

How CEOs of the Small Firms make Decisions to ensure Information Systems Resilience?

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Abstract: Information Systems are essential for successful organisation. If Information System interrupts, the whole business continuity is compromised. Organisational resilience has gained increasing attention in recent years. This paper focuses on an aspect of organisational resilience, i.e., on IS resilience. Given the potentially devastating implications of disruptions to organisations, understanding the dynamics of the successful adaption of IS within organisations indicates an important avenue for future research. In this paper, we adopt Agency theory to develop a conceptual framework, focused on decision making and planning for IS resilience. Concourse theory and Q-methodology were used to develop a Q-sort questionnaire, which was refined through interviews with researchers and IS professionals. The resulting 37 statements were then sorted by eight managers. Q-sort methodology identified three types from the data, each representing distinct collective perspectives. Though three archetypes emerged but we decided to focus on a particular archetype called "Mindful decision maker". This type demonstrate unique flavour of decision making under uncertain situation. This type is described and discussed in detail, along with implications of findings as well as suggestions for future research.

Keywords: Information system resilience, agency theory, Q-methodology, CEO, decision making, SME

1. Introduction

Although resilience is widely recognised in related disciplines such as, Computer Science, Crisis Management or Safety Engineering, there is very little attention paid by Information Systems (IS) scholars to Information Systems (IS) resilience. Today, only a limited number of resilience researches exist (Muller et al., 2013). Natural disasters, pandemic disease, and terrorist attacks all pose a severe threat to the continuity of an organisation's operation. Disasters can cause challenges to organisations and it is essential that sufficient effort is directed into making them robust and resilient to withstand these uncertainties and challenges. To a large extent, most organisations are dependent on information systems in their activities. Should there be a major disruption to the information systems services, it is practically impossible for the businesses to function with snail mails and paper based accounting. Therefore, when examining the crisis resilience of organisations, one crucial aspect is to examine the continuance of stable and reliable IS services (Gibb and Buchanan 2006).

Small and Medium Sized Enterprises (SMEs) make a significant contribution to employment generation and economic growth of a nation (OECD 2010; Ministry of Economic Development, 2012). Traditionally, SMEs have several advantages over larger companies due to their flexibility in adapting to change. However, SMEs are vulnerable and very susceptible to these types of disaster. This research gap is surprising, as resilience is often said to be a combination of organisational and technical qualities and, therefore, a research topic well suited for IS research (Muller et al., 2013). SMEs are highly reliant on the entrepreneur or owner-manager or CEO as a leader, decision maker, manager and day-to-day operator of the firm (Storey and Greene 2010). This research examined the role of the Chief Executive Officers (CEOs) after the Christchurch earthquake crisis, and in particular, concentrated on understanding the CEOs' effort to make their business resilient in relations of Information Systems.

Agency theory has demonstrated significant predictive power with respect to the decision-making of business owners and managers by its proposition of the principal-agent relationship dynamics (Jensen and Meckling, 1976; Eisenhardt, 1989; Gurbaxani and Whang, 1991; Lee and Wingreen, 2010). Specifically, agency theory proposes that the misalignment of interests between the principals (owners) of a firm and the agents (managers) is a source of costs and losses to the firm (Jensen and Meckling, 1976; Eisenhardt, 1989). In the context of SMEs, where the owner and manager is frequently either the same person, or a small, tight-knit group of people, in theory there should be either very little or no misalignment of interests, and therefore very low costs linked with "agency problems", as they are called.

The paper first reviews the literature on organisational resilience, SMEs, and agency theory. The paper then describes the research methodology, in which the methods and procedures prescribed by concourse theory are used to develop and pilot test a set of Q-sort items. Further, we present the findings of Q-methodology case study. The paper concludes with the relevance of this research for both practitioners and academics and we propose some recommendations for further research in the area of IS resilience.

2. Definition of IS Resilience

The concept of resilience has been a prominent and emerging topic in various scientific fields, however, as resilience research encompasses a wide range of disciplines such as ecology, psychology or engineering, and different research contexts and topics, it is not surprising that the concept lacks an accepted common definition across disciplines (Muller et al., 2013). Rooted from the word '*resilire*', meaning to spring back or to rebound, the term refers to "the ability to recover form and position elastically" (Muller et al., 2013). Against this backdrop, resilience is defined as the ability of an organisation to not only survive but to thrive, both in good times and in the face of adversity (Seville 2009). Vargo and Stephenson (2010) proposed that for organisations to invest in resilience, the business case for resilience investments has to go beyond insurance, and must be as good as the business cases for new equipment or new staff (Vargo and Stephenson 2010).

