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# Understanding IOS Adoption Processes in Three Victoria-Based Hospitals: An Organisational Motivation Perspective

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## Abstract

In recent years, hospitals in Victoria have initiated a program of adopting various forms of inter-organisational systems (IOS) which link them with their pharmaceutical suppliers. In this paper, we use a positivist multiple case study approach to examine the IOS adoption experiences of three large hospitals, and explain their IOS adoption processes using a theoretical model which we developed based on the ideas of 'organisational motivations' for IOS adoption. The findings obtained from the hospitals offer insights about what influences IOS adoption processes in organisations, which in turn, help in reducing the uncertainty associated with IOS adoption practices.

**Keywords:** Inter-organisational systems, adoption, hospitals, Victoria

## Introduction

Inter-organisational systems (IOS) are a distinctive type of information systems (IS) which crosses organisational boundaries (Malone et al., 1989). These systems enable exchange of information by linking electronically two or more organisations and form the foundation of business-to-business e-commerce initiative (Senn, 1996). The adoption of IOS has received considerable attention in the literature. However, past studies have generally described why and how IOS are adopted in organisations, but have not discussed why differences in IOS adoption processes are observed in different organisations. It is important to address this issue as potential adopter organisations would like to receive clear guidelines for initiating IOS adoption processes once a favourable decision is made to adopt these systems.

IOS adoption has traditionally been investigated in the automobile and retail industries. In recent years however the Australian hospital industry has received considerable attention from the government due to increased growth in the health expenditure (Anonymous, 2003). According to the Australian Institute of Health and Welfare (Anonymous, 2004), hospitals incurred an expenditure of A\$22.23 billion in the year 2001-02. It is therefore not surprising that the demand for improved services, products and patient care has grown dramatically in the hospital industry, and at the same time, the hospitals are increasingly required to operate more efficiently (More and McGrath, 2000a). Hospitals are thus more likely to introduce innovative information technologies including IOS solutions as a way to respond to this challenge. This assertion is supported by More and McGrath (2000b) who observed that Australian hospitals are increasingly establishing pharmaceutical ordering systems, a form of IOS, with their key suppliers. Little is however known about what motivates these hospitals to adopt IOS and what adoption processes they follow.

In this paper, we study the IOS adoption processes in three large hospitals located in the state of Victoria, Australia, and explain them in terms of a theoretical model which we develop based on the ideas of 'organisational motivations' for IOS adoption discussed in our previous work (Rahim et al., 2001). In our previous work, we introduced the notion of organisational motivation for IOS adoption, identified four distinct motivation scenarios for IOS adoption, and suggested that an organisation intending to adopt IOS could be classified into one single motivation scenario. In this paper, we argue that organisational motivations for IOS adoption are related to IOS adoption processes in organisations. The theoretical model was applied to examine the IOS adoption processes in three hospitals. We predicted that hospitals would demonstrate the characteristics of '*techno-economic followers*', one of the four distinct types of motivation scenarios, shown in the model due to two reasons. First, the hospital supply chains in Australia are dominated by a few large pharmaceutical wholesaling companies which enjoy enormous purchasing capacity and hence hospitals are likely to be docile players (Rahim, 2003). Second, hospitals

are likely to look upon IOS as a means to address their inefficiency problems in order to deliver improved services within tight budgetary constraints required by the government. The empirical evidence obtained from the participating hospitals provides some support for our predictions. We have found that hospitals tend to follow similar IOS adoption processes and established identical motivations for IOS adoption. This study therefore makes a clear contribution to the IOS adoption literature as it greatly improves our understanding about the IOS adoption phenomenon.

## Related Literature

Information systems (IS) researchers have addressed different aspects of IOS adoption. One group of researchers has focused on the factors affecting IOS adoption decision. The works of Iacovou et al. (1995), Hausman and Stock (2003) and Soliman and Janz (2004) represent this group. These studies typically identify the conditions (called 'factors') which significantly affect the decision of organisations to adopt IOS. In general, three broad categories of factors are identified: (a) the properties of the IOS being adopted, (b) the characteristics of the adopter organisation, and (c) the conditions prevailing in the environment of the potential adopter organisation. The factor-based studies suggest that the more favourably a potential adopter organisation perceives the importance of a factor, the more likely it is that the organisation will adopt IOS. These studies are useful as they offer guidelines facilitating successful IOS adoption decisions. They however do not discuss the conditions relating to initiating IOS adoption processes. Another group has adopted the process-oriented approach and describe the processes used in introducing IOS in organisations. The works of Webster (1995), Allen et al. (1999) and Gregor and Jones (1999) represent this stream of research. These studies emphasise that the processes undertaken in the course of implementation and not factors determine the outcomes of IOS adoption. However, they do not discuss what determines the particular processes chosen by IOS adopters. Thus, work of neither of these two groups has explained why different organisations follow different IOS adoption processes. We argue that IOS adoption processes initiated by organisations are related to the type of motivation that those organisations establish for IOS adoption in the first place. Hence, the differences in IOS adoption processes can be explained by the differences in the organisational motivations for IOS adoption. Conversely, two organisations would tend to adopt similar IOS adoption processes if they establish identical motivations for IOS adoption.

## Theoretical Model

The term organisational 'motivation' is defined as the '*desire of an organisation that prompts it to act in a certain way for adopting an innovative system such as inter-organisational system*' (Rahim, 2003). In this paper, we argue that it is the organisational motivations that determine which IOS adoption processes are followed by organisations. This assertion constitutes the foundation of the theoretical model shown in Figure 1. Therefore, two organisations tend to initiate IOS in a similar manner if they form identical motives. We further argue that the relationship depicted in the model is valid to those industries in which supply chains are characterised by a few dominant players and many docile players. In some industries (e.g. airline, banking) organisations participate in an 'electronic exchange' relationship with many partners. The notion of having dominant and docile players may not be observed in those industries. Consequently, the theoretical model cannot be applied to those industry settings. This characteristic of the industry constitutes the boundary of the theoretical model.

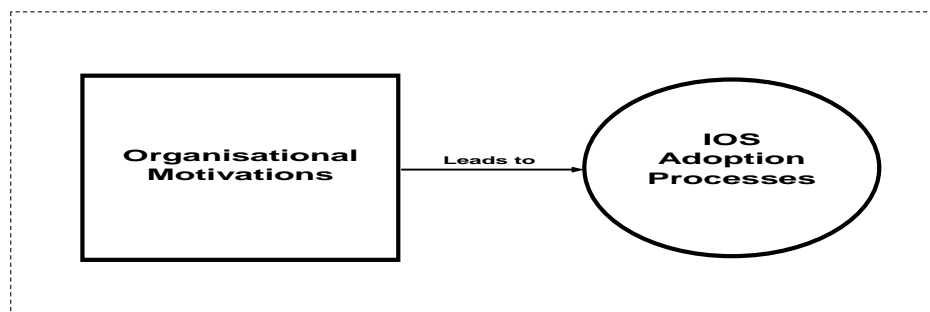


Figure 1: The theoretical model

The theoretical model shown above can be further enriched by incorporating the notion of ‘motivation scenarios’ that we proposed in our previous work (Rahim et al., 2001). In that work, we classified organisational motivation along two dimensions: locus of motivation and type of motivation, and identified a total of four distinct motivation scenarios (see Figure 2). The four types of motivation scenarios shown in Figure 2 were proposed in recognition of the existence of various types of organisational motives (e.g. coercive force, normative relations, economic gains, gaining status) and the source (e.g. internal or external) from which such motives may originate.

