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## **Interorganisational Information Systems Maturity: Do Supply Chain Integration and Business/IT-Alignment Coincide?**

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### **Abstract**

*Although interorganisational information systems (IOIS) have existed as study object for a long time, much research into IOIS remains sector-specific. By employing a multi-sector dataset, this paper aims to contribute to the cross-sectoral analysis of IOIS. We formulate four hypotheses on IOIS maturity based on theory concerning supply chain integration and business/IT-alignment, taking both 'IT' and 'organisation', and 'supply' and 'demand' into account. This leads to the twofold research question (i) how IOIS maturity of organisations can be measured in a generic manner, and (ii) if supply chain integration and business/IT-alignment are related as similar determinants of IOIS maturity. We empirically test our hypotheses on survey data collected among a group (n=74) of Dutch organisations, diverse in terms of industry and size. Correlation analysis confirms all four hypotheses. This indicates that business/IT-alignment and supply chain integration are indeed related.*

**Keywords:** Interorganisational information system; IOIS; ICT; Supply chain integration; Business/IT-alignment; Maturity

## **1 Introduction**

Interorganisational information systems (IOIS) have a long history of study (e.g., Kaufman, 1966; Barrett & Konsynski, 1982; Johnston & Vitale, 1988; Meier & Sprague, 1991; Williams, 1997; Agi, Ballot, & Molet, 2005; Reimers, Johnston, & Klein, 2010). The role of IOIS has been studied in the 'traditional' domains of supply chain management (SCM) such as supply chain automation, supply chain integration, and collaborative planning, forecasting, and replenishment (CPFR). Due to globalisation, technological developments, and institutionalisation, interorganisational

relations have become more extended and complex. Consequently, IOIS are also studied in a number of new emerging fields such as virtual organisations, value networks, e-collaboration, interoperability and chain-computerisation.

At the same time, we see that studies on IOIS are not only conducted in sectors such as manufacturing, retail, and transport, but also at service-based organisations such as those in the financial, public, and health care sectors. This is specifically illustrated by the emerging field of service management and operations (Fitzsimmons & Fitzsimmons, 2004). Although sector-specific studies of IOIS dominate, some research has been done *across* sectors. For example, the health care sector increasingly adopts enterprise systems from other industries as retail and manufacturing to support patient-oriented care and to improve their purchase function (cf. Meijboom, Schmidt-Bakx, & Westert, 2011).

While the research on IOIS in specific industries can be understood from the need to capture the specific nature of their products, services, and tradition, one can also argue that this hinders the exchange of experiences between sectors – and hence the innovation opportunities that can emerge from sectoral comparison. So far, only a few multi-sectoral analyses of IOIS have been conducted. Obviously, it is a challenge to compare different types of organisations, that have different primary and secondary processes, different intra- and interorganisational structures, and act in different environments. Still, the added value of doing so is to discover what generally drives or hinders the use and development of IOIS in organisations, and generally determines their success and consequences. This is of particular interest as many theories and models on IOIS are actually generic by nature; they aim to describe, explain or prescribe common problems in the adoption, implementation, and use of IOIS within and between organisations.

This paper aims to contribute to the multi-/cross-sectoral analysis of IOIS, in particular to the exploration of IOIS maturity of (different types of) organisations. As an empirical basis for this goal, data are collected among a diverse group of organisations in terms of industry (sector) and size. The theoretical angle of this study is to investigate two common principles behind IOIS maturity: (i) supply chain integration, and (ii) business/IT-alignment. In the next section, we elaborate on both principles and discuss how they are conceptually related in the determination of IOIS use and maturity of organisations. A number of expectations that are formulated on this elaboration are then tested using our multi-sector dataset. This provides an answer to our main research question:

*How can IOIS maturity of organisations be measured in a generic manner, and are supply chain integration and business/IT-alignment related as similar determinants of IOIS maturity?*

The remainder of this paper is structured as follows. First, we provide the theoretical background and conceptual elaboration, leading to a set of hypotheses. Next, we present the applied research methods, followed by a description of our results. We discuss these results, including the limitations of our work and some opportunities for future research. We finish with a summary of our main conclusions.

## **2 Theory**

### **2.1 Supply chain integration**

A first central principle relevant to define IOIS maturity, is supply chain integration (e.g., Frohlich & Westbrook, 2001; Simatupang, Wright, & Sridharan, 2002; Rai, Patnayakuni, & Seth, 2006). Realising “inter-firm coordination and cooperation within supply chains are not easy” (Rokkan & Buvik, 2003, p. 247). From a supply chain integration perspective, it is not only important to optimise the links and collaborations that organisations have with their suppliers and buyers, but to align both cross-functionally (Ellinger, 2000; Jüttner, Christopher, & Baker, 2007) as well. The procurement and marketing/sales domain of organisations each have significantly matured. Organisations have standardised their management of suppliers and customers, adopted specific procurement and marketing strategies, allocated professional procurement and marketing departments, and so on. The basic ‘gap’ between procurement and marketing still remains existent within many organisations, however (Daft, 2001). This is caused by the different interests and cultures that are ascribed to the two domains, but it also seems that organisations are not able to act on the similarity between the external management of suppliers and customers.

At least from a Resource Based View (RBV) perspective, this is both surprising and interesting. In an early stage, Wernerfelt stated that scholars should be “analysing firms from the resource side rather than from the product side” (Wernerfelt, 1984, p. 171). Barney (1991), one of the founders of RBV, then claimed that focusing on the internal organisation should be done by defining resources as “all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm” (Barney, 1991, p. 101). In order for resources to be of (strategic) value to a firm, they need to adhere to the VRIN criterion: they should be valuable, rare, inimitable, and non-substitutable. Later, the related Dynamic Capabilities View (DCV) has been developed that claims to offer “a more dynamic version of the RBV by emphasising that possessing a set of resources with VRIN characteristics is not enough to stay competitive in a changing business context” (Den Hertog, 2010, p. 133). Dynamic capabilities are defined as “the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments” (Teece, Pisano, & Shuen, 1997, p. 516). Kähkönen and Lintukangas (2012) further develop the value-creation potential for the supply management side of organisations.

When we focus on IOIS maturity of organisations, it is to be expected that supply and demand side maturities should be mutually defined and be aligned (cf. Frohlich & Westbrook, 2001; Plomp & Batenburg, 2010). Hence, the maturity with regard to supply-side functions like (e-)procurement is expected to be related to the maturity of demand-side functions like Customer Relationship Management (CRM). In other words, when we aim to define IOIS maturity from a chain perspective, measurement at both the ‘upstream’ and ‘downstream’ side of the focal organisation is required (Plomp, Batenburg, & Van Rooij, 2012).

### **2.2 Business/IT-alignment**

The second principle relevant to define IOIS maturity is business/IT-alignment. Since the 1980s, scholars, analysts, and consultants alike advocated the approach that the

adoption and deployment of information systems or information technology (IS/IT) is adjusted to the nature of the organisation – and vice versa. The fit of IT solutions to business requirements can be considered as a continuous challenge (Luftman, Lewis, & Oldach, 1993). The alignment of business planning and IT planning was the focus of the Information Systems Planning methodologies that arose in the early 1980s (Chan & Reich, 2007). Henderson and Venkatraman's Strategic Alignment Model is to be considered as one of the first models that provides levers for organisations in introducing new IT technologies using business/IT-alignment concepts (Henderson & Venkatraman, 1993). Business strategy, IT strategy, organisational infrastructure and processes, and IT infrastructure and processes should be in balance through strategic fit and functional integration (see also Luftman et al., 1993). Subsequently, several authors applied the Strategic Alignment Model. Despite being well studied in over 150 studies listed, Maes et al. (2000) conclude that the majority of publications are rather vague in terms of how to define or practice alignment. In fact, there is no consensus on a precise definition of business/IT-alignment (Kyobe, 2008). Actually, different words are used to describe or define the word 'alignment' (Silva, Plazaola, & Ekstedt, 2006), such as "fit" (Henderson & Venkatraman, 1993), "harmony" (Luftman et al., 1993), "integration" (Weill & Broadbent, 1998), "linkage" (Reich, 1993), "bridge" (Ciborra, 1997) or "fusion" (Smaczny, 2001).

