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# **R27. The Use of Cloud Computing by Small Service Business in Canada: An Exploratory Study**

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## ***Abstract***

This paper analyzes the use of cloud computing (cloud) by small service business (SSB) firms in the Greater Toronto Area (GTA) of Canada and its impact on their competitiveness. There is research that suggests that small and medium sized enterprises (SMEs) lack technical and management capabilities in relation to information and communications technology (ICT) that impede strategic impacts from their use. However, new forms of ICT such as cloud may offer opportunities for SSBs to overcome some capability limitations traditionally associated with the use of ICT. There is a dearth of studies on the use of cloud in SMEs. It is, therefore, hoped that this Canadian focused investigation will contribute to our understanding of how cloud is being used by SSBs and if such usage has resulted in any competitive advantage. Results show that GTA-based SSBs define cloud variously as email, Apple iCloud, storage, sharing of files with multiple computers, online hard drive and office applications. Almost all respondents indicated that some form of cloud is used by their business and that this use results in competitive advantages. SSBs who have high levels of alignment of their IT and business strategies also show high alignment of cloud and business strategies.

## ***Keywords***

Cloud Computing, Small Service Business, Canada, Strategy, Competitive Advantage

## **1. Introduction**

Industry Canada defines a small business as having between 1 and 99 paid workers and small businesses in the service sector represent 98.3% of all services business in Canada (Industry Canada, 2013). Canadians, therefore, get almost all of their services from small businesses, so gaining a better understanding of small service business operations should be of interest to all. Much literature exists on how ICT can impact business strategy (Laudon and Laudon, 2014) and help create competitive advantages (Porter and Millar, 1985). There is also significant evidence to show that competitive impacts from ICT requires technologies to be aligned to business practices (Henderson and Venkatraman, 1993; Luftman et al, 2013). Small and medium sized enterprises (SMEs) on the other hand have often been seen as resource constrained leading them to either not

exploit ICT adequately or fail in effectively aligning them with business objectives due to poor management capabilities (Pavic et al., 2007; Ifinedo, 2011). Several new IT delivery methods are now available to SSBs, including the recent development of cloud (Frantsvog, Seymour and John, 2012). The use of cloud has not been extensively studied in relation to Canadian small service businesses. This paper therefore explores the use of cloud by SSBs in the Greater Toronto Area of Canada (GTA) and asks if their use has led to any competitive advantages.

## **2. Small Service Business (SSB) and Cloud Computing**

Canada has two groups of small businesses; goods-producing and service-producing (Industry Canada, 2013). The focus of this study is service producing businesses. Services-producing businesses provide services that are experienced at the time of production, for instance a haircut or a medical examination.

Cloud may be regarded as permitting ubiquitous on-demand access to shared pools of substantial computing power (Oredo and Njihia, 2014) provided from large, sometimes globally distributed data centers (DC), operated by cloud service providers (CSP) and linked to users via internet technologies (Narayanan, 2012). Users can therefore access cloud services from any location. The cloud can be deployed in many ways - private cloud; public cloud; hybrid cloud (Ross and Blumenstein, 2013). A private cloud use off-premises DCs owned by the private firm that consumes the service (Oredo and Njihia, 2014). SMEs do not have large outlays of cash to spend on IT (Pavic et al., 2007), so a private cloud may not be suitable for SSBs. The public cloud is an off-premises-based DC solution provided by public CSPs, and users pay for the service via regular subscriptions (Oredo and Njihia, 2014), a model that may be more suited to SSBs. Amazon web services are examples of a public cloud. The hybrid cloud links the private and public clouds (Aslam, Ullah and Ansari, 2010). An SSB may avoid the hybrid cloud based on the lack of funding needed for a private cloud. Cloud usage limits the amount of local IT equipment such as servers that an SSB would normally need. Three main cloud service models are available and these are, Infrastructure as a Service (IaaS); Platform as a Service (PaaS); Software as a Service (SaaS) (Căținean and Căndeia, 2013). IaaS use server virtualization and the virtualized servers are provided as the service. For instance, Amazon's IaaS provides computing power to users. IaaS may not be suitable for SSBs as such firms often lack technical skills (Gill and Biger, 2012) that IaaS requires (Căținean and Căndeia, 2013). Also, PaaS may not be suitable for SSBs as it is mainly targeted at application developers (Oredo and Njihia, 2014). SaaS, on the other hand offers opportunities for SSBs, as these provide applications (Laudon and Laudon, 2014), such as email. For instance, Gmail from Google is SaaS.

