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Critical marketing variables when launching high-technology products into international markets: An empirical study of Finnish firms

Abstract

While much research has been directed at the variables critical to successful R&D of new and high-technology products, much less work has been directed at those factors crucial to the success of these products when the firm attempts to enter the international marketplace. This study surveys Finnish high-technology firms and identifies those variables associated with successful versus unsuccessful attempts to enter the international marketplace. More precisely, the research attempts to determine and identify the marketing methods used by Finnish high technology companies in launching new products abroad. The rank order of importance of the different marketing methods will be presented. Also, the purpose is to determine if the use of marketing concept, marketing mix variables and marketing organization and planning variables significantly contribute to the success of international product launch. The generalizability of the findings to other economies is discussed.

Overview - The Problem

The product development process is long and tedious. Starting from idea generation and hopefully ending with a successful market place launch, emphasis has been placed by the developed countries on development of new products. During last 20 years or so the relative amount of R&D expenditure has risen from about 0,7 % to its current level of 2,2 % of GNP in Finland. This growth of R&D expenditure has been among the fastest of OECD countries.¹ The rise in R&D expenditures has been crucial to the success of many Finnish industries and companies.

Putting resources in R&D is not enough, however. The best innovation in the world is meaningless without purchasing customers. Marketing is the area most cited by technology intensive companies as being neglected.² Many of the problems new technology companies face are marketing related. These problems include lack of corporate identity, lack of marketing expertise, inability to reach target markets and develop customer relationships, difficulty in gaining channels of distribution and lack of international contacts. Finnish high-technology companies face an additional hurdle. Autio's internationalization hurdle is shown in the following figure 1.³ In another study it was found internationalization to be rather important to firms in Finland and U.K. due to the home market being most often too small to allow rapid growth of new, technology-based companies. More importantly, the importance of going international was believed to grow significantly. Going international at an early stage was found to be essential to companies achieving rapid growth. This step was concluded to be very difficult, yet crucial for companies of limited managerial and/or financial resources.⁴

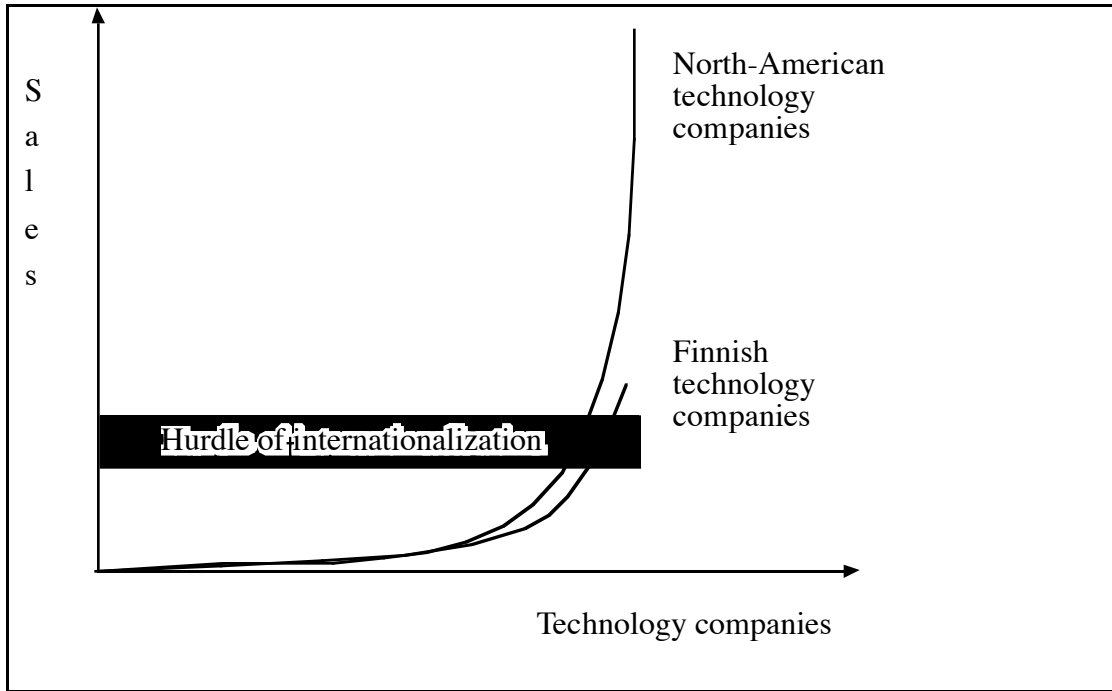


Figure 1. Comparison of Finnish and North American technology companies established within technical research institutes and universities.⁵

