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Banking on ICT: How the Tuvalu Financial Services Industry Benefits from Investment in ICT

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Abstract

Financial service industries in every country have made substantial investments in information and communication technologies (ICTs). What have been the benefits from this investment? This research extends the decades of research into the relationship between ICT investment and organisational performance in several ways. First the study uses the resource-based value framework to propose an ICT Investment Model to comprehensively describe the relationship between ICT investment and organisational performance. Second, the research identifies nine specific benefits the Tuvalu financial services industry (TFSI) has received from ICT investment. Third, the study does so with a qualitative research methodology in a specific industry in a developing country (most studies in this area are quantitative and have a national or multi-industry perspective in an economically developed country). Key benefits from ICT investment in the TFSI include improvements in collaboration, efficiency, data monitoring and communication.

Keywords

Information and communication technologies, organisational performance, Tuvalu, benefits

INTRODUCTION

Numerous studies (e.g., Alpar and Kim 1990; Barua and Lee 1997; Kauffman and Weill 1989; Lin and Shao 2006) have investigated the relationship between investment in information and communication technologies (ICTs) and organisational performance. Most of these studies assess the impact of ICTs on organisational performance in developed countries in North America and Europe, only rarely in developing countries and never in the South Pacific. Most of these studies use national data in a quantitative approach. This study offers a different approach, a qualitative research design in the financial services industry in the South Pacific country of Tuvalu.

Specifically, the principal purpose of this research is to determine what benefits the Tuvalu financial services industry (TFSI) has received from its investment in information and communication technologies (ICTs). This research is set in the context of the development of the ICT Investment Model that offers a comprehensive explanation for the investment-to-performance relationship. The development of this Model is the second purpose of the study.

This paper begins by providing a brief description of the Tuvalu financial services industry. The literature review (a) develops an ICT Investment Model for assessing the impact of ICT investment on organisational performance and (b) offers an examination of the literature on organisational benefits from ICTs. Next, the research methodology and procedures for data collection and analysis are described. Finally, the results section reports the findings from interviews with senior managers in the TFSI.

BACKGROUND

Tuvalu is a small (26 square kilometres), remote (midway between Hawaii and Australia), atoll (nine low-lying islands) nation in the South Pacific. Most of the 10,000 habitants are dependent on traditional economic activities such as farming and fishing.

The financial services industry in Tuvalu reflects the characteristics of the country in which it is based. The TFSI is small, composed of two banks (National Bank of Tuvalu, Development Bank of Tuvalu), an insurance and investment fund (Tuvalu National Provident Fund) and a government agency (Ministry of Finance).

Although 80% of all transactions between the financial institutions are electronic (National Bank of Tuvalu 2011), in the consumer market transactions are conducted by almost exclusively by cash or cheque.

Annual reports from the financial institutions show that capital investment in ICTs was approximately AUD$120,000 in 2011. This is down slightly from previous years, mostly because of the impact of the global financial crisis. In interviews conducted for this study, this investment was determined to include desktop and laptop computers, accounting software and various management systems for loans and international banking. The TFSI also invests in network infrastructure, facilitated by major investments by the Ministry for Communication and Information Technology.

ICT INVESTMENT MODEL

A review of the literature found a number of models that utilise the resource-based value (RBV) framework to investigate the relationship between ICT investment and organisation performance, either directly or implicitly. The RBV framework states that institutional resources are used to generate competitive advantage (the competitive advantage phase) and long-term increased organisational performance (the sustainability phase) (Wade and Hulland 2004). The framework links enterprise resources (in this study ICT investment) to improved organisational performance (in this study expressed as benefits) to enhance the long-range value of the firm.

Previous models that investigated this investment-to-performance relationship proposed that use of information systems (Lucas 1975), information technology (Lucas 1993), IT expenditure (Markus and Soh 1993) or IT investment (Trice and Treacy 1986; Weill 1992) led to positive changes in organisational performance. All models also included intervening variables such as IT management (Markus and Soh 1993), appropriate use and expenditure (Lucas 1993) and situational factors (Lucas 1975; Trice and Treacy 1986) that influenced this relationship, either positively or negatively. All models are linear, only Weill's 1992 model includes the suggestion that time lags and growth means that an iterative process for evaluating this relationship is required.

The ICT Investment Model proposed in this study is shown in Figure 1 and explained in the following paragraphs.

