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Similarities and differences in multiple stakeholder interorganisational relationships (IORs) in product innovation: Results from Australian manufacturing firms

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ABSTRACT

Academic interest in analysing the relationship between innovative performance of small firms and their recourse to external resources, especially through interorganisational relationships (IORs) has been growing over the last ten to fifteen years. However, to date the emerging literature has given limited attention to the systematic empirical assessment of the relationship *and* innovation inputs and outputs of cooperative product innovation. Furthermore, most of the literature focuses on cooperative innovation IORs with customer stakeholders, ignoring the potential role played by other external stakeholder groups, such as suppliers, industry partners and research/advisory organisations.

This paper presents selected results from an empirical examination into the similarities and differences in the involvement of four external stakeholder groups in Australian manufacturing firms' product innovation. A six-factor model of cooperative IORs in product innovation with customer, suppliers, industry partners and research/advisory organisations was developed from a strategy-structure-performance-based model of marketing channel relationship structure. Four of the 15 hypothesised associations were significant for all or most of the stakeholder groups, and these are of central interest in the paper. Five hypothesised associations were not significant for any of the stakeholders, and the remaining hypotheses were significant for selected stakeholder groups only. Hence, the way in which multiple stakeholder groups are involved in manufacturing firms' product innovation is more similar than different.

Preferred Stream: Networks, Clusters, Collaboration and Social Capital

Keywords: Interorganisational relations, innovation, cooperative strategy, collaborative capability

1. MULTIPLE STAKEHOLDERS IN PRODUCT INNOVATION

Despite widespread recognition of the relationship marketing paradigm and multi-stakeholder approaches by academicians and practitioners alike, studies of **interorganisational relationships (IORs)** predominantly focus on a *single* stakeholder, notably buyer-seller relationships (Heide and John 1990; Anderson and Weitz 1992; Kalwani and Narayandas 1995). There have been numerous calls to expand the marketing and stakeholder orientation research domain to incorporate other key stakeholders (Day and Wensley 1983; Kohli, Jaworski et al. 1993; Slater and Narver 1995; Kimery and Rinehart 1998). Yet the IOR literature lacks descriptive and empirical research with regard to *multiple* stakeholders. Stakeholder theory and, to a lesser degree, Relationship marketing theory both tend to have normative objectives and an inadequate empirical research base (Mattsson 1997). Only a handful of studies involving the empirical testing of a multi-stakeholder orientation have emerged in the IOR literature (Lusch and Lazniak (1987) Kotter and Heskett's (1992) and Greenley and Foxall's (1996).

Specifically, in product innovation (or new product development) a range of partners represents a vital source of knowledge and collaborative potential (Håkansson 1989). However, much of the traditional **innovation** literature is built on the traditional manufacturer-active paradigm, which mostly ignores interactive relationships (Zaltman 1973; Nelson and Winter 1977; Urban, Hauser et al. 1987). Indeed, the role of external parties in product development was not fully acknowledged by prominent innovation researchers, including Cooper (1987), Johne (1988) and Aaker (1995). In a review of the innovation literature, Hart (1995) also noted a tendency to view new product development (NPD) from the manufacturer-active paradigm, resulting in an incomplete view of the role of information integration. Beyond stating the need for information sharing, Hart observed that "very little is said regarding how this might be researched and nothing is said about the integration of other parties in the process" (p. 36). Thomas and Ford (1995) also contended that "an introspective view of technology is still common in industry..." and that "managers ... have an unclear view of the processes by which technology develops between customers and suppliers or other combinations of firms" (p. 265).

Other academicians observe that "…recognition of the interactive nature of much technological development and corporate behaviour has been relatively recent, but has compensated for its tardiness by considerable variety and depth of analysis" (Håkansson 1987, p. 265). There is now an increased awareness of the potential benefits of sharing resources and knowledge when developing and applying innovations and new technology, such as achieving innovative success (Biemans 1992; Organisation for Economic Cooperation and Development 1992; Rothwell and Dodgson 1994). A small but growing number of researchers are contributing to the literature on collaborative innovation involving

a range of *single* external stakeholders, e.g. *suppliers* (Ford 1984; Parkinson 1985; Cunningham and Ford 1993; Håkansson and Eriksson 1993), *competitors* (Håkansson 1989; Clark and Fujimoto 1991), *customers* (e.g. Parker 1982; Gardiner and Rothwell 1985; Parkinson 1985; von Hippel 1986; Holt 1987; von Hippel 1988; Anderson and Narus 1991; Rothwell 1991; Foxall 1994; Rothwell 1994; Kahn 1998) and *research organisations* (Fowler 1984; Gemünden, Ritter et al. 1996).