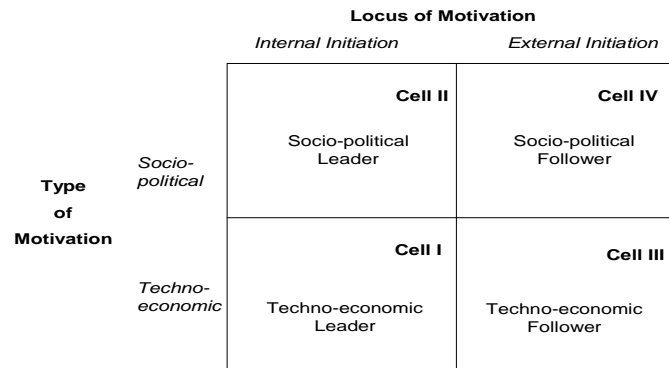


Figure 2: Motivation scenarios for IOS adoption

The notion of motivation scenarios (Figure 2) when incorporated in the theoretical model (Figure 1) results in the revised model shown in Figure 3. It clearly depicts that organisational motivations determine IOS adoption processes. Figure 3 also shows the activities that constitute IOS adoption processes. These activities were identified based on a review of the past IOS adoption literature. Detail discussion of these activities is reported in Rahim (2003). The associative relationship between motivation and IOS adoption processes is shown as a solid line. Thus, the model predicts that if two organisations establish similar motives to adopt IOS (and hence belong to the same motivation scenario), they are likely to follow similar IOS adoption processes.

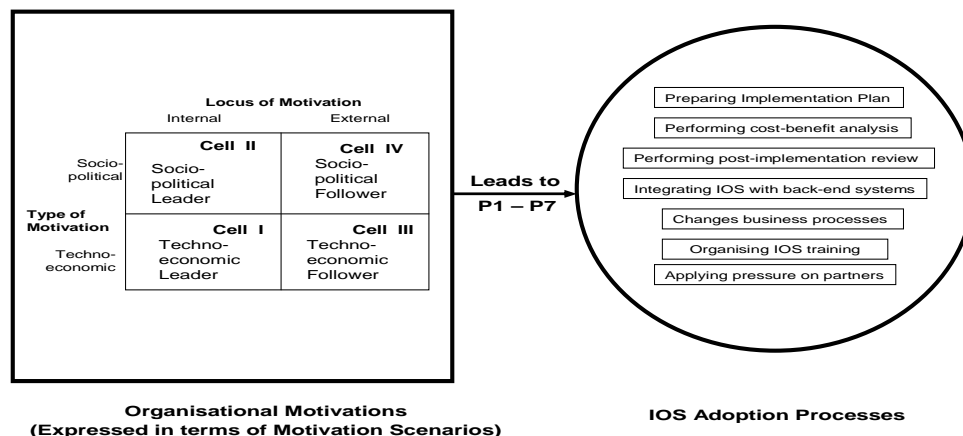


Figure 3: Revised model showing relationship between organisational motivations and IOS adoption processes

By drawing upon the past IOS literature, we have further developed a set of propositions relating to the IOS adoption processes followed by organisations belonging to each motivational scenario. As we have pointed out earlier that hospitals can be classified as techno-economic followers, the particular propositions for that group are stated in Table 1 and are represented as P1 – P7 in Figure 3. The deduction of these propositions is briefly described below and a more detailed discussion about the deduction of these propositions can be found in Rahim (2003).

Table 1: Propositions relating to IOS adoption processes followed by techno-economic followers

Propositions
P1: A techno-economic follower is likely to prepare an IOS implementation plan.
P2: A techno-economic follower is likely to initiate cost-benefit analysis for IOS.
P3: A techno-economic follower is likely to perform a post-implementation review of IOS
P4: A techno-economic follower is likely to integrate IOS with back-end IT systems.
P5: A techno-economic follower is unlikely to introduce changes in the business practices.
P6: A techno-economic follower is likely to organise training in IOS.
P7: A techno-economic follower is likely to apply pressure on partners.

The ‘Techno-economic’ motivation scenario (shown as cell III in Figure 3) occurs when an organisation is approached either by its business partners or by any other influential organisation about IOS adoption and having evaluated the potential economic benefits of the IOS, it invests voluntarily in IOS. Although the motivation to adopt IOS is generated from external sources, the decision is made based on economic motive. Techno-economic followers usually have limited cost involvement in IOS projects because they do not share the expense of IOS development with the dominant business partners that introduce IOS. However, techno-economic followers recognise the importance of introducing IOS systematically in their organisations as it is intended to address an organisational inefficiency problem. This recognition prompts them to prepare an implementation plan. As these followers are basically driven by the economic attractiveness of IOS, they are likely to evaluate the economic and technical aspects associated with IOS adoption before deciding to embrace the technologies. They are also likely to review the impact of IOS after its introduction.