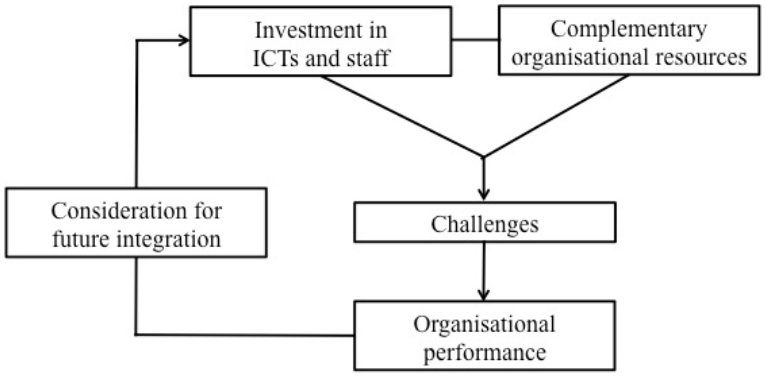

Figure 1: Model of the Relationship between ICT Investment and Organisational Performance

Investment in ICT Capital and Staff

Enterprises invest significant financial resources in ICTs in pursuit of improved organisational performance. Accordingly this Model begins with investment in ICTs and staff. Here ICTs include infrastructure (e.g., telecommunications networks), equipment (e.g. desktop computers, laptops) and software (e.g., business applications, databases). Consistent with the RBV framework (e.g., Barney 1991), the other key resource included here is the knowledge or expertise of ICT staff, both technical and managerial staff. Trice and Treacy (1986) explicitly included personnel as a variable affecting utilisation of resources and Markus and Soh (1993) included IT management as a variable in their model. Accordingly, ICT staff is embedded in this ICT Investment Model with ICT expenditures.

Complementary Organisational Resources

ICT investment rarely stands alone. The RBV framework explicitly includes capabilities that can be combined with ICT to generate competitive advantages (Barney 1991). Other studies also find existing organisational resources (Keen 1993), organisational infrastructure (Kettinger et al. 1994) and sustainable resources (Powell and Dent-Micallef 1997) are complementary resources that could enhance performance when combined with ICTs. In the ICT Investment Model, the descending lines show ICTs and complementary organisational resources join together to lead to changes in organisational performance.

Complementary organisational resources include both non-IT capital and non-IT employees such as policies or frameworks, suppliers, senior management commitment, organisational structure and users' satisfaction (Barney 1991). Although applying ICT tools with few additional resources for improved organisational performance is possible (McAfee 2002), the reality is that maximum benefit from ICT investment is often accompanied by other significant organisational resources.

Challenges

As noted above, previous models in the literature (e.g., Lucas 1975; Weill 1992) suggest intervening variables also influence the impact of ICTs investment on organisational performance, sometimes negatively. Challenges such as lack of IT personnel and high costs of technologies are common to many organisations (Weill 1992), as are limited budget and ineffective ICT utilisation (Trice and Treacy 1986). Accordingly, the ICT Investment Model includes the challenges that enterprises encounter that hinder the delivery of its services.

Organisational Performance

Perhaps the most important and complex component of the Model is organisational performance. RBV framework studies define this as improved performance achieved through competitive advantage. In the ICT Investment Model organisational performance is defined as both competitive advantage and organisational benefits. It is benefits that are the primary focus of this study and further elaborated on in the following section.

Consideration for Future Integration

To further sustain organisational improvement, existing ICTs must be integrated with new advances in technology for continuing success, acceptability and improved performance. This also completes the Model and initiates new investment for improving organisational performance.

Model Flow

Previous models that examined the investment-to-performance relationship are linear (e.g., Lucas 1993; Trice and Treacy 1986; Markus and Soh 1993). Weill's (1992) model included provisions for time lags and impact of previous investments in an iterative process. The ICT Investment Model utilises the outcome of the final component (consideration for future integration) as input to further ICT investment, thus completing the cycle in a recurring fashion. A cyclic model, not a linear one, is a distinctive contribution of this study.

In the research design discussed below, senior managers in the Tuvalu financial services industry were interviewed to collect data on all aspects of the ICT Investment Model. Space limitations prevent the presentation of all results in this paper. Instead, the focus of the research reported here is on the most important and, arguably, the most complex component – organisational performance. For the purposes of this study, organisational performance is defined as benefits the TFSI has received from ICT investment.