Hence, due to the size of the Finnish domestic market, there is greater need for Finnish companies to internationalize. Otherwise, revenues and profits will be inadequate to support the required expenditures in R&D. Market and marketing related factors contribute greatly towards the hurdle of internationalization effectively prohibiting many of the efforts of high-technology companies to internationalize. Understanding the needs of customers should be the starting point of R&D even in high technology companies. This approach has been found to significantly contribute to the success of new products.⁶

Marketing effectiveness and usage of marketing methods

The level of sales or profit performance does not necessarily reflect the effectiveness of marketing. Good performance can be achieved because the company is in the right place in the right time, rather than having an effective marketing management program.⁷ Cooper and Kleinschmidt indicated that new product's achievement can be measured in many different ways such as success/failure, profitability, pay back period, domestic market share, foreign market share, relative sales, relative profits, actual sales vs. objectives, actual profits vs. objectives, extent of existing market opportunities and extent of new market opportunities.⁸ There can be other reasons for good performance. Kotler suggests that various concepts should be used in measuring the effectiveness of marketing practices. The end result will be a measure indicating how well the different marketing tasks have performed. The marketing effectiveness of a company depend on a combination of five activities: Customer philosophy, integrated marketing organization, adequate marketing information, strategic orientation, and operational efficiency?⁹ Ann D'Aquila Scheer, on the other hand, used case study method in her study as a primary research instrument.

The purpose of this study is to determine which marketing methods have been used when launching new high technology products into the foreign markets, and how efficient they have been. The research so far does not cover this area. In a broad sense, the marketing methods included here are marketing concept, product, pricing, distribution, personal selling, advertising, publicity, promotion, market organization, use of marketing consultants, market share, new product development, market

segmentation, positioning, differentiation, marketing planning, marketing information systems/marketing intelligence, and market research.¹⁰

International marketing and export strategies

As in the case of marketing in a domestic context, international marketing is about creating and keeping customers in global markets. International marketing includes the same marketing methods as does domestic marketing, but what distinguishes international marketing is not the activities performed, but the way in which they are performed.¹¹

A marketing strategy is normally defined in terms of market selection and product strategy, and can be represented by a product/market matrix. Scheer's¹² approach is similar in this issue. She claims that when marketing management considers entering into the international marketplace, it is faced with three basic decisions: First, whether to engage to international activities at all; secondly, to identify what specific international markets are to be served; and thirdly, the best approach to use with respect to products, promotion, channels of distribution and price. "Product strategy" is used to describe product adaptation policy, or the degree to which a firm adapts its products to foreign markets. The strategy of market selection in export marketing includes two dimensions, the countries exported to, and the level of segmentation within these countries.¹³ No conclusive evidence has been found, suggesting that a company should concentrate on a few major markets. Cooper et al.¹⁴ showed that the type of foreign markets selected, segmentation strategy and product strategy all have pronounced impact on export sales and export growth. They also found that export strategy is often quite similar to the domestic marketing strategy.

The marketing concept suggests, that companies should use market segmentation and design products to fit the needs of each target market. It is logical to assume export marketing companies that adapt their products to the various export markets will have more market success. The relationship between strategy and performance has been established, and similar conclusions have also been drawn with respect to export growth. It is clear that the export strategy elected - marketing versus selling, or world versus nearest neighbor¹⁵ - is strongly related to export performance. Alahuhta¹⁶ was able to draw similar conclusions, though in a narrower context. He indicated that it was important for a high technology challenger to set global objectives early in order to efficiently exploit the global market opportunity. Challengers do not become global leaders by chance. Those firms that elect a world marketer strategy were found to have achieved an exceptional annual growth.

Another aspect to the strategy/success relationship, integration of technology and marketing, can be found in Cooper's and Kleinschmidt's study.¹⁷ As shown in figure 2, the most successful strategy is one that integrates marketing and technology. Here the focus is on the needs of the customer and at the same time on the state-of-the-art technology.