In his overview study, Silvius (2013) advocates to define business/IT-alignment as "the degree to which IT applications, infrastructure and organization enable and shape the business strategy and processes, as well as the process to develop this" (Silvius, 2013, p. 6). This definition points out that business/IT-alignment not only covers the alignment process to enable IT applications and infrastructures, but also the agreements regarding the management and maintenance of application and infrastructure services. He states that: "The question whether IT aligns to business or the other way around is answered as 'enable and shape'. This defines alignment as a two-way process" (Silvius, 2013, p. 6). This resembles what we conclude in the previous section: just as the alignment of the 'upstream' and 'downstream' side of the focal organisation, so is the alignment of the IT and organisational dimension an essential two-sided concept.

### 2.3 Conceptual model and hypotheses

Combining the two principles described above results in the following conceptual framework and hypotheses that drive our empirical analyses. The central question what determines the IOIS maturity of (different types of) organisations is hence driven by the two theoretical angles, supply chain integration and business/IT-alignment. Beforehand, we do not assume that supply chain integration is more important to establish IOIS maturity than business/IT-alignment or vice versa, nor do we predict that a certain order in these concepts is to be expected. The hypotheses formulated aim to be tested on their basic validity. I.e., whether it is empirically supported that organisations that align their suppliers and customers in terms of *IT systems* also align their suppliers and customers in terms of *organisational systems* (e.g., contractual/business agreements). And, whether it is empirically supported that organisations that align their *suppliers* in terms of IT systems also align their *customers* in terms of IT systems. To formulate the full conceptual model, we elaborate and hypothesise the following.

First, we expect organisations that align their supplier and customer relations will be more mature in their IOIS, as they invest in internal coordination (or: consistency) of

their boundary processes. Secondly, including the business/IT-alignment principle, this implies that they do so recognising that this supply chain integration has both an organisational and a technological dimension. The combination of the two principles basically has, therefore, four implications.

The first hypothesis considers business and IT maturity at the purchase side of an organisation:

*H1: The higher an organisation's IT maturity to support the purchase function, the higher its business maturity to support the purchase function.*

The subsequent second hypothesis is, for the customer side of an organisation:

*H2: The higher an organisation's IT maturity to support the sales function, the higher its business maturity to support the sales function.*

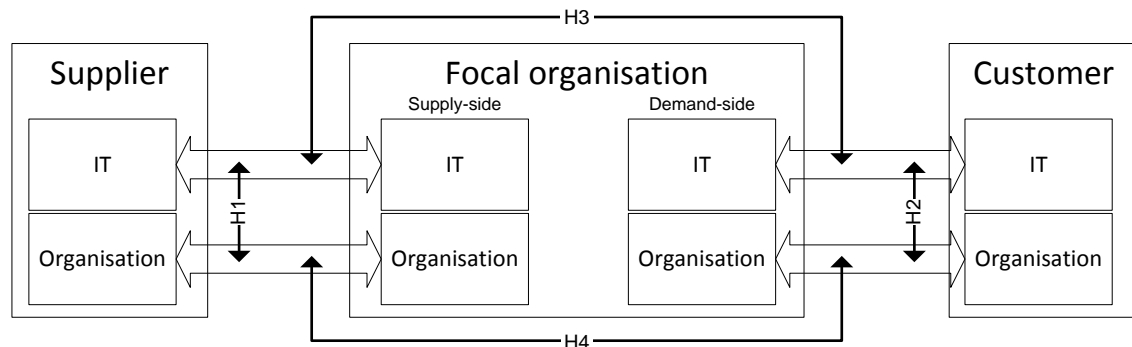
Then, the third hypothesis concerns the IT dimension of IOIS:

*H3: The higher an organisation's IT maturity to support the purchase function, the higher its IT maturity to support the sales function.*

And subsequently, hypothesis four is on the business dimension of IOIS:

*H4: The higher an organisation's business maturity to support the purchase function, the higher its business maturity to support the sales function.*

The four hypotheses are depicted in Figure 1.



**Figure 1:** Conceptual representation of the assumed relationships between supplier- and customer-oriented IOIS, and between the IT and organisational domain.

### 3 Method

To collect data in order to test our hypotheses, we conducted an online questionnaire among Chief Information Officers (CIOs) of Dutch organisations from various industries through professional and personal networks (i.e., through convenience but controlled random sampling). A first subset of data was collected in 2009; a second round of data collection was done in 2011. No requirements were applied in the selection process (e.g., with respect to sector), except that all organisations had to be sized 10 FTEs (full time equivalents) or larger. The CIOs were personally asked and motivated to participate in the research and fill in the online questionnaire. When they agreed to participate, the link of the online questionnaire was sent to them. In the questionnaire, additional instructions and motivation for the CIOs was given (e.g., they would receive a report of their scores and be able to compare this to their peers). The

respondents were free to choose when and where they would complete the questionnaire, as long as the results had been submitted before a clearly stated deadline.

