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Determination of the Alignment between Information Systems and Marketing

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Abstract
This paper addresses the challenge of measuring alignment. Two different approaches are developed: one based on seven dimensions of strategic orientation; and one based on eight dimensions of market orientation. A formula is developed for the calculation of alignment. The formula is applied to a survey of 175 large New Zealand companies. Analyses of the results suggest overall similarity between the strategic orientation and market orientation approaches, yet with distinct differences which might impact on business performance.

Keywords: IS-marketing alignment, alignment calculation, strategic orientation, market orientation

Introduction

For over a decade strategic alignment between information systems (IS) and the business has consistently been one of the major challenges for IS academics and practitioners (Luftman & McLean 2004)**.** Not only has it been a challenge to determine how best to measure it, but it has also been a challenge to ascertain its impact on business performance. Further questions arise as to the impact on business performance of the alignment between IS and another function such as marketing.

To date there have been various studies on the alignment between IS and business (eg. Henderson & Venkatraman 1993; Reich & Benbasat 1996) but few have attempted to devise a measure for alignment. The studies of Chan (1992) and Chan, Huff, et. al. (1997) stand out in this regard with their measure for alignment. There have been even fewer studies on the measurement of alignment between IS and another function, and none as yet on the alignment between IS and marketing.

In order to examine the impact of the alignment between IS and marketing on business performance, it was necessary to first develop an appropriate measurement of IS-marketing alignment. The purpose of this paper is to describe the conceptualization, operationalization and validation of a method for determining IS-marketing alignment. The following sections describe the background and basis for the approach taken, the survey which provided the data for the analysis, the measurement of alignment, and the further implications of approaching alignment in this manner.

Overview of the literature

The concept of alignment has been widely used in the management and marketing literature to emphasize the importance of aligning the organization to the needs of the customer (Mitchell 2001). It has also been used loosely to refer to the connection between various business functions. However, research on the alignment between a function and the general business strategy has been most extensively addressed from an IS perspective.

The IS perspective

Initial models, such as those of Henderson and Venkatraman's (1991) "Strategic Alignment Model," were based on the concept that IT and business strategies should be interdependent, rather than IT being only a support function. Although this model depicted the relationship between IT and business, the challenge remained of how to precisely characterize and measure alignment. Chan (1992) met this challenge with her development and validation of a model which measured the alignment between the strategic orientation of business strategy and IS strategy. She defined IS alignment as: "the coherence or synergy between business strategic orientation and IS strategic orientation" (Chan, 1992). The emphasis of Chan's study on strategic orientation was prompted by the work of Venkatraman (1989a, 1989b) who had previously developed a measure of business strategic orientation.

Venkatraman's characterization of strategic orientation comprised seven distinct dimensions: aggressiveness, analysis, defensiveness, futurity, innovativeness, proactiveness and riskiness. Venkatraman also developed and validated a questionnaire instrument for measuring the position of a firm on each of the seven dimensions (Venkatraman 1989b). Chan (1992) employed Venkatraman's seven dimensions, and developed measures of "the extent to which the organization's information systems addressed each dimension". Chan (1992) and subsequently Chan et al. (1997) showed that the alignment between business strategic orientation and IS strategic orientation had a significant positive impact on IS effectiveness and on business performance.

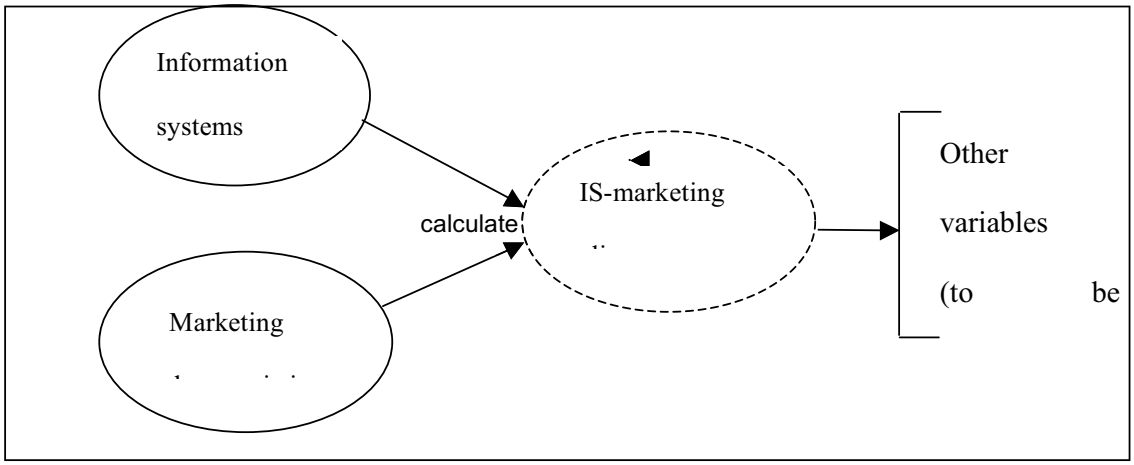
The marketing perspective

With regard to marketing, the concept of alignment has been addressed mainly from the perspective of the alignment of the organization with its market or customer needs (Mitchell 2001). Although the strategic orientation of marketing has not been researched specifically, Noble, Sinha and Kumar (2002) interpreted market orientation as being a type of strategic orientation. On the other hand, other researchers such as Matsuno and Mentzer (2000) indicated a distinction between strategic orientation and market orientation. There thus appear to be conflicting views of whether or not market orientation is the same as strategic orientation.

Market orientation had its origins in the marketing concept (Drucker, 1954). As opposed to marketing orientation which would focus specifically on the marketing function, market orientation embodies the organization-wide awareness of, and response to, the marketplace, including customers, competitors, suppliers and the broader external environment such as the legislative, economic, cultural, social and geographic environments. Market orientation is thus the responsibility of the whole organization and all the functions within the organization (Kohli & Jaworski 1990). The two most significant pieces of research in this regard were those of Kohli and Jaworski (1990) and Narver and Slater (1990). Kohli and Jaworski (1990) proposed that market orientation was: "the organization-wide generation of market intelligence pertaining to current and future customer needs, dissemination of the intelligence across departments, and organization-wide responsiveness to it". This resulted in the MARKOR scale of market orientation (Kohli, Jaworski & Kumar 1993). On the other hand, Narver and Slater (1990) derived an alternative model - the MKTOR model - which depicted three components impacting on business performance: business specific factors, market orientation (customer orientation, competitor orientation and inter-functional coordination), and market-level factors.

Research model

To summarize: both IS-business alignment and marketing-business alignment and their espective impacts on outcome variables such as business performance have been researched fairly extensively in the past. However, IS-marketing alignment and its impacts has not been studied to date. Drawing on previous research in both information systems and marketing, the research model shown in Figure 1 is proposed as a basis for an investigation of IS-marketing alignment and its impacts. Following Chan (1992) and Chan et al's (1997) example, alignment as such would not be measured, but would be calculated, as described below.



2. Figure 1 - Research model

Appropriateness of the strategic orientation and market orientation approaches

In calculating the alignment between IS and marketing, the aspects that would be aligned need to be applied in parallel. In other words, they need to reflect identical dimensions of each function. They also need to qualify as "strategic," embodying characteristics such as being concerned with large-scale, future-oriented issues which require top management decisions (Miles & Snow 1978), having a long-term impact, being multi-functional and having an external focus (Pearce & Robinson 1988) and providing an integrated focus on markets and competition (Day &Wensley 1983).

The seven strategic orientation dimensions originally developed by Venkatraman (1989b), and subsequently modified by Chan et. al. (1997), reflect these characteristics of strategy. These dimensions manifest a strong competitiveness emphasis, as well as a focus on markets, on the means as opposed to the ends, on realized as opposed to intended behaviour, on implemented as opposed to planned strategy, and on content as opposed to process. In addition, the construct is multi-dimensional (Morgan & Strong 2003).

As for market orientation, there are clear overlaps between the two core models of Narver and Slater (1990) and Kohli and Jaworski (1990). Both exhibit a customer focus and an emphasis on behaviours relevant to the dimensions of their models. They also both focus on implemented as opposed to planned actions. Detailed examination suggests that the Narver and Slater model (1990) has a more strategic and externally oriented perspective whereas the Kohli and Jaworski model (1990) is more functional and internally focused. On the other hand, the latter model includes more stakeholders than the Narver and Slater (1990) model,

which is limited to customers and competition. In comparing the two models to the criteria of strategy noted above, it can be seen from the table below that neither really meets all criteria.

Table 1 - Strategy attributes of Narver and Slater (1990) and Kohli and Jaworski (1990) models

Strategy attributes	Narver & Slater (1990)	Kohli & Jaworski (1990)
Large scale	Not always	Not always
Future-oriented	Implicit	Implicit
Involving top management decisions	Not always – more so than Kohli and Jaworski (1990)	Not always
Long-term impact	Implicit – more so than Kohli and Jaworski (1990)	Implicit
Multi-functional	Yes	Yes
Integrated	Yes	Yes
External focus	Limited	Yes
External focus – markets	Yes	Yes
External focus – competition	Yes	Yes

However, as these two market orientation models display so many strategic characteristics, and as market orientation appears to be such a strong organizational driving force, it was decided to use them in combination to create a market orientation construct, and to use it in addition to strategic orientation to explore the alignment between IS and marketing. In other words, the importance of IS-marketing alignment would be tested in two ways: one based on strategic orientation, and one based on market orientation.

The following sections describe the constructs that were selected for the calculation of alignment.

Construct Identification

Strategic Orientation

Most of the strategic orientation dimensions were derived from Venkatraman's (1985) and Chan's (1992) instruments.

Aggressiveness

This describes the way in which companies approach their external environment - and their competitors in particular. The focus is more on effectiveness than efficiency. Aggressiveness could be based on product innovation and/or market development, or on high investment to improve relative market share. It could also reflect a short term business thrust or an expansion of market share by 'multiplication' (Venkatraman 1985).

Futurity

This dimension distinguishes between long-term and short-term perspectives, and focuses on long term sustainability. Venkatraman (1985) highlighted the forecasting of sales and customer preferences, as well as formal tracking of electronic trends.

Innovativeness

This dimension covers innovation and creativity with regard to offerings in the marketplace, ways of conducting business, and the use of IT in promoting innovativeness in general (Chan 1992). The current business climate suggests that innovativeness should form an important dimension of strategic orientation.

Proactiveness
Often confused with aggressiveness, proactiveness refers to the constant striving to improve a company's strengths and to seize as many opportunities as might arise. While there is an element of aggressiveness in terms of beating the competition to seizing opportunities, the focus is more on achieving the lead and thus being more able to control than being controlled. Venkatraman (1985) cited Miles and Snow (1978) who had emphasized the continuous search for market opportunities, and experimentation with potential responses to changing trends.

Risk aversion
Initially Venkatraman (1985) and Chan (1992) conceptualized this dimension as 'riskiness'. Venkatraman (1985) had expected it to be evident in resource allocation, and in general decision making. However, Chan et al. (1997) changed its name to 'risk aversion.' Risk aversion approaches the concept from the opposite perspective to riskiness and reflects the caution that a company might exercise in the way it approaches both its internal operations, as well as its external environment.

Analysis
As with risk aversion, this reflects the caution with which a company makes decisions, particularly about major business situations. Venkatraman (1985) indicated that this reflected comprehensiveness and a searching for the roots of problems in order to find the best solutions.

Defensiveness
Often seen as the counter-approach to aggressiveness, there is a strong focus on a company's protection of itself from the competition. This may take the form of protecting and maintaining their internal strengths, or improving their internal efficiency. It may also comprise entrenching relationships with suppliers or customers, or adjustments in bargaining power (Venkatraman, 1985). Chan (1992) chose to split defensiveness into internal and external defensiveness, but this would have led to an increased complexity of the model. It was thus decided to maintain the single dimension.

Market orientation

Most of these dimensions result from a combination of the Kohli and Jaworski framework (1990), the Kohli et al. (1993) and Narver and Slater (1990) measures, and refinements made by themselves and other researchers. Although most of the items already existed, they were rearranged in order to provide a balance between analysis and responsiveness with regard to customers, competitors and the environment. Two additional dimensions of 'interfunctional coordination' and 'market driving' completed the coverage of the construct.

Interfunctional coordination
Interfunctional coordination is essential to ensuring that the right information reaches the right person at the right time, and that actions are taken in a concerted and well-focused manner. Appropriate information about the company, its customers, suppliers, competitors, and relevant aspects of the external environment is crucial to ensure the company is equipped to deal with all the challenges and opportunities it faces.

This dimension is largely based on the 'interfunctional coordination' dimension of Narver and Slater (1990). It also reflects the 'intelligence generation' and 'intelligence dissemination' dimensions of Kohli and Jaworski (1990) who indicated the importance of having both a

customer and competitor focus, and on gathering, generating and disseminating the information along both formal and informal channels within an organization.

Customer analysis
As no company can exist without the customer, it makes sense to learn as much about the customer, his/her needs, as well as trends in customer behaviour. It captures the 'intelligence generation' dimension of Kohli and Jaworski (1990) in part, as well as the 'customer orientation' dimension of Narver and Slater (1990) insofar as it refers to understanding the customer.

Competitor analysis
As so many companies are driven by a competitive strategy, it follows that they would acquire as much information and as many insights as possible about the competition. Narver and Slater (1990) and Kohli and Jaworski (1990) had highlighted the importance of understanding and focusing on the competitor in their 'competitor orientation' and 'intelligence generation' dimensions respectively.

Environmental analysis
Each company is affected by, or affects, the external environment. The dimension refers to the macro environment and encompases aspects such as the legal, economic, cultural, social and geographic environments. Kohli and Jaworski (1990) had referred to the importance of understanding the market needs in general, and Narver and Slater (1990) had emphasized the impact of market dynamics on the organization and its buyers.

Customer responsiveness
This goes in tandem with customer analysis. Once the needs of the customer are understood, the company will be better able to fulfil these requirements and, very often, to exceed them. To a certain extent, it captures part of the dimension of 'responsiveness' of Kohli and Jaworski (1990) and the dimension of 'customer orientation' of Narver and Slater (1990).

Competitor responsiveness
As with customer analysis and responsiveness, it is logical that only by responding to the analysis of the competition, can anything be achieved. This dimension reflects part of the 'responsiveness' dimension of Kohli and Jaworski (1990) and part of the 'competitor orientation' dimension of Narver and Slater (1990).

Environmental responsiveness
The way in which the analysis is acted upon, dictates the success and meaningfulness of the analysis. It also indicates to the environmental stakeholders that the company is alert and responsive to their needs and concerns. As with the two previous dimensions, this reflects part of the 'responsiveness' dimension of Kohli and Jaworski (1990) as well as responding to the market dynamics covered by Narver and Slater's (1990) 'customer orientation' dimension.

Market driving
This dimension had not been included in previous market orientation measures. However, authors such as Jaworski, Kohli and Sahay (2000) have stressed the importance of not only responding to the markets or being market driven, but also of shaping, leading, or controlling the markets. They suggested four key mechanisms: deconstruction; construction; functional modification; and shaping market behaviours (Jaworski et al. 2000).

Research design

A questionnaire was designed to collect data for operationalizing the measures of alignment. The questionnaire included items to measure all the research constructs as well as some demographics.

In order to ensure content validity, where possible, scales were taken from instruments which had been validated and found reliable in previous. Chan's (1992) instrument thus served as the point of departure for the dimensions and operationalization of strategic orientation. The market orientation questions were mainly derived from the original Kohli and Jaworski (1990) and Narver and Slater (1990) studies, subsequently modified slightly by various other researchers. Through a number of iterations, 23 items were decided upon to measure the seven dimensions of strategic orientation, and 39 items to measure the eight dimensions of market orientation

The head of IT/IS and the head of marketing of each participating organization would be required to complete a survey questionnaire. Separate versions of the questionnaire were developed for each. Although the heads of IT/IS and marketing would each respond to similar items with regard to the strategic orientation, market orientation, and business performance constructs, plus the demographics, only the heads of marketing would answer the questions on marketing performance.

Five point Likert scales were used for the response options to all the independent and dependent variables. Only the few demographic questions required open-ended responses. A number of items were reverse coded in order to reduce response set bias.

Although most of the proposed items for the questionnaire had been validated in prior research, pre-testing of both versions of the survey instrument was conducted with seven marketing and IS managers. Most respondents found the questionnaire clear and without problems, the only correction needed was to resolve the inconsistent reference to "firm" or "company".

The physical questionnaire, as well as the questionnaire package, were designed so as to reduce non-response rate. Hard copies of the questionnaire booklet, with brightly coloured covers which aided reminding were dispatched, together with a personalized covering letter. Each questionnaire was coded in order to identify the respondent. Although respondents' names and the names of their companies were requested in the questionnaire, there was a possibility that their writing might not be easily legible, and/or that the company had changed its name or operated under another name than the one under which it was registered. A self-addressed, stamped envelope completed the pack.

Data collection

The main source that was used for the composition of the sampling frame was *The Atlantis 800 Business Directory* (2003). The frame consisted of large New Zealand companies (business units). A random sample of companies was selected, and potential participants were contacted by telephone. No company was included in the sample unless both the heads of IT/IS and marketing agreed to participate. Altogether 281 companies (562 individuals) indicated they would participate. A questionnaire package was then posted to each individual.

Following the guidelines of Dillon, Madden and Firtle (1994), after the initial despatch, there were two main follow-up stages. The first follow-up, a reminder letter, took place three weeks

after the initial despatch. The second stage, six weeks after the initial despatch, comprised phone calls to each individual who had not yet responded. In total 415 completed questionnaires were returned – a 74% response rate. However, there were a number of instances where either only the head of IT/IS or the head of marketing responded. In total 175 companies were represented by both the required heads – a 62% company response rate.

As the response rate was high, overall non-response bias did not pose a significant problem. Furthermore, the almost even number of responses from the heads of marketing and the heads of IT/IS precluded the necessity of weighting the responses of either group in order to balance the input in the analysis (Dillon et al., 1994). In addition, any difference in the numbers of responses would only impact on the first stage of analysis, the factor analysis, because only pairs of responses would be used for the later stages.

Analysis

The first stage of the data analysis was a factor analysis, followed by the calculation of alignment. This was succeeded by structural equation modeling, but this component is not the focus of this paper and thus not reported on here.

Factor Analysis

Factor analysis was undertaken in order to ensure that the measures used in the calculation of alignment were as valid and reliable as possible. To a large extent, the analysis of the strategic orientation measures was confirmatory, while the analysis of the market orientation measures was exploratory. Even though the instruments on which the latter were based had been tested previously, they had not been used in such a combination before, hence the appropriateness of exploratory factor analysis.

In order to ascertain convergent validity and discriminant validity of the factors, the loadings of each item onto the respective factor should be above 0.6 although loadings of 0.5 and above are acceptable for larger samples such as 400 or more (Hair, Anderson, Tatham & Black 1998). To determine reliability of a factor, a Cronbach's alpha of over 0.6 was required (Hair et al. 1998).

In the analysis of the strategic orientation items, all the items loaded onto the intended factors. Only one 'risk aversion' item demonstrated a loading of less than 0.6, at 0.407. The Cronbach alphas of all factors was over 0.6 except for the 'proactiveness' factor which was very slightly less than 0.6 at 0.59, and the 'risk aversion' factor which was 0.42. The reliability of the 'proactiveness' factor could not be improved by the deletion of any item, and was so slightly below 0.6 that it was deemed acceptable. However, the 'risk aversion' factor was significantly improved to a Cronbach alpha score of 0.7267 by the exclusion of the low loading item. This item referred to risky strategies adopted by the company as opposed to the other items which referred to risk averse strategies. It was thus deleted.