After an extensive literature review we have not been able to find a definition of IS resilience. However, organisational resilience has been studied extensively by researchers (Vargo and Seville, 2011; Hatton et al., 2012). In order to define IS resilience we have utilised six attributes as identified by McManus (2008), namely overall situation awareness, decreased vulnerabilities and increased adaptability, risk intelligence, flexibility and agility.

A definition of Information Systems resilience is introduced based on these characteristics for the purpose of our study, it is defined as:

Information Systems resilience is a function of an organization's overall situation awareness related to Information Systems, management of Information Systems vulnerabilities, and adaptive capacity, risk intelligence, flexibility and agility of Information Systems in a complex, dynamic, and interconnected environment.

3. Agency Theory Effects in SMEs

Agency theory applies to situations where one or more persons (the principals) engage another person or persons (the agents) to perform some service on their behalf, which includes delegating some decision making authority to the agent. "If both parties to the relationship are utility maximisers then there is good reason to believe the agent will not always act in the best interests of the principal" (Jensen and Meckling, 1976). Agency theory predicts that the agency conflict may be reduced when the owner is involved in management (Fama and Jensen, 1983; Jensen and Meckling, 1976). This theory may be more pertinent in the case of smaller organisations where it is more likely for the principal and agent to develop a close relationship, or even the principal and agent may, for practical purposes, be the same person. On the other hand, it is also true that managers in small firms may be more isolated from the market discipline due to a closer relationship with their principals. Such isolation may result in entrenchment. Entrenchment is, in turn, likely to have a negative impact on performance. Furthermore, isolation from market disciplines and entrenchment-induced inertia is likely to encourage a weak culture and weak leadership as well as a myopic strategy (Ghobadian and O'Regan, 2006). However, in SMEs, the CEO is usually also the owner-manager. Since the CEO is the main decision maker, the managerial style and personal traits of the CEO could potentially influence the culture, leadership and strategic planning processes of an SME (Ghobadian and O'Regan, 2006). Therefore, in the case of an SME with a single CEO owner-manager, decision priorities reflect the risk tolerance or risk aversion of the owner-manager, and often do not include "agency effects" related to the misaligned interests of other decision makers.

The owner-manager's desire for autonomy and possible disposition towards social aspects of relationships should not be ignored when trying to better understand the dynamics of power within SMEs. Implementing change can be particularly problematic for organisations where power and authority are highly centralised (Paton, 2007). Competitor power is also of concern to SMEs, especially when buyers can at short notice switch suppliers (Paton, 2007).

In summary, based on the arguments and predictions of agency theory, SMEs and large organisations are likely to behave differently. Moreover, agency theory predicts differences in leadership style, culture, the emphasis placed on different dimensions of the strategy making process, barriers to the implementation of strategy and performance between SMEs and large organisations. SMEs and large organisations also differ across a number of culture constructs. Large organisations are more likely to have formal strategic plans than SMEs. The personal traits of CEOs could potentially influence the culture, leadership, and strategic planning processes of SMEs.

Overall, it is evident from our literature review that the form of IS resilience in large organisations may not be directly applicable to SMEs. Whereas in large firms, a study of the firm involves the study of its network of

principals and agents, their interrelationships, and decision structures intended to make them function as if they were of one mind and purpose; in SMEs we often find that the firm and the CEO owner-manager are one and the same. In other words, to study the decision priorities of SMEs is to study their CEOs, and to study CEOs of SMEs is to study their firms' decision priorities.

4. Leadership

A crucial characteristic of resilient organisations is the nature of their leadership (McManus et al., 2008). An organisation with a great crisis response plan but poor leadership can be far more vulnerable to a crisis than an organisation that has great leadership, making up for their limited crisis response planning (Penrose 2000).

There are many case examples where the role of an inspiring leader has proven to be crucial for an organisation's recovery from a major crisis (Gunasekaran et al., 2011). Leadership during crisis is more than making decisions; the leader must convey a sense of hope, optimism, establish an inspiring vision, and assume the role of chief public relations officer (Penrose, 2000). Leadership also plays a key role through the processes of sense making (by ascribing meaning to strategy-relevant events, threats and opportunities) and sense giving (disseminating a vision that stakeholders and constituents can comprehend, accept and act upon) (Ghobadian and O'Regan, 2006).

