

EFTPOS IMPACTS ON BRANCH BANKING: AN EXTRAORGANISATIONAL ANALYSIS

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ABSTRACT

Perceptions and experiences of bank branch managers and merchant who have installed EFTPOS are surveyed to investigate the impact of EFTPOS on branch banking activities using internal and extraorganisational perspectives. Impacts are identified by reference to banking activities and interpreted as efficiency, effectiveness and competitiveness impacts. It appears that bank managers may have difficulty in isolating the impacts of EFTPOS on banking activities from concurrent changes in banking practices and might overestimate some beneficial impacts. Results indicate a much richer view can be obtained using an extraorganisational perspective of a systems' impacts.

KEY WORDS

EFTPOS, impacts, branch banking, small business, extraorganisational perspective

INTRODUCTION

This study investigates the impact of the Electronic Funds Transfer at Point of Sale (EFTPOS) system on branch banking activities by considering both the banks' and their merchant customers' perspectives. The results, while based on Australian data, have implications for similarly developing systems. The approach used is potentially relevant to studying the impact of information technology (IT) on other activities in other contexts.

EFTPOS has become an important element in consumer markets with potentially powerful social influences on how individuals and organisations engage in retail transactions. Australian banks have invested heavily in EFTPOS with significant take-up by retail merchants. Individuals are increasingly using the system for everyday payment transactions. The system is now regarded as an established part of retail banking (Gart, 1992) with extensive adoption in Australia.⁴ While some authors have speculated as to the impact of EFTPOS on banking and users (e.g. Barras, 1991; Chorafas, 1987; Clarke and Walters, 1989; Fraser, 1985), there appears to have been little empirical investigation of such impacts in any context. Such empirical work is desirable because of the likely influence exerted by the technology on many aspects of retail banking and trading and the absence of published explicit knowledge.

In assessing IT impact, most studies are concerned with changes from an internal perspective and typically focus on aggregated financial outcomes that relate to cost or revenue objectives for the organisation as a whole (e.g. Alpar and Kim, 1990; Harris and Katz, 1991; Mahmood and Mann, 1993). Barua *et al.* (1995) criticise this approach and propose that a more disaggregated approach be adopted. Following Weil and Olson (1989) they canvas the notion that impacts should be identified at the strategic business unit level. This remains an introspective (or intraorganisational) approach which still appears inadequate when viewing a system that substantially interfaces with external parties. In a more general context of performance evaluation, Kaplan and Norton (1992) propose a 'balanced score-card' approach that requires consideration of customers' perspectives of service or product delivery – this 'extraorganisational' approach is also in sympathy with developments in other domains, such as those dealing with interorganisational information systems (see Gupta, 1995; Johnston and Vitale, 1988; Kumar and van Dissel, 1996) and those concerned with environmental impacts (see Lederer and Mendelow, 1990).

In providing EFTPOS, banks compete at the institutional level. A substantial proportion of banks' other activities, such as delivery of the traditional retail banking products and services, occurs primarily through branches. Branch banking activities, therefore, is an appropriate reference for the sub-unit approach for identifying impacts, with customers for those products and services providing the focus for the extraorganisational perspective. Assuming banks can more easily identify the dollar costs attributed to EFTPOS *per se* and the revenues flowing from its adoption, the current study is restricted to looking only at the juxtaposition of these local (branch level) and extraorganisational (customer) perspectives. While this is only an intermediate phase of impact assessment, it serves to provide a richer view of impacts than if they are subsumed in the effects of other simultaneous developments (such as organisational restructuring and ongoing automation of transaction processing) through aggregated measures.