Techno-economic followers want to maximise its economic benefits and integration will be regarded as a facilitator to gain more benefits. Hence, they are likely to invest resources in IOS integration. These organisations may also regard IOS as a facilitator for making their business process efficient, but despite the recognition they are unlikely to adopt a business process improvement initiative. This is because process changes are not economically attractive unless an organisation establishes electronic relationships with a large number of trading partners via IOS. These followers typically use IOS to transact primarily with the trading partner that initiated IOS along their supply chain, and they still continue to transact manually with many other non-IOS enabled trading partners. In such a situation, only a small portion of their transaction base is automated by IOS and hence it would not be worthwhile from cost perspective, to introduce major process changes.

The techno-economic followers realise the importance of training people to implement and use IOS. Hence, they are likely to organise necessary training to alleviate the concerns of employees who may resist change when implementing IOS. As these followers are the proactive users of IOS, they seek every opportunity to obtain additional benefits from the business partner that initiated IOS along the supply chain. They will actively co-operate with the partner that initiated IOS and may even grant the partner an access to their internal databases. In doing so, these followers will not hesitate to put some pressure on the partner in order to persuade them from disclosing more critical information (e.g. planning, forecasting) which was not previously shared by the partner. These considerations lead to the specific propositions given in Table 1 concerning adoption processes initiated by techno-economic followers. For each motivation scenario contrasting sets of propositions can be deduced in a similar way indicating operationalising basic model that motivations determine adoption processes.

## Research Design

IOS adoption generally takes place in a complex environment (Premkumar et al., 1997). Hence, it is critical to capture the experiences of the relevant people and the context of their actions to understand IOS adoption. Case studies are particularly suitable for understanding phenomena within their organisational context (Yin, 1994). Multiple cases were chosen because we wanted to examine several instances of IOS adoption representing ‘techno-economic followers’ scenario. This would enable us to maximise our ability of producing analytically generalisable results. This notion is known as literal replication (Yin, 1994). The multiple case studies were conducted using the rigorous principles of Yin (1994) and Sarker and Lee(2000) which are grounded in the positivist tradition. The positivist tradition is used because of the need to develop a theoretical model to explain the behaviour of

organisations for IOS adoption. Drawing upon the model, it was also possible to deductively test certain concepts pertaining to organisational behaviour for introducing IOS. The implication is that the case data that were collected from interviews and other relevant sources were primarily used to test the theoretical model and the propositions. Unlike in the interpretivist tradition, the case study data were not collected to understand the meaning or interpretation provided by the case participants. The case organisations were selected from a list of hospitals which participated in e-commerce initiatives encouraged by the National Office of Information Economy (Anonymous, 1998). Individual IOS projects used within organisations are considered as the unit of analysis because we argue that each IOS project is introduced by an organisation with a particular motive. In-depth interviews were sought from two senior executives from each hospital: (a) pharmacy directors (key informants) who provided the official view of the hospital about its motivation to adopt the particular IOS with suppliers; and (b) the head of the IT function who provided details about IOS adoption process.

Established methodological guidelines were applied in order to generate reliable findings. Reliability was addressed by clearly conceptualising research variables, developing an unambiguous case study protocol, pilot testing and using multiple coders. The interviewees on many occasions granted access to company documents relating to the company background, IT profile, IOS characteristics, and IOS implementation which often helped us to corroborate the information provided during interviews. The interview transcripts as well as a draft report on IOS adoption were prepared and were sent to the interviewees for review. External validity was addressed by applying the notion of 'literal replication' (Yin, 1994) and using analytical generalisations (Yin, 1994). The participating hospitals represented three instances of '*techno-economic followers*' motivation scenario, and thus helped us to improve external validity through literal replication. Data collected from the hospitals were analysed using the pattern matching logic. It allowed us to compare the pattern of outcomes of dependent variable (i.e. IOS adoption processes) predicted from the theoretical model with the pattern of outcomes deduced from the case data collected from hospitals. However, consistent with the notion of analytical generalisation, we also examined that the expected processes were initiated for the same reasons (as reported by the informants) as that used in the logical deduction of the propositions. Furthermore, the arguments used in deriving the research propositions did not make any references to any specific traits of organisations operating in the Australian healthcare industry. Finally, we also developed an alternative model based on a critical review of the past factor-based studies which dominate the IOS adoption literature. The empirical data obtained from the case organisations did not render any support for the alternative model thus providing additional support for the analytical generalisations by ruling out alternative explanations. Details of the model is reported in Rahim (2003)