In the analysis of the market orientation items, three methods of analysis were applied: unconstrained, with a specified number of items, and with specified items. They produced similar results although with the first, unconstrained approach, the 'customer analysis' and 'competitor analysis' items loaded together onto one factor. As a division between the two dimensions was desirable, the third approach seemed preferable. The loadings of the majority of items was above 0.6 with one 'interfunctional coordination' item, one 'market driving', and two 'environmental responsiveness' items being above 0.5. The Cronbach alphas of all factors

was above 0.7, except for 'market driving' at 0.522 and 'environmental responsiveness' at 0.409. Neither could have met the 0.6 requirement by the deletion of any item. Both being newly constructed factors, it was decided to retain them – in the first instance because such a score is acceptable for new constructs (Hair et al. 1998) and, in the second, because it was seen as necessary in order to balance out the 'analysis' and 'responsiveness' pair

Calculation of Alignment

The second stage of the analysis consisted of the development of a method for the calculation of alignment.

From the outset it was the intention, as with other alignment studies, that alignment would be calculated, as opposed to measured. The only alternative would be to develop a set of questionnaire items designed to tap the respondent's perceptions of alignment, and to develop a psychometric measure from them. However alignment is a multifaceted construct embodying numerous dimensions of both marketing and IS characteristics; it was felt that the likelihood of a respondent possessing the necessary personal knowledge to provide a strong basis for such a mental determination was low. Furthermore, as much of this research was based on the work of Chan (1992), it would seem prudent to follow a path of enquiry which had been tested and found valid.

The calculation of alignment would be derived from the responses, by the heads of IT/IS and marketing, to parallel items in their respective questionnaires. In deciding how best to approach the calculation, this research drew again on the work of Chan (1992). As part of her research objective, Chan set out to examine several models of alignment (Chan et al. 1997), and to determine which was the most appropriate. She considered the calculation of alignment from a number of perspectives, but in order to avoid unnecessary complexity, she favoured three of Venkatraman's (1989a) options - calculating matching, profile deviation, and moderation models of alignment. All three were explored. The former two options were eventually rejected in favour of the moderation approach. Logically, it appeared to be most suitable and it also found support from Chan's (1992) analysis. The moderation approach used the positive product at item level, then the average of these at each dimension. However, Chan (1992) did acknowledge that alternative models should not be dismissed regardless of the fact that they were not well supported in her study.

This study considered Chan's (1992) arguments carefully. (Her formula is referred to as Formula 1.) While the merits of the rationale behind her moderation approach cannot be denied, there was concern that such a calculation would not accommodate the "anti-synergy" which might result from the IT/IS and marketing respondents' scores being very different. In other words, according to Chan's (1992) approach of initially calculating the product of the two respondents' scores (xy), if the two scores for an item, such as 'We constantly try to be ahead of the competition' were 1 and 4 respectively, or if they were 2 and 2, the alignment score in each case would be 4. However, the assumption is that if both respondents produced similar scores, they would be of like mind and would act accordingly in their approach vis-à-vis the competition. On the other hand, if they had widely different perceptions regarding their approach to the competition, they would act differently and in what might be a contradictory or "anti-synergistic" way whereby the difference would be magnified.

In order to address this issue, the following formula, Formula 2, was considered:

$$(4- |x-y|)((x+y)/2)$$

- 4 represents the largest possible difference between the item scores of the IT/IS and marketing respondents, given the 5-point Likert scale.
- It was necessary to subtract the absolute difference from 4 in order to obtain an indication of the alignment, or similarity, between the item scores rather than the non-alignment, or dissimilarity, which would have resulted if it were not subtracted from 4.
- Using the absolute difference between x and y removes the implication of order in the subtraction. A negative sign would have been an artifact of such an order.
- (x+y)/2 represents the average of the two scores. It could be assumed that the strength of the manifestation of any aspect of a dimension, as captured by an item, would result from the average strength, or score, of the two.
- The product of the two parts of the formula captures the synergy, or the magnification, between the similarity of the scores and the average strength of each of those scores.

