37] and responsiveness [38], where VPI relates to the propensity of SA [9], and responsiveness and flexibility are direct measures of SA. At the same time, resource fluidity capability is an adaptation of an existing construct represented by RM, FR, and IDC sub-constructs [2]. Lastly, the research modified and repurposed the DITC scale to represent the DCC scale. Additionally, the study removed infrastructure-related measures from the DITC scale [29,46] and transformed the IT measures into relevant cloud measures to define the DCC scale, as shown in Table 2.

Table 2. Construct Reliability and Validity.

Instrument and Constructs	Constructs	Stand. Loading	Cronbach Alpha	AVE	CR
Cloud Human Resources (CHR)	DCC	0.93	0.898	0.99	1.00
Cloud Intangible Resources (CIR)		1.01			
Cloud Configurability (CC)		0.99			
Resource Mobility (RM	RF	0.98	0.87	1.00	1.00
Finance Reallocation (FR)		1.02			
Interdepartmental Collaboration (IDC)		0.98			
Responsiveness (Resp)	SA	0.94	0.879	0.98	0.99
Flexibility (Flex)		0.96			
Value Proposition Innovation (VPI)		1.01			
Our employees have strong cloud and IT technical skills (e.g., Google Docs, Microsoft Office 365, cloud CRMs, Knowledge in new cloud-based solutions, etc.)?	CHR	0.58	0.78	0.52	0.82
We often examine, adjust, and relocate human IT/cloud resources to better match our product and market areas?		0.71			
We can reconfigure human IS/IT resources (e.g., training for new technologies, reassignment of personnel, etc.) to create new assets?		0.64			
Our employees have strong managerial skills (example)		0.70			
Cloud allows us to expand or shrink IT/IS resources with minimal financial impact?	CC	0.61	0.78	0.46	0.77
We can integrate and combine IT/cloud resources into innovative combinations?		0.62			
We often examine and adjust cloud resources to better match our product and market areas?		0.58			
We can reconfigure our cloud resources to come up with new assets as technology and markets change?		0.64			
We often examine and adjust cloud/IT resources to better meet our customer's needs, manage our knowledge assets, and share assets across divisions	CIR	0.70	0.73	0.53	0.82
We can reconfigure cloud resources to maintain our focus on meeting customer's needs, manage the organisation's knowledge assets, and share assets across divisions.		0.63			
Our cloud-based Information System resources assist in sharing assets and capabilities across functional departments?		0.67			
Our cloud-based Information System resources assist in managing our organisation's knowledge assets?		0.62			
Approvals for any reallocation of resources in our organisation are based on well-defined management processes?	RM	0.53	0.60	0.40	0.65
Uniformity and compatibility in resource allocation enable resource mobilization?		0.54			
We reallocate human resources based on a fair performance management system?		0.56			

Table 2. *Cont.*

Instrument and Constructs	Constructs	Stand. Loading	Cronbach Alpha	AVE	CR
Mutual responsibility and shared commitment are among our management team create organisational shared agenda?	IDC	0.58	0.77	0.48	0.74
We coordinate tasks across the different units or departments?		0.70			
Different organisational units often join forces when change is needed?		0.59			
We reallocate financial resources based on a clear and transparent evaluation of costs and benefits?	FR	0.57	0.70	0.41	0.73
We reallocate financial resources between functional departments as needed?		0.60			
We reallocate financial resources between shared corporate services and autonomous business functions?		0.58			
Our organisation has at least one to three months of financial reserves?		0.58			
Our organisation responds effectively to changing competitor's strategies?	Resp	0.68	0.73	0.47	0.73
Our organisation has developed a disaster scenario that incorporates social distancing, telecommuting and healthy working practices?		0.59			
Our organisation responds to promptly to changing competitor's strategies?		0.60			
Our firm has a system that can implement small product changes in response to changes in customer needs or from corrective actions?	Flex	0.54	0.64	0.44	0.70
Our firm has a system that can handle increases and decreases of the product portfolio in time?		0.66			
Our firm can increase or decrease aggregate production in response to customer demands?		0.57			
We emphasize innovative/modern actions to increase customer retention (e.g., CRM cloud)?	VPI	0.70	0.75	0.42	0.78
We are constantly seeking new customer segments and markets for our products and services?		0.51			
We take opportunities that arise in new or growing markets?		0.58			
Our products or services solves customer needs, which were not solved by competitors?		0.57			
Our products or services are one step ahead when compared to our competitors?		0.53			