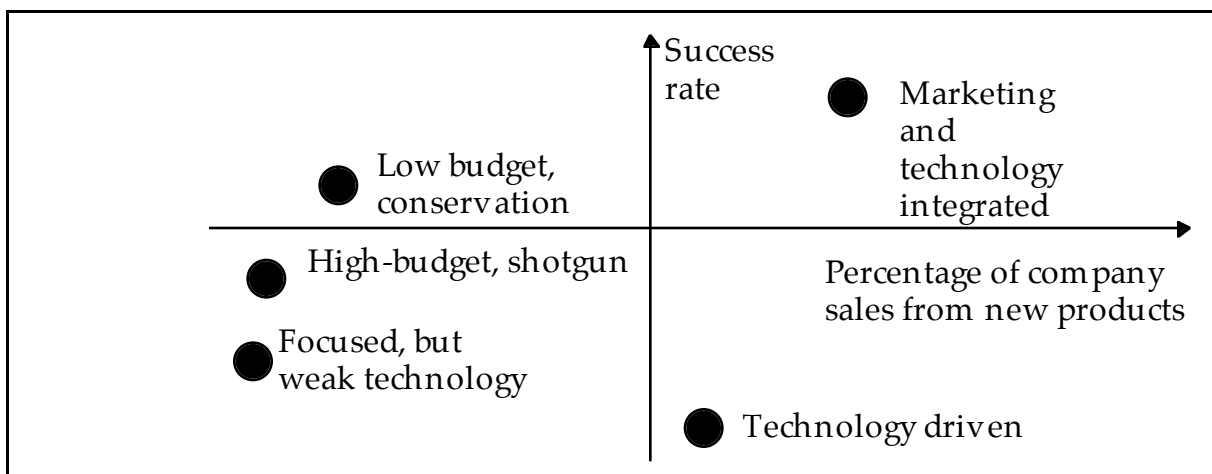


Figure 2. Comparison of new-product strategies on the percent sales and on the percent of projects that were successful.

High technology products and international marketing

Markets often must be created, not surveyed for technologically innovative products.¹⁸ The theory of supply-side marketing says that surveys trying to determine demand before the new product development are basically unnecessary.¹⁹ It was also concluded by Kohli and Jaworski concerning market orientation that "*The greater the technological turbulence, the weaker the relationship between market orientation and business performance*". The proposition is not that a market orientation is unimportant, but rather that it is less important.²⁰ Buskirk et al.²¹ note that "*High technology is the innovative application of technology to the solution of marketplace problems*". The role of marketing varies depending upon the stage of technology. Buskirk et al. suggest that a business competing with high-technology strategy succeeds by combining its technical expertise, its ability quickly to gain knowledge about its customers' problems and needs, and its ability to give the customer sufficient technological expertise to be able evaluate and choose a product.

McKenna emphasizes that there is need to draw a distinction between *marketing-driven* and *market-driven* approaches. Marketing-driven approach is based on advertising and promotion, while market-driven approach is based on developing strong products, understanding the market structure, and building relationships with other people and companies in the marketplace.²² Dynamic management of marketing relationships in the high-technology context is to be viewed as a creative learning process, based on the interaction between the buyers and sellers. It is clear that the marketing concept should be included in the framework of the present study. It should, however, be modified because of the nature of the high-technology products and the concepts of relationship marketing should be taken into account.

Goals of the research

The purpose of the present research is to gain knowledge about the use of marketing concept, marketing mix variables, and marketing organization and planning variables (marketing methods from here on) used by Finnish companies when launching new high technology products into foreign markets. The research contributes to empirically based knowledge concerning product launches and specifically to the role of marketing methods in product introductions. The research attempts to determine and identify the marketing methods used by Finnish high technology companies in launching new products abroad. Marketing methods investigated were selected through a literature review with respect to accounting for the special features of high-tech products.²³

Broader research issues can be reflected in the following questions: To what extent do Finnish high-technology companies use different marketing methods when launching new products into foreign markets?

Scope and limitations of the study

The focus is on Finnish high-technology industries. Pure services, management technology, process technology are beyond the scope of the research. Projects, subcontracted products and consumer products are also excluded. Noel Capon and Rashi Glazer write in their study more widely about the definition of technology. They identify three sources, or components of know-how: product technology (the set of ideas embodied in the product), process technology (the set of ideas involved in the manufacture of the product or the steps necessary to combine new materials to produce a finished product), and management technology (the set of management procedures associated with selling the product and administration of the business unit.²⁴ Finland, however, is representative of a

number of developing countries, which are presently attempting to enter international markets with their emerging high-tech domestic products.

Research methodology and model description

Data were collected from the managing directors and managers or directors of independent profit-centers of firms, headquartered in Finland, having sales revenue from both domestic and foreign markets. The reason for using this level of management was an attempt to avoid the intrinsic prejudices that could affect the responses of managers of departments concerning the relative importance of their own departments. Additionally, directors normally are also in charge of strategic decisions, and should therefore have the capability to evaluate new product launches and their results, while department heads often do not have enough information to properly address the strategic questions at hand.

The respondents were asked to reply regarding a product launch effort made during last three years. All possible efforts were made in the design process of the questionnaires to avoid the problem of selective perception.²⁵

Methodology included the development of questionnaires both for successful and unsuccessful product launches. Successful and unsuccessful product launches were compared. The difference between the successful and unsuccessful product launches was whether predetermined objectives were reached or not. The conceptual model in figure 3 suggests the relationship between marketing concept, marketing mix variables and organization/ planning on one hand, and success on the other hand.