## **Description of Cases**

The participating cases are all large Victoria-based teaching hospitals and have a bed capacity of over two hundred. Out of three, two (Case A and B) are public hospitals and another (Case C) is private. The annual operating budget of the hospitals ranges between A\$250 million to A\$300 million. The IT department of the hospitals consists of between 25 to 40 staff and have an annual budget of between A\$26 million to A\$40 million. Key software applications used by the hospitals include patient administration system, clinical reporting system, pathology system and pharmacy system (either Stocca or Merlin) which operate in the Unix environment. All these systems were developed by external software companies. The IT department provides maintenance support and has little involvement in the development of new applications. All the hospitals acquired a proprietary modem-based ordering system (i.e. a supply chain oriented IOS solution) from their key pharmaceutical supplier. None of them had actually built the ordering system which is not surprising given their limited experience in applications development.

## **Case Study Findings**

This section presents empirical findings confirming that the participating hospitals represent the 'techno-economic followers' motivation scenario. It also presents evidence that many of the propositions relating to IOS adoption processes predicted for techno-economic followers are confirmed for the IOS projects undertaken by these hospitals. This will be demonstrated by comparing the processes followed by the hospitals to adopt IOS with the logical arguments expressed in the research propositions.

### **Classifying IOS Adoption Motivations of Hospitals**

The motivations of the hospitals for IOS adoption are examined in terms of '*locus of motivation*' and '*type of motivation*'. The loci of motivation of the hospitals were found to be external and the type of motivation was found

to be 'techno-economic' in nature. Consequently, in accordance with the theoretical model proposed earlier, the participating hospitals are categorised as '*techno-economic followers*'. Details are discussed below:

*Locus of Motivation:* All the participating hospitals adopted a proprietary computer-based ordering system which was built by a pharmaceutical wholesaling company. The initiative to introduce this system did not originate from the hospitals, but came from the wholesaling company. In two hospitals (Cases A and C), a representative of the wholesaling company visited the hospital and briefed the pharmacy director about the e-commerce potential of the ordering system. Moreover, the representative promised to offer the system free to the hospitals. The pharmacy director of a public hospital (Case A) made the following remarks:

*"The initiative to adopt the ordering system obviously came from a large wholesaling company. They came to us and told us: "Look, we have got this new e-commerce system, would you like to try it?" We said "Yes, we would like to give it a go, we always want to explore any new, potentially good system".*

Similar views were also expressed by the chief pharmacist of the private hospital (Case C). However, in another public hospital (Case B), the director of the pharmacy department attended a meeting with the pharmacy directors of several other metropolitan and regional hospitals. At that meeting, a representative of a large pharmaceutical wholesaling company introduced the idea of establishing an electronic system to enable hospitals to transmit purchase orders direct to that supplier company. The idea was endorsed by all the pharmacy directors. In the mid-1990s, the wholesaling company contacted the hospital and successfully demonstrated the ordering system. The director liked the technical capabilities of the system and decided to adopt it. According to the pharmacy director:

*"People from our key supplier were very keen to establish an electronic ordering system to enable hospitals to send orders to them. They presented their ideas to a group of Directors of Pharmacy. I was a member of that group. We liked their proposal and encouraged them to develop it. It took quite a while for the electronic ordering system to get up and running properly. Once it was available, we just adopted it in our ordering process."*

*Type of Motivation:* The participating hospitals introduced IOS solutions in order to improve the efficiency of their drug purchasing process. This goal was addressed in any one of the following ways: (a) by reducing data entry errors, (b) by decreasing order preparation time, (c) to take some costs out of the ordering process by reducing mismatched invoices, and (d) to reduce uncertainty associated with purchasing decisions by being able to view the stock status and price information of the products sold by the pharmaceutical company. All the hospitals wanted to develop the ability to view stock status and price information of the products held at their suppliers' warehouses, but only one hospital (Case A) wanted to use this information to reduce the uncertainty associated with purchasing decisions. According to the pharmacy director of public hospital:

*"We expected to get access to the most up-to-date stock information and delivery confirmation. We did not want to wait on the phone to talk to someone to secure delivery confirmation."*

By contrast, another public hospital (Case B) intended to view stock status and price information to make cost savings. This hospital introduced the ordering system in order to reduce order processing costs by eliminating the need to handle mismatched invoices. The mismatched invoices are often created due to data entry errors and price discrepancies. The director of pharmacy remarked:

*"Basically, we adopted this ordering system to be able to reduce our order processing costs by sending quality orders. It is because we do not have to handle mismatched invoices."*

The private hospital (Case C) however introduced the ordering system because of its desire to achieve cost savings by being able to view stock status and price information of the products supplied by the wholesaling company. It recognised the usefulness of knowing product pricing at the time of placing orders. It wanted to send an order to another supplier if the price of certain products rises abruptly. This aspect of the ordering system represented a major financial advantage from the hospital's viewpoint. According to the chief pharmacist:

*"The main reason is to get some cost savings by knowing the exact price before we place orders. If we could determine that the price of a particular item has gone up from this key supplier, we could then send our order to another supplier who might be able to provide us the same item at a lower price."*

None of the hospitals however introduced the electronic ordering system to achieve competitive advantage. They basically considered these systems as an operational tool, rather than as a means to strengthen their bargaining position over suppliers. The hospitals were receiving pharmaceutical products at a reasonable price and hence did not want to use IOS solutions to further enhance their bargaining ability over suppliers. Furthermore, the motivation of the hospitals was not socio-political in nature. They did not introduce IOS solutions due to pressure from the wholesaling companies, nor did they adopt these systems to enhance image in the society. The chief pharmacist of the private hospitals (Case C) commented:

*“We did not adopt these systems due to pressure of the supplier. In our hospital, this system was being taken up as a sensible good step.”*

### **Testing Propositions Related to IOS Adoption Processes**

Techno-economic followers are expected to prepare an IOS implementation plan in part due to the recognition of the importance of the IOS project to their company. The plan is also intended to assure management that appropriate procedures would be followed to minimise the risk factors that may adversely affect the implementation of IOS in organisations. This argument has received empirical support: all the hospitals prepared a project plan to introduce an electronic ordering system. As the ordering system, if not properly implemented, could disrupt the hospital's ordering process, great care was taken by the hospitals to prepare a project plan. The plan also addressed management's concern for purchase order validity and security, and identified the hardware and software requirements. According to the pharmacy director of the private hospital (Case C):

*“We prepared a project plan. We determined resource requirements on our side to install the system. We also planned to spend considerable time on system testing to ensure that correct products are ordered. This helped us to receive support from our hospital management.”*

Similar views were also expressed by other hospitals. Thus, proposition P1, which suggests that techno-economic followers are likely to prepare an IOS implementation plan, is supported. Techno-economic followers are expected to perform a formal cost-benefit analysis as IOS solutions are introduced to seek economic benefits. The case data reveals that none of the hospitals conducted a formal cost-benefit analysis prior to introducing the electronic ordering systems. The hospitals made no financial contribution to the development of these systems, which, in fact, were offered free to the hospitals by their suppliers (that is wholesaling companies). As a result, the hospitals were not obliged to prepare a sound business case to obtain approval from top management. This observation has been reflected by the pharmacy director of a public hospital (Case A) as follows:

*“The system was given free to us. So, a formal cost-benefit evaluation of the e-ordering system was not necessary.”*

Hence, proposition P2, which suggests that techno-economic followers are likely to initiate a cost-benefit analysis before deciding to adopt an IOS solution, is not supported. Similar findings have also emerged with regard to performing a post-implementation IOS review. Techno-economic followers are likely to initiate a post-implementation review as they would be keen to know the outcomes of their IOS investment. The empirical case data however suggests that none of the hospitals performed such a review after introducing the electronic ordering system. This is because the maintenance and further enhancements of these systems were carried out by the suppliers, and subsequent upgrades of the system were also offered free to the hospitals. In other words, the hospitals did not financially contribute to the further improvement of the ordering systems. Hence, there was no need to seek funding from hospital management. Additionally, the benefits that resulted from using the ordering system were obvious to the hospitals. Consequently, they considered it unnecessary to quantify savings to secure extra funding from hospital management. Thus, proposition, P3 which postulates that techno-economic followers are likely to perform a post-implementation review of IOS, is not supported.