ORGANISATIONAL BENEFITS FROM ICT INVESTMENT

An evaluation of the existing literature shows that there are numerous studies that have examined how organisations benefit from investment in ICTs. Table 1 lists these benefits and associated studies. These benefits form the basis for a key section of the interview questionnaire used to examine how the TFSI has benefitted from investment in ICTs and are briefly discussed in the following paragraphs.

ICT tools such as e-mail and video conferencing increase the communication capabilities of any organisation, more than solely face-to-face communication allows (Hiltz et al. 1986). ICTs link employees and enable them to communicate effectively either within or between different functions and divisions of the organisation. ICTs also allow increased collaboration between the organisation and its key stakeholders (e.g., customers, suppliers, partners), increasing online interdependencies and information accessibility (Edmondson and Moingeon 1998). Related benefits from using ICTs for communication and collaboration include increasing a person's self-esteem through experience sharing, feelings of commitment, feelings of organisational citizenship and shaping norms (DeSantics and Monge 1999; Hiltz et al 1986).

Acknowledging that human memory has always been quite fallible, the ability of an organisation to capture, codify, store and retrieve knowledge has been greatly facilitated by advanced ICTs (Davenport and Prusak 1997; Anand et al. 1998). ICT tools improve the initial base knowledge from employees and generate new skills and knowledge for all staff. However, ICT tools could also lead to information overload within an organisation (Wood-Harper et al. 1990) and sorting through a large amount of data can impede a manager's ability to make timely decisions (e.g., DeSantics and Monge 1999). Although efforts have been made to mitigate this downside, research for mitigating measures to negate the effect of information and data overload is needed (Davenport and Prusak 1997).

Table 1. Benefits of Information and Communication Technologies on Organisational Performance

Benefits	Studies
Link employees to increase communication and collaboration	Barua et al. 1995; Davenport and Prusak 1997; DeSantics and Monge 1999; Edmondson and Moingeon 1998; Hiltz et al. 1986; Powell and Dent-Micallef 1997
Codify knowledge base	Anand et al. 1998; Davenport and Prusak 1997; DeSantics and Monge 1999
Increase boundary spanning	DeSantics and Monge 1999; Powell and Dent-Micallef 1997
Exploit new work mode structures	Davenport and Prusak 1997
Promote efficiency	Barua et al. 1995; Davenport and Prusak 1997; Pickering and King 1995; Powell and Dent-Micallef 1997
Promote innovation	Davenport and Prusak 1997; Dewett and Jones 2001; Ray et al. 2005
Increase a person's cognitive skills	Daft and Lewin 1993; Pavlou and El Sawy 2006
Increase data capturing, integrity, assimilating, storing and retrieving	Anand et al. 1998; Carr 2003; Chowdhury 2003; Davenport and Prusak 1997
Reduce cost of communications	Brynjolfsson and Hitt 1998; Chowdhury 2003
Improve staff training	DeSantics and Monge 1999
Increase data analysis capability	Brynjolfsson and Hitt 1998; Carr 2003; Chowdhury 2003
Allow faster external environment scanning and monitoring	Pettigrew et al. 2001; Poole and Van de Ven 2004

Video and audio media presented through ICTs allow organisations to exploit new work mode structures such as telework and virtual teams (Davenport and Prusak 1997).

ICTs create effective personal ties and potential synergies for the organisation through obtaining relevant technologies, industry best practice and proficient work associations (Pickering and King 1995), hence promoting overall business efficiency.

The role of ICT tools in promoting innovation within organisations has been widely recognised (e.g., Ray et al. 2005). Closely associated with innovation through ICTs are the person's cognitive and intrinsic motivation skills (Daft and Lewin 1993), which enable the potential for innovations to increase (Dewett and Jones 2001).

A consideration relevant for the current study is that although these studies concluded that organisations in developed countries generally received modest to substantial benefits from ICTs, there is no such evidence for developing countries (Pohjola 2001). As developing countries invest in ICT infrastructure it becomes an enabler of productivity and growth. Developing countries should not be isolating themselves from the changes occurring in the development of ICTs globally (Gholami et al. 2004), and so this is one of the motivations for this study.

RESEARCH DESIGN

The focus of this research is on the how and why aspects of the relationship between ICT investment and organisational performance (e.g., how do institutions in the TFSI benefit from ICT investment?). In seeking answers to how and why questions, a qualitative research methodology emphasises words, not numerical data (Chan 2000) to allow the researcher to understand the participants' perceptions, motivations and concerns (Mangan, et al. 2004). Accordingly, a qualitative research methodology is considered the most suitable approach.

The interview is selected as the data collection method because it allows considerable flexibility for in-depth explanation in the data collection stage and insightful explanations in the data analysis stage. Furthermore, all interviews were conducted in person in Tuvalu. A face-to-face interview provides the opportunity to ask complex questions that would be difficult by email or telephone and allows the researcher to observe and note participants' reactions to the questions asked in their own environment (Neuman 2000). Finally, a semi-structured interview format is adopted because it allows both flexibility in the questions asked (a structured interview does not) and ensures all key points are explored (which may not be the case in an unstructured interview).

Data collection occurred during April and May 2011. The interviews were mostly conducted in the participants' workplaces on Funafuti, the main island of Tuvalu. There were slight variations in length, but most interviews were 90 minutes. Following each interview, participants were given a small gift to thank them for their participation and later they were provided with a transcript and a request that they verify their comments and answer any unresolved questions.

Thematic analysis is the data analysis technique used in this study. Coding and data analysis according to themes, areas of similarities and contradictions was completed using NVivo, a data analysis software package for qualitative research.

Research Participants

The sampling frame for this study is all senior managers in the Tuvalu financial services industry. A random purposeful sampling strategy was deployed to select participants randomly, but also subject to their availability and demographic profile. Random purposeful sampling from a sampling frame ensures credibility in the results, but not necessarily a precise cross-population representation, as is the case with more rigorous sampling methods (Coyne 1997; Morrow 2005).

At the conclusion of participant identification and selection, the 18 participants represented the Ministry of Finance (6 participants), the National Bank of Tuvalu (5), the Tuvalu National Provident Fund (4) and the Development Bank of Tuvalu (3). Most participants were not directly involved with delivering ICT services, but a few ICT managers were interviewed in order to include their perspectives in the results.

The participants in this study are older (61% over the age of 40), predominately male (61% men) and better educated (82% have tertiary education degrees) than residents of the country of Tuvalu. However, the interview panel is considered to be generally representative of the TFSI (e.g., 66% of employees in the TFSI are male) and especially representative of the senior management team of banks and other institutions in the TFSI.

ORGANISATIONAL BENEFITS FROM ICTs IN THE TFSI

This section reports the results of the study. In face-to-face, semi-structured interviews, the 18 participants were asked to identify, rate and discuss benefits the Tuvalu financial services industry has received from its investment in information and communication technologies. Participants were provided with a "starter list" of potential benefits as identified in the literature (see Table 1) and asked to rate each benefit on a five-point Likert scale: very high – high – average – low – very low. The use of a Likert scale in the interviews was a quantitative aspect in this mostly qualitative study to bring a focus to the interview, and this exercise was followed by extensive verbal discussion of the reasons for the participants' rating as well as identification of additional benefits not found in the literature.

Benefits that failed to achieve majority support (10 or more participants) in the high/very high category were not considered significant enough to include in the results. Nine specific organisational benefits (and a tenth overall assessment of benefits) were identified and are shown in ranked order in Table 2. The following subsections discuss each of them, illuminated with comments from the participants.

Table 2. Benefits from Investment in ICTs in the Tuvalu Financial Services Industry

Very low and low	Average	High and very high	TFSI Benefits from ICT Investment
--	1	17	Increase of collaboration level amongst institutions
1	--	17	Increase in efficiency
--	2	16	Better monitoring of data and information
1	1	16	Better communication channel
1	2	15	Increase in data analysis capacity
1	3	14	Increase in reporting capacity
2	2	14	Increase in competitive advantage for the TFSI
5	2	11	Increase in customer service delivery
7	1	10	Increase in staff training and personnel productivity
1	1	16	Overall increase in performance in the TFSI

Increase of Collaboration Level Amongst Institutions

The use of ICT to increase collaboration amongst the four institutions and outside agencies was identified as the top benefit. Seventeen of the 18 participants rated it as high/very high and none of the participants rated this benefit as either very low or low. These TFSI managers commented that prior to the introduction of financial accounting software packages, the Internet and mobile phone, it was very difficult for different financial institutions in Tuvalu to share data and ideas amongst themselves. Participant 8 (P8) highlighted this by commenting: "To be frank, we could not collaborate effectively with other financial service providers without ICTs. If there were no ICTs, there would be no collaboration amongst different financial institutions."