The Kaplan and Norton (1992) approach of incorporating customers' perspectives focuses on the nature and delivery of the product. In the context of EFTPOS, the primary product is the EFTPOS facility for engaging in

⁴ EFTPOS was introduced in Australia in 1984 although the take up rate by merchants increased significantly only after 1990. The number of EFTPOS terminals installed by merchants grew from 26,314 terminals in 1992 to 116,704 by the end of 1996. Similarly, the number of EFTPOS transactions increased from 129 million in 1991-92 to 470 million in 1995-96 (Australian Payment Systems Council, 1993, 1996).

transactions, not the transactions *per se*. The main customer in this regard is the merchant who has installed EFTPOS, rather than the bank account holder who uses a debit card for purchasing goods and services from merchants using EFTPOS. Note that merchants need not have acquired their EFTPOS facilities from the bank with which they conduct their branch banking. EFTPOS nevertheless may have impacted on branch banking activities as a result of changes in both bank processing of transactions and the substitution of EFTPOS for other types of retail transactions by merchants. In particular, bank branches which previously carried a substantial burden of transaction processing may have experienced changes in the nature of their functions and relationships with customers. The nature of impacts is outlined in the next section. Issues in identifying and measuring EFTPOS impacts on branch banking activities are explored in the third section, followed by a description of the research design and data collection. The analysis is presented in the fifth section while implications and limitations are considered in the conclusion.

IMPACTS OF EFTPOS

The nature of impacts of most systems are necessarily complex, even at localised levels. Nonetheless, it is analytically convenient to label impacts according to some schema regardless of any lack of exclusivity. Three popularly identified labels for impacts of IT investment (see Earl, 1989 among others) are efficiency, effectiveness and the promotion of competitiveness.

Efficiency refers to resource utilisation within a particular IT application (Earl, 1989) at the operational level of an organisation (Singleton *et al.*, 1994). Efficiency is generally associated with cost, accuracy and timeliness (Mahmood, 1994).

Effectiveness refers achievement of organisations' goals (Earl, 1989) – typically it describes the extent to which IT applications achieve business objectives (Srinivasan, 1985; Lyytinen *et al.*, 1991; Haga and Zviran, 1994).

Promotion of competitiveness refers to the use of IT to respond to the changing nature of the business environment (Earl, 1989). Competitiveness is also described as arising from efficiency and effectiveness (Galliers, 1993). This latter perspective seems more salient in the case of EFTPOS and banking – particularly in the context of extraorganisational impacts. This is explored further within the empirical analysis.

Use of these labels to aid interpretation of changes wrought by IT developments must recognise that some impacts will have multiple connotations for efficiency, effectiveness and promoting competitiveness.

IMPACTS ON BANK BRANCH ACTIVITIES

Branch banking is the quintessential interface between banks and their retail customers. The principal branch functions in this regard are the delivery of identifiable products and services and ongoing interaction with customers. Branch level impacts of EFTPOS should be identifiable by reference to activities associated with these functions.

The literature already offers some speculation and evidence as to the nature of such impacts. There is some suggestion in Fraser (1985) and Chorafas (1987) that the spread of the EFTPOS system was expected to significantly reduce the paperwork involved in cash and paper-based payments. Removing clerical aspects of transaction processing from banks' branch activities should affect timeliness and accuracy of payment transactions (following Mahmood, 1994). Two possible consequences for branches of this change are reduced staff numbers and increased staff activities in improving customer service and promoting other banking products. Barras (1991) reports reduced demand for clerical staff that had previously undertaken these tasks. This, however, does not negate the possibility of changes in staff activities. Increased staff activity in promoting bank products may involve extending the skills of individual staff and the introduction of additional products or services through the branch. If staff are successful in this regard, there should be an identifiable impact in the form of increased business from existing customers.

The provision of centralised telephone assistance for EFTPOS and access to account balances combined with reduced cash and paper-based transaction volumes may impact on merchants' banking practices by changing the nature and extent of contact with bank branches. For example, Clarke and Walters' (1989) suggestion that merchants may benefit by reducing their costs of holding and transferring large amounts of cash to banks also implies reduced merchant contact with the bank. This may conflict with the possible impact of redirecting bank branch staff activities to improving customer service and promoting other products by reducing the potential for contact between branch staff and merchant customers. Fraser (1985) argues that merchants will adopt EFTPOS to increase sales. If this dominates changes, rather than substitution of EFTPOS for other forms of transactions, then no impact on merchant contact with the bank would be expected. Where EFTPOS is provided to a merchant by a separate agency, it may be seen as a "foot-in-the-door" threat to the banks' competitiveness. If this is the case, there should be an identifiable impact in the form new merchant accounts.

