December 2003

Preliminary Evaluation of Inter-Oraganizational Information Systems and Relationships

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Abstract

It is agreed that good communication systems between organisations increase customer satisfaction and relationship behaviour. However, less is known about the details of how information is used to manage relationships. Theories that have been found have either been tested on non-perishable goods or on small case studies. This paper presents a preliminary evaluation of some aspects of Storer (2001) model of inter-organizational information feedback systems (IOIS) and relationships. Specifically whether patterns of information sharing between organisations can be explained by relationship and environmental variables.

A case study was conducted of 32 dyadic pairs of organisations (64 respondents) involving perishable products (green life plants). A Rasch analysis of the types of information exchanged variables showed there was a consistent order of information sharing and that an interval scale of information sharing could be calculated. All respondents had similar information sharing patterns. Factor analysis of relationship variables resulted in three reliable factors – 'trust', 'responsiveness', and 'satisfaction and commitment'. Factor analysis of environmental variables also resulted in three reliable factors – 'relationship predictability', 'uncertainty', and 'dependence and influence'. Two variables did not load well onto these factors and were used separately in further analysis ('difficulty in replacement' and 'loyalty - remain with them despite alternatives').

Regression analysis was conducted to determine if information sharing patterns could be predicted by environmental and relationship variables and factors. However, it did not explain a great deal of the variance in the information sharing patterns (adjusted R^2 = 0.13) and the only significant predictor factor was the perceived responsiveness of the other party. It is concluded that future research needs to be undertaken to see if the results will hold for a larger sample size. In addition, it may be that the other variables in the IOIFS also need to be analysed and modelled with the relationship and environmental variables as originally hypothesised by Storer (2001).

Keywords:

Buyer & seller relationships, Inter-organizational information systems, Theory testing, Rasch analysis

Introduction

There is support for the idea that suppliers' efforts to assist communication increases customer satisfaction and relationship behaviour (Anderson & Narus 1990, Keith et al. 1990, Mohr & Nevin 1990, Leuthesser & Kohli 1995, Mohr & Sohi 1995, Mohr et al. 1996, Uzzi 1997). To date, much of this research has examined the efficiency of transactions and primary processes (such as placing orders, scheduling production, filling orders and organising logistics through enterprise resource planning (ERP), electronic data interchange (EDI) and e-commerce (Bowersox &Closs 1996). For example Vlosky & Wilson (1996) examined the impact of transactional inter-organizational information systems (bar coding) on buyer-seller dyad relationships. Essentially this has been a focus on inter-organisational data transmission systems. Improving high volume transactional processes has the potential to create great efficiencies and cost savings. However, there is also a need to understand higher-level inter-organisational information systems such as inter-organisational management and strategic information systems. There has been less research in this area and there appears to be a gap in this research about information systems in chains and networks and about perishable product chains. This paper presents a preliminary evaluation of some aspects of a theoretical framework developed for inter-organisational information feedback systems to manage chains of organisations dealing with perishable products.

Background Literature

In addition, there appears to be a lack of detailed studies of perishable goods systems. It has been argued that food chains have different product characteristics than do non-perishable products, as there is greater uncertainty (Trienekens 1999). Galbraith (1973) and Ancona & Caldwell (1992) suggest that task environment uncertainty increases the need for additional information processing capacity and frequency of information exchanges and Bensaou (1999) argued that it might affect the nature of the relationship. Perishable product chains therefore, are likely to have different inter-organizational information systems than durable product chains. While the Supply Chain Partnerships Program (2000) web site provides guidance about general changes in information systems in chains over time in the food and other industries, it has not been tested empirically. Spekman et al. (1998) have examined perishable chains but did not looked in detail at information systems aspects. Mohr et al. (1996) and Mohr & Sohi (1995) used a sample of computer dealers to test their models. Bensaou (1992; 1997 & 1999) tested his model on a sample of automobile manufacturers.

In conclusion, there would seem to be a gap in the research on the role of information systems to manage interorganisational relationships in chains and networks of organisations, especially for those dealing with perishable goods. Therefore, the first phase of this research was to explore this issue.