A handful of studies have attempted to capture *all* the main stakeholder groups contributing to a firm's product innovation (Beesley and Rothwell 1987; Håkansson 1989; Shaw 1991; Gemünden, Heydebreck et al. 1992; Birchall, Chanaron et al. 1996; Gemünden, Ritter et al. 1996; MacPherson 1997). While each of these studies contribute understanding to certain aspects of multi-stakeholder involvement in product innovation, a **systems** approach linking the antecedent (strategy) and consequent (performance) variables to cooperative product innovation (structure) has not been attempted to date. Such a model of would provide clarity on the interrelationships between the constructs and partly answer calls by marketing researchers (e.g. Manu and Sriram 1996) to examine which marketing strategies (e.g. maintaining a stakeholder orientation) will lead to higher performance for a given innovative posture.

2. THE RESEARCH MODEL OF MULTI-STAKEHOLDER COOPERATIVE IORS IN PRODUCT INNOVATION

2.1 Model development and specification

Building upon prior models of cooperative IORs, including Robicheaux and Coleman's (1994) strategy-structure-performance-based conceptual model of marketing channel relationship structure, a six-factor multi-stakeholder model of cooperative IORs in product innovation for Australian manufacturers was developed. The research model synthesised and incorporated concepts and measures drawn from the IOR and product innovation literatures.

The central factor in the model was *Stakeholder Involvement in Product Innovation* (SIPI). It was based on the concept of IOR structure, i.e. the operational integration of a stakeholder group with the focal firm. Two factors were used to predict SIPI: *Stakeholder Orientation* (SO), a firm's view of the strategic importance of the stakeholder relationship, and *Product Innovation Orientation* (PIO), a firm's view of the strategic importance of its product innovation strategy. A further two factors represented outcomes of SIPI: *Relationship Quality* (RQ), a firm's attitudes toward the stakeholder relationship resulting from interaction, and *Product Innovation Performance* (PIP), the technical and market outcomes of the firm's product innovation efforts. A sixth factor – *Overall Firm Performance* (OFP) based on management's satisfaction with financial and non-financial performance outcomes -

was also measured to assess the broader implications of the model. Two objective, single-item variables were also included in the model – relative Product innovation spending (associated with PIO) and Sales growth (associated with OFP).

To address the need for a multi-stakeholder perspective, the three IOR-oriented constructs SO, SIPI and RQ were specified for *each* of the four external stakeholder groups most likely to be involved in a manufacturer's product innovation – customer, supplier, industry partner and research/advisor. Two types of structural models of stakeholder cooperation in product innovation were developed:

1. One ***overall*** (multi-stakeholder) model containing partially aggregated composite measures for each of the four stakeholders within the three stakeholder-based (second-order) constructs SO, SIPI and RQ
2. Four ***specific stakeholder*** models with single-stakeholder (first-order) constructs for the three stakeholder-based constructs SO, SIPI and RQ.

2.2 Model analysis and assessment

Strategic-level data was required for this research and was obtained from 120 CEOs/General Managers of Australian machinery and equipment manufacturers, predominately small and medium-sized manufacturing enterprises (SMMEs).

