An empirical and logical exploration of the strategic compatibility of *best practice* and *product innovation*: preliminary insights from Australian and New Zealand manufacturing industry.

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Abstract

In an attempt to enhance debate focused on an established academic controversy, this study re-investigated selected data from the 1994 AMC survey of Australian and New Zealand manufacturing practices to test the hypothesis that *best practice* and *product innovation* may be incompatible generic business strategies. A modification of Robert G. Cooper's Stage-Gate product development model was used as a theoretical framework to create a measurable construct of '*product innovation*' as a strategy and compare two groups: firms committed to a *best practice* strategy (BPs) and firms not utilising *best practice* (Non-BPs). Eight variables were scrutinised. After logical critique was added to statistical data analysis, four major insights emerged.

(1) Tests yielded several statistically significant but substantively inconclusive results because both studied groups had nearly identical profiles in rating innovation as the factor of lowest importance to commercial success and because the definitional framework which guided construction of the survey instrument treated innovation as a second-order issue. (2) Currently, *best practice* and *product innovation* are logically incompatible by definition. (3) Even if the definition of *best practice* were changed, it is likely that the additional key process of innovation would remain incompatible with the existing key process of benchmarking. (4) However, until the definition of best practice *does* make an attempt to include innovation as a key process rather than an outcome, testing any hypothesis of strategic compatibility between a best practice focus and an innovation focus will be both empirically difficult and logically unnecessary.

Introduction

The Research Problem

This paper reports a limited empirical investigation of the proposition that *best practice* and *product innovation* are incompatible generic business strategies for manufacturing enterprises. The study re-analysed selected data

from the Australian Manufacturing Council's (AMC's)1994 survey of Australian and New Zealand manufacturing practice in order to compare certain *product innovation* characteristics of two groups: firms using a *best practice* strategy (BPs) and those not using a *best practice* strategy (Non-BPs). The study's primary hypothesis, (H_1)adapted for each tested variable comprising the construct of *product innovation*, was that the pattern of innovation behaviour for BPs and non-BP's would be significantly different.

There is no doubt that the commissioners and researchers of the original AMC study implicitly believed that the BPs would be better at innovation. But they never specifically addressed this issue in their analysis of the wealth of data they generated. This paper aims to remedy that omission. A second objective, beyond any empirical findings of statistical difference (or similarity) between the BP and Non-BP groups, was to apply logical scrutiny to some of the core assumptions which underpinned the AMC's model of *best practice*.

The importance of the strategic compatibility question

This paper is grounded in a definitional conception of entrepreneurship as a process that stresses the close nexus between entrepreneurship, innovation and growth.

> *Entrepreneurship is the creation and management of a new organisation designed to pursue a unique, innovative opportunity and achieve rapid, profitable growth.*

The research began with a strong suspicion that the AMC best practice model - which prevailed at the alleged leading edge of Australian and New Zealand manufacturing industry until the mid-1990s and is still strongly advocated in early 2000 – is badly flawed because it views innovation as an output rather than a process (see AMC 1994, 3 and *passim*). Management's and scholarship's fascination with generic business strategies seems to be a constant. However, the respect accorded any given generic strategy seems to vary with time and place. Every decade or so, a new generic business strategy evolves and tends to dominate both business practice in a given community and management theory in learned journals. In Australia and New Zealand in the 1980s, the 'modern' generic strategy of *best practice* replaced the 'old' generic strategy of *cost reduction driven by economies of scale* as the dominant philosophy for manufacturing enterprises.