The potential complexity of impacts on various branch activities, and their interaction, reduces the strength of a priori reasoning as to their cumulative impact on the bank-merchant relationship, leaving it as an issue to be explored empirically. How indicators of potential impacts are sought is described below in the context of the empirical research design.

RESEARCH DESIGN AND DATA COLLECTION

Indicators of potential impacts were sought by surveying bank branch managers and merchants who use EFTPOS. Separate questionnaires^[5] were developed for bank managers and merchants which largely mirrored their perceptions or experiences of impacts of EFTPOS. The key information sought through the survey is listed in Table 1.

Table 1**Information sought regarding perceptions of EFTPOS impacts on branch banking activities**

EFTPOS impact on:	Bank Managers' Perceptions:	Merchants' Perceptions of:
Transaction volumes	<ul style="list-style-type: none"> • number of cheques transactions • number of cash transactions 	<ul style="list-style-type: none"> • number of cheques transactions • number of credit card transactions • number of cash transactions
Contact with banks	<ul style="list-style-type: none"> • frequency of visits to bank • frequency of account queries 	<ul style="list-style-type: none"> • frequency of visits to bank • frequency of account queries
Branch staff	<ul style="list-style-type: none"> • number of branch staff • staff skills regarding other bank products 	
Products offered	<ul style="list-style-type: none"> • the number of bank services or products offered through the branch 	
Branch business	<ul style="list-style-type: none"> • attracting more business from existing bank customers • attracting business accounts to the branch • the bank's business relationships with EFTPOS merchants 	<ul style="list-style-type: none"> • use of other bank products/services • the merchant's business relationship with their bank

The bank manager survey focussed on the impact of EFTPOS on branch banking, distinguishing impacts on staff, customers, products or services, and internal activities. The merchant survey distinguished on the EFTPOS installation decision, reasons for adopting EFTPOS and the impact of EFTPOS on the business. Both questionnaires used a mix of open-ended, categorical and scalar questions. Many of the questions in regard to changes in banking practice and transaction volumes were common to both surveys.

In developing the bank manager questionnaire, a consultative group of three bank managers and a merchant survey manager of a major bank group provided assistance in regard to the feasibility of information sort and served as a pilot group testing the questionnaire. Three merchants provided similar assistance in the development of the merchant questionnaire. Piloting resulting in some structural and "language" changes to the instruments.⁶ In generating the sample for bank branches, the policies for participation in surveys for each national and regional bank was firstly established through contact with representatives of each bank. All banks with ACT branches were approached. Four declined to participate. One bank required regional office approval and the others approved direct individual contact with branches. The questionnaires were mailed directly to branch managers in August 1996.

It was necessary that the individuals completing the merchant questionnaire have detailed knowledge of the business and its experiences with branch banking. Large retail corporations typically organise their banking via centralised accounts and facilities rather than through local branches. Consequently, the study was limited to small merchants because they are most likely to operate branch accounts as their main bank accounts and only one or two people will hold most of the management functions. A prospective sample of 700 merchants was created from local business directories^[7] and the merchant survey was mailed in September 1996.

Respondents

Twenty branch managers across four banks agreed to participate. Most branch managers had at least three years experience, with 50% having more than 5 years as a branch manager. Most (75%) had managed their current branch for at least 2 years.

⁵ Initial discussions with bank representatives indicated that questionnaires would be more acceptable than interviews.

⁶ The consultative/pilot group participants were not included in the final survey.

⁷ The 700 merchants were identified from three main sources: the *membership directories of the ACT Chamber of Commerce* and the *Queanbeyan Business Council (NSW)*, and the *Telstra Yellow Pages*. Merchants were selected if they satisfied the small business criteria of the Australian Bureau of Statistics (<100 employees).