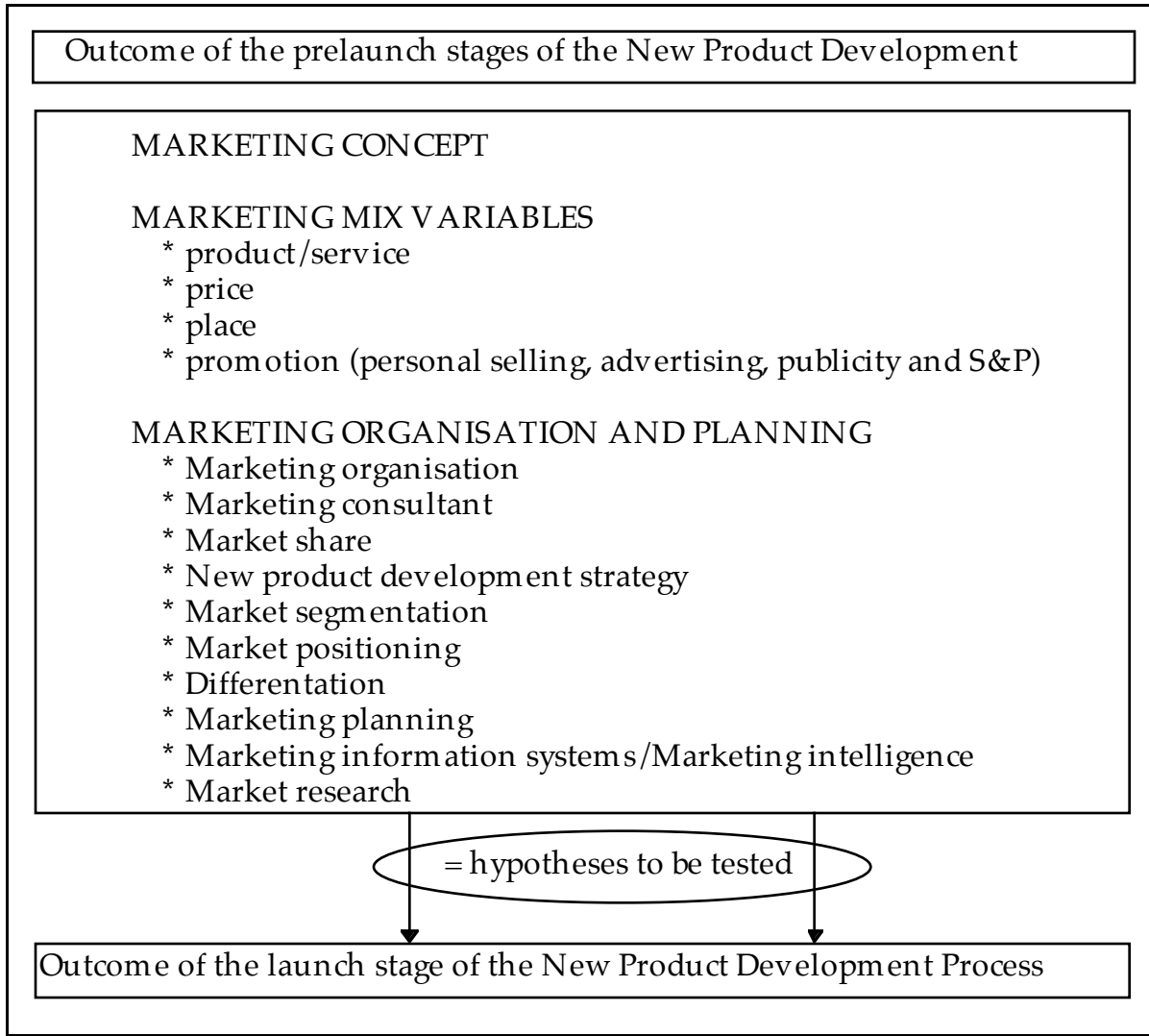


Figure 3. The conceptual framework of the research.

The primary concepts are the outcome of the new product launch into the foreign markets, and the marketing methods used and their contribution towards success. Figure 3 describes the hypothesized relationships of selected variables. The effect of the prelaunch stages and any number of additional factors, although very important, is beyond the scope of this research. It is the belief here that the management has the opinion prior the actual launch that the new product to be launched has every possible chance to make it in the market place. The other factors include f.ex. company-related factors such as background of key personnel, size of the company, industry, export intensity and company's experience in product launches.

In the real life the success or failure of the launch stage is influenced by internal factors (marketing and business controllables) such as marketing methods and costs and by external factors (marketing and business uncontrollables) such as competition, customers and business environment. Development of a more complete framework for the more careful appraisal of the role of marketing in the launch stage will be developed based upon this work.

Research questions and hypotheses

The aim is to study how effective various marketing methods are. As such, the hypotheses read:

- H₀₁ The use of marketing concept does not affect success at new product launches into the foreign markets.
- H₀₂ The use of marketing mix variables does not affect success at new product launches into the foreign markets.
- H₀₃ The use of marketing organization and planning variables does not affect success at new product launches into the foreign markets.