A grounded theory approach was taken using literature reviews, informal in-depth interviews with experts internationally and a case study network of five organisations involved in several chains ('netchain' Lazzarini et al. 2001). The result of the first reseach phase was a proposed model of inter-organizational information feedback systems[1] (IOIS) which Storer (2001) describes in further detail (Figure 1).

[1] A system can be defined as a group of related objects with a common purpose. A chain can be defined as a sequence of at least three organisations (supplier, focal firm and customer) working to satisfy customer needs at a profit. The inter-organizational information system

In the model, it was suggested that expected future outcomes from the relationship were related to the nature of the inter-organisational information feedback system adopted in the chain which, in turn, was related to current perceived outcomes of the chain (as suggested by Bowersox & Closs 1996, Stank et al. 1996, Vijayasarathy & Robey 1997, Benedict & Margeridis 1999).

It was proposed that satisfaction with the IOIS would be dependent on the nature of the IOIS. It was expected that as the IOIS system developed and sensitive information was more frequently shared, more competitive opportunities would arise and there would be greater satisfaction with the information shared. In addition, as information would be exchanged more frequently to resolve management problems, greater satisfaction would result. The assumption was that an organisation would have different IOIS with each customer or supplier. If there were greater levels of commitment to developing long-term relationships, there would be a greater investment in the IOIS. Investment in the IOIS being demonstrated by a wider range of information shared more frequently.

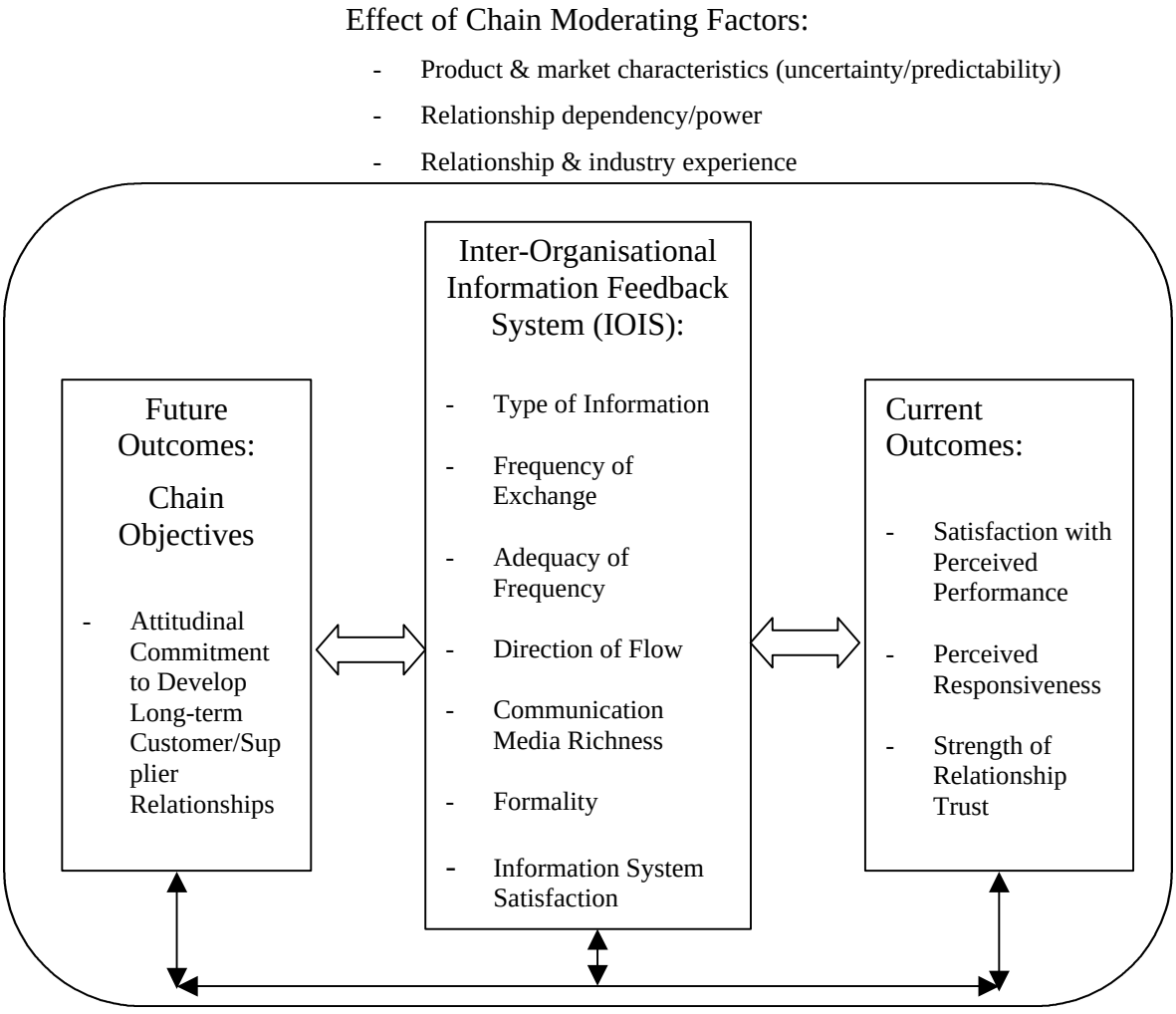

Figure 1 Model of Inter-Organisational Information Feedback Systems in a Chain Context
Source: Adapted from (Storer 2001)

(IOIS) has been defined as the information exchanged by organizations in a chain to manage the chain and build the competitive advantage of the chain.

Further, the model argued the results would be moderated by factors such as product and market uncertainty, relationship dependency and power, experience in the relationship and in the industry, as well as personal characteristics (as suggested by Ancona & Caldwell 1992, Spekman et al. 1998, Bensaou 1999).

To operationalise the model, the inter-organisational information feedback system was examined by asking participants about the *types of information exchanged* to manage the relationship (Mohr & Nevin 1990) (Appendix 1). Specifically, participants were asked whether they exchanged information for: performance feedback; problem resolution; new product development; forecast supply and demand; and opportunities and threats (Anderson et al. 1987, Womack et al. 1990, Cunningham & Tynan 1993, Bowersox & Closs 1996, Christopher 1997, Andraski 1998, Hines et al. 1998, Van Hoek 1998). Based on the netchain case study, performance feedback was expanded to cover product quality, on-time delivery, completeness of orders, flexibility to change orders and invoicing accuracy.

For each type of information shared, details were sought of: the *frequency* it was shared on average in a year (absolute frequency); *frequency adequacy* ie was information exchanged as often as necessary (relative frequency); *direction* it flowed through the chain; *communication media* used; and *formality* of the process (Farace et al. 1977, Daft & Lengel 1986, Anderson et al. 1987, Dansereau & Markham 1987, Huber & Daft 1987, Mohr & Nevin 1990, Bensaou & Venkatraman 1995, Choo 1996, Daft & Lengel 1996, Borgen & Ohren 1999, Ellinger et al. 1999). An assessment of the information system was made in terms of perceived overall *information system satisfaction and usefulness* (Bensaou & Venkatraman 1995).

Expected future outcomes from the relationship were measured as attitudinal *commitment* to develop long-term customer-supplier relationships (Ganesan 1994, Gundlach et al. 1995, Sharma et al. 2001).

Current outcomes from the relationship were measured by comparing perceptions of the buyer/seller's *performance, responsiveness and willingness to change,* and *trustworthiness* to others in the industry (Anderson et al. 1987, Womack et al. 1990, Kumar et al. 1992, Gassenheimer & Scandura 1993, Kohli et al. 1993, Anderson et al. 1994, Ganesan 1994, Bensaou & Venkatraman 1995, Gundlach et al. 1995, Doney & Cannon 1997).

Moderating variables included uncertainty, dependency/power and experience. *Uncertainty* was measured as: predictability of demand; production yield; quality and quantity of supply; market competition; and changing consumer preferences (Kumar et al. 1992, Ganesan 1994). Relationship *dependency and power* were measured as: availability of alternative customers and suppliers; importance to each other; influence; and ease of replacement (Kumar et al. 1992, Ganesan 1994). *Experience* was measured in terms of the number of years working in the industry and with the organisation (Ganesan 1994, Doney & Cannon 1997).

To explore the dynamics the interaction over time, the information satisfaction and relationship variables were measured in terms of the current situation and how it had changed over the last five years. Comments were recorded about respondent's perceptions about the reasons for change.

Present Study

The framework and propositions developed in the first phase of the research were based on a case study of five organisations in a netchain, therefore it would seem that further empirical testing and model refinement is needed on chain information systems and on perishable goods systems. The aim of the second phase of the research was to evaluate, test and refine

the theoretical framework based on a survey of food processors and a further perishable product chain case study. Reported in this paper are the results of a case study of nursery retailers (buyers) and eleven of their wholesale nursery 'green-life' suppliers (sellers).

The aim was to determine if some the propositions stood up to empirical testing in another perishable goods context (perishable green life - plants). As part of a preliminary evaluation, the applicability of the following three propositions for the information sharing part of the IOIS will be evaluated in the research reported in this paper.

- Investment in information systems is positively related to satisfaction with performance, trust and commitment to developing long-term relationships.
- Commitments to develop long-term relationships and invest in information feedback systems are higher with organisations in an environment where there is a perceived mutual dependency and equal power.
- Commitment to develop long-term relationships and invest in information feedback systems occurs in markets where there is uncertainty in production yield, product quality, supply and end consumer demand quantity or preferences.

Based on these propositions it was specifically hypothesised that:

- A wider range of different types of information (higher rasch score) will be shared where there is information system satisfaction as well as positive perceived performance, trust and commitment.
- A wider range of different types of information types (higher rasch score) will be shared in environments of greater uncertainty.
- A wider range of different types of information (higher rasch score) will be shared where there is mutual dependency and equal power.

Sample Selection

The nursery retailer was selected as the focal firm based on their interest in developing long-term relationships with wholesale nursery green-life suppliers and their willingness to participate in the research. From the nursery retailer's list of preferred green-life suppliers, the head office green-life category manager selected eleven suppliers who were considered to be important in terms of strategic positioning, volume and value and to which the retailer was committed to developing long-term relationships. Head office and eight retail stores had dealings with the suppliers. The head office green-life category manager selected three retail stores to participate in the research, along with head office. With a decentralised store level procurement system, the information of each store (buyer) with each wholesale nursery (supplier) was a separate unit of analysis. The case study resulted in 32 matched pairs (64 respondents) of dyadic relationships (Figure 2).

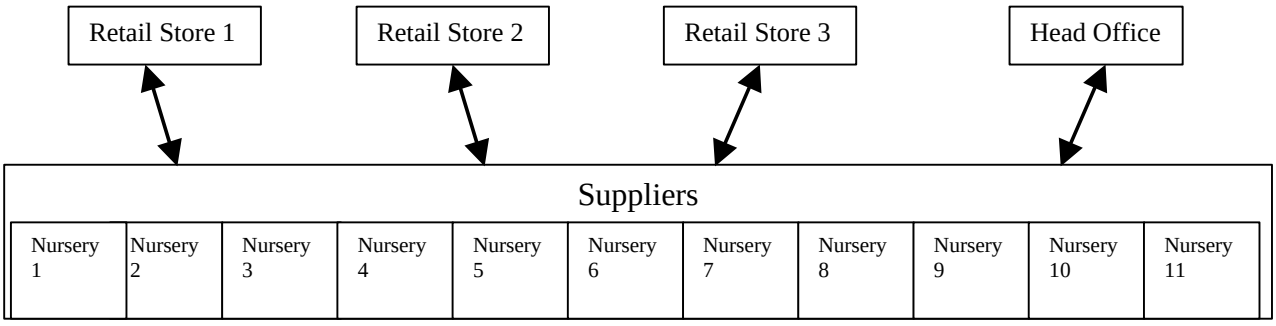

Figure 2: Case Study Participants

Data Collection

A structured questionnaire (Appendix 1) was developed based on the framework developed in the food processor netchain case study (Storer 2001). The description of the IOIFS was based around whether different types of information were exchanged ie about performance feedback, problem resolution, new product developments, forecast supply and demand, and opportunities and threats. Based on interview transcripts performance feedback was expanded to specifically cover product quality, on time delivery, completeness of orders, flexibility to change orders and invoice accuracy. If information was exchanged, respondents were then asked about the frequency of exchange, communication medium used and formality of the process as well as the direction of these exchanges. Respondents were also asked about the nature of their relationship commitment, trust, performance satisfaction, responsiveness, experience, dependency and environmental uncertainty.

The questionnaire was structured so respondents were initially asked 'easy to answer questions' about their experience in the relationship and about the industry. They were then asked to provide details about the inter-organisational information system followed by perceptions about the relationship and the environment. Most questions were either 'yes'/'no' dichotomous scales or seven-point disagree-agree scales with a "don't know" option. Open-ended questions were also asked to understand problems, as well as provide explanations as to why there had been changes in the last five years.

Data was collected through personal in-depth interviews with retail store green-life category managers and wholesale nursery owners/managers during June to October 2001. The head office green-life category manager advised participants of support for the research and made introductions. Appointments were made at a mutually convenient time and interviews lasted for from one to two hours Data were recorded during the interview, as well as on audiotape.

Limitations

The main limitation in the study was the small sample size (14 organisations) and a restriction to one industry (green life wholesale nurseries and retailers). In addition, only one key informant in each organisation was interviewed rather than multiple informants as recommended by Kumar et al. (1993) and Anderson et al. (1994). Key informants can create problems, such as informant bias, random error, hindsight bias, attributional bias and subconscious attempts to maintain self-esteem or impression management (Kumar et al. 1993). Multiple informants were originally to be used, but assurances by the nursery retailer category manager that most dealings were through store category managers and wholesale nursery owners/manager lead to interviewing only these people. Research on multiple informants in the previous case study found managers were better able to report on organisational interactions with customers and suppliers than operational level staff, perhaps due to the scope of their job (Storer 2001).

Data Coding & Analysis

The audio tapes were used to check recording sheets and enable coding, as well as enable a qualitative analysis of open-ended questions. The survey data were initially analysed using univariate statistics, such as frequencies, histograms, modes, means and standard deviations (depending in the nature of the scales used), to check the accuracy of data entry and to get a feel for the data.

Based on the first phase qualitative case study research Storer (2001) it was proposed that the nature of the relationship and environment would be related to the type of information exchanged between organisations. Before this could be tested, the pattern of information exchanged had to be examined in closer detail. Was there a dimensionality of information exchange where certain types of information were exchanged more frequently than other types? In addition, was the pattern of information exchange the same for all segments of the population eg suppliers and customers? To answer these questions it was important to derive an information sharing order using a measurement model that could evaluate both the goodness of fit of items (frequency of different types of information exchanged) and of people.

In the present study the measurement model used was post hoc. That is, a predetermined order of information sharing was not developed before examining the data. This was done because there was no established information sharing taxonomy. As suggested by Soutar & Cornish-Ward (1997) a Rasch Analysis was preferred over the conditional probability approach and the Guttman Scalogram Analysis. The Rasch Analysis is not dependent on the number of items considered and allows for probabilities other than zero or one (Rasch 1960, Andrich 1988). The Rasch model is one of a family of logit models that has been primarily used in educational research to examine the difficulty of test items, especially in the binary correct/incorrect case (Soutar & Cornish-Ward 1997). Such a situation is analogous to that of organisations who exchange or do not exchange different types of information. 'Difficulty', here, represents the order of the different types of information exchanged. Based on Wright (1977) and following Soutar et al. (1990), the appropriate logit model can be shown as:

{P.sub.vi} = exp ({B.sub.v} – {D.sub.i})/{1 +exp ({B.sub.v} – {D.sub.i})} (1)

where:

{P.sub.vi} = probability of a person v exchanging information type i;

{B.sub.v} = location of person v on the Rasch scale;

{D.sub.i} = location of information type on the Rasch scale.

In the present case, the Rasch model's {B.sub.v} parameter provides a measure of a person's level of participation in information sharing, while {D.sub.i} relates to 'difficulty' of sharing different types of information and so is a measure of the extent that information is shared. The Rasch model enables item and person fit to the model to be computed (Wright 1977). Consequently, the dimensionality of information sharing order can be answered through the degree of observed item fit to the model's order. The model also allows an examination of each respondent's pattern of information sharing compared with that expected by the model, enabling an investigation of the presence of sub-groups whose patterns do not fit a general model.

Attitudes about the relationship (trust, commitment & satisfaction) and other environmental moderating variables (uncertainty, dependency & experience) were also measured. A further analysis was undertaken to find out whether these variables were positively or negatively related to the propensity to share information as proposed by Storer (2001). Since the scale values obtained from Rasch modelling can be considered interval scaled Soutar & Cornish-Ward (1997), regression analysis was used to examine the proposed relationships. The results of these analyses are outlined in the following section.