Increase in Efficiency

The second top-ranking benefit of ICTs is an increase in efficiency within the industry's overall operations. TFSI managers cited automation of branch and bank office functions, delivery of training exercises, preparation of efficient work plans and transaction tracking as examples.

Participants agreed that as a result of using ICT tools, employees of the industry are able to execute tasks and deliver final outcomes at a much higher level of efficiency in terms of costs, quality and timeliness that, in turn, positively influences performance.

Better Monitoring of Data and Information

Participants believe that with new advanced computerised systems, financial institutions are able to monitor multiple data streams more effectively and accurately. Among the key outcomes cited here was better monitoring of data that translates into improved responses to stakeholders. According to P11: "The use of computers and the Internet by our office have improved the level of data monitoring and has eventually translated into more accurate, complete and timely delivery of financial statements."

Better Communication Level

Sixteen participants considered ICT tools such as mobile phones and the Internet to have positively influenced the way the TFSI communicates with its customers, both domestic and overseas. The thematic analysis found this was mentioned several times in several places – for example P13 cited the example that better communication channels facilitated by ICTs has reduced the number of clients with unpaid loans: "The number of customers with outstanding loans has reduced significantly since the installation of our office Internet on the outer islands. I personally think that the constant communication with customers has obviously paid dividends in terms of their repayments being honoured on a continuous basis."

Increase in Data Analysis Capability

An increase in data analysis capability was rated high/very high by 15 of the 18 participants. Participant 5 commented: "Well, I honestly think that the accuracy, relevance and timeliness of data analysis presented to the management and Board of Directors has improved significantly since the installation of our office computerised accounting software package." Discussion of this benefit with P3 and P17 revealed that faster and more accurate calculation of statements of financial performance and/or financial position lead to other indirect organisational benefits such as financial stability of the firm.

Increase in Reporting Capability

ICT tools, especially accounting software and financial management systems, enable institutions in the TFSI to easily prepare and submit timely and accurate financial reports. For example, prior to the introduction of computerised accounting software packages, reports to external authorities had to be prepared manually and often these reports were delayed, incomplete and inaccurate. Additionally, P2, one of the IT participants, cited the use of ICTs to monitor and report on internal performance and productivity measures such as ad-hoc management reports, downtime reports and call centre statistics.

Increase in Competitive Advantage for TFSI

Obviously, acquisition of competitive advantage is a key aspect of improved organisational performance – considered the second element in the organisational performance component of the ICT Investment Model – and several participants in this study raised it as a key benefit from the deployment of ICT tools, and so it has been added to this list of benefits. Participants felt that ICTs have raised the competitiveness of the industry to such an extent that it is more competitive both domestically and regionally. The loan management system developed by the Tuvalu Provident Fund was cited as an example (P5): "Absolutely, from the use of ICT tools our

organisation is now able to compete with other regional financial industries in terms of knowledge, skills and expertise on certain systems."

The use of ICT tools for competitive advantage has unfulfilled potential, according to some participants. For example, P3 comments: "To be frank, I think most ICTs within the TFSI remain under-utilised to their full potential and therefore have not fully impacted on the competitiveness of the industry. As much as we love to say how ICTs have created a level of competitiveness within the industry, the fact remains that creating competitiveness from ICTs requires more time and effort." This perspective could account for the relatively low ranking of this benefit (see Table 2).

Increase in Customer Service Delivery

Customer services enhanced by ICTs in the TFSI include account enquiries, customer statements and customer relationship management. TFSI managers feel that ICT tools enhance delivery of these services to customers, which then reflects improved customer satisfaction for these key stakeholders. The staff's ability to deliver different loan products has also been improved, according to P9: "The officers who deal with customers have the confidence and relationship to promote and deliver financial products in a more positive, accurate and accessible channel."