We operationalised chain digitisation maturity in the same way as in the study of Plomp et al. (2012). In total, 32 statements about both technological and organisational maturity on both the supply and demand side of the organisation have been used (see Figure 2). Important to note is that in this operationalisation, again in line with Plomp et al. (2012), the statements for both technology and organisation are ‘mirrored’ for the supply and demand side, e.g., “managing capacity or inventories of suppliers” versus “managing capacity or inventories of customers”, and “evaluate supplier performance on contract parameters” versus “evaluate your performance on contract parameters”.

	Supply side	Demand side
IT	<p><i>To support the purchase function, does your organisation use specific IT systems/applications for:</i></p> <ul style="list-style-type: none"> <li>- Ordering goods or services online?</li> <li>- Arranging payments online for ordered products or services?</li> <li>- Receiving e-invoices?</li> <li>- Finding suppliers in the market?</li> <li>- Inviting suppliers to quote prices or submit proposals?</li> <li>- Running online auctions?</li> <li>- Collaborating with suppliers to forecast your demand?</li> <li>- Collaborating with suppliers to design new products or services?</li> <li>- Managing capacity or inventories of suppliers?</li> </ul>	<p><i>To support the sales function, does your organisation use specific IT systems/applications for:</i></p> <ul style="list-style-type: none"> <li>- Receiving online orders?</li> <li>- Enabling payments online for ordered products or services?</li> <li>- Sending e-invoices?</li> <li>- Sending offers?</li> <li>- Answering calls after proposals or tenders?</li> <li>- Launching sales auctions, for example on B2B or B2C marketplaces?</li> <li>- Collaborating with customers to forecast their demand?</li> <li>- Collaborating with customers to design new products or services?</li> <li>- Managing capacity or inventories of customers?</li> </ul>
Organization	<p><i>To support the purchase function, does your organisation apply specific (i.e. customised and written) organisational arrangements to:</i></p> <ul style="list-style-type: none"> <li>- Document delivery contracts on the operational level?</li> <li>- Settle strategic alliances?</li> <li>- Share strategic information?</li> <li>- Evaluate supplier performance on contract parameters?</li> <li>- Document joint process descriptions with suppliers?</li> <li>- Govern a joint work team with suppliers?</li> <li>- Align your strategy with your suppliers' strategy?</li> </ul>	<p><i>To support the sales function, does your organisation apply specific (i.e. customised and written) organisational arrangements to:</i></p> <ul style="list-style-type: none"> <li>- Document delivery contracts on the operational level?</li> <li>- Settle strategic alliances with your customers?</li> <li>- Share strategic information with customers?</li> <li>- Evaluate your performance on contract parameters?</li> <li>- Document joint process descriptions with customers?</li> <li>- Govern a joint work team with your customers?</li> <li>- Align your strategy with your customers' strategy?</li> </ul>

**Figure 2:** Maturity dimensions and the survey questions employed to measure them.

The respondents were asked to express how each statement fits their organisation. Four different answer categories were provided, namely:

- ‘Yes, for (almost) all of our suppliers/customers’,
- ‘Yes, for some of our suppliers/customers’,

- ‘Yes, for only one of our suppliers/customers’, and
- ‘No’.

In addition a ‘Do not know / cannot say’ option was provided.

## 4 Results

In total, we received 74 completed surveys. Before testing our hypotheses, we first present some descriptive statistics. As argued in the introduction of this paper, we aim to study a diverse sample in order to investigate whether generic patterns and relationships between supply chain integration and business/IT-alignment exist across different types of organisations. As a result of our data collection strategy, we see at the left side of Table 1 that our sample is diverse. In our sample, both profit and non-profit organisations are present: 56 (75.7%) are profit organisations while 18 (24.3%) are non-profit (by self-classification). In terms of size (see the right side of Table 1), almost half of the organisations in our sample have more than 250 FTEs, with the median at 185 FTEs. By no means, our sample aims to be representative for the Dutch economy. Still, the variation that is essential for our study is present in this sample.