The responses to the questions were 5-point Likert multiple choices ranging from 5 (strongly agree) to 1 (strongly disagree).

Table 2 shows various measures of measurement scale suitability for the constructs and the model, including Cronbach's alpha, the average variance extracted (AVE), and composite reliability (CR). The results of Cronbach's alpha show that all constructs satisfy internal consistency requirements, with most constructs having a value greater than 0.7 (good reliability) and a couple having a value greater than 0.6 (acceptable reliability), as recommended by Hair et al. [16].

The study used pooled CFA [47] to verify the construct validity using AVE, CR, discriminant validity, and finally, the optimization of the structural models. A part of pooled CFA to optimize the measurement model, in which the regression paths between second-order constructs, are replaced by correlation paths using an iterative process [16,48]. Furthermore, the AVE and CR evaluations are based on the output of the optimized measurement model [47]. The results satisfy the recommendations; AVE values greater than 0.5 signal a good measure of convergent validity [49]. However, if the AVE is less than 0.5, CR > 0.6 alone is enough to assess the construct validity [49]. Following the recommendations, the CR values for all constructs were significant and more than 0.6, satisfying the construct validity requirement.

Table 2 shows the AVE and CR evaluations. Moreover, the discriminant validity was successful, which is evaluated by verifying the AVE's square root of the second-order constructs to be greater than correlations among the second-order constructs [48].

Table 3 shows the discriminant validity evaluation, and it is evident from the table that the diagonal values are more significant than the non-diagonal correlation values satisfying discriminant validity.

Table 3. Discriminant validity: Correlation of latent variables.

Discriminant Validity			
Construct	**DCC**	**RF**	**SA**
DCC	0.995		
RF	0.862	1	
SA	0.938	0.882	**0.99**

Note: diagonal elements are square root of AVE.

4.3. Analysis

The analysis was carried out using SPSS-AMOS 27 software [50], whereas the descriptive analysis was carried out using SPSS and SEM by the AMOS package. The study used various literature resources, including statistical concepts [51] and SEM analysis [16,47,52–56]. Additionally, the study followed the process outlined in Awang's handbook [48] to optimize the hierarchical reflective–reflective model using the AMOS package. Finally, based on the analysis of survey data, the hypothetical model fits well and is ready for a discussion of results.

5. Results

Figure 2 shows the optimized structural model; the goodness-of-fit statistics satisfied the recommended model's relevant criteria with the following values: root mean square error of approximation RMSEA = 0.048 [57]; chi-squared χ^2/df = 1.5 [58]; comparative fit index CFI = 0.9130 [59]; and Tucker–Lewis index TLI = 0.9030 [60].

Based on the statistical evaluation of the structural model, the following outcomes of the hypothesis can be inferred:

The H1 hypothesis test established a positive and significant relationship between DCC and RF with a standardised estimate of 0.864 and p-value = 0.000 (p-value < 0.05).

The H2 hypothesis test established a significant relationship between DCC and SA with a standardised estimate of 0.698 and p-value = 0.000 (p-value < 0.05).

The H3 hypothesis test established a significant relationship between RF and SA with a standardized estimate of 0.277 and p-value = 0.032 (p-value < 0.05).

To verify the H4 hypothesis, the mediating effect of RF between DCC and SA, the article uses the causal step approach by Baron and Kenny [61]. The process involves evaluating three regression equations, which means evaluating three SEM models. Figure 3 shows the three simplified models used to assess the mediation effect of RF, where c, a, b and c′ refer to the regression coefficients.