Techno-economic followers are expected to integrate IOS with their back-end information processing systems to maximise the economic return from their IOS investment. The empirical case data reveals that all the hospitals integrated the ordering system with their own back-end pharmacy system. The integration was established to improve efficiency of the ordering process by avoiding double entry of purchase orders. According to the pharmacy director of a public hospital (Case B):

*“For a considerable length of time, the e-ordering system was not incorporated within Merlin, but became integrated about 18 months ago. The main reason for this integration was to make ordering seamless. This really improves our efficiency by eliminating redundant data entry.”*



The integrated ordering system enabled the hospitals to pass purchase order data, generated from the pharmacy system, seamlessly to the ordering system. Then the ordering system sends those orders to the supplier's computer via a modem. Hence, proposition P4, which postulates that techno-economic followers are likely to integrate IOS with its back-end IT system, is supported.

Techno-economic followers are not expected to adopt process improvement initiatives by capitalising on the opportunities arising from embracing an IOS solution. This is because these organisations typically use an IOS solution to transact primarily with the trading partner that initiated the IOS solution along their supply chain, and they still continue to transact manually with many other non-IOS enabled trading partners. In such a situation, it is not economically attractive for them to introduce major process changes. This view is partially supported by the case data which found that two hospitals did not make any attempt to improve their business practices. For example, one hospital (Case A) expressed the need for using a comprehensive IOS-enabled e-commerce solution rather than a proprietary ordering system. This is because a comprehensive e-commerce system would enable the hospital to electronically transact with many suppliers, and only then would the hospital be interested in implementing any necessary changes in its business processes. In other words, process changes are not economically feasible unless a hospital develops the ability to electronically transact with many suppliers. According to the pharmacy director:

*"We did not make any changes in our business process. We did not introduce VMI or JIT practice. I think in order to introduce a significant change in our way of doing business, we need a comprehensive e-commerce system that will enable us to establish electronic relationships with all our major suppliers rather than one-to-one e-ordering system. Only then, it is worthwhile to invest in process improvements."*

The above view has been reinforced by the private hospital (Case C), which also did not make any major changes to its processes. This hospital does not communicate electronically with all its major suppliers, and hence, it is hard for it to secure the logistics support needed to introduce JIT service. However, only one hospital (Case B) persuaded its key supplier to introduce the 'ward box delivery practice'. This key supplier accounts for over 80% of the hospital's purchase. The ward box delivery practice is a new supply chain oriented initiative that allows a supplier to send a series of boxes containing pharmaceutical items directly to the different wards of a hospital. It thus bypasses the central pharmacy store system of a hospital, and reduces the inventory cost. The introduction of the ward box initiative was facilitated by the seamless integration that was in place between the ordering system and the hospital's back-end pharmacy system. Hence, partial support was found with regard to proposition P5, which suggests that techno-economic followers are unlikely to introduce changes in business practices.

Techno-economic followers are expected to raise the awareness of staff about the potential merits of IOS. They are also likely to reduce the perceived fear of employees which may be caused by the introduction of IOS. Hence, they are likely to organise staff training in IOS operations. The empirical data confirm this assertion as all the hospitals were found to have organised staff training in the ordering system from time to time in order to improve staff awareness and confidence in the use of the electronic ordering system. IOS training was also intended to enable the pharmacy staff to exercise greater control over the ordering process. This sentiment was expressed by the pharmacy director of a public hospital (Case A) as follows:

*"From time-to-time, training programs were organised to reduce the fear of our staff to work with the electronic system. The supplier who developed this system also came to help organise training without any charge."*

Hence, proposition P6, which suggests that techno-economic followers are likely to organise staff training in IOS, is supported.