Of the 700 selected small merchants, 291 (41%) responded. Of these, 105 (36%) currently used EFTPOS. These are described by industry and size in Table 2. The profile of merchants shows substantial representation of responding EFTPOS adopters for a broad range of retail categories. Most firms are quite small (less than 25 employees) so that the respondent managers/owners are likely to have close supervision of EFTPOS use and banking activities.

Table 2
Industry and size profile of merchant respondents

	Number of respondents	% of total
<i>Main Business:</i>		
Department & general stores	7	6.7
Clothing & fabrics	21	20.0
Homewares etc	14	13.3
Petrol retailers	7	6.7
Food	5	4.8
Specialty retail	35	33.3
Hospitality	3	2.9
Services	6	5.7
Pharmacies	7	6.7
	105	100.0
<i>Number of Staff</i>		
1 - 5	72	68.6
5 - 25	27	25.7
• 25	6	5.7
	105	100.0

Generally, the profiles of both bank managers and merchants suggest they are well placed to comment on the various issues and impacts considered in the questionnaires. The major limitation on the data set is the uncertainty of its representativeness of merchants and bank branches outside the ACT.

ANALYSIS OF RESPONSES

The analysis of the responses are organised under the headings used in Table 1. In each case, banks' and merchants' views are assessed in terms of implications for efficiency, effectiveness and competitiveness impacts.

Transaction Volumes

Bank managers and merchants categorised the extent to which EFTPOS had substituted for other types of transactions (cheque, credit card and cash).⁸ This is a difficult task for the bank managers who may not have adequate information regarding the composition of branch transactions or their breakdown by customer type. Half of the bank managers were unable to estimate these effects. Of those that gave estimates, results were so diverse that no clear view of changes can be obtained from banks' responses alone. The impact of EFTPOS on cheque deposits was described as positive (increasing) by 5 respondents, negative by 3 and no change by 2; impact on cash deposits were described as 3 positive, 2 negative and 5 no change. Cash withdrawals had greater consensus with 7 positive and 3 negative. Overall, this is contrary to expectations. While bank managers may have difficulty in addressing such details if all transaction levels for branches has increased substantially in recent years, the absence of data regarding changes in transaction volumes for individual branches leaves this as conjecture.

Those managers that identified an increase in cheque or cash deposit activities, which is logically inconsistent with EFTPOS, are evidence of the difficulty in separating the impacts of specific changes including generally increasing activity levels. The apparent increase in ATM withdrawals at branches may indicate a product complementarity impact for banks whereby EFTPOS encouraged greater take-up and use of electronic facilities by non-merchant customers. However, the extent of other concurrent banking changes that may pertain to this effect places it beyond the scope of this investigation.

The merchants' perceptions offer a more consistent and seemingly more reliable guide as to the extent and nature of these impacts. Table 3 describes merchants' responses, adjusted for those that do not accept cheques or credit cards. Approximately three quarters of respondents described reductions in cheques and credit card transactions as a result of adopting EFTPOS while about half (48%) identified some substitution for cash transactions. While most of these

⁸ Bank managers were not be expected to have knowledge of the timing individual merchant adoption of EFTPOS and therefore were asked to evaluate changes over the past three years, which coincides with the spread of EFTPOS through the merchant sample - 90% of whom indicated that they had installed EFTPOS within the last three years (75% within the last 18 months).

substitutions, were placed in the lesser category ("some decrease"), "large decreases" were attributed in 32% of cases for cheques, 19% of cases for credit cards and 14% of cases for cash. The implication of these merchants' responses for the bank perspective is important.

While banks identified little overall change in cheque deposits, merchants' reports of decreased cheque volumes imply efficiency gains in the clerical aspects of cheque processing at branches with fewer cheques to be entered by counter staff when accepting deposits and less sorting and validation activity. The lower incidence of substitution of EFTPOS for cash transactions for merchants and apparent increases in bank dealings in cash suggests that any efficiencies arising for merchants and banks through reduced cash handling may be minor at best. This is discussed below in terms of the frequency merchant contact with banks. The flow-on effectiveness and competitiveness impacts of transaction type substitution also may arise with the nature of bank contact with merchants and delivery of other products and services as discussed below.