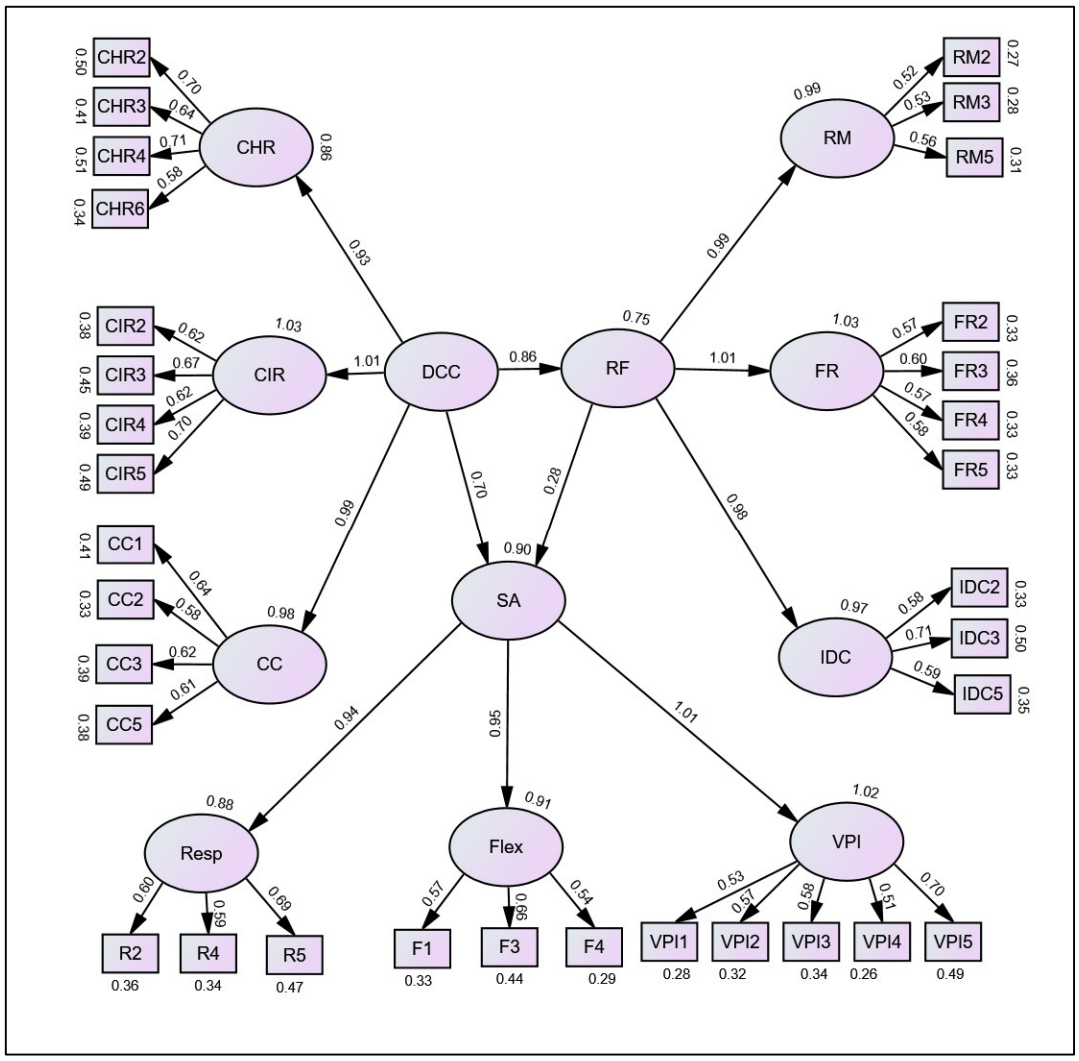

Figure 2. Statistical findings of DCC.