## **3. SSBs, Cloud Computing and Competitive Advantage**

Competitive strategy is the basis by which firms differentiate themselves and outdo rivals (Porter, 1996). Responding to developments in the firm context requires firms to develop a variety of internal resources and capabilities (Prahalad and Hamel, 1990). Research suggests that this poses problems for SMEs, including SSBs, that often lack resources such as finance and the requisite technical and management capacity (Pavic et al., 2007; Ifinedo, 2011). Once acquired, the impact of ICT is mediated by the effectiveness of the alignment with business strategies (Henderson and Venkatraman, 1993; Luftman et al., 2013). Therefore SSBs might gain benefits, and potentially competitive impacts, if their cloud usage - as their IT delivery vehicle - is aligned with their

business strategies. Alignment deals with the continuous strategic fit between the IT and business strategies and processes (Henderson and Venkatraman, 1993).

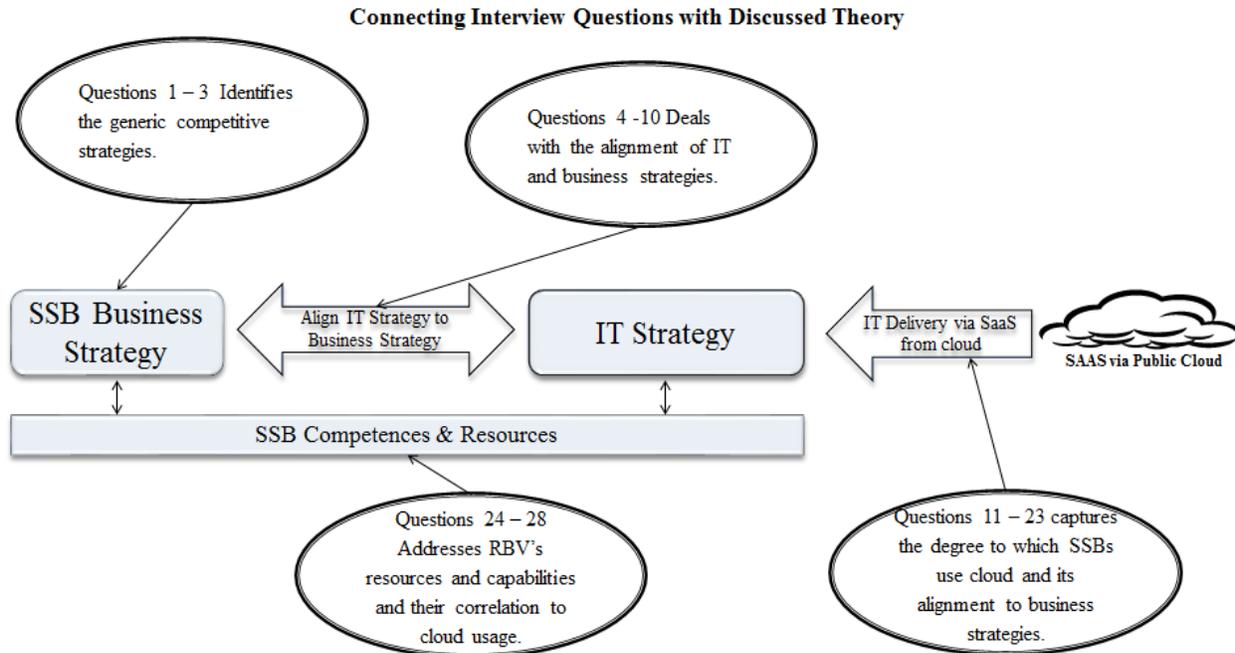
### **3.1 Potential Benefits to SSBs**

The cloud allows firms to buy some IT that is required to run their business on a pay-per-use basis (Gandhi and Moe, 2012), a particularly attractive feature for resource-starved SMEs. These firms often tend to start with a single important cloud service, such as email and then purchase multiple services (Avrane-Chopard et al., 2014). This pattern may also benefit SSBs. Packaged applications require little IS know-how, and may be best suited for SMEs (Cragg and King, 1993). Thus, SaaS cloud service, which closely resembles packaged software, may best suit SSBs. Customers can change the services that they buy on a monthly basis (Pavic et al., 2007) allowing SSBs to flexibly order and cancel SaaS based on requirements. Cloud delivers cost minimization and reduced risks from technology obsolescence (Ross and Blumenstein, 2013). Thus, SSBs who adopt cloud may feel less constrained by the lack of in-house IT skills when compared to their counterparts who have in-house IT (Ifinedo, 2011). Cloud usage can offer SMEs – and SSBs - the same technology edge as larger firms (Frantsvog, Seymour and John, 2012). However it will still be interesting to explore how cloud usage affects in-house IT skills and expertise in SSBs.

### **3.2 Challenges in using the Cloud**

Despite the above advantages, the cloud also has certain pitfalls. A South African study noted that many SMEs know little about cloud (Mohlameane and Ruxwana, 2014) - possibly hampering its adoption. In some cases, if users do not specifically store their data locally, all of that data may be stored on the cloud (Laudon and Laudon, 2014), making it unavailable if the cloud provider's servers were shut down (Frantsvog, Seymour and John, 2012). A multi-tenancy business model provides cloud services to many customers (Frantsvog, Seymour and John, 2012). Security is thus a major concern of using the public cloud (Aslam, Ullah and Ansari, 2010). For instance, one SSB data may be accidentally shared with another. Some state agencies, such as the Office of the Privacy Commissioner of Canada (2015), impose regulations which all firms must follow, such as rules affecting how Canadian firms handle customers' information. SSBs may need to carefully consider their IT governance structures (Laudon and Laudon, 2014) because the provider of IT is being moved from internal to external operators (Oredo and Njihia, 2014). But developing structures may be challenging for resource starved SSBs. Security issues also raise the question whether cloud should be seen by SSBs as their only IT delivery method. Also, cloud as IT delivery may not even be less expensive in some instances where "the cost of renting software adds up to more than purchasing and maintaining an application in-house" (Laudon & Laudon, 2014: 226).

## 4. Research Framework



**Figure 1:** The research framework

The research framework presented in figure 1 above conceptualizes the link between various elements being explored in this study. We assert, based on literature, that there is general widespread support that when IT is aligned with business strategies, it provides competitive advantages (Porter & Millar, 1985; Henderson & Venkatraman, 1993; Laudon & Laudon, 2014). This extensive consensus suggests that, SSBs might achieve competitive advantages if they align their own chosen IT delivery methodologies (cloud) with their business strategies.

## 5. Research Methodology

The research used a mixed method with qualitative and quantitative approaches. The field study uses an interviewer-completed structured questionnaire (see Appendix A) (Bryman, 2008), which will facilitate the collection of standardized data. This will also include a number of open-ended questions that allows the respondents to freely express their views, thereby providing the opportunity to collect rich qualitative data that can contextualize the quantitative responses. The Likert questions are later mapped to numerical values for statistical use. The interview questions are linked to the reviewed literature, as depicted in figure 1. Since some SSBs may not understand terms such as alignment, common terms such as matching are used. A representative sample of SSBs as defined by Industry Canada (2013), was interviewed face-to-face or over the phone. Due to the difficulty of getting SSB participation, a combination of convenience and snowball sampling drawn from a number of owner/managers of SSBs in the GTA was considered. The GTA is studied because Canadian services-based businesses are clustered in metropolitan areas (Statistics Canada, 2010) and also because the lead author lives in this area. Thirty one SSBs were contacted and thirteen interviews were conducted. Some disadvantages of questionnaires using structured interviewing include response biases based on interviewer's characteristics (Bryman, 2008). The geographical scope of the research is also a limiting factor. Despite these drawbacks structured

interviewer-completed research has been shown to provide responses in-line with other forms of questionnaires such as responder-completed questionnaires that are returned by mail (McDonagh and and Rosenblum, 1965).

## **6. Research Findings**

This study uncovered that GTA based Canadian SSBs are significant users of SaaS cloud offering rather than IaaS or PaaS. 38% of SSBs report that they are heavy cloud users, 31% are occasional users, 23% are frequent users, and 8% report that they do not use cloud. 77% of respondents report that free email is the first cloud service used. The common theme for email being the first cloud service centered on ease of connecting with staff and clients and email being ubiquitous. 15% of respondents stated that storage was the first cloud service used due to the need to keep customer records safe.

77% of the SSB sample strongly agreed or agreed that that the use of SaaS provides competitive advantages to their businesses. 16% strongly disagreed or disagreed and 8% neither agreed nor disagreed that cloud provided competitive advantages. Of the heavy cloud users, 80% strongly agreed, and 20% agreed that cloud usage provided competitive advantages. Examples of such advantage include ease of use, cost reduction, no software purchases or software upgrades, limited free services and storage adequate for their business, easy communication, one system used for all business functions, synchronizing devices in the cloud, and the possibility of accessing business data from any location with any access device. One SSB owner said that using the conference calling feature in Facebook was a compelling cloud advantage, suggesting that there is a narrow delineation between how SSBs view social networking services and the cloud. Some SSBs view security as a disadvantage, because many respondents include terms like unsafe or insecure when asked to state the disadvantages of cloud.

54% of SSBs report that they either strongly agree or agree that their cloud and business strategies are aligned with the rest strongly disagreeing or disagreeing. Those who support cloud and business strategy alignment reported that they attempt to keep abreast of technological developments. This cohort also pays for subscription to cloud services and uses an average of three cloud services. They also use more sophisticated SaaS applications such as online customer booking applications, customer records backup, Google Blogger, file storage and file sharing with co-workers, and online software such as Google Docs. The cohort that does not support cloud and business strategy alignment uses an average of two cloud services, and use cloud for basic tasks such as (free) email. SSBs who have high levels of alignment of their IT and business strategies also have high alignment of cloud and business strategies, suggesting that these SSBs view cloud as another IT delivery method. 100% of the heaviest users of cloud strongly agree that their IT and business strategies are aligned. Similarly, those who report strong alignment with IT and business strategies find it easier to align cloud and business strategies, and they are also among the heaviest users of cloud. Thus, for SSBs to capture the biggest benefit from cloud, the data suggest that they need to understand the need for tight integration and alignment of IT with business strategies – whether it's traditional IT or cloud. 70% of SSBs reported that their cloud usage fits well with the generic competitive market segment that they serve.

## 7. Conclusions and Expected Contributions

Little literature exists on Canadian SSBs' use of cloud, and as such various levels of Canadian governments, cloud providers, large businesses, academics and SSBs may find this study insightful. Governments could enact policies that address the security concerns of SSBs, thereby potentially improving SSBs' cloud adoption, which may lead to greater economic activities. Cloud providers and large firms could better market their offerings to SSBs. SSB managers could use the study to help discover how to align their cloud and business strategies, and make adoption decisions that could improve their competitiveness.

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## *Appendix A: Research Questionnaire*

<p><b>Qs 1 – 3 cover SSB generic market and business strategy.</b></p> <ol style="list-style-type: none"> <li>1. Which of these statements most closely match the market that you serve? 1. <i>Low Prices to few customers</i>, 2. <i>Low Prices to many customers</i>, 3. <i>Mid to high prices &amp; unique services to few customers</i>, 4. <i>Mid to high prices &amp; unique services to many customers</i>, 5. <i>A balance of mid to high prices &amp; unique services to many customers</i></li> <li>2. Why did you give that answer?</li> <li>3. What are the 3 top plans for your business?</li> </ol> <p><b>Qs 4 -10 cover the alignment of IT and business strategies.</b></p> <ol style="list-style-type: none"> <li>4. How would you respond to this statement? I use IT in my business. 1. <i>Strongly Disagree</i>, 2. <i>Disagree</i>, 3. <i>Neither Agree nor Disagree</i>, 4. <i>Agree</i>, 5. <i>Strongly Agree</i></li> <li>5. What type of IT do you use and why?</li> <li>6. How would you respond to this statement? I match my IT plans with my business plans. 1. <i>Strongly Disagree</i>, 2. <i>Disagree</i>, 3. <i>Neither Agree nor Disagree</i>, 4. <i>Agree</i>, 5. <i>Strongly Agree</i></li> <li>7. How do you do the matching?</li> <li>8. How would you respond to this statement? The use of IT gives my business advantages (price or other advantages). 1. <i>Strongly Disagree</i>, 2. <i>Disagree</i>, 3. <i>Neither Agree nor Disagree</i>, 4. <i>Agree</i>, 5. <i>Strongly Agree</i></li> <li>9. Why did you give that answer?</li> <li>10. How would you respond to this statement? For my business, the market segment that my IT best serves is: 1. <i>Low Prices to few customers</i>, 2. <i>Low Prices to many customers</i>, 3. <i>Mid to high prices &amp; unique services to few customers</i>, 4. <i>Mid to high prices &amp; unique services to many customers</i>, 5. <i>A balance of mid to high prices &amp; unique services to many customers</i></li> </ol> <p><b>Qs 11 – 23 capture the degree of cloud usage and its alignment to business strategy.</b></p> <ol style="list-style-type: none"> <li>11. In your view, what is Cloud computing?</li> </ol>	<ol style="list-style-type: none"> <li>14. Why was this order of cloud services used?</li> <li>15. How many people in your business focus on managing your cloud services?</li> <li>16. How would you respond to this statement? I take steps to match my cloud plans to my business plans such as the markets that I serve. 1. <i>Strongly Disagree</i>, 2. <i>Disagree</i>, 3. <i>Neither Agree nor Disagree</i>, 4. <i>Agree</i>, 5. <i>Strongly Agree</i></li> <li>17. Tell me about this matching, how did you do it?</li> <li>18. How would you respond to this statement? I find it easy to match my cloud plans to my business plans. 1. <i>Strongly Disagree</i>, 2. <i>Disagree</i>, 3. <i>Neither Agree nor Disagree</i>, 4. <i>Agree</i>, 5. <i>Strongly Agree</i></li> <li>19. How would you respond to this statement? The use of cloud gives my business advantages (price or other advantages). 1. <i>Strongly Disagree</i>, 2. <i>Disagree</i>, 3. <i>Neither Agree nor Disagree</i>, 4. <i>Agree</i>, 5. <i>Strongly Agree</i></li> <li>20. Why did you give that answer?</li> <li>21. What disadvantages (if any) of cloud computing are there to your business?</li> <li>22. For my business, the market segment that cloud computing best serves is: 1. <i>Low Prices to few customers</i>, 2. <i>Low Prices to many customers</i>, 3. <i>Mid to high prices &amp; unique services to few customers</i>, 4. <i>Mid to high prices &amp; unique services to many customers</i>, 5. <i>A balance of mid to high prices &amp; unique services to many customers</i></li> <li>23. Why did you give that answer?</li> </ol> <p><b>Qs 24 – 28 covers RBV</b></p> <ol style="list-style-type: none"> <li>24. My firm has resources and capabilities that are difficult for others to copy. 1. <i>Strongly Disagree</i>, 2. <i>Disagree</i>, 3. <i>Neither Agree nor Disagree</i>, 4. <i>Agree</i>, 5. <i>Strongly Agree</i></li> <li>25. How does cloud help you to make the best of your resources and capabilities?</li> <li>26. Which internal capability is best tied to your number 1 business plan?</li> </ol>
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12. How often do you use Cloud computing? 1.*Not at all*,  
2.*Occasionally*, 3.*Frequently*, 4.*Medium*, 5.*Heavy*
13. What are the names of the cloud services that you use,  
starting with the first one used?

27. What is your number 1 business plan?
28. If you could design the best cloud service for your business  
what would it be?