A third approach, Formula 3, was also considered: to simply use the absolute difference between the scores per item. The rationale was that the difference would imply the lack of alignment and thus the synergy between the two respondents. As already stated, the use of the absolute difference removes both the confounding effect of negative signs as well as any indication of preferred score of departure. This, in fact, reflects a matching approach.

There were thus three approaches to choose from: Formula 1, using Chan's (1992) (xy) formula; Formula 2, using (4- |x-y|)((x+y)/2) ; and Formula 3, using the absolute differences between item scores.

Yet another issue to consider was whether to first apply whatever formula was selected at item level and then average the resultant scores across each dimension, or whether to first average the individual respondents' scores across each dimension and then apply the formula at the dimension level. In each case the average dimension score would be calculated to form the alignment index. It was felt that each item of a dimension was important, and that an aggregation first across the dimension would obscure the relative impact of each item. The preferred approach was therefore to capture that individual importance by calculating the formula at item level first.

In conclusion, the approach using Formula 2, (4- |x-y|)((x+y)/2), was selected, with the calculation of the formula at item level first, rather than only at an average dimension level, being preferred. In comparison with the other two approaches, this formula captured the important aspect of synergy/anti-synergy more effectively. Although not expanded upon in this paper, significant additional analysis was also conducted as a precaution to see whether statistical calculations according to the other approaches which had been considered would yield radically different results from the selected method. These other approaches are depicted in Table 2.

The third option was chosen but applied to only the 175 pairs of responses, that is, the companies from which both the heads of IT and marketing had responded. The alignment index was calculated as the average score across the alignment on all seven dimensions. The calculated alignment index value thus formed the sole independent variable in the model which would be tested in the next stage of the analysis.

Table 2 - Optional approaches to calculating alignment

	Formula 1 Chan's formula (xy)	Formula 2 (4- |x-y|)((x+y)/2)	Formula 3 Absolute difference formula |x-y|
Applied at item level	Considered	Preferred	Considered
Applied at average dimension level	Considered	Considered	Considered

Results and discussion of the calculation of alignment

The results of the calculations yielded some interesting insights, both with regard to each approach, but also with regard to the differences between a strategic orientation approach and a market orientation approach. Table 3 presents the descriptive statistics of alignment on the various strategic orientation dimensions prior to the final calculation of the alignment index.

Table 3 - Alignment on strategic orientation dimensions: descriptive statistics

Dimension	Minimum	Maximum	Median	Mean	Std dev.
Aggressiveness	0	20.00	14.67	14.42	3.68
Futurity	0	16.50	9.83	9.79	3.09
Innovativeness	0	20.00	11.17	11.15	3.37
Proactiveness	0	17.83	11.00	10.89	2.84
Risk aversion	0	16.00	10.17	10.23	3.11
Analysis	0	20.00	11.00	10.96	3.53
Defensiveness	0	19.00	11.88	11.66	2.92

As can be seen, 'aggressiveness' emerged as the dimension on which the mean score was highest (14.42), and 'futurity' as the dimension on which the alignment between heads of IT/IS and marketing was lowest (9.79). Understandably, 'aggressiveness' was also one of the three dimensions on which the top point of the range reached the maximum of 20, and it demonstrated the largest standard deviation of 3.68. However, the distance between both the mean (14.42) and the median (14.67) of 'aggressiveness' and the scores for the other dimensions was significantly greater. This provides some indication of the focus of large New Zealand companies. Given the very competitive nature of the current business climate worldwide, this is to be expected. Interestingly, although the mean for 'defensiveness' was relatively high in comparison to the other dimensions, its standard deviation was relatively small. This could indicate a similarity of approach of large New Zealand companies in this regard.

Descriptive statistics of alignment on the various market orientation dimensions are depicted in Table 4. In this case 'customer responsiveness' was the dimension with the highest mean score (14.71) and 'market driving' the dimension with the lowest (8.26). Concomitantly, these dimensions also demonstrated the highest and lowest standard deviations, and 'customer responsiveness' the top point of the range (20). The high scores for 'customer responsiveness' is a manifestation, not only of the focus of large New Zealand companies but also of the focus of companies worldwide where slogans such as "…where the customer is king" and '…added customer value" abound. The low scores of 'market driving' could be an indication of the relative recency of the concept and it not having gained prominence in the New Zealand

business community. However, the items used to measure 'market driving' could require attention as the construct had demonstrated a lower reliability than most of the other market orientation dimensions.