In many cases, the crisis might never occur or the consequences be significantly limited if the organisation had more resilient leadership that is both inspiring and grounded in reality (Penrose 2000). Penrose (2000) identifies crises as one of the key characteristics demanding leadership in our current day. He describes the three tasks of leadership as envisioning, engaging and enacting.

5. Conceptual Model

Gibson and Tarrant (2010) presented the herringbone resilience model shown as Figure 1. This model suggests that resilience is enhanced by a combination of an organisation's characteristics or attributes and their activities and capabilities (Gibson and Tarrant 2010). The 'herringbone resilience model' recognises that an organisation holds a substantial range of capabilities and undertakes a range of activities (collectively what the organisation 'does') that will contribute towards improved resilience. Furthermore, the organisation also exhibits a number of characteristics ('how' the organisation operates), that will affect the effectiveness of the capabilities and activities and help to enhance the organisation's resilience. The herringbone resilience model incorporates many of the factors considered as possible indicators of IS resilience.

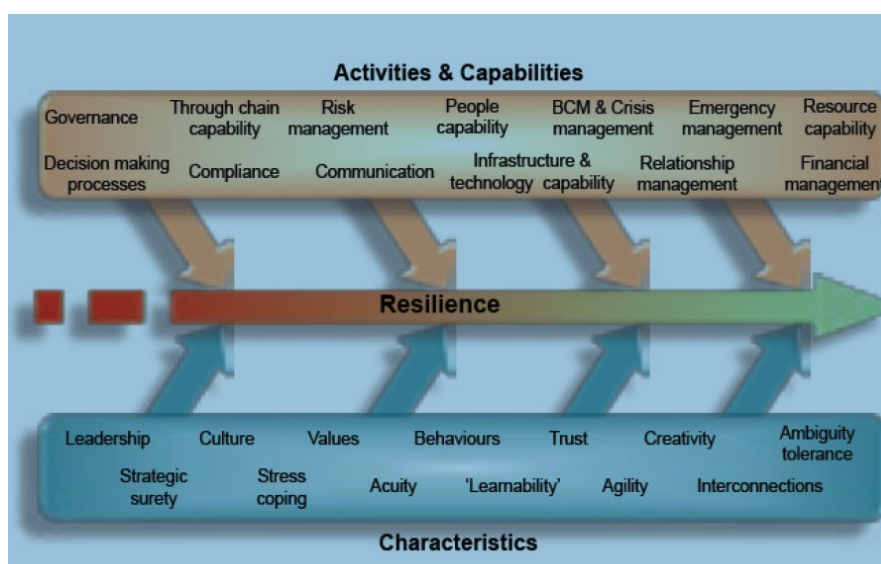


Figure 1: Herringbone Resilience Model (Gibson and Tarrant 2010)

The conceptual research framework developed in this section is based on the fundamental concepts of IS resilience that can be found in herringbone resilience model (Gibson and Tarrant 2010).

A conceptual framework of determinants of IS resilience, and therefore what ought to be the decision priorities for one who is responsible for IS resilience, is presented in Figure 2.