Table 3

Merchants' descriptions of substitution of EFTPOS for other transaction types

Transaction type	% of merchant respondents				Total
	Some decrease	Little or no change	Some increase	Unsure	
Cheque	40	8	32	20	100
Credit card	56	2	19	23	100
Cash	35	35	13	17	100

Contact with Banks

While the reduction in cheque volumes suggests merchants have opportunities for reducing the frequency of branch deposits, this may continue to be moderated by the degree of risk attached to holding cash. A small proportion of merchants (18%) reported that they reduced the frequency of their visits to bank branches. This appears to conflict with the 40% of bank managers who believed there had been some reduction in the frequency of such visits as a consequence of installing EFTPOS. Some explanation of this disparity may lie in the aggregation of effects at the bank branch. Bank managers were not reporting how many merchants had reduced the frequency of their visits, but rather whether the bank had experienced a net reduction in visits from merchants who had installed EFTPOS. It is unlikely, however, that the differences are caused by a large reduction in visits by some merchants given that less than 3% reported that their frequency had greatly decreased.

Similarly, there appear to be differences in perceptions of the changes in the frequency of account queries following the installation of EFTPOS. Only 9% of merchants reported any decrease and another 9% reported some increase, whereas 25% of bank managers believed there had been a decrease and 10% believed there had been some increase. Subject to the previous qualification, there are four possible explanations for these various differences in perceptions:

- The results are distorted by sample differences if a significant proportion of the responding merchants deal with banks or branches not covered by the bank branch sample.
- Bank managers have a poor perception of the experiences and practices of their small merchant customers.
- Banks are obtaining efficiencies through reductions in such transactions that are not enjoyed by a corresponding number of merchants.
- Bank managers impute to EFTPOS effects from other systems.

Overall, responses indicate that efficiency impacts at bank branch level appear to be minor or have been subsumed in other coincidental changes to banking. If a substantial proportion of merchants are experiencing negative efficiency impacts, or at least failing to obtain the expected degree of positive impacts, then this may have significant implications for assessments of effectiveness or competitiveness impacts for banks. While it is not obvious as to whether merchants' or banks' views are the more reliable in this regard, if branch managers are overestimating the decrease in contact with merchants then this may cause inappropriate bank decisions in areas such as staffing levels training and branch-oriented marketing activities, with consequences for competitiveness.

Branch Staff Changes

The potential efficiency gains in transaction processing (discussed above) raise expectations regarding staffing. Half of the branches reported a decrease in staff numbers over the last 2 years, 10% reported an increase and 40% had no change. The changes in staff numbers had no statistical association with the changes in counter staff skills. Most bank managers (90%) reported that staff had increased their skills or knowledge in other bank products, half of these being described as "greatly increased". This effectiveness impact has major implications for customer servicing (competitiveness), including providing the bank with opportunity to increase business and enhance the bank-customer relationship.

There are substantial difficulties in separating restructuring and other industry developments that have also affected staffing practices. Consequently, it is difficult to attribute these changes wholly to EFTPOS although 40% of bank managers believed that EFTPOS has a positive impact on the number of products or services offered through branches (45% believed there was no effect).

Branch Business

It has been suggested that the provision of EFTPOS facilities arose more through competitive necessity than as a new market willingly pursued by banks. Evidence of this is scant but Myers (1997) indicated that New Zealand banks had first proposed EFTPOS systems to large retailers in the 1980s but had then sought to withdraw from the market, claiming unexpectedly high unit costs of transaction processing. Key large retailers threatened to withdraw their custom from particular banks, thus forcing them to persevere with the establishment and provision of EFTPOS. This appears to have forced other banks to then follow suit to retain their positions in the broader banking services market.