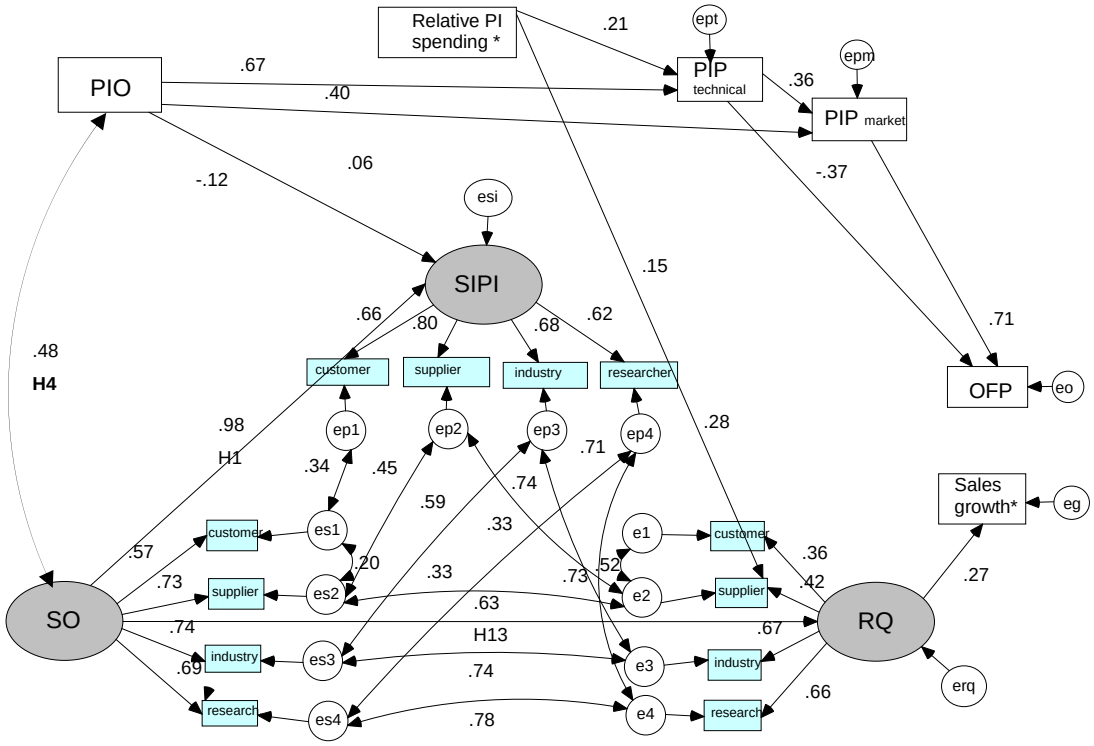
Using a two-step structural equation modelling (SEM): confirmatory factor analysis (CFA) approach, examinations of parameter estimates, fit and residuals were used to test the individual constructs for validity. Composite reliability and average variance extracted were used to test for construct reliability. The overall (multi-stakeholder) structural model, as well as the four single-stakeholder models, was then tested using SEM AMOS software. Meaningful modifications[1] of the hypothesised model were undertaken to improve model fit. The four modified single-stakeholder models and the overall (multi-stakeholder) model were found to provide a satisfactory fit[2]. Statistically significant standard coefficients for each of the latent constructs provided evidence of the importance of each

[1] Modifications comprised the inclusion of error correlations between error terms for stakeholder-specific composites relating to SO, SIPI and RQ. In spite of proven discriminant validity having been shown to exist, these variables had the same measurement scale and represented a series of questions on different aspects of a *related topic*, i.e. the nature of the interorganisational relationship (IOR). In addition, when classifying their attitudes toward their relationship with the top firm in each stakeholder group, the respondent had answered the questions relating to each stakeholder group in the same way. These two reasons provided theoretical support for the use of correlated errors (Dunn, Everitt et al. 1993; Kline 2003; Garson 2006).

[2] *Overall* model: X^2/df = .37, CFI = .967, RMSEA = .056, SRMR = .060; *Stakeholder* models: X^2/df = .385-.987, CFI = 1.0, RMSEA = 0, SRMR = .027-.046.

element as an input or outcome of cooperative innovation. The final tested overall (multi-stakeholder model of cooperative IORs in product innovation is shown in **Figure 1**.

Figure 1 Final overall (multi-stakeholder) model of IORs for cooperative product innovation



* single item

3. TESTING OF HYPOTHESES RELATING TO DIFFERENCES BETWEEN STAKEHOLDERS IN COOPERATIVE PRODUCT INNOVATION

To establish the presence and nature of any differences in a focal firm's relationships with each of the four stakeholder groups in product innovation (customer, supplier, industry partner and research/advisor), the significant associations relating to the 15 hypotheses involving stakeholder-specific constructs (i.e. SO, SIPI and RQ) were compared for each of the four individual stakeholder models and the overall (multi-stakeholder) model. Significant associations ($p<.01$) and those common to all or most stakeholder groups were identified. This analysis is summarised in **Table 1**.