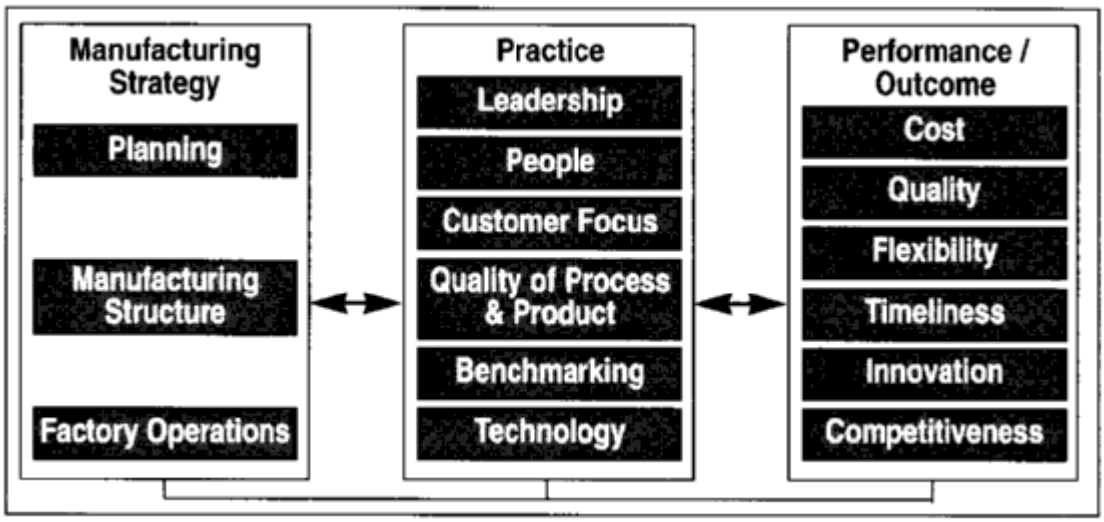
By the late 1990's, the broad emphasis had shifted to a focus upon innovation. But practitioners have not given much thought to the issue of strategic compatibility. Thus the vital question arises. Are *product innovation* and

best practice compatible generic strategies? If they are not, then a dilemma arises regarding which is the preferable alternative. This is an established academic controversy. On the one hand, some researchers argue that *best practice* enhances organisational culture and better develops business resources and systems to generate a more conducive and productive base for the creation of *new products* (Rimmer et al. 1996). In sharp contrast, other analysts, including Hayes and Pisano (1994), Sweetman (1996), Manoochehri (1999) and Schrage (1999), argue that the pursuit of *best practice* can actually constrain and hinder business organisations from successfully implementing and executing a *product innovation* strategy. However both sides of the argument suffer from a lack of formally-researched empirical support. To the best of the author's knowledge, no empirical investigation using dispassionate hypothesis testing appears to have been undertaken to test the contentious issue of the compatibility of *best practice* and *product innovation* as generic strategies. This study endeavoured to do so by revisiting an established data base.

The original survey – intent, perspectives and beliefs

In 1994, the Australian Manufacturing Council (AMC) was the peak body for manufacturing industry in Australia. In 1993 and 1994 it conducted a research project to provide 'a snapshot of the extent to which the pursuit of international best practices had permeated local workplaces' (AMC 1994, ii). The survey questionnaire was based on the Best Manufacturing Practices (BMP) Model illustrated in Figure 1, below.

Figure 1 - Best Manufacturing Practices Model (Source, AMC 1994: 3)



At the risk of oversimplifying the agenda of a very comprehensive study it can be said that two questions dominated the agenda of the original investigation. First, to what extent had *best practice* – as defined by the AMC model - been implemented by manufacturing enterprises? Second, was there a demonstrable relationship between the exercise of *best practice* strategy and business performance? The AMC survey found that a majority of manufacturers in Australia and New Zealand were adopting *best practice* and established a positive relationship between the pursuit of a *best practice* strategy and superior cash flow and sales growth results.

Incidental to its main focus, the AMC's survey instrument asked some questions, widely spaced throughout the survey instrument, about the importance manufacturing firms placed on certain activities in the areas of innovation in general and *product innovation* in particular. This minor, peripheral emphasis in the original AMC survey, was the main emphasis of the study reported in this paper. The responses to selected product innovation questions in the original survey were used to develop a *product innovation* construct, (see appendix and method section,below). It was hoped that the construct might yield new insights and perspectives concerning the compatibility *of best practice* and *product innovation* as generic business strategies.

Key Definitions

The definition used in the AMC study was:

> *Best practice is the co-operative way in which firms and their employees undertake business activities in all key processes: leadership, planning, customers, suppliers, community relations, production and*

> *supply of products and services, and the use of benchmarking. These practices, when effectively linked together, can be expected to lead to sustainable world-class outcomes in quality and customer service, flexibility, timeliness, innovation, cost and competitiveness.* (AMC 1994: 1).

Many other definitions of *best practice* exist, mostly emanating from analysts' attempts to understand, account for and emulate the position of global dominance achieved by sectors of Japanese manufacturing, in particular, its automobile industry (Womack 1990). This study has employed the Australian Manufacturing Council's definition of *best practice* (AMC 1994: 1) because it is both widely-used and specifically includes the argument that best practice helps organisations to be more successful at innovation. This study simultaneously employed Robert G. Cooper's definition of *product innovation* because of its combination of simplicity and comprehensiveness.

> *Product innovation is the systematic creation of products and services that contain some degree of 'newness' and commercial value.* (Cooper 1993:11).

Assumptions and Limitations

The study employed the following key assumptions.

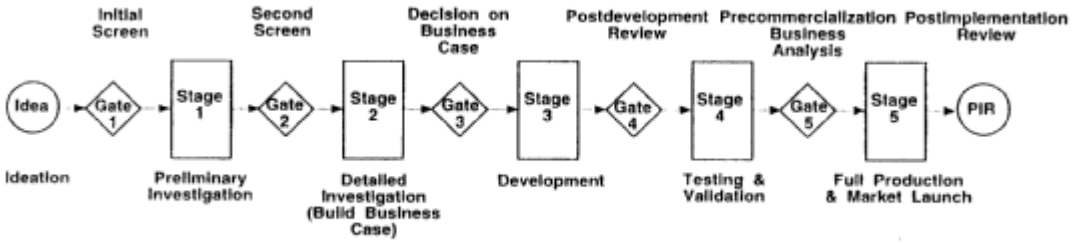
1. AMC respondent firms who indicated that they had a *best practice* program defined *best practice* ina manner similar or equal to the AMC's definition.
2. Both *innovation* and *product innovation* were interpreted by respondent manufacturing firms to be 'the ability to develop new commercially viable products and improve existing ones'.

This study focused narrowly on the compatibility of *best practice* and *product innovation* as generic business strategies among the Australian and New Zealand firms that responded to the AMC survey. It did not address the question of whether a relationship of causation existed between *product innovation* and *best practice*.

Theoretical Framework

Nijssen & Lieshout (1995) found that there are more than 180 relevant models that can be used to implement a *product innovation* strategy. Among all these models, Robert G. Cooper's stage-gate product development model was selected as the basis of a theoretical framework for this study (Cooper 1993: 107).

Figure 2 - Stage-Gate New Product Model (Source, Cooper 1993: 107)



This model was adopted because it is extensively used by business enterprises and because a derivative of it permits creation of a useful construct of *product innovation*.

Method

Data: ampling and instrument

The data used in this study came from the responses to the AMC's Best Manufacturing Practices Survey questionnaire (AMC 1994). A detailed treatment of all methodological issues associated with data collection can be found in the original report. In summary, in a stratified sampling design, questionnaires were posted to 3,000 Australian and New Zealand manufacturing companies (based on ABS data and its NZ equivalent). Just under 1,300 valid responses were obtained. Responses were found to be biased towards larger firms (over 100 employees). The survey sought to capture a range of information about the strategy, practices, manufacturing outcomes and business performance of respondent manufacturing sites. The full text of the AMC questionnaire is reproduced as appendix one of the original study (AMC 1994: 87-103). The questionnaire was derived from the *best practice* model presented above.

Populations: two groups distinguished

The very first question of the AMC survey (AMC 1994, 87) asked:

> *Has your site embarked upon a program aimed specifically at achieving "Best Practice"?* (with a reference to the definition already quoted above).

After the usual data cleaning, 914 "yes" responses provided the *best practice* (BP) group, while 345 "no"

responses provided the *non best practice* (Non-BP) group for the present study.

Measurement regime: construct and variables

Using data captured by the AMC survey instrument, Robert G. Cooper's Stage-Gate product development model (Cooper 1993, 107) can be abbreviated and operationalised as a construct where product innovation equals a function of two key elements: *commitment* and *capability*. The AMC data (see Appendix) permits 'commitment' to be represented by two variables and 'capability' by six variables. The appendix at the end of this paper contains the exact wording of the questions which generated each variable.

Table 1. The Eight Variables Examined in the Study

TWO 'COMMITMENT' VARIABLES

Variable 1: Product Innovation Importance Rating.

The whole process of product innovation is unlikely to begin unless management regards it as important.

Variable 2: R&D Commitment.

The function which Cooper calls 'ideation', the initial screen and 'preliminary investigation' are heavily dependent on the firm's commitment to R&D.

SIX 'CAPABILITY' VARIABLES

Variable 3: New Product Development Capability.

Unless the firm perceives that it possesses its *own* capacity (and a good one relevant to competitors) to create new products, it will probably not innovate.

Variable 4: Degree of Internal Focus: Match with Current Skills.

Variable 5: Degree of External Focus 1 - Domestic Customer Involvement.

Variable 6: Degree of External Focus 2 - Overseas Customer Involvement.

Variable 7: Degree of External Focus 3 - Supplier Involvement.

Variables four to seven, in combination, will determine a firm's ability to pass through the remaining gates and execute the remaining stages of the stage-gate model.

Variable 8: New Product Speed.

How fast is the firm from concept to product launch?

An additional variable which would have provided an excellent measure of product innovation capability,

percentage of sales represented by new products was included in the original survey but, unfortunately, data from the responses to this question were not made available to the researcher.

Hypothesis and analytical regime

One dominant hypothesis was examined for each of the 8 variables listed above.

H_1: the pattern of innovation behaviour for BPs and Non-BP's are significantly different.

Since this was exploratory research, non-directional testing was appropriate. A critical value of .05 was chosen.

Data were analysed using SPSS (version 9). For each of the eight variables, all of which involved ordinal data, a cross-tabulation showing percentages in each category for each group was generated and scrutinised and three tests were used to find evidence against the null hypothesis that no difference existed between the two groups with respect to the relative frequency with which group members fell into the various categories of the variable of interest. Tests were: (1) the Pearson two-sample chi-square test; (2) the Mann-Whitney U test and (3) the Gamma test. Table 2, below, in the results section, presents selected tabulated results of the hypothesis testing regime.

Validity and reliability issues

This study's survey instrument had high face validity. *Best practice* was clearly defined for survey respondents. The sample size (1,289 responses) was large and representative of the population of manufacturing firms. Construct validity is acceptable. The *product innovation* construct's variables represent the core elements of the Stage Gate product development model used as a theoretical framework. The measuring instrument delivered high reliability. It is possible to be confident that the model of *best practice* used by the survey instrument, if tested again, would yield the same results.

Results

The hypothesis (H_1) that there would be significant differences between groups for each product-innovation variable was supported for five of the eight variables as Table 2, below shows.

Table 2. Results of Hypothesis Testing

(A tick indicates H_1 is supported)

Variable Number and Name		Pearson chi-square p-value	Gamma test p-value	Mann-Whitney p-value.	H_1
1	Product Innovation Importance	.472	.704	.702	✗
2	R&D Commitment	.000	.000	.000	✔
3	New Product Development Capability	.790	.679	.679	✗
4	Degree of Internal Focus: Match with Current Skills	.010	.002	.002	✔
5	Degree of External Focus 1 - Domestic Customer Involvement	.028	.002	.002	✔
6	Degree of External Focus 2 - Overseas Customer Involvement	.000	.000	.000	✔
7	Degree of External Focus 3 - Supplier Involvement	.000	.000	.000	✔
8	New Product Speed	.138	.484	.491	✗

Interpretation and Discussion.

The three variables showing no significant differences between the groups

Variable 1: Product Innovation Importance Rating.

Table 3. The Low Importance Accorded to Innovation by Both Groups

MS2E Importance of Innovation * IN1A Has a Best Practice program ? Crosstabulation

			IN1A Has a Best Practice program ?		
			0 Non-BP	1 BP	Total
MS2E Importance of Innovation	1 Most important	Count	31	71	102
		% within IN1A Has a Best Practice program ?	9.0%	7.8%	8.1%
	2	Count	29	69	98
		% within IN1A Has a Best Practice program ?	8.4%	7.5%	7.8%
	3	Count	28	104	132
		% within IN1A Has a Best Practice program ?	8.1%	11.4%	10.5%
	4	Count	51	143	194
		% within IN1A Has a Best Practice program ?	14.8%	15.6%	15.4%
	5 Least important	Count	206	527	733
		% within IN1A Has a Best Practice program ?	59.7%	57.7%	58.2%
Total		Count	345	914	1259
		% within IN1A Has a Best Practice program ?	100.0%	100.0%	100.0%

As table 3 demonstrates, on this, the biggest innovation issue of all, nearly 60% of both BPs and Non-BPs rated innovation as the least important of five success factors (the others were leadership, planning, employee relations, customer relations and supplier relations). This is probably the most telling revelation of the whole study, providing compelling evidence that, in the mid-1990s, product innovation simply was not regarded as a key strategic issue by Australian and New Zealand manufacturing industry irrespective of any strategic involvement with *best practice*. Less than 10% of both groups rated innovation as the *most* important success factor. Any attempt to give support to either side in the debate about the compatibility of *best practice* and *product innovation* by discovering empirical distinctions between BPs and Non-BPs with regard to lesser nuances of the innovation issue was probably doomed from this point onwards – an event that could not be anticipated when specifying the research design. And so it turned out, as subsequent analysis demonstrates.