A positive impact for customer service delivery was not a universal perspective. A number of participants rated this benefit as low/very low (5 participants; 28%). Between 78-94% (14-17 participants) had rated the previous benefits as high/very high, but only 6% (11 participants) rated customer service delivery as high/very high. Several participants attributed this to the difficulties in connecting to the Internet. For example, P8 commented: "It's a pity that the Internet and phone line connections to the outer islands are not sustained in order for the TFSI to deliver an undisrupted level of customer service."

Increase in Staff Training and Personnel Productivity

The tenth and final benefit to garner majority support from the TFSI managers was staff training and ensuing productivity. Ten participants (56%) rated this benefit as high/very high and seven participants (39%) rated it as low/very low. According to the participants, this placement may reflect a lack of formalised training programmes, more than the role of ICTs in delivery of training programmes. As P12 stated: "I think the inexistence of on-going long-term training plan for staff prevents them from improving their level of productivity. We have been relying on government to provide formal training opportunities for staff, but these have proved unsuccessful as some of the staff have not been exposed to formal training since leaving secondary school."

Overall Increase of Performance in the TFSI

The final question in this portion of the interview asked participants to rate and comment on the overall impact of ICT investment on organisational performance in the financial services industry as a whole. Of the 18 participants, 16 managers (89%) rated overall improvement of performance as high/very high, and the comments support this. According to P4: "I totally agree that ICTs have been the catalyst for the improved performances of the financial industry over the past ten to twenty years. I would say that ICTs coupled with additional capital injections were obviously key factors for the industry to improve performance." Similarly, P15 commented: "I think the introduction of various ICT tools into the Tuvalu financial services industry has indeed fully revolutionised the who industry mandates, morale and, of course, raised dramatically the performance of the financial industry."

The conclusion drawn from the quantitative ratings and the qualitative analysis presented in this section is that there have been a number of positive outcomes for the Tuvalu financial services industry due to the investment in ICTs. Seven of the nine individual benefits were strongly supported as benefiting from ICT investment, as was the overall increase.

THE ICT INVESTMENT MODEL FOR THE TFSI

As noted earlier in this paper, a full investigation of all components of the ICT Investment Model was completed in the course of the research in Tuvalu. The results for benefits, the key aspect of measuring organisational performance, have been reported here. Space limitations prevent the reporting of complementary organisational resources, challenges and considerations for future integration here.

A partly expanded version of the ICT Investment Model introduced earlier is shown in Figure 2. In this version of the Model the seven key benefits identified in the previous section are shown as making a significant contribution to organisational performance.

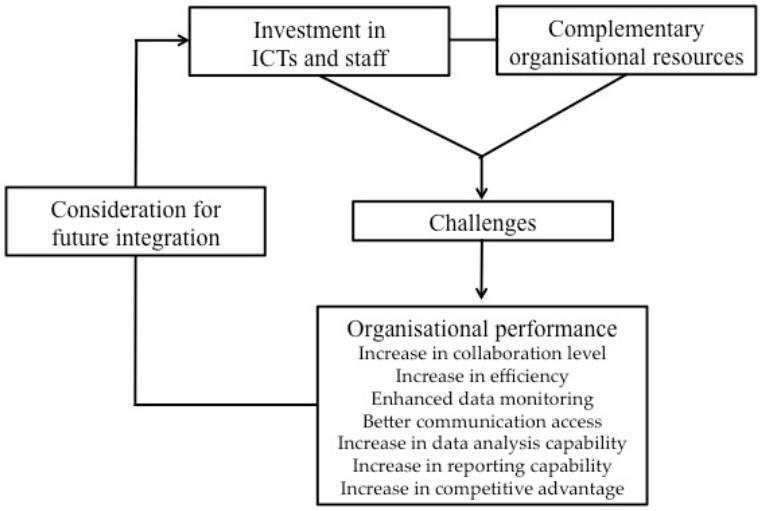

Figure 2: Organisational Benefits Contributing to Organisational Performance in the TFSI

DISCUSSION AND CONCLUSION

The principal purpose of this research is to examine how the Tuvalu financial services industry (TFSI) has benefited from its investment in information and communication technologies (ICTs). First, an ICT Investment Model, based on the resource-based value framework, was derived from the literature. Second, nine specific benefits were identified by a majority of the senior managers in the Tuvalu financial services industry as contributing to improved organisational performance from the investment in ICTs (see Table 2). Additionally, 16 of the 18 managers rated the overall improvement in organisational performance as high or very high.

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