Sector	n	%	Size	n	%
Construction	4	5.4%	< 50 FTEs	28	37.8%
Education	6	8.1%	50-250 FTEs	10	13.6%
Government	6	8.1%	> 250 FTEs	36	48.6%
Healthcare	9	12.2%			
Logistics / Utilities	6	8.1%			
Manufacturing/producing	15	20.3%			
Professional services	14	18.9%			
Retail/wholesale	14	18.9%			

**Table 1:** Sector and size distribution of sample (n=74).

All organisations are based in the Netherlands, but some were also active in other countries. As can be seen on the left side of Table 2, the organisations in our sample have different areas of operation, i.e., there are organisations present that act on local, national, continental as well as global scale. In terms of diversity of our sample, it is also useful to inspect the organisations’ age distribution (right side of Table 2). The median organisation in our sample has been active for 40 years.

Area of operation	n	%	Age of organisation	n	%
Local/regional	16	21.6%	<10 years	5	6.8%
National (i.e., The Netherlands)	30	40.5%	10-50 years	41	55.4%
Continental (i.e., Europe)	15	20.3%	51-100 years	14	18.9%
Global	13	17.6%	>100 years	14	18.9%

**Table 2:** Area of operation and organisational age of sample (n=74).

To operationalise the dimensions described in the previous section, scales were created. First, four maturity dimensions were constructed based on the questions from Figure 2. To inspect the correlations between all survey items per maturity dimension, we use medians and Spearman correlations as our data are at the ordinal level. The resulting correlation matrices are presented in Tables 3 through 6. Based on inspection of these correlation matrices, it can be concluded that items related to each dimension correlate significantly with each other, with the exception of item number 3 for both IT to support the purchasing function (receiving e-invoices; Table 3) and IT to support the sales



function (sending e-invoices; Table 5). Because of this, these items number 3 were eliminated for scale construction.

After scale construction (i.e., taking the median of all item scores of a dimension), reliability analysis was conducted for each maturity dimension, resulting in Cronbach's Alpha scores of 0.84 (technology, supply side), 0.94 (organisation, supply side), 0.85 (technology, demand side), and 0.93 (organisation, demand side). These scores imply a good reliability and therefore the scales can be used (Nunnally & Bernstein, 1994). Furthermore, in order to analyse the potential issue of common method bias as a result of working with one integrated questionnaire, we performed an exploratory factor analysis (EFA), and applied a one factor extraction test (Harman, 1967). An EFA of the 30 remaining items showed 7 factors with eigenvalues above 1.00. In the unrotated solution where the number of factors is limited to one, there is no single factor that explains the majority of the variance. This supports the argument that common method bias does not form a threat here.

Nr	Variable description	N	Median	Min	Max	Spearman's rho correlation (1-tailed)								
						1	2	3	4	5	6	7	8	9
1	Ordering goods or services online	74	3	1	4	1	.56**	.35**	.19*	.22*	.38**	.39**	.37**	.43**
2	Arranging payments online for ordered products or services	72	3	1	4		1	.47**	.41**	.30**	.34**	.31**	.33**	.36**
3	Receiving e-invoices	71	2	1	4			1	.40**	.28*	.05	.42**	.40**	.21*
4	Finding suppliers in the market	70	1	1	4				1	.68**	.34**	.38**	.55**	.41**
5	Inviting suppliers to quote prices or submit proposals	70	1	1	4					1	.56**	.39**	.40**	.37**
6	Running online auctions	72	1	1	4						1	.41**	.37**	.45**
7	Collaborating with suppliers to forecast your demand	72	1	1	4							1	.45**	.65**
8	Collaborating with suppliers to design new products or services	68	1	1	4								1	.44**
9	Managing capacity or inventories of suppliers	71	1	1	4									1

**Table 3:** Use of specific IT systems to support the purchase function (<sup>+</sup> =  $p < .10$ , \* =  $p < .05$ , and \*\* =  $p < .01$ ).