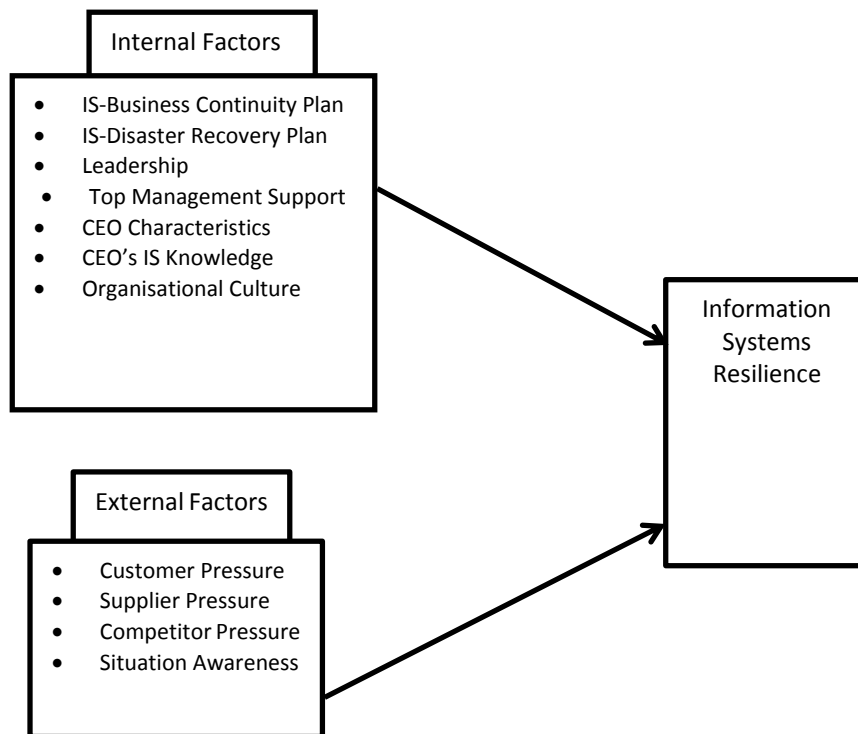


Figure 2: Conceptual Model of IS Resilience in SMEs

Internal and external factors presented in the above framework of IS resilience for SMEs were derived from the literatures discussed in the previous section. In the context of this research, the model provides a guide for the development of instrumentation, and interpretation of the results.

Research has also found that small and medium enterprises (SME) suffer the most in times of crisis and are the least prepared of all organisations (Weick and Sutcliffe, 2007). How SMEs plan for and respond to extreme events is under examined (Weick and Sutcliffe, 2007). Based on the conceptual model of Information Systems resilience the main research question we want to discuss here is: How the CEOs of SMEs prioritise their decisions in context to information system resilience?

6. Research Method

In the context of this study, Q-methodology and the Q-sort are prescribed by Concourse Theory to reveal the decision priority of CEO of the SME in context to the IS resilience of their organisation. States of communicability are operationalized by the participants themselves as they arrange the Q-sort statements according to their own unique points of view (Stephenson, 1986a, b, 1987, 1988). Since each statement is sorted in relationship to all others in any given sort, a Q-sort represents the individual's coherent point of view on the subject. A Q-factor analysis correlates individual points of view into factors that represent the types of viewpoints on the subject, and hence reveals the naturally existing structure of discourse (Brown, 1980; Stephenson, 1986a, b, 1987, 1988). As such, Q-methodology stands at the intersection of qualitative and quantitative research methods. This characteristic that makes it possible to appropriate the most effective aspects of both approaches; specifically, the ability to make empirically based generalizations while maintaining a greater level of phenomenological richness (Wingreen et al, 2005).

In our previous research (Sarkar, et al., 2013), a Q-sort instrumentation, a set of 37 Q-sort statements, was developed according to the guidelines delineated by previous research (Stephenson, 1986a, 1986b). A set of Q-sort statements should represent the concourse of interest in the same way that a sample of people should represent the population in a classical correlational study. Therefore, certain prescribed guidelines were

adopted in our previous research for the selection of statements so as to achieve the highest probability of "representativeness" of the domain of the discourse: 1) review of the literature, 2) conversations and interviews with people who participate in the discourse, and 3) input from domain experts about the content of the sample of Q-statements (Stephenson, 1986a, 1986b).

As an end result, we selected statements which represent the various dimensions of IS resilience which should be reflected in the decision priorities of SME CEOs. These items were then coded according to whether they might be desirable for small firms according to agency theory, and risk tolerant or risk-averse decision makers. Therefore, the final set of 37 items was both representative of the larger discourse and well-balanced with regard to all the theoretical categories of interest in the current research.

We sent fourteen SMEs in different industries selected from the list of local chamber of commerce the invitation to participate in this research and eight private CEO owner-managers of local SMEs were keen to participate, who provided their own Q-sorts followed by an intense semi-structured interview. The data gathered was analysed using the PQ-method software that is commonly used in Q-methodology research (Wingreen et al, 2005). Next section will explain our findings in detail.

7. Research Findings and Discussion

This section presents the findings of this research that were reached through analysis of Q-sort data. The type identified as a result of the analysis is described in details. The type identified is "*Mindful Decision Makers, who are mindfully managing the unexpected*". In this section we will describe two cases which belongs to this particular type. Both the cases has shown remarkable mindful characteristics and true out of box decision making in time of uncertainty.

Case 1: In this case, CEO showed some very interesting, pragmatic, unique and mindful characteristics and thus emerged as a separate type. He is a CEO of a small medium enterprise whose core business is to provide software solutions. He is running this company for last 30 years and has a significant client base in New Zealand and overseas. According to him, "Resilient and accessible critical facilities (e.g. back-up systems, redundancy of data)" and "Setting up information disaster recovery system (e.g., disk redundancy, backup facility)" is of utmost importance. He also mentioned that the critical resources to his company are the staff members. "If something happens to them then we will lose the intellectual property. [As a consequence] cannot maintain connection with our customers. Staffs are 'key' to us [SMEs]". When probed on this and asked him whether his company maintains a knowledge repository, he said that, "if you do not have a staff member then you cannot do anything. Maintaining knowledge repository is not going to solve this problem. Another important aspect of his business is to "ensure data security", when probed on this he mentioned that "our business is Data; we have to do everything possible to make sure that it is secured." He mentioned that he is not a process oriented person. His leadership style is empowering and supportive and he has always been like that. In other words, he has not changed his leadership style after the earthquake. In his own words, "...you have to remember that you are dealing with intelligent peoples...they do not required to be micro-managed rather they want a supportive leadership in place. I employ people who are capable of learning and doing jobs. I support them to do their job. While employing staff I make sure that they are smart, bright...I mean quick learner, flexible and adaptable." As mentioned before this CEO is not a process driven person while probed on this he mentioned that, "planning is important until the disaster struck, while in crisis mode then you have to start thinking the unthinkable." After the series of devastating earthquakes he has done three things which he thinks will make his company more resilient. Firstly, he has put a formal succession plan in place. His company now has a person who he has mentored for years who can look after this business without compromising the business values. Second thing that he has done is, setting up a second location where the whole team can move within two hours and continue business as per usual. Lastly, he has started diversifying his business to more locations, "...I am diversifying my client base. Your business can be resilient and have very little downtime but your client's business can be liquidated, so we are now entering new markets." He further explained that, "Providing the organizational units with information for 24 hours a day, 7 days a week" is absolutely not critical as they have offsite remote back up facilities and they have stored procedures and triggers which will take care of the day to day business of their clients. If they require them to make any alterations then they can do it as long as they can go to their second location and have all the knowledge resources (primarily the staffs) intact.

On one hand, any type of planning is absolutely not a priority for this decision maker and he neither consider “ability to anticipate surprises and crises” nor “Ability to identify key risks” as the top priorities rather he thinks it is far more important to “Practice thinking the unthinkable”. He is strong advocate of resilient and accessible critical facilities (e.g. back-up systems, redundancy of data), setting up information disaster recovery system (e.g., disk redundancy, backup facility) and setting up information and disaster recovery system, which includes reliable back up facilities and redundancy and replication of data. He showed significant level of mindfulness-based resilience and decision making under crisis situation. We will discuss about mindfulness-based decision making in detail at the end of this section.

In *Case 2*, when the second organisation’s Christchurch staff trusted on electronic files accessed remotely following the February 2011 Christchurch earthquake, it swiftly became apparent going paperless had benefits for both staff and clients. The CEO said that, “Whole organisation is now focused on innovation and inventiveness; it has become part of our culture and the whole team is cognisant of the value generated by IS resilience. We now see resilience as a key factor in our success”.

He added “In our business paper based is the legacy. We were almost 100% paper based before September 2010 Christchurch earthquake. Then we realised how risky it is for us and for our clients. Data is everything to us. Loss of data means [we] lose everything... intellectual property [of clients], patents, trademarks documentation, designs, and commercialisation strategy and litigation trail.” Pre-earthquake mostly paper files and some electronic replication done but was mostly unstructured. Post-earthquake (September 2010) they decided to invest on complete digitisation of documents and build a robust, cloud based, logically organised and easy to find [by name, date or type].

As an aftermath of February 2011 earthquake that is exactly what happened. Not only did the remote server become a life saver for the office, which could not access its paper files for a long time after the quake; working with electronic files proved more efficient and cost effective. One blessing was that all their paper files were duplicated electronically and mirrored across servers in their Christchurch, location 2 and Auckland offices. While the Christchurch servers were unharmed, power to the building was, so Christchurch lost both its paper files and local server access. Luckily, they were able to remotely access the servers in location 2 and Auckland. As a result of February 2011 earthquake they were red zoned and they could not access their office for months.

According to him, “he need for a traditional large file room seemed less necessary and a new streamlined approach of electronic file management prevailed. While paper files have proven to be an effective method for maintaining client records, they consume a huge amount of paper, space and time.” Paper files are also slow to access, cumbersome, and if removed from the security of the office environment, present a huge risk to the security of the data they contain. Paper files can also be lost, misplaced or destroyed by fire or flood.

An electronic database can be maintained on a server database which is a fraction of the physical size of a file room, yet with immensely more capacity. This essentially eliminates the cost overhead of maintaining a physical file room. An electronic database can be duplicated on multiple remotely located servers and can be backed up regularly; this removes any risk of losing data. In contrast, the duplication of a physical file room is completely impractical.

One of the surprising benefits they have noticed is a huge reduction in clutter. Where previously a busy day may have resulted in a high stack of paper files, the same work now equates to a small stack of slim plastic wallets. The wallet contains only the current correspondence that needs to be addressed. Everything else is accessed electronically. Electronic files can also be accessed near instantaneously from anywhere a secure internet connection is available and with complete security. Together with the vast speed and accuracy with which electronic files can be searched and maintained, these benefits result in faster, more efficient and more cost effective client service. In the past, if a client had a query, the associated paper file would need to be requested and delivered to an attorney, often resulting in a delay providing the information back to the client. Now they also have placed a workflow management system. If a staff member is overloaded or incapacitate for some reason than that job can be delegated not only to someone else within the office but to someone in another office as well. Previously it used to be couriered but now it can be done instantly.

8. Conclusion

We have identified a gap in research related to information systems resilience in SMEs and hence proposed that the decision priorities of CEOs in Small Medium Enterprises in context to Information System resilience must be studied in depth. Accordingly, we conducted an extensive literature review to identify differences between large-scale enterprises and SMEs with respect to IS resilience and undertook an empirical study using Q-sort instrumentation to analyse key issues. We used agency theory to establish the decision priority differences between SMEs and large organisations. This study contributes to the limited body of knowledge on IS resilience in SMEs in four ways. Firstly, we have developed and pilot tested an instrument to capture the decision priorities of SME CEOs. Secondly, we propose a definition of organisational IS resilience. Thirdly, our research shows that agency theory is predictive to interpret decision priorities of SME CEOs. Lastly, this is the first attempt to understand the IS resilience decision priorities of SME CEOs in lens of Agency Theory, and it appears to be valid.

In recent research it is proposed that mindfulness can help individuals at each stage of decision making (Karelaia & Reb, 2014). They mentioned that at the stage of decision framing, mindfulness is likely to increase decision maker's awareness of the likelihood (or the necessity) to make a decision and mitigate the sunk cost bias. It may also increase goal awareness thereby enhancing decision consistency with one's objectives and reducing post-decision regret. Greater goal transparency will in turn facilitate option generation, which will be further enhanced by creativity that mindfulness is likely to spark. Moreover, by increasing awareness of one's values and making it more likely that individuals consider how their decisions can affect others, mindfulness has the potential to increase the ethicality of decisions. At the stage of information gathering and processing, mindfulness may reduce the scope of information search and simultaneously increase the quality of information considered. In particular, mindful individuals are likely to be less susceptible to confirmation-seeking and overconfidence, have a better ability to separate relevant from irrelevant information, and rely less on stereotypes. Furthermore, they posit that mindful individuals are more likely to objectively assess uncertainty and productively work with it. First, they are more likely to recognize when feedback is missing or noisy. Second, because they are more capable of disengaging from ego-concerns, they are more open to both positive and negative feedback and less prone to misinterpret feedback by making self-serving attributions. As we have discussed, mindfulness may be relevant to many diverse phenomena affecting human judgment and decision making. Finally, mindful decision makers are more likely to learn from feedback and, importantly learn the right lessons (Karelaia & Reb, 2014).

The Q methodology does have some limitations. It is a small-sample technique, and the sample of items and participants is usually purposive, and the results lack generalizability. However, since the goals of Q-methodology are interpretive, this is usually not considered a weakness by Q-method practitioners. This study is a starting point for further research into the IS resilience in SMEs. There are a number of avenues of future research, including examining a greater range of organisations. Future empirical research should attempt to understand the IS resilience decision priorities and characteristics of resilient organisations.