Table 1 Inter-stakeholder comparison of significant associations (std. coefficients)

Hypo-thesis	Association	Stakeholder type				Overall model	Significant ?	Common ?
		Customer	Supplier	Industry partner	Researcher			
H1	SO-SIPI	.53 ***	.76 ***	.77 ***	.79 ***	.98 ***	√	√
H2	PIO-SIPI	.15 *	n.s.	n.s.	n.s.	-.12*	marginal	X
H3	Relative PI spending-SIPI	n.s.	n.s.	n.s.	n.s.	n.s.	X	√
H4	PIO-SO	.35 ***	.45 ***	.29 ***	.29 ***	.48 ***	√	√
H5	Relative PI spending-SO	n.s.	n.s.	n.s.	.18 *	n.s.	marginal	X
H6	SIPI-RQ	n.s.	.26 **	.42 ***	.35 ***	n.s.	√ for 3/4	√ for 3/4
H7	SIPI-PIP technical	n.s.	n.s.	.12 *	n.s.	n.s.	marginal	X
H8	SIPI-PIP market	n.s.	n.s.	n.s.	n.s.	n.s.	X	√
H9	RQ-PIP technical	n.s.	n.s.	n.s.	n.s.	n.s.	X	√
H10	RQ-PIP market	n.s.	n.s.	n.s.	n.s.	n.s.	X	√
H11	RQ-OFP	n.s.	n.s.	n.s.	n.s.	n.s.	X	√
H12	RQ-Sales growth	.17 *	n.s.	n.s.	.27 ***	.27 ***	√ for 1/4	X
H13	SO-RQ	.33 ***	.33 ***	.50 ***	.53 ***	.63 **	√	√
H14	Relative PI spending-RQ	n.a.	.14 *	n.a.	n.a.	.15 *	marginal	X
H15	SIPI-OFP	n.a.	-.20 *	n.a.	n.a.	n.s.	marginal	X

*** p <.001; ** p<.01; * p < .05; n.s. = not significant; n.a. = not applicable

From Table 1 it can be seen that the results are mixed. Of the 15 hypothesised associations, five were significant at the 99% confidence level. Three of these associations applied to *all* stakeholder groups and one applied to three stakeholder groups. The significance levels for a further five hypothesised associations were lower ($p<0.05$) and in relation to one or two stakeholders only. The remaining five associations were not significant for any of the stakeholder groups. Overall, with more than half of the 15 hypotheses shown to apply to all four stakeholders, it was shown that there are more similarities than differences between stakeholders in the extent to which they are involved in a firm's product innovation.

4. DISCUSSION OF RESULTS RELATING TO SIGNIFICANT ASSOCIATIONS COMMON TO ALL/MOST STAKEHOLDER GROUPS

This section discusses the findings in relation to the four significant positive associations found in the research model, which were common to all or most of the stakeholder groups (shaded in Table 1).

4.1 Stakeholder orientation SO and Stakeholder involvement in product innovation SIPI (H1)

A significant coefficient between SO and SIPI (.98; $p<.001$) in the overall (multi-stakeholder) model as per Table 1 indicated a large effect (Kline 1998). This result was consistent with conceptual and empirical literature. The strong, positive association provides support for Lefton's (1973) hypothesis

that "… those organizations characterized by greater degrees of *lateral* and *longitudinal* interest in their clients' will manifest greater readiness of interorganizational collaboration…" (p. 163). More specifically, it supports the link proposed in Robicheaux and Coleman's (1994) model of IOR structure between the culture dimensions of external polity (including SO) and operational integration of channel relationship structure (as measured by SIPI). To the extent that SO indicates a firm's IOR strategy and SIPI indicates IOR structure, Chandler's (1962) thesis that 'structure follows strategy' holds true.

The research results are also consistent with extant empirical work in the IOR literature, which showed a link between the firm's perceptions of various stakeholder groups – suppliers (Baker, Simpson et al. 1999); customers and consultants (van de Ven, Hudson et al. 1984) – and its involvement of/cooperation with these stakeholders in general activities. This relationship was also suggested in the interactive innovation literature – both conceptual (Dougherty 1992) and empirical (Håkansson 1989; Yli-Renko, Autio et al. 1999).