As techno-economic followers are proactive users of IOS, they recognise the potential strategic benefits associated with IOS. Therefore, they are more likely to take initiatives to persuade the partner (which took the IOS initiative) to further expand the application of IOS in multiple functional areas. These followers, if necessary, will not hesitate to exert pressure on the partner to enable them to use IOS for strategic purposes. The empirical case data provides partial support to this notion as two hospitals applied some pressure on their partners and persuaded them to introduce additional services. For example, one public hospital (Case B), applied pressure on its supplier to introduce the ward box initiative. The private hospital (Case C) also asked its supplier to provide more frequent delivery service. The supplier eventually introduced two deliveries a day in response to that request. In contrast, another public hospital (Case A) did not put any pressure on their suppliers. It did not ask the suppliers to further reduce the

price of pharmaceutical items. This is because the prices were considered quite reasonable. Therefore, proposition P7 is partially supported.

In summary, three propositions (i.e. P1, P4, and P6) are supported for reasons that are consistent with those expressed in the propositions. However, two propositions (i.e. P5 and P7) received partial support and another two (i.e. P2 and P3) were not supported. Reasons for the lack of support for P2 and P3 are provided in the followings 'Discussion' section.

## Discussion

The previous section indicates that IOS solutions were offered free to the hospitals by their key suppliers (i.e. wholesaling companies). Furthermore, subsequent maintenance and upgrades of these solutions were also carried out free of charge by the suppliers. Consequently, the hospitals did not conduct a cost-benefit analysis (P2) and post-implementation review (P3). These organisation-specific conditions, which we call '*situational factors*', however are not unique in the healthcare industry and may also be observed in other industry contexts. For example, after many years trying to persuade suppliers, Coles Myers (a powerful Australian retail chain) eventually realised that they had to offer IOS solutions free to their business partners in order to improve the effectiveness of their supply chains (Johnston et al., 2000). In contrast, in the automobile industry, Ford did not offer EDI solutions free to its suppliers who were required to acquire their own EDI solution in order to interact electronically with Ford (Webster, 1995). Therefore, the issue of IOS initiators offering their IOS solutions free to the followers varies from industry to industry and is influenced by the attitude of the powerful players in a given industry. As such, propositions P2 and P3 are not governed by organisational motivations alone, but are also influenced by the power structure of a given industry. Hence, we suggest that propositions P2 and P3 are unable to offer any clear predictions for techno-economic followers within the boundary of this study.

On the matter of generalisability of results, we argue that the case study findings can with reasonable certainty be extended to the entire population of the hospital industry because a suitable sample of three hospitals was carefully selected which are typical of the hospitals operating in the Australian hospital industry. While such a small sample does not support statistical generalisation, the logic of analytical generalisation was applied in interpreting evidence for evaluating the research propositions. The conceptual model was used as a template with which the empirical results that emerged from the hospitals were compared. In making comparisons, not only the prediction offered by each research proposition was matched against the empirical evidence obtained from the case data, but the underlying logic for supporting or refuting the research propositions was also considered. Additionally, the arguments that were used to derive the research propositions from the literature made no reference to any specific properties (e.g. size, IT budget) of organisations operating within the hospital industry. Therefore, as the research propositions are independent of any organisation-specific properties, the findings should be applicable to other similar hospitals.

## Conclusion

In this paper, we have investigated IOS adoption experiences of three large hospitals and observed similarities in their IOS adoption processes which were attributed to the similarities in their motivations for IOS adoption. This finding is explained in terms of a theoretical model that discusses why different organisations are likely to follow IOS adoption processes in a different manner. The empirical evidence obtained from the hospitals thus offer some support to the notion that organisational motivations determine the IOS adoption processes followed by organisations. The findings contribute to the IS literature by highlighting the role of motivation as a determinant of IOS adoption processes, and can be generalised with reasonable confidence to the Australian hospital industry because of the methodological rigor applied in conducting the case studies. The practical implication is that, by knowing their own motivations for IOS adoption, the potential IOS adopter organisations can obtain insights about how to initiate adoption processes. This in turn can reduce the uncertainty associated with IOS adoption in organisations.

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