Variable 3: New Product Development Capability.

There is a clear implication in comparing the answers here to answers concerning variable 2, 'R&D commitment' (see below). Many respondent firms have obviously uncoupled 'new product development' from 'research and

development'. This uncoupling is fully compatible with the low importance accorded to product innovation invariable one.

Variable 8: New Product Speed. How fast is the firm from concept to product launch?

There are no differences in pattern between the groups.

The five variables showing significant differences between the groups

Preliminary.

Space constraints forbid reproduction of every cross-tabulation performed for each variable. This is a pity because sensible scrutiny of the cross-tabulations provides several good examples of the fact that, in this study, statistical significance was not often synonymous with high substantive value.

Variable 2: R&D Commitment.

When one burrows below the *overall* test p-values and simply 'eyeballs' the cross tabulations, it is obvious that there was no difference in the percentage of BPs and Non-BPs who spent in the highest R&D expenditure category (more than 5% of sales). This is the most important category for assessing distinctions with respect to product innovation. The major differences occur at the other extreme – businesses spending less than .05% of sales on R&D (the lowest category offered to respondents). This can scarcely be taken as evidence of greater innovation proclivity on the part of BPs.

Variable 4: Degree of Internal Focus: Match with Current Skills.

There is a remarkable congruence between the two groups at the centre of the ordinal range. So, the majority of statistical significance lies in the areas of minority response.

Variable 5: Degree of External Focus 1 - Domestic Customer Involvement.

Most of the differences between groups showed up in the numbers of respondents indicating heavy involvement of domestic customers in the product innovation process.

Variable 6: Degree of External Focus 2 - Overseas Customer Involvement.

Cross-tabulations clearly indicate that BPs had a much higher level of involvement of overseas customers in the

new product process. This is very probably because many of the Non-BPs, being smaller enterprises,were purely domestic and had no overseas clients! The statistically significant differences between the groups should not, therefore, be interpreted as a meaningful comparison of innovative propensity.

Variable 7: Degree of External Focus 3 - Supplier Involvement.

Here differences are highly significant, their direction is strongly indicated and important substantive value may be inferred. The evidence of the survey strongly supports an inference that BPs invoke supplier involvement in the new product development process more heavily than do Non-BPs.

Synthesising the implications

The findings of the empirical component of this investigation seem superficially disappointing. They do not directly contribute either firm support or rejection to resolution of the *best practice/product innovation* controversy. However failure at the task of resolution has been balanced by success in the area of elucidation. What emerges as important from this study's revisiting of an important data set is not any *differences* between best practice firms and non-best practice firms but their remarkable *similarity* in according low strategic importance to innovation in general and product innovation in particular. The central question which motivated this investigation was: are *best practice* and *product innovation* incompatible managerial strategies? Despite support for the hypothesis of difference for five of the eight variables analysed, the question of strategic incompatibility remains unresolved in an empirical sense. However, the very attempt to obtain and test empirical evidence has provided substantial logical insights.

The framework of best practice as embodied in the AMC study and represented in its the best manufacturing practices model (see figure 1, above) seems to predetermine incompatibility with any strategic approach to innovation. The AMC best practices model views innovation as an outcome – not a process. Innovation is thus, *a priori,* allocated to secondary status. In the AMC model, 'practice' (i.e. the conscious exercise of management processes) is determined by 'leadership', 'people', 'customer focus', 'quality of process and product', 'benchmarking' and 'technology'. The model fails to define any attributes which distinguish 'quality of product' and 'technology' (both considered as self-contained 'practice' categories) from the self-contained 'outcome' category of 'innovation'. Worse, the model provides no discussion of the potentially damning inconsistency

between benchmarking and innovation. Benchmarking is essentially copying: setting your standards by what someone else has done. Innovation is essentially being original: creating your standards by doing what no-one else has done. How can the practice of copying result in an outcome of originality? The intrinsic logic of the AMC version of *best practice* seems fundamentally flawed. It is no wonder therefore that data collected under the assumptions of this model are inadequate for testing the compatibility between *best practice and product innovation* or any other form of innovation. Let us return to the definition, used in the AMC study and presented at the beginning of this paper.

> *Best practice is the co-operative way in which firms and their employees undertake business activities in all key processes: leadership, planning, customers, suppliers, community relations, production and supply of products and services, and the use of benchmarking. These practices, when effectively linked together, can be expected to lead to sustainable world-class outcomes in quality and customer service, flexibility, timeliness, innovation, cost and competitiveness.* (AMC 1994: 1)

This definition treats innovation as fundamentally *passive*: one consequence of a limited set of active 'key processes'. This is a seriously flawed conception because innovation is nothing if not an active process. Innovation does not just happen. It must be consciously striven for. It is itself a key process. If *best practice* remains defined as the AMC (in company with many organisations and scholars) has defined it, there is simply no need for an empirical demonstration of its incompatibility with innovation (be it product or process innovation). The two strategic approaches are incompatible, in logic, to anyone who considers innovation to be an active variable: a 'key process' in its own right.

In summary, four major insights emerged from this preliminary investigation.

(1) Empirical hypothesis testing of the strategic compatibility of *best practice* and *product innovation* has yielded several statistically significant but substantively inconclusive results. This is for two reasons. First, both groups compared in this study had nearly identical profiles in rating innovation as the factor of lowest importance to commercial success. Second, the *best practice* definitional framework which guided construction of the AMC survey instrument treated innovation as a second-order issue and therefore was far from systematic in the placement and consistency of the innovation questions it asked of respondents.

(2) Currently, *best practice* and *product innovation* are logically incompatible by definition.

(3) Even if the definition of *best practice* were changed to include innovation as a key process rather than as a mere outcome, it is likely that the new key process of innovation would remain incompatible with the old key process of benchmarking.

(4) However, until the definition of best practice *does* make an attempt to include innovation as a key process rather than an outcome, testing any hypothesis of strategic compatibility between a *best practice* focus and an *innovation* focus will be both empirically difficult and logically unnecessary.

Appendix: the eight questions defining the variables under scrutiny.

This study's variable 1: Product Innovation Importance Rating (Source: AMC question code MS 2)

'Please prioritise the following factors from 1 – most important – through to 5 – least important) in relation to your site's success at this time, by placing a different number in each box. (Use each number only once).

OUTCOMES: • Cost • Quality • Flexibility • Timeliness • Product Innovation

This study's variable 2: R&D Commitment .(Source: AMC question code PO8d)

'Please indicate your site's current Research and Development as a percentage of sales?'

OPTIONS: 1 = less than 0.5%; 2 = 0.5% - 0.99%; 3 = 1% - 1.99%; 4 = 2% - 5%; 5 = more than 5%.

This study's variable 3: New Product Development Capability (Source: AMC question code MS 3h)

'Relative to our major domestic and international competitors, this site has an advantage/disadvantage in the following area: our ability to develop new products.'

OPTIONS: 1 = Large Disadvatage; 2 = Disadvatage; 3 = Same; 4 = Advantage; 5 = Large Advantage; 0 = Don't Know.

This study's variable 4: Degree of Internal Focus: Match with Current Skills. (Source: AMC question code CF4)

'We design new products to match our manufacturing and other capabilities.'

OPTIONS: 1 = Strongly Disagree; 2 = Disagree; 3 = Neither Agree nor Disagree; 4 = Agree; 5 = Strongly Agree.

This study's variable 5: Degree of External Focus 1 - Domestic Customer Involvement. (Source: AMC question code CF3a)

'In designing new products and services we use the requirements of domestic customers.'

OPTIONS: 1 = Strongly Disagree; 2 = Disagree; 3 = Neither Agree nor Disagree; 4 = Agree; 5 = Strongly Agree.

This study's variable 6: Degree of External Focus 2 - Overseas Customer Involvement. (Source: AMC question code CF3b)

'In designing new products and services we use the requirements of domestic customers.'

OPTIONS: 1 = Strongly Disagree; 2 = Disagree; 3 = Neither Agree nor Disagree; 4 = Agree; 5 = Strongly Agree.

This study's variable 7: Degree of External Focus 3 - Supplier Involvement. (Source: AMC question code CF3b)

'Our suppliers work closely with us in product development.'

OPTIONS: 1 = Strongly Disagree; 2 = Disagree; 3 = Neither Agree nor Disagree; 4 = Agree; 5 = Strongly Agree.

This study's variable 8: New Product Speed. (Source: AMC question code PO1g)

'Relative to our major domestic and international competitors, our new product introduction lead time is.'

OPTIONS: 1 = Much Higher; 2 = Higher; 3 = On Par; 4 = Lower; 5 = Much Lower; 0 = Don't Know.

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