While the link between stakeholder orientation and involvement of stakeholders enjoys conceptual and some empirical support in both IOR and interactive innovation literature bases, certain aspects of the link were unexplored. Prior to this research the link had not been adequately investigated in relation to multiple stakeholders in the product innovation context (1), IOR polity had not been clearly distinguished from IOR structure (2) and the IOR measures used were limited (3). This research has addressed these gaps as follows: (1) Stakeholder orientation SO and Stakeholder involvement in product innovation SIPI were used as multi-stakeholder constructs, i.e. each construct captured aspects of the focal firm's relationships with top firms in four stakeholder groups. (2) SO and SIPI measures were rigorously developed following a thorough assessment of extant conceptualisations of IORs and measures of pertinent aspects of IORs and (3) SIPI was adapted to the product innovation context.

Consequently, this research is the first to support the causal link between multi-stakeholder orientation of a focal firm and the subsequent involvement of these stakeholders in its product innovation process. In other words, it has been shown that a multi-stakeholder cooperative approach to product innovation is considerably influenced by an understanding of the importance of multi-stakeholder relationships.

4.2 Product innovation orientation PIO and stakeholder orientation SO (H4)

A significant coefficient between PIO and SO (.48; $p<.001$) in the overall (multi-stakeholder) model (see Table 1) indicated a large effect (Kline 1998), showing that the two strategy-based (exogenous) constructs were strongly correlated, as hypothesised. This result was consistent with the conceptual and empirical literature. In their empirical studies, Narver and Slater (1990), Pelham and Wilson

(1996) and Appiah-Adu and Singh (1998) found a positive link between product innovation strategy and market (or customer) orientation. A number of other studies have found a relationship between innovation strategy, a broader-based view of stakeholder orientation, i.e. with universities, consultants and other companies (Nyström 1979); clients, suppliers and consultants (Lefebvre, Harvey et al. 1991) and other (non-specifiied) external stakeholders (Rothwell 1977; Atkins and Lowe 1994).

The results from this study strengthen and extend extant research findings in that a firm's product innovation strategy is shown to be significantly positively associated with its orientation toward all four important stakeholder groups in product innovation – customer, supplier, industry partner and researcher/advisor. In other words, if a firm emphasises product innovation strategy, it will also stress the importance of IORs with key stakeholder groups.

4.3 Stakeholder involvement in product innovation SIPI and relationship quality RQ (H6)

Following the SSP paradigm, the proposed model of cooperative innovation IORs links Stakeholder orientation SO (IOR strategy) and RQ constructs indirectly via a third mediating construct, SIPI (IOR structure). Therefore, it was hypothesised that SIPI fully mediates the SO-RQ relationship, i.e. that there were direct links between SO-SIPI (H1) and SIPI-RQ (H4). However, H4 was rejected, as the standard coefficients between SIPI and RQ in the *overall* (multi-stakeholder) model and the *customer* model were not significant (0.05; p=.644 and 0.28; p=.267 respectively). By contrast, in the other three single-stakeholder models the SIPI-RQ association was significant: Supplier (.26; p=.017), industry partner (.42; p<.001) and researcher/advisor (.35; p<.001), as is shown in Table 1.

Yli-Renko Autio et al.'s (1999) study of knowledge-based customer relationships may offer some insights into this apparent contradiction. The authors posited a (positive) one-way path from customer relationship quality (similar to RQ) to technical knowledge acquisition (an aspect of SIPI). A *negative* association was found, which the researchers attributed to the 'overembeddedness' of customer relationships, i.e. close relationships insulate firms from other external sources of information. As RQ reaches a very high level, the perceived need to monitor the relationship (an aspect of SIPI) diminishes. While reduced monitoring may decrease the cost of knowledge exchange (Dyer and Ouchi 1993), it may also lower the amount of new knowledge acquired.

The presence of a significant and moderately large SIPI-RQ association for the supplier, industry partner and researcher/advisor stakeholders suggests that these are not as 'embedded' as customer relationships. However, the effect for the customer relationship appears to be stronger, as the absence of a customer SIPI-customer RQ association has also resulted in the absence of this association in the overall (multi-stakeholder model). These findings need to be considered in light of the direct path from SO to RQ discussed next.

4.4 Stakeholder orientation SO and Relationship quality RQ (H13)

As shown in Table 1, the post-hoc hypothesised direct relationship between SO and RQ was significant (.63; p=.011) in the overall (multi-stakeholder) model and was accepted. In addition to this direct effect, SIPI contributed an *indirect* effect (std. coeff. 0.27), bringing the total effect of SO on RQ to of 0.90. It can thus be concluded that SIPI partially mediates the relationship between SO and RQ.