Sampling frame and sample, and data analysis methodology

Virtaharju and Åkerblom²⁶ identified the following high technology industries: drugs and medicine, office machinery and computers, electrical machinery for industry, telecommunication equipment, and scientific instruments. Drugs and medicines were left out of the present study due to their different nature in comparison to the other industries. The problem with industry-based definitions is that the companies within the specified industry are dissimilar. Every effort was made that the problems in this respect could have been avoided. It was asked from the respondent in the questionnaire, that whether the launched product in question, was a consumer or industrial product, project or subcontracted product. Accordingly, if the answer to this question was "Project", "Subcontracted product" or "Consumer Product", the answer was left out from the final sample, since it was felt by the researcher that projects and subcontracted products differ so vastly from the rest of the sample population. Projects and subcontracted products are always "produced" in very close connection with the final customer and thus f.ex. the meaning of advertising can be assumed to be limited. It was also decided that consumer products are to be left out of the scope of the research due to the fact the emphasis in the use of marketing methods is different.²⁷

The initial sample was received from the Statistics Finland and included all 298 companies in those industries. Two statistical analytical techniques were used. Chi-square analysis was used to check for relationships between two variables. Relationships between variables measured by categorical data, such as nominal or ordinal data, are typically examined using chi-square analysis. Chi-square analysis is used in the questions where the respondent is asked to circle a number on a scale from 1 to 5.²⁸ Chi-square is the "Likelihood ratio chi-square test" of the hypothesis that the model fits no better than fixed response rates across the whole sample. The likelihood ratio chi-square test is computed as twice the negative log likelihood for model in the analysis of likelihood table.²⁹

Findings

The mean sales of the companies was 256 millions of finnmarks (MFIM). Out of the firms, 44,4% belonged to a parent company. The mean percentage of R&D expenditure of sales was 9,6 %, which clearly indicates that the R&D intensity is very high in these companies when compared to the medium or low tech industries.³⁰ The mean percentage of marketing expenditure of sales was 10,0%. The percentage of export share of the sales was 62,4%, which indicates high export intensity.

Table 1 shows the rank order of importance of the different marketing methods. The second column (Calc.) was produced by multiplying the fifth level of importance by the corresponding frequency and by multiplying the fourth level of importance by the corresponding frequency and combining the two figures. This calculation was used possible to rank the marketing methods. The marketing methods were also divided into the groups shown in table 2.

Table 1. *The importance of marketing methods in ranking order.*³¹

Marketing method	Calc.	Rank	Description of importance
MARKETING CONCEPT			
1. Marketing concept	254	2	Very important
MARKETING MIX VARIABLES			
1. Personal selling	296	1	Very important
2. Product/service specialization	206	5	Rather important
3. Pricing	189	6	Moderately important
4. Sales promotion	178	7	Moderately important
5. Distribution	154	10	Moderately important
6. Publicity	77	14	Rather unimportant
7. Advertising	48	16	Very unimportant
MARKETING ORGANIZATION AND PLANNING			
1. New product development strategy	254	3	Very important
2. Differentiation	252	4	Very important
3. Market segmentation	177	8	Moderately important
4. Marketing organization	161	9	Moderately important
5. Positioning	141	11	Moderately important
6. Marketing planning	116	12	Moderately important
7. Market share	109	13	Moderately important
8. Market research	74	15	Rather unimportant
9. Marketing information systems/ Marketing intelligence	47	17	Very unimportant
10. Marketing consultants	31	18	Very unimportant

By using similar procedure, the usage of marketing methods in both successful and unsuccessful product launches are presented in the table 2.

Table 2. The rank order importance of marketing methods in successful and unsuccessful product launches into foreign markets.

Marketing method	Successful		Unsuccessful	
	Calc.	Rank	Calc.	Rank
MARKETING CONCEPT				
1. Marketing concept	213	3	41	4
MARKETING MIX VARIABLES				
1. Personal selling	227	1	69	1
2. Product/service specialization	169	5	37	6
3. Pricing	155	6	34	7
4. Sales promotion	135	8	43	3
5. Distribution	126	10	28	11
6. Publicity	73	15	4	16
7. Advertising	44	16	4	16
MARKETING ORGANIZATION AND PLANNING				
1. New product development strategy	214	2	40	5
2. Differentiation	189	4	63	2
3. Market segmentation	146	7	31	9
4. Marketing organization	127	9	34	7
5. Positioning	113	11	28	11
6. Marketing planning	98	12	18	13
7. Market share	78	13	31	9
8. Market research	74	14	8	15
9. Marketing information systems/ Marketing intelligence	30	17	17	14
10. Marketing consultants	27	18	4	16

Note: Bold font indicates a difference of two or more in rank order.