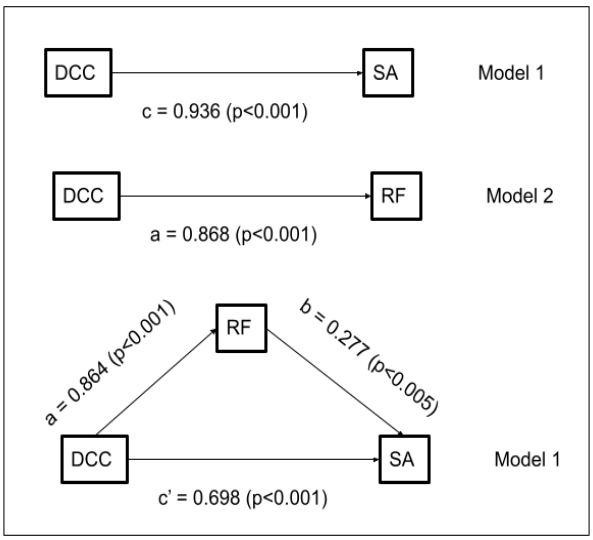

Figure 3. The mediation effect.

According to Baron and Kenny [61], four conditions for mediation are present. According to Figure 3, the "c" regression is statistically significant, and the analysis meets it with c = 0.936. Secondly, the "a" regression is statistically significant; the study meets it with a = 0.868. Thirdly, the "b" regression is statistically significant; the analysis meets it with b = 0.277. Fourthly, the c'< c and this criterion is met with (c' = 0.698) < (c = 0.936), and both paths are statistically significant. Figure 3 shows the paths and the summary statistics. Hence, the mediation effect is established.

Additionally, the significance of the mediation effect requires a test such as Sobel's z-test [61]. The results in Table 4 show that RF has a statistically significant mediating effect between DCC and SA (z = 2.038; $p < 0.05$). The significant z -value provided sufficient evidence in support of the hypothesis. The findings show an index ratio of 25.62%, with the full mediation effect on RF. The index ratio suggests that variations in RF affect the variations in DCC that subsequently cause changes in SA.

Table 4. Mediation effect.

Sobel *z*-Value	**2.03856659; *p*-Value = 0.0415 ($p < 0.05$)**
Total = c' + a × b	0.938436
Direct = c'	0.698
Indirect = a × b	0.240436
% Indirect to total ratio	25.62092673

6. Discussion

6.1. Key Findings

This investigation anticipates DCC's positive effect on the RF of an ICT SME, based on the arguments presented in Section 3.1 and expressed as hypothesis H1. The result validates this causal relationship, which is quantitatively described by the standardised estimate of 0.864 (with 1 being the maximum possibility). The standardized estimate of 0.864 indicates a powerful influence of DCC on RF. Additionally, this result emphasises the effectiveness of DCC and its components, relating to human resources (CHR), intangible resources (CIR), and configurability (CC), in improving the RF of an ICT SME. From the theoretical point of view, this result sheds fresh light on how an organisational capability relating to technology, such as cloud computing, can influence the flexible allocation of resources as prior studies on DITC theory [25,28] do not evaluate this effect.

The causal relationship between DCC and SA is anticipated based on the arguments presented in Section 3.2 and reflected as hypothesis H2. The result of the quantitative assessment evaluates the standardised estimate as 0.698, indicating a strong causal relationship. The importance of this result is that the proposed DCC theory effectively improves the SA of an ICT SME in response to the disruptive business environment. From the theoretical point of view, a similar study involving DITC was carried out, and a theory on which DCC builds and the impact on SA was investigated. The quantitative assessment had a similar result with a standardised estimate of 0.76 [25]. Hence, the hypothesis affirms the effectiveness of DCC in improving SA like that of the DITC theory.

The causal relationship between RF and SA is anticipated based on the arguments presented in Section 3.3 and is reflected in hypothesis H3. The results validate this causal relationship, with a standardised estimate of 0.277. This result validated the arguments presented in the development of the hypothesis. RF has been studied by various authors using qualitative studies to have a substantial influence on SA [2,3,10]. The theoretical conclusions presented by prior studies are validated and applicable in the context of ICT SMEs.

The mediating effect of RF between DCC and SA is established using Baron and Kenny's method [61] and Sobel's Z test. The test shows the mediating impact of RF, as stated in H4, hence affirming the multi-dimensional nature of organisational capabilities in improving SA as described by Adler [2]. In fact, it holds with DCC, the proposed theoretical construct, and its ability to interact with other theoretical capabilities such as RF.

Additionally, it establishes the finding that DCC helps to better allocate technical resources, improving the SA of an ICT SME.

6.2. Implications for Theory

This article's main contribution is that it proposed a type of DCC that addresses the cloud's technological capabilities' ability to improve SA. The DCC builds on the DITC theory [26–28]. The second unique contribution is that the article constructed and validated a measurement scale for DCC by adapting and repurposing DITC's scale [12,30].

Thirdly, the scale is then used to establish the effects of DCC on SA and RF using quantitative assessments. Hence, the scale and the construct are validated and can be used for further research and practice. The DCC's CHR, CIR, and CC sub-constructs are validated using quantitative assessments. The study's quantitative assessments emphasized the effectiveness of sub-constructs with high correlation values and statistical significance, hence validating the sub-constructs that build the DCC.

6.3. Implications for Practice

Adopting DCC in an organisation's strategy would particularly appeal to ICT SMEs as it has been verified to improve SA. Additionally, ICT SMEs are limited in resources, and the flexible use of resources would be vital for success and SA [10]. Given the arguments and the effectiveness of DCC in improving RF, as validated by the study, DCC could appeal to ICT SMEs and improve their technology management [62].

Another implication to practice is a lack of cloud-related practical frameworks or practices that help ICT organisations improve SA. The industry's trending IT/IS management practices do not address SA, i.e., DevOps, ArchOps, CI/CD, Agile Manifesto, etc. [63]. These practices are mostly related to software development or project management; none have yet to be known to improve organisational agility or SA. Hence, DCC could benefit cloud providers, software development firms, and ICT organisations in realizing SA.

Apart from pure ICT, other sectors, which seek organisational agility, such as accounting, might find DCC appealing. For example, Xero expanded its accounting business extensively by creating a cloud-based accounting solution [64].

Additionally, the government sector and manufacturing companies have frequently changing requirements to stay current in the digital era [52,62], and the COVID-19 pandemic played the role of a catalyst hastening the changes. Applying DCC and the RF concepts could help the government sector stay current and become strategically agile.

6.4. Limitations and Suggestions for Future Studies

A limitation of the study is the sample size. Given the nature of the research and the low response rate, the sample size was limited to 222 samples. As evaluated in the methodology section, the target sample size for this study was 225, following Bryant and Yarnold's [44] suggestions. A more significant number would strengthen the study. Although the data collection marginally fell short, the statistical model fit well, and obtaining a few more responses would not affect the results.

Another limitation of the study is that the survey constrained the sample data collection to Australian ICT SMEs. The constraint helps the research to study organisations in similar socio-economic conditions. Additionally, the research has a finite scope and time, which made this constraint favourable. However, organisations in different socio-economic conditions, such as developing countries, are not included due to this constraint. A recommendation would be to carry out a study in such countries with an expectation of similar results.

7. Concluding Remarks

By studying the survey responses from 222 Australian ICT SMEs, the study established the enhancing effect of the cloud's technical capabilities (DCC) on an organisation's response to business environmental changes (SA) and the ability of organisational resources

(RF). The study also established the mediating role of RF between DCC and SA. This suggests that DCC is an effective way of realizing the cloud's technical capabilities.

The conceptualization and suggested use of DCC hint at the effective use of three components cloud-based human resources (CHR), technology intangibles (CIR), and technology configurability (CC). DCC and other capabilities such as RF can provide ICT SMEs an approach to effectively respond to disruptive business environment changes and make strategic changes.

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