Nr	Variable description	N	Median	Min	Max	Spearman's rho correlation (1-tailed)						
						1	2	3	4	5	6	7
1	Document delivery contracts on the operational level	70	3	1	4	1	.72**	.54**	.55**	.65**	.64**	.46**
2	Settle strategic alliances	70	2	1	4		1	.73**	.61**	.62**	.65**	.59**
3	Share strategic information	70	2	1	4			1	.61**	.67**	.72**	.62**
4	Evaluate supplier performance on contract parameters	72	3	1	4				1	.64**	.51**	.54**
5	Document joint process descriptions with suppliers	65	2	1	4					1	.91**	.75**
6	Govern a joint work team with suppliers	68	1	1	4						1	.82**
7	Align your strategy with your suppliers' strategy	69	1	1	4							1

**Table 4:** Organisational agreements to support the purchase function (\*\* =  $p < .01$ ).

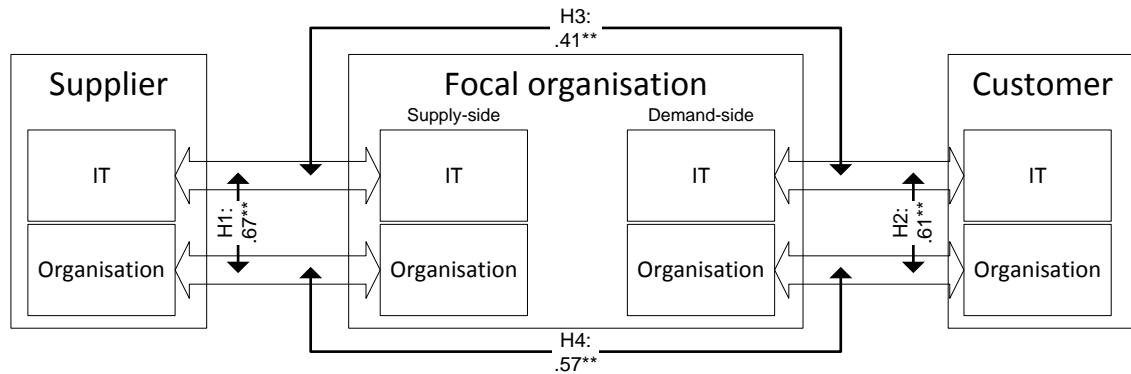
Nr	Variable description	N	Median	Min	Max	Spearman's rho correlation (1-tailed)								
						1	2	3	4	5	6	7	8	9
1	Receiving online orders	74	3	1	4	1	.42**	.54**	.45**	.49**	.47**	.42**	.22*	.34**
2	Enabling payments online for ordered products or services	74	1	1	4		1	.57**	.35**	.27*	.46**	.27*	.20*	.32**
3	Sending e-invoices	73	1	1	4			1	.25*	.35**	.31**	.19*	.14	.22*
4	Sending offers	72	1.50	1	4				1	.71**	.42**	.42**	.34**	.43**
5	Answering calls after proposals or tenders	71	1	1	4					1	.43**	.45**	.42**	.33**
6	Launching sales auctions, e.g. on B2B or B2C marketplaces	71	1	1	4						1	.50**	.43**	.34**
7	Collaborating with customers to forecast their demand	73	1	1	4							1	.65**	.62**
8	Collaborating with customers to design new products or services	72	1	1	4								1	.51**
9	Managing capacity or inventories of customers	73	1	1	4									1

**Table 5:** Use of specific IT systems to support the sales function (<sup>+</sup> =  $p < .10$ , \* =  $p < .05$ , and \*\* =  $p < .01$ ).

Nr	Variable description	N	Median	Min	Max	Spearman's rho correlation (1-tailed)						
						1	2	3	4	5	6	7
1	Document delivery contracts on the operational level	72	3	1	4	1	.75**	.66**	.53**	.64**	.50**	.46**
2	Settle strategic alliances with your customers	72	1.50	1	4		1	.71**	.64**	.66**	.56**	.55**
3	Share strategic information with customers	72	1	1	4			1	.62**	.60**	.55**	.65**
4	Evaluate your performance on contract parameters	73	2	1	4				1	.61**	.52**	.65**
5	Document joint process descriptions with customers	70	1	1	4					1	.74**	.68**
6	Govern a joint work team with your customers	73	1	1	4						1	.74**
7	Align your strategy with your customers' strategy	73	1	1	4							1

**Table 6:** Organisational agreements to support the sales function (\*\* =  $p < .01$ ).

Figure 3 reproduces our conceptual model (Figure 1), including the Spearman's rho correlations between the four maturity dimensions. As can be seen in the figure, all correlations are positive and significant ( $p < .01$ ), thereby supporting our hypotheses. The highest correlations are between 'IT, supply-side maturity' and 'organisation, supply-side maturity' (.67), and between 'IT, demand-side maturity' and 'organisation, demand-side maturity' (.61). The correlations between 'IT, supply-side maturity' and 'IT, demand-side maturity' (.41), and 'organisation, supply-side maturity' and 'organisation, demand-side maturity' (.57) are also considerable.