Finally, results have implications both for researchers who are looking for theories that explain the importance of IS resilience and business managers and owners who are challenged with decisions about how to design resilient information system framework for their organisation.

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APPENDIX A

Q-SAMPLE

Let us imagine a scenario, such as:

“Your business has been interrupted by a major incident. You have no access to your premises, IT systems and business records. Some of your employees are injured or dead. You do not know how long the outage is going to last. If you are trying to plan ahead, anticipating this scenario, what would your priorities be?”

Q-sort distribution:

Keeping in mind the above scenario, rate which statements are important according to your experience during *Information Systems Resilience planning*. Assign the statements "from the outside in", that is, decide on two "very important" and "very unimportant" statements first, then select *four* statements each for the "important" and "unimportant" categories, and *six* statements each for "somewhat important" and "somewhat unimportant". The last *thirteen* statements need not be sorted, and will be categorized as "neutral". Enter the number to the left of each statement in the spaces provided. Please ensure that you enter a statement only once for each set of priorities.

Very Important (2 items)						
Important (4 items)						
Somewhat important (6 items)						
Somewhat unimportant (6 items)						
Unimportant (4 items)						
Very Unimportant (2 items)						

Q-Sort by Case 1 CEO

Very Important (2 items)	37	16				
Important (4 items)	25	7	5	27		
Somewhat important (6 items)	2	4	1	6	35	21
Somewhat unimportant (6 items)	23	13	17	20	29	26
Unimportant (4 items)	9	10	11	15		
Very Unimportant (2 items)	12	3				

Q-Sort by Case 2 CEO

Very Important (2 items)	7	8				
Important (4 items)	16	21	1	6		
Somewhat important (6 items)	2	4	5	25	37	28
Somewhat unimportant (6 items)	9	17	18	19	20	22
Unimportant (4 items)	11	12	13	14		
Very Unimportant (2 items)	3	10				

Q-Statements

1. IS Disaster Recovery plans informed by understanding of underlying causes of vulnerability and other factors outside organisation's control.
2. Organisation IS Continuity plans, developed through participatory processes, put into operation and updated periodically.
3. Organisation's IS resilience plan shared with all suppliers.
4. Organisation hazard/risk assessments carried out which provide comprehensive picture of all major hazards and risks faced by organisation (and potential risks).
5. On-going monitoring of hazards and risks and updating of plans.
6. Organisational vulnerability and capacity assessments carried out which provide comprehensive picture of vulnerabilities and capacities.
7. Resilient and accessible critical facilities (e.g. back-up systems, redundancy of data).
8. Top management support and commitment to IS resilience.
9. IS resilience can provide an organisation with an edge over its competitors.
10. Our competitors are developing and enhancing their IS resilience capabilities.
11. A sound IS resilience plan will help us to win more business contracts.
12. A sound IS resilience plan will help us to pay lesser insurance premium.
13. A sound IS resilience plan will help our organisation to make more efficient use of resources.
14. Long-term IS Resilience, Business Continuity, Disaster recovery justification and planning.
15. Competitor analysis.
16. Setting up information disaster recovery system (e.g., disk redundancy, backup facility).
17. Study resilience strategies of competitors.
18. Select suppliers with robust resilience plan.
19. Use IS network to communicate with the customers.
20. Use IS networks to connect to supplier's databases.
21. Use cloud computing to back up organisational data.
22. The level of customer involvement in preparing resilience, business continuity and disaster management plans.
23. The extent of follow-up with customers for feedbacks.
24. The level of supplier involvement in preparing resilience, business continuity and disaster management plans.
25. Ensuring data security
26. Providing reliable and consistent services to Suppliers
27. Providing reliable and consistent services to customers
28. Capability for disaster recovery
29. Providing the organizational units with information for 24 hours a day, 7 days a week
30. Understanding the strategic priorities of top management
31. Aligning IS strategies with the strategic plan of the organization
32. Adapting technology to strategic change
33. IS resilience plan that is well defined and structured
34. IS resilience plan that is flexible and adaptable
35. Ability to identify key risks
36. Ability to anticipate surprises and crises
37. Committed, effective and accountable leadership of IS resilience planning and implementation.