The Results Obtained

As was noted in the previous section, people were asked whether they exchanged ten types of management information and how often. The percentage of respondents sharing each information type is shown in Table 1. Information was shared by almost all the respondents to resolve problems (95%). It was also common to share information about product quality (91%), completeness of orders (88%), flexibility to accept order changes (78%) and invoicing accuracy. However, fewer firms (31%) shared information about profitability, costs of production and prices.

Item – Information Type	% Sharing Info Type	Scale Value	Chi-square Statistic	Probability
Problem resolution	95%	-2.42	3.45	0.18
Product quality	91%	1.59	2.78	0.25
Complete ordering	88%	1.12	0.78	0.68
On time delivery	80%	0.26	2.26	0.32
Flexibility to accept order changes	78%	0.11	1.62	0.44
Accurate invoicing	75%	-0.07	0.80	0.67
Response time	59%	-1.08	3.00	0.23
Opportunities & threats	59%	-0.82	4.81	0.09
Forecast demand & supply	61%	-0.85	2.89	0.24
Profitability, costs & prices	31%	-2.42	3.45	0.18
Overall fit	Good			
Chi-square statistic	0.268			
Cronbach's alpha	0.68			
Individual person fit residuals mean	-0.16			
Individual person fit residuals range	-1.1 to 1.7			

Table 1: Rasch scale values and fit statistics for all ten types of management information

As was also noted in the previous section, the frequency with which different types of information were shared was analysed using the Rasch model (Andrich 1988) to find whether a unidimensional information sharing order existed. Table 1 also provides the Rasch scale values for the various information types, with respective individual tests of fit for each item. All of the information types fitted the model well, with a 'good' overall fit between the model and the set of all information types. The chi-square statistic was not significant at the 0.01 level (Chi-square 23. p = 0.289) and Cronbach's alpha (0.68) was greater than the suggested 0.60 minimum.

Individual respondent fits were also examined using chi-square analysis to compare individual information sharing profiles with the model's predictions (Andrich 1988). All of those surveyed (64 respondents) had an information sharing profiles expected by the model, with overall and individual person fit residuals less than 2.0 (a mean –0.16 and a range from -1.1 to 1.7). This suggests a consistent order of information sharing of the ten information types used in the analysis and implies there is no point in trying to find groups with different information sharing patterns as there was uniformity in the information types analysed.

To determine the relationship between information sharing and other relationship and environmental variables a regression analysis was to be conducted. Before estimating the regression of the relationship between information sharing patterns and other variables, it was necessary to scale some of the independent variables, as some were inter-related. A factor analysis of respondents' attitudes about the relationship and the environmental moderating variables was undertaken. The number of factors retained was determined using the 'eigen-values greater than one' rule and by examining the scree diagram. This resulted in retaining five factors that explained 75% of the variance in the data. The factor loading matrix after a varimax rotation is shown in Table 2.

Variables	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
"Satisfaction & Commitment"					
Commitment to long term relationship	.85				
Change in commitment in last 5 years	.81				
Satisfaction with information system	.72				
Change in satisfaction with information system in last 5 years	.79				
Performance change in last 5 years	.77				
Crucial to future performance	.73		.40		
Usefulness of information in the last 5 years	.70				
"Predictability"					
Predictable demand		.92			
Predictable volume of supply		.89			
Predictable quality of supply		.76			
"Trust"					
Trustworthiness compared to others in		.52			.55

the industry Change in trustworthiness in the last 5 years	.44	.46			

Variables	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
"Dependence & Influence"					
Our importance to them			.84		
Their influence over us			.74		
Difficulty in replacing them			.59		
"Responsiveness"					
Responsiveness compared to others in the industry				.90	
Change in responsiveness in the last 5 years				.89	
"Uncertainty"					
Changeable consumer preferences					.84
Highly competitive market					.77
Remain with them despite alternatives					.49

Based on a 7 point scale with larger numbers signifying greater agreement

Table 2 Factor Loadings – Relationship and Environmental Variables

Scores were computed for each factor by averaging the responses to those variables that loaded together. The means and reliabilities of the scales (shown in Tables 3 & 4) were examined and only those with acceptable reliabilities were retained (alpha greater than 0.6). Variables were removed from a factor where their removal increased the alpha coefficient but these excluded variables were included separately as individual variables in the subsequent regression analysis (Table 4).

Factor/Variable	Mean Score	Alpha Reliability
Satisfaction & Commitment Factor	6.2	0.87
Trust Factor	5.6	0.75
Responsiveness Factor	5.4	0.93

Table 3 Relationship Variables – Means Scores & Reliabilities

Three relationship factors were found. While the satisfaction and commitment variables loaded together, the trust variables loaded onto three of the factors with relatively low factor loadings but had greater alpha reliability when separated. Responsiveness was a separate factor from the other performance satisfaction variables. While it was expected that responsiveness would be a key performance variable for measuring satisfaction with information systems, it was not expected to be a separate factor.

Factor/Variable	Mean Score	Alpha Reliability
Dependence & Influence Factor	6.2	0.75
Difficulty in replacing them	6.2	Not Applicable
Uncertainty Factor	5.8	0.64
Predictability Factor	5.5	0.82
Remain with them despite alternatives	5.3	Not Applicable

Table 4 Environment Variables – Means Scores & Reliabilities

Three environmental factors were also found, although this was not expected from past research. The predictability factor was based on demand, as well as supply, volumes and qualities. The uncertainty factor was based on changing consumer preferences and market competition but did not include the predictability variables as expected. The dependence and influence factor did not include the difficulty in replacement and loyalty (remain with them despite alternatives) variables as had been expected.

A regression analysis was undertaken to determine if the information sharing patterns could be explained by the relationship and environmental variables and factors (Table 5). However, the analysis did not explain a great deal of the variance in the information sharing patterns (adjusted $R^2 = 0.13$) and the only significant predictor variable was the perceived responsiveness of the other party.

Independent Variable	B	Beta	T value
Responsiveness Factor	0.44	0.38	3.06 a
Constant	-0.67		-0.84 c
Adjusted R^2	0.13		
a – significant with 99% confidence; c – not significant			

Table 5 Multiple Regression of Environment and Relationship Variables or Factors

It would seem that information sharing is explained by factors other than those collected in the present study or that the small sample size did not allow for a conclusive result. There was some anecdotal evidence that information sharing was related to the relationship and environmental variables. Comments included that more information was being shared as the relationship developed and the customer or supplier was perceived to be more responsive. Others that satisfaction was improved with more communication and the customer or supplier being helpful and work cooperatively (responsive). Several mentioned that trust developed with sharing more information including sensitive information about costs.

Conclusions

Most buyers and sellers share different information types, particularly where the sharing could bring mutual benefit to both parties. For instance, discussions about problems and problem resolution as well as quality concerns and ordering information were important to both buyers and sellers alike. Consequently, they were generally shared. However, profit, costs and prices, which were perhaps considered more sensitive information, were not as openly discussed.

The Rasch analysis of the different information types showed that there was a consistent order of information sharing and that an interval scale of information sharing could be calculated. All respondents had similar information sharing patterns.

The study also found that the respondents considered satisfaction and commitment, dependence and influence, and the difficulty of replacing suppliers important. Regression results showed that perceived responsiveness of the other party was the only relationship and environmental variable related to information sharing patterns. However perceived responsiveness only explained a small portion of the variation in information sharing patterns. Caution is needed before accepting the null hypothesis that information sharing patterns are not related to relationship and environmental variables as this research was based on a relatively small sample size of 32 pairs of dyadic relationships (64 respondents). Some anecdotal evidence from comments provided suggested that information sharing was associated with relationships and the environment. Future research needs to be undertaken to see if the results will hold for a larger sample size. In addition, it may be that the other variables in the IOIFS also need to be analysed and modelled with the relationship and environmental variables as originally hypothesised by Storer (2001). This will be the subject of future research analysis in the next phase of the research.

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Appendix 1 – Questionaire

How long have you been working with this organisation?
How long have you been working in the Industry?
How long has your organisation been doing business with these *customers/suppliers*?