Table 4 - Alignment on market orientation dimensions: descriptive statistics

Dimension	Minimum	Maximum	Median	Mean	Std dev.
Interfunctional coordination	0	17.58	10.00	10.34	2.66
Customer analysis	0	19.00	11.07	11.07	3.06
Competitor analysis	0	17.90	9.80	9.94	2.60
Environmental analysis	0	16.08	11.50	11.33	2.48
Customer responsiveness	0	20.00	14.75	14.71	3.25
Competitor responsiveness	0	18.37	12.75	12.40	2.78
Market driving	0	15.37	8.25	8.26	2.31
Environmental responsiveness	0	17.00	11.62	11.56	2.50

In comparison with the scores for the strategic orientation dimensions, those for market orientation demonstrated a greater range, even taking into account that strategic orientation consisted of seven dimensions whereas market orientation consisted of eight. However, the scores for the market orientation dimensions were more evenly spaced over the range than those for strategic orientation where 'aggressiveness' demonstrated markedly higher scores than the rest of the dimensions.

The highest mean score for market orientation ('customer responsiveness' – 14.71) was higher than the highest for strategic orientation ('aggressiveness' – 14.42), and the lowest ('market driving' – 8.26) was lower than the lowest for strategic orientation ('futurity' – 9.79). However, the highest standard deviation of market orientation ('customer responsiveness' – 3.25) was lower than the highest standard deviation for strategic orientation ('aggressiveness' – 3.68), and the lowest standard deviation for market orientation ('market driving' – 2.31)was lower than the lowest standard deviation for strategic orientation ('proactiveness' – 2.84). This seems to indicate that although the emphasis on the market orientation dimensions might vary more than on the strategic orientation dimensions, large New Zealand companies are more similar in their approach to market orientation than strategic orientation.

The alignment formula captured both the strength of focus on a dimension, as well as the similarity of the head of IT/IS and marketing of that focus, and synergy derived from it. Overall, the responding companies only manifested slightly above average (10) mean and median scores for the majority of the dimensions. The dimensions which scored more highly were the strategic orientation dimension of 'aggressiveness' and the market orientation dimensions of 'customer responsiveness' and 'competitor responsiveness'. This seems to indicate where the emphasis lies with large New Zealand companies. On the other hand, the strategic orientation dimension of 'futurity' and the market orientation dimensions of 'market driving' and 'competitor analysis' could benefit from some attention. This would facilitate a good match with the respective dimensions which enjoyed greater emphasis.

Finally, the general similarity of the scores for the strategic orientation and market orientation measures, point to them both having a role to play. Future research may indicate that one

approach is preferable to the other, but at this point it would be appropriate to keep both approaches under consideration.

Conclusion

This paper has proposed a method for measuring the alignment between IS and marketing within an organization. Two different approaches were developed, one based on the notion of strategic orientation (7 dimensions), the other based on the idea of market orientation (8 dimensions). A survey instrument employing Likert scales was developed and validated so as to measure individual scores for the various construct dimensions. (The questionnaire details are not included here for space reasons, but are available from the authors.) Various formulae for calculating alignment, under both strategic orientation and market orientation approaches, were examined. The formula $(4- |x-y|)((x+y)/2)$ was found to be preferred to the others. The preferred formula was applied to data gathered from 175 New Zealand companies. Analyses of the results from both strategic orientation and market orientation approaches suggested an overall similarity in the results. Future research will be conducted to examine the impacts of alignment on various organizational variables such as marketing effectiveness and business success. Such analyses should shed more light on whether one approach or the other is a stronger predictor of important outcome variables. In addition, it would be meaningful to conduct a similar study in another country or more to explore the difference between the New Zealand companies and those of the other nationalities.

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