This view is not supported by the survey of merchants, although the situation may have changed substantially from the 1980s to the time of the survey. A significant proportion of merchants (29%) indicated that their EFTPOS provider was different from their provider of other banking services. This selection of a specific EFTPOS provider by merchants appears to treat EFTPOS as separable from other banking services. This is further evidenced by the relatively minor part played by EFTPOS in decisions to switch banks. While a modest proportion of merchants (25%) indicated that they had changed banks during the EFTPOS expansion period, most of these indicated that EFTPOS was not a consideration in their decisions to do so. The few that indicated that EFTPOS was particularly important in their decisions to switch banks (4 cases in total) all indicated at least one other equally important factor, and most identified 3 or 4. Another 4 respondents indicated that EFTPOS was a factor but was much less important than other factors such as bank fees, debt provision and quality of branch service.

There is no evidence that the provision of EFTPOS to merchants provides banks with a "foot-in-the door". Indeed, a remarkably consistent proportion (30%) of merchants used a separate EFTPOS provider, regardless of whether or not they had recently changed banks (whereas a "foot-in-the door" argument suggests that recent switchers should have a much lower proportion of separate providers). When combined with the reasons of merchants' switching banks, this provides support for the view that merchants do not associate EFTPOS services with their traditional banking services or products.

This suggests that bank branches will not experience a significant competitiveness impact from EFTPOS. This is contrary to implications that may be drawn from the specific impacts (on the level and nature of branch business with merchants) identified in the context of transaction type substitution, branch-merchant contact and staff skills. This issue is examined using five factors as proxies for branch business changes: branch relationship with merchants; number of services or products offered through the branch; change in branch business from existing customers; merchants' view of their change in use of products; and new branch business accounts. The first two of these may pertain to either retaining existing business (competitive necessity) or generating new business (competitive advantage), while the remainder pertain only to generating new business.

Most bank managers (66%) reported that EFTPOS had no impact on the branches' relationship with merchants. Of the balance, 3% reported a deterioration and 31% reported an improvement. These proportions are reasonably consistent with merchants' views (72% no effect, 9% deteriorated and 19% improved).

Forty per cent of bank managers believed that EFTPOS increased the number of products and services offered through branches (45% believed there was no effect and 15% believed the impact was negative).

While most merchants (95%) reported no change in their use of other banking products or services as a consequence of EFTPOS, 20% of bank managers perceived an increase in their branch business from existing merchant customers as a result of EFTPOS (70% of bank managers reported no change). Similarly, 20% of bank managers reported an increase in business obtained through new business accounts as result of EFTPOS and 65% reported no change. While the proportion reporting increased business from existing customers is consistent with that reporting an improved relationship, there are only 2 respondents common to these categories.

On balance, some bank managers believe that their branches have increased their business as a result of EFTPOS but this is not supported by the analysis of merchants' actions.

As with other differences identified above, this may reflect the twofold aggregation problem in branch perspectives: that involving aggregation across merchant customers and that involving difficulty in separating EFTPOS impacts from other concurrent changes in banking. Nonetheless, it highlights the desirability of incorporating the extraorganisational perspective in analysing impacts on business units.

CONCLUSION

This study had two elements in its objectives. The first was to investigate the impact of EFTPOS on branch banking. The second was to assess the merit of analysing external parties experiences and perceptions in determining the impacts of an extraorganisational system on sub-units of an organisation.

Possible branch level impacts of EFTPOS were identified by reference to changes to activities associated with branch functions (the delivery of identifiable products and services and ongoing interaction with merchant customers). Such changes are labelled as efficiency, effectiveness and promoting competitiveness impacts.

EFTPOS appears to have provided some efficiency gains to bank branches, identified in the context of transaction type substitutions and staff changes. This is identified from merchant responses, with bank managers' perceptions suggesting difficulty in separating such impacts from concurrent changes in other areas of banking for transaction substitution. The merchant perspective is supported by bank managers reporting reduced staff numbers or increased (substitute) activities by staff. These efficiencies, however, appear to be confined to the transaction processing activities and not in the frequency of counter transactions or other dealings with customers.

Effectiveness impacts for bank branches were identified by reference to dealings with customers, including the nature and frequency of contact with merchants and the bank-merchant relationship. While some bank managers believed there were identifiable decreases in merchant visits to or inquiries through the branches (40% and 25% respectively), merchant perspectives indicate that EFTPOS had little or no impact in this regard. Whether this represents overstatements by bank managers or differences in perspectives caused by bank managers' views being aggregations across their merchant portfolios cannot be determined. In either case, this demonstrates that a more accurate or richer view of impacts might be obtained by analysis of extraorganisational perspectives. Reasonably consistent views were obtained in the case of the bank-merchant relationship, with improvements reported by substantial minorities of both merchants and bank managers. Importantly, however, this does not appear to have flowed through to the competitiveness impacts.

If banks have experienced any competitiveness impacts from EFTPOS, it seems unlikely that this was at the branch level. Again, this was evidenced most clearly by reference to merchants' behaviour, rather than the internal perspective. Again, it cannot be determined whether these differences are due to overstatements by bank managers or bank managers' views being aggregations across their merchant portfolio. While a significant minority of bank managers reported increases in branch business, 95% of merchants indicated that they had not changed their use of other bank products or services as a result of EFTPOS. When combined with the analysis of merchant behaviour in choosing EFTPOS providers or switching banks, it further illustrates the potential value of incorporating extraorganisational perspectives in assessing organisational impact.

Limitations

Several data limitations reduce the generalisability of these results. All of the data is regional although any differences between the ACT region and the rest of Australia in relation to banking or the use of EFTPOS cannot be identified. Likewise, the nature and extent of any response bias for either banks or merchants is unknown. However, the range of merchant types in the sample and variety of individual responses suggest little likelihood of particular responses biases in respect of the issues considered. The number of bank branches in the sample limit the extent to which responses can be disaggregated. Nonetheless, it provided a reasonable basis for this exploratory study of the experiences and perceptions of key participants in a largely overlooked extraorganisational IT application.

Methodologically, it is important to note that the assessment of impacts were based primarily on perceptions. Banks should be able to pursue a more rigorous analysis of impacts using quantitative data from internal records, but it seems this may still be unduly limited if they do not take account of extraorganisational perspectives of impacts.

Implications

The implications of this study for assessing the impacts of EFTPOS are modest given the limitations noted above. However, it does suggest that, even at the sub-unit level, bank managers may have difficulty separating the impacts of individual IT changes from the general melee of changes on their activities that is to be expected in a dynamic commercial environment.

A more general implication of this exploratory study is its highlighting of the *potential* of an extraorganisational approach when assessing impacts. While this has been demonstrated at the sub-unit (branch) level for banks in the case of EFTPOS, it may be as or more valuable where internal perspectives are based on more aggregated measures or perceptions.

This remains very much an exploratory study with much yet to be resolved. Application of an extraorganisational approach in other cases, with greater access to internal data or with reference to multiple external perspectives (such as non-merchant customers in the case of EFTPOS) should advance understanding and lead to more comprehensive treatments of IT impacts on organisations.

REFERENCES

- Alpar, P. and Kim, M. (1990), "A Microeconomic Approach to the Measurement of Information Technology Value", *Journal of Management Information Systems*, Vol 7 No 2, pp 55-67.
- Australian Payment System Council (1993), *Annual Report*, Canberra: Reserve Bank of Australia.
- Australian Payment System Council (1996), *Annual Report*, Canberra: Reserve Bank of Australia.

- Barras, R. (1990), "Interactive Innovation in Financial and Business Services: The Vanguard of the Service Revolution", **Research Policy**, Vol 19, pp 215-237.
- Barua, A., Kriebel, C.H. and Mukhopadhyay, T. (1995), "Information Technologies and Business Value: An Analytic and Empirical Investigation", **Information Systems Research**, Vol 6 No 1, pp 3-33.
- Chorafas, D. (1987), **Strategic Planning for Electronic Banking: From Human Resources to Product Development and Information Systems**, Butterworths, London.
- Clarke, R. and Walters, M. (1989), "Consumer EFTS in Australia: An Introduction", **Computer Law and Security Reporter**, Vol 4 No 4.
- DeLone, W. and McLean, E. (1992), "Information Systems Success: The Quest for the Dependent Variable", **Information Systems Research**, Vol 3 No 1, pp 60-95.
- Earl, M. (1989), **Management Strategies for Information Technology**, New York: Prentice Hall.
- Frazer, P. (1985), **Plastic and Electronic Money: New Payment Systems and Their Implications**, Cambridge: Woodhead-Faulkner.
- Galliers, R. (1993), "IT strategies: Beyond Competitive Advantage", **Journal of Strategic Information Systems**, Vol 2 No 4, pp.283-291.
- Gart, A. (1992), "How Technology is Changing Banking", **Journal of Retail Banking**, Vol XIV. No.1, pp 35-43.
- Gatian, A. (1994), "Is User Satisfaction a Valid Measure of System Effectiveness?", **Information and Management**, Vol 26, pp 119-131.
- Gupta, A. (1995), "A Stakeholder Analysis Approach for Interorganisational Systems", **Industrial Management and Data Systems**, No 6, pp 3-7.
- Haga, W. and Zviran, M. (1994), "Information Systems Effectiveness: Research Designs for Causal Inference", **Information Systems Journal**, Vol 4, pp 141-166.
- Harris, S. and Katz, J. (1991), "Organisational performance and information technology intensity in the insurance industry", **Organisation Science**, Vol 2 No 3. pp 263-295.
- Johnston, H. and Vitale, M. (1988), "Creating Competitive Advantage with Interorganisational Information Systems", **MIS Quarterly**, Vol 12 No 2, pp 153-165.
- Kaplan, R. and Norton, D. (1992), "The Balanced Scorecard - Measures that Drive Performance", **Harvard Business Review**, January - February, pp 75-85.
- Kumar, K. and van Dissel, H. (1996), "Sustainable Collaboration: Managing Conflict and Cooperation in Interorganisational Systems", **MIS Quarterly**, Vol 20 No 3, pp 279-300.
- Lederer, A. and Mendelow, A. (1990), "The Impact of the Environment on the Management of Information Systems", **Information Systems Research**, Vol 1 No 2, pp 205-222.
- Lincoln, T (1990), **Managing Information Systems for Profit**, Chichester: John Wiley & Sons.
- Lyytinen, K., Klein, H. and Hirschheim, R. (1991), "The Effectiveness of Office Information Systems: A Social Action Perspective", **Journal of Information Systems**, Vol 1, pp 41-60.
- Primozic, K., Primozic, E. and Leben, J. (1991), **Strategic Choices: Supremacy, Survival, or Sayonara**, McGraw-Hill, New York, as quoted in Sprague, Jr., R. and McNurlin, B. (1993), **Information Systems Management in Practice**, Third Edition, Englewood Cliffs, NJ: Prentice-Hall.
- Mahmood, M. (1994), "Evaluating Organisational Efficiency Resulting from Information Technology Investment: An Application of Data Envelopment Analysis", **Journal of Information Systems**, Vol 4, pp.93-115.
- Mahmood, M. and Mann, G. (1993), "Measuring the Organisational Impact of Information Technology Investment", **Journal of Management Information Systems**, Vol 10 No 1, pp 97-122.
- Singleton, J., McLean, E. and Altman, E. (1994), "Measuring Information Systems Performance: Experience with the Management by Results System at Security Pacific Bank," in Gray, P., King, W., McLean, E. and Watson, H. **Management of Information Systems**, Second Edition, New York: The Dryden Press.
- Srinivasan, A. (1985), "Alternative Measures of System Effectiveness: Associations and implications", **MIS Quarterly**, Vol 9 No 3, pp 243-253.