Theoretically, a mediating construct facilitates the relationship between the other two constructs involved (Hair, Black et al. 2006). If a firm has a strong SO, this quality may encourage it to involve key stakeholders more in its product innovation efforts, which could result in higher stakeholder Relationship quality (RQ). In this case a significant relationship between SO and RQ can be explained by the SO-SIPI-RQ sequence of relationships. Abundant support for a partial to full mediating effect of Stakeholder involvement SI and Stakeholder involvement in product innovation SIPI on Relationship quality RQ can be found in extant IOR and interactive innovation literature:

- The IOR literature views information exchange (an aspect of SI) as a necessary antecedent of trust (an aspect of RQ) (Dwyer, Schurr et al. 1987; Anderson and Weitz 1989; Anderson and Narus 1990; Mohr and Nevin 1990; Boyle, Dwyer et al. 1992; Mohr and Spekman 1994; Morgan and Hunt 1994). Some IOR academicians view cooperation (SI) as causally antecedent to trust (RQ) (Axelrod 1984; Anderson and Narus 1990); others contend that IOR performance (RQ) affects IOR structure (SI) (Hagg and Johanson 1983; Heide and John 1990; Morgan and Hunt 1994; Pelton, Strutton et al. 1997; Johnson 1999; Walter 2003). A case has also been made for a two-way, mutual reinforcing relationship between SI and RQ (Anderson and Weitz 1989; Anderson and Narus 1990; Seyed-Mohamed 1995; Möller and Wilson 1995a).

- The interactive innovation literature provides support for both one-way (Håkansson 1989; Dougherty 1992) and bi-directional (Smith, Dickson et al. 1991) influences between SIPI and RQ.

Due to the recursiveness assumption inherent in the SEM analytical method applied in this research, reciprocal relationships were not explored. Whether the SIPI-RQ relationship is one-way or two-way, the point of interest in this research has been whether this association is significant and positive in a multi-stakeholder context. A positive indirect association between SIPI and RQ was found in the wider context of a SO-SIPI-RQ model. With justification provided for the existence of the mediating effect of SIPI, the question is whether a direct association between SO and RQ can be argued. The following two studies in the IOR literature offer evidence for this linkage.

- Johnson's (1999) study of 160 SME buyer-seller relationships within the industrial machinery and equipment industry found strong correlations between the RQ elements flexibility and continuity expectations and strategic integration (SO) of the seller into the distributor's strategy[3].

- In a study of 380 suppliers, Baker, Simpson and Siguaw (1999) found that a supplier's perceptions of a reseller's market orientation (in terms of customer orientation, hence similar to SO) is positively associated with supplier perceptions of key relationship quality factors - trust, commitment and satisfaction (similar to RQ, as well as the SI variable 'cooperative norms'). In other words, a supplier who perceives a reseller as being customer-oriented is likely to have more positive perceptions of the relationship with that reseller.

In both these studies, SO (IOR strategy) measures included some aspect(s) of SI (IOR structure), highlighting (1) the mediating effect of SI and (2) measurement issues in IOR research relating to lack of clear conceptualizations of IOR structure and outcomes.

In conclusion, this research is the first to explicate and measure separately the related but distinct concepts of IOR strategy (SO), IOR structure (SI/SIPI) and IOR quality (RQ) for a firm's relationships with four distinct stakeholder groups (customer, supplier, industry partner and research/advisor). The way a firm views the strategic importance of each of these key stakeholders in product innovation (SO) is positively associated with the quality of relationship maintained with each of these stakeholders (RQ) and is partially affected by the way in which the firm cooperates with each of these stakeholders in its product innovation efforts (SIPI). In addition, the research shows that firms paying more attention to key stakeholder groups are more committed to product innovation, which results in better product innovation outcomes (PIP) and overall firm performance (OFP). Hence, for manufacturing firms to perform well, they need to have a view to product innovation *and* sound IORs with their top customer, supplier, industry partner and researcher/advisor. This finding is significant for Australian manufacturing managers, who are seeking to develop or maintain a competitive edge in the global marketplace.

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[3] Johnson's operationalisation of strategic integration combines elements of both SO (e.g. considering key stakeholders in planning) and Stakeholder Involvement SI* (importance of maintaining cooperative relations with key stakeholders).

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