It can be seen, that all the marketing methods examined, are used in all companies to some extent. The relative importance of the marketing methods, however, seems to be quite different. **Sales promotion** is emphasized more strongly in unsuccessful launches than it is in successful ones. **New product development strategy**, on the other hand, seems to be less used as a marketing method in unsuccessful product launches than in successful launches. Contrary to this, **differentiation** seems to be more frequently used as a marketing method in unsuccessful product launches. **Market share** strategies would appear to be used more often in unsuccessful product launches. Another important issue here is that most of the differences seem to be in the marketing organization and planning category, where in six out of ten, a difference of more than two occurred. In the marketing mix variables category, only one major difference took place (sales promotion).

Research hypothesis 1 reads " The use of marketing concept does not affect success at new product launches into the foreign markets." The purpose is to determine if the use of marketing concept significantly contributes to the success of international product launch. The null hypothesis was rejected (see table 5), and thus it was found out that the use of marketing concept is significantly important when launching high-technology products into the international marketplace.

Table 3. The results of the chi-square analysis concerning hypothesis : the use of marketing methods versus successful/unsuccessful product launches.

Marketing method	Chi-square	Prob>ChiSq
MARKETING CCONCEPT		
1. Marketing concept	11,679	0,0199
MARKETING MIX VARIABLES		
1. Product/service specialization	6,265	0,1802
2. Pricing	2,319	0,6773
3. Distribution	3,483	0,4804
4. Personal selling	4,045	0,3999
5. Advertising	5,984	0,2003
6. Publicity	7,581	0,1082
7. Sales promotion	4,786	0,3100
MARKETING ORGANIZATION AND PLANNING		
1. Marketing organization	5,761	0,2177
2. Marketing consultant	2,352	0,6714
3. Market share	2,727	0,6045
4. Overall strategy in new product program	7,442	0,1143
5. Market segmentation	5,227	0,2647
6. Positioning	5,906	0,2063
7. Differentiation	2,225	0,6945
8. Marketing planning	6,117	0,1906
9. Marketing information system/marketing intelligence	8,480	0,0755
10. Market research	3,216	0,5223

Research hypothesis 2 reads " The use of marketing mix variables does not affect success at new product launches into the foreign markets." The purpose is to determine if the use of marketing mix variables significantly contributes to the success of international product launch. The null hypothesis was accepted (see table 5), and thus it was found out that the use of marketing mix variables is not significantly important when launching high-technology products into the international marketplace.

Research hypothesis 3 reads "The use of marketing organization and planning variables does not affect success at new product launches into the foreign markets." The purpose is to determine if the use of marketing organization and planning variables significantly contributes to the success of international product launch. The null hypothesis was accepted (see table 5), and thus it was found out that the use of marketing organization and planning variables is not significantly important when launching high-technology products into the international marketplace.

Conclusions

1. The success rate when launching high technology products into the export markets was in this study 80,4 %. This is a fairly high figure in comparison to the findings in other research. Zirkle, for example, found out in his research concerning consumer products that the success rate was 75,3 %.³² Caution should be exercised, however, when comparing the findings concerning new-product success rates between domestic and foreign markets, as well as between consumer and industrial markets.

2. Amongst Finnish high technology companies, product and sales related factors appear to have greater importance than marketing related factors, when launching new products into the foreign markets. The high ratings of product related factors of usage and effectiveness (new product development strategy (3. and 1. respectively) and product/service specialization (5. and 4.)) and rather high ratings of sales related factors (personal selling (1. and 3.), differentiation (4. and 5.), promotion (7. and 11.), and positioning (9. and 11.) are clear indicators that the Finnish high technology companies place more emphasis on product and sales related factors than marketing related factors (marketing concept (2. and 2. respectively), marketing planning (12. and 12.), market research (15. and 15.), and marketing information systems/marketing intelligence (17. and 14.). A *"Here is what we have discovered in our labs, and produced in our production line and this is what we sell!"* seems to be the standard approach instead of *"What do you really need and what kind of benefits are you seeking?"*

3. Amongst the four P's of the marketing mix, product factors clearly have the highest utilization, whilst the non-personal elements of promotion have the lowest usage ratings. Personal selling is the most important promotional element. The strong role of personal selling is probably due to the nature of the high technology products. It has to be noted here that, this research only dealt with industrial high technology products. This finding is in accordance with Philip Kotler's thinking when considering the role of the elements of the promotional mix between consumer and industrial products.³³

4. The careful balance between the various marketing methods is important in the successful launch of new high technology product into the export market. Product is the starting point. Failure cannot be avoided by artificial differentiation and massive promotional efforts. Achieving a certain market share should not be an objective at the outset of a product launch. When launching new high technology products, the situation is often such that there are no markets for the product or they are very limited. Thus, the emphasis should be in the creation of the markets. Later on, when the product has advanced in its' life cycle, the role of market share could increase.

5. Marketing concept is a marketing method which is more commonly used in successful product launches. This is an important finding. Marketing concept is a very important marketing method. Its' relative ranking was 2 amongst the 18 marketing methods studied. Although marketing concept was regarded as a very important marketing method both in successful (relative ranking 3.) and unsuccessful (relative ranking 4.) product launches, the difference in usage is significant.

Managerial implications

The results of this research bring many important points to the attention of the management of high technology companies. They should focus their attention on the following points when launching new products into the foreign markets:

1. Always study carefully the contents of the marketing methods you are using in the launch process of the high technology products. The launch of a new high technology product into the foreign markets is clearly a different process than the launch of a traditional consumer product.
2. Remember that the new product is finished only when the launch process is completed, i.e. the final customer has received the product and is satisfied with it.
3. Be aware of the final customers' real needs. Make sure you are able to offer the benefits he or she is seeking. Try not to compensate for the shortages of the product/service offering with overly zealous promotional efforts.
4. Implement the marketing concept into your organization. Involve everybody in this process including the R&D and production personnel.

Suggestions for further research

The contribution of this research is the determination of effective marketing methods in various situations when launching new high technology products into the international markets. Several interesting issues for further research aroused during the project:

1. Comparative research between countries with identical research approaches to the study in hand would raise interesting issues. In spite of the potential shortcomings of this approach, due to the cultural viewpoint, further research needs to be done.
2. Using similar research approach, but employing case study method would bring additional information to the marketing theorists and practitioners when speaking about the launch process of new high technology products.
3. Even more comprehensive research, including the market condition factors that affect the success of the launch, should be investigated.
4. The responding companies in this research were companies producing industrial products. It would be an interesting area to also study companies and the use of their marketing methods as regards to companies producing consumer products.

¹ Mikael Åkerblom: Yritysten tutkimus- ja kehittämistoiminnan kansainvälistyminen, p.7.
See also M. Puhakka: Euroopan integraatio ja yritysstrategiat.

² See for example Erkko Autio, Martti M. Kaila, Reima Kanerva, Ilkka Kauranen: Uudet teknologia-yritykset, p. 68, William L. Shanklin, John K. Ryans, Jr.: Essentials of Marketing High Technology, pp. 39-48 and 121-130, Robert G. Cooper: Overall Corporate Strategies for New Products p.186-189 and Regis McKenna: The Regis Touch, p.3-10. See also Annareetta Lumme: Uusteollistamisen avaimet, p. 28. In this latter study marketing and sales topped the list of management capability related factors.

³ Erkko Autio, Martti M. Kaila, Reima Kanerva, Ilkka Kauranen: Uudet teknologiayritykset, p. 153.

⁴ In Annareetta Lumme, Ilkka Kauranen, Erkko Autio, Martti M. Kaila: New technology-based companies in the United Kingdom and in Finland.

⁵ Erkko Autio, Martti M. Kaila, Reima Kanerva, Ilkka Kauranen: Uudet teknologia-yritykset, p. 68

⁶ See Deborah Dougherty: Understanding New Markets for New Products. Strategic Management Journal 11 (1990), p.59.

⁷ Philip Kotler: Marketing Management: Analysis, Planning and Control , 8th edition, Prentice-Hall, Englewood Cliffs, New Jersey. 1994. p. 756.

⁸ See Cooper, R.G., Kleinschmidt, E.J.: "New Products: What Separates Winners from Losers," Journal of Product Innovation Management 4 (1987), p. 169-185.

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- ⁹ Ann D'Aquila Scheer has used Kotler's approach in a way similar to that intended in this study. In her study the American export management companies were examined. Philip Kotler: From Sales Obsession to Marketing Effectiveness, *Harvard Business Review*, November - December 1977.
- ¹⁰ Ann D'Aquila Scheer: *Effective Marketing Methods in Export Management Companies*, The Fielding Institute. 1992. p. 72.
- ¹¹ Vern Terpstra, Ravi Sarathy: *International Marketing*, 5th edition, The Dryden Press, Hinsdale, Illinois. 1991. p. 166.
- ¹² See Ann D'Aquila Scheer: *Effective Marketing Methods in Export Management Companies*, The Fielding Institute, p. 38.
- ¹³ See also Adrian B. Ryans: *Strategic Market Entry Factors and Market Share Achievement in Japan*, *Journal of International Business Studies*, Fall 1988.
- ¹⁴ Robert G. Cooper and Elko J. Kleinschmidt: *The Impact of Export Strategy on Export Sales Performance*, *Journal of International Business Studies*, Spring 1985. p. 169-184.
- ¹⁵ Robert G. Cooper and Elko J. Kleinschmidt: *The Impact of Export Strategy on Export Sales Performance*, *Journal of International Business Studies*, Spring 1985. p.37-55.
- ¹⁶ See Matti Alahuhta: *Global Growth Strategies for High Technology Challengers*, Helsinki University of Technology, Espoo, Finland. 1990. p.129-131.
- ¹⁷ Robert G. Cooper: *Overall Corporate Strategies for New Product Programs*. See also Glen L. Urban, John R. Hauser: *Design and Marketing of New Products*, *Industrial Marketing Management*, 14 (1985). p. 59.
- ¹⁸ William L. Shanklin, John K. Ryans, Jr.: *Essentials of Marketing High Technology*, 2nd edition, Lexington Books. 1987. p. 41.
- ¹⁹ Larry Reynolds O'Neal: *An Empirical Investigation of the Role of the Marketing in the New Product Design*, Texas A&M University. 1985. p. 6.
- ²⁰ Ajay K. Kohli and Bernard J. Jaworski: *Market Orientation: The Construct, Research Propositions and Managerial Implications*, *Journal of Marketing*, 54 (April 1990). p.14. See also John C. Narver, Stanley F. Slater: *The Effect of a Market Orientation on Business Profitability*, *Journal of Marketing*, October 1990. p. 20-35.
- ²¹ Bruce D. Buskirk, Allan C. Reddy, Edward T. Popper: *Planning Market Development in High-tech Firms*, *Technovation* 14 (1994), p.2. See also Robert G. Cooper: *New Products: What distinguishes the Winners*. *Research and Technology Management*. (33), No. 6, November-December 1990. p. 27-31.
- ²² Regis McKenna: *The Regis Touch*, Addison Wesley Publishing Company. 1985. p.26.

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- ²³ See Sage Ann D'Aquila Scheer: *Effective Marketing Methods in Export Management Companies*, The Fielding Institute. 1992.p.6-7. Philip Kotler: *From Sales Obsession to Marketing Effectiveness*, Harvard Business Review, November - December 1977.
- ²⁴ See Noel Capon and Rashi Glazer: *Marketing and Technology: A Strategic Coalignment*, Journal of Marketing, 51, July 1987. p.2.
- ²⁵ Murray Richard Millson: *A Study of Internal and External Organisational Integration, New Product Development Proficiency, and Success*, Syracuse University. 1993. p. 12.
- ²⁶ Markku Virtaharju, Mikael Åkerblom: *Technology Intensity of Finnish Manufacturing Industries*. Statistics Finland. 1993:3. In their study, Virtaharju and Åkerblom determined the total technology intensity of various industries, and were able to divide industries in four different categories as follows: 1) high technology, 2) medium-high technology, 3) medium-low technology and 4) low-technology.
- ²⁷ See for example A.C. Cooper: *Entrepreneurship and High Technology* In D.L. Sexton and R.W. Smilor: *The Art and Science of Entrepreneurship*. Ballinger, Cambridge, Massachusetts, USA, 1986, p. 153-168. See Robert R. Reeder, Edward G. Brierty, Betty H. Reeder: *Industrial Marketing Management*, 2nd edition, Prentice Hall, Englewood Cliffs, New Jersey. 1991. p. 5-6 and Philip Kotler: *Marketing Management: Analysis, Planning and Control*, 8th edition, Prentice Hall, Englewood Cliffs, New Jersey. 1994. p. 205-213.
- ²⁸ See O'Neal, Larry Reynolds: *An Empirical Investigation of the Role of Marketing in New Product Design*, Texas A&M University. 1985. p. 37-38.
- ²⁹ SAS Institute: *JMP Statistics and Graphics*, Gary, North Carolina. 1994. p.118 and 102.
- ³⁰ For example Alahuhta's determination as high-technology assumed at least 5 % of R&D expenditure of turnover. Frequently used percentage is also 4 %. See Matti Alahuhta: *Global Growth Strategies for High Technology Challengers*, Helsinki University of Technology, Espoo, Finland. 1990. p.19. See also *Classification of high-technology products and industries*. Working Party N°9 of the Industry Committee on Industrial Statistics. Organisation for Economic Co-operation and development (OECD). 1994.
- ³¹ If the marketing method received 250 - 300 points, it was classified as "Very important", 200 - 249 points "Rather important", 100 - 199 points "Moderately important", 50 - 99 points "Rather unimportant", and finally 0-49 points "Very unimportant".
- ³² Edward J. Zirkle: *The Role of Marketing in New-Consumer-Product Development for Foreign Markets*, United States International University. 1993. p. 104. See also p. 5 for numerous other research articles concerning the failure rates of new products in various situations.
- ³³ Philip Kotler: *Marketing Management: Analysis, Planning and Control*, 8th edition, Prentice-Hall, Englewood Cliffs, New Jersey. 1994. p.617.