Inter-organisational Information Feedback System

Do you exchange information with *customer/supplier 1/2* about:

Problem resolution	Invoice accuracy
Product quality	Profitability, costs & prices
On time delivery	Forecast demand & supply
Completeness of orders	New product development
Flexibility to accept order changes	Opportunities & threats

If yes ask the following for each type of information

i. Who do you exchange this information with? *(record position title)*
ii. How do you exchange the information?
(phone, fax, email, face to face meetings, letter, report, invoice/credit note, telex, EDI)
iii. In what direction does the information flow? (upstream, downstream, both directions)
iv. Do you discuss this information with other customers/suppliers or internally?
v. What is the formality of the information systems used? (ad hoc and/or formal)
vi. Do you perceive there are any problems with the current system? *(Probe suggestions)*
vii. How often is information exchanged?
(times a day, daily, times a week, weekly, times a month, monthly, yearly, occasionally)
viii. Could indicate if you consider you exchange this information as often as necessary?

Never			Most of the time		Whenever necessary		Don't Know
1	2	3	4	5	6	7	9

Do you perceive that you exchange more or less **useful information** with these *customers/suppliers* now than *5(k)* years ago

Much less useful information			No change			Much more useful information
1	2	3	4	5	6	7

If some change ask Why?

How **responsive** do your feel these customers/suppliers are to your requirements and how willing are they to change relative to others in the industry?

Not at all responsive & willing to change			Somewhat Responsive			Highly responsive & willing to change
1	2	3	4	5	6	7

How responsive do your feel these *customers/suppliers* are to your requirements and how willing are they to change relative to others in the industry now compared with 5(*k*) years ago?

Much less responsive & willing to change			No change			Much more responsive & willing to change
1	2	3	4	5	6	7

If some change ask Why?

To what extent are you **satisfied with the information systems** with these *customers/suppliers*?

Extremely Dissatisfied			Neither Dissatisfied Nor Satisfied			Extremely Satisfied
1	2	3	4	5	6	7

Probe for details if not already discussed

To what extent are you satisfied with the information systems with these *customers/suppliers* compared with 5(*k*) years ago?

Extremely Dissatisfied			Neither Dissatisfied Nor Satisfied			Extremely Satisfied
1	2	3	4	5	6	7

How **committed** do you think your organisation is to developing long-term relationships with these customers/suppliers?

Not at all committed long-term			Somewhat committed long-term			Highly committed long-term
1	2	3	4	5	6	7

How committed do you think your organisation is to developing long-term relationships with these *customers/suppliers* now compared to 5 (*k*) years ago?

Not at all committed long-term			Somewhat committed long-term			Highly committed long-term
1	2	3	4	5	6	7

If some change ask Why?

How would you rate the **performance** of these *customers/suppliers* compared to others in the industry?

Worst Performance in Industry			Mediocre			Best Performance In Industry
1	2	3	4	5	6	7

Do you perceive these *customer's/supplier*'s performance is better or worse now than 5(*k*) years ago?

Much Worse			No change			Much Better
1	2	3	4	5	6	7

If some change ask Why?

Do you find these *customers/suppliers* more or less **trustworthy** than others in the same industry?

Less Trustworthy			Average			More Trustworthy
1	2	3	4	5	6	7

Do you perceive these *customer's/ supplier's* trustworthiness is better or worse now than 5(*k*) years ago?

Much Worse			Same			Much Better
1	2	3	4	5	6	7

If some change ask Why?

Environment

Could you please indicate if you agree or disagree with each of the following statements

Strongly Disagree			Neither Agree nor Disagree			Strongly Agree
1	2	3	4	5	6	7

Dependence & Influence:

These *customers/suppliers* are crucial to future performance
We are important to these *customers/suppliers*
These *customers/suppliers* exerts a strong influence over us
It would be difficult for us to replace these *customers/suppliers*

Predictability:

Demand is predictable for….*product category*
Volume of supply by *these customers/your organisation* is predictable
Quality of supply by *these customers/your organisation* is predictable
Production yields from *our product /these supplier's are* highly variable

Uncertainty:

The level of competitive activity in *these customer's/supplier's* markets are high
Consumer's preferences in *these customer's/supplier's* markets are changing
Other alternative customers/suppliers are available to us, however we choose to remain with these *customers/suppliers*