**Figure 3:** Results of analysis: relations between supplier- and customer-oriented IOIS, and between the IT and organisational domain (Spearman correlation coefficients; \*\* =  $p < .01$ ; 1-tailed testing).

To investigate the robustness of our results, we also performed Pearson correlation tests using the averages of our scales, assuming interval levels for all variables. This leads to the similar conclusion that all four hypotheses are supported as all four Pearson correlations are positive and significant (H1: .67, H2: .66, H3: .47, H4: .68; all with  $p < .01$  using 1-tailed testing).

A final important step in our analysis is to see if diversity in our sample matters for the correlations that we found in the total sample. In order to check for this, we also performed partial correlations controlling for (i) size, (ii) sector, and (iii) size and sector. In terms of size, we split our sample in two equal halves: the 50% smallest and 50% largest organisations based on FTEs. For sector, we looked at production organisations (i.e., construction, logistics/utilities, manufacturing/producing, and retail/wholesale) versus service organisations (i.e., education, government, healthcare, and professional services). This resulted in sub-samples of respectively 39 and 35 organisations. Table 7 shows the results of the initial and partial Pearson correlation analyses. The table shows that our results remain the same when controlled for size, sector, and both. All correlations are still significant and the coefficients are similar in size.

Hypothesis	Initial	Controlled for:		
		Size	Sector	Size & Sector
H1	.67**	.61**	.67**	.62**
H2	.66**	.65**	.66**	.65**
H3	.47**	.46**	.45**	.44**
H4	.68**	.69**	.68**	.69**

**Table 7:** Initial correlations and partial correlations controlling for size, sector, and size & sector.

## 5 Conclusions

We set out to answer the question whether IOIS maturity of organisations can be measured in a generic way, and how supply chain integration and business/IT-alignment are related as similar determinants of IOIS maturity. With regard to the first part of this question, we applied a questionnaire containing generic items to measure IOIS maturity along four dimensions on a diverse group of organisations. During the fieldwork, it appeared that all respondents were able to complete the questionnaire and answer the questions for their own specific organisation. Still, it would be valuable to cross-validate the answers to investigate the validity of the questionnaire.

With regard to the second part of our research question, we find evidence that business/IT-alignment and supply chain integration are indeed related. We formulated four hypotheses, expecting interrelations between IT and organisational maturity on both the supply and demand side of a focal organisation. All four hypotheses were confirmed by positive and significant correlations, independent of assumptions on the measurement level of variables and controlling for a number of organisational characteristics. Still, even though our results show statistically demonstrated relationships, they do not imply that in practice organisations deliberately align business/IT-alignment on the one hand, and supply chain integration on the other. What we do see however, is that organisations that are mature in their business/IT-alignment are also mature in their supply chain integration and vice versa. This is in support of the idea that resources at the demand and supply side of organisations are of similar importance and actually coincide in their contribution to IOIS maturity. It remains an open question how organisations define and align their procurement and marketing/sales strategies on the one hand, and their IT and organisational strategies on the other.

An interesting next step would be to investigate the precise mechanisms behind these results, including whether there is a causal relation in which business/IT-alignment is a prerequisite for supply chain integration, or vice versa. Qualitative case studies

questioning multiple stakeholders on their intentions and motives regarding supply chain integration and/or business/IT-alignment could prove valuable for this aim. Another extension of our study would be following organisations through time applying a longitudinal design. An obvious limitation of our current study is that although our sample is generic in terms of size and sector, it contains organisations based in the Netherlands only. It would be interesting to replicate our research in other countries.

Where Frohlich and Westbrook (2001) also consider the relationship between supply chain integration and organisational performance, we left this out of the scope of our current study. One reason for this is that organisational performance is hard to measure in a generic way (i.e., for organisations stemming from different sizes and sectors). A second reason is that we should be careful in assuming that higher maturity will lead to higher performance by definition, as Frohlich and Westbrook (2001, p. 193) indicate with regard to this point as well. The pitfall might be in the over-emphasis of so-called 'best practices' in supply chain integration and/or business/IT-alignment.

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