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Abstract

This paper addresses the problem of identifying success factors for new innovative software products to enter the market. A model for marketing innovative software products (MISP) that has evolved from Moore's (2002) 'crossing the chasm' metaphor is discussed. Catalysts and barriers that are relevant in the context of MISP throughout the first stages of a technology adoption life cycle from innovators to the early majority have been identified.

A case study method has been adopted to apply this model to a small innovative software organisation in New Zealand. Exploratory research was chosen to investigate the phenomenon under consideration. The research illustrates an exploratory single case study applying a deductive framework approach.

In this study it is suggested that the exploitation and saturation of each stage of the adoption life cycle is critical for overall product success. Relevant catalysts and barriers vary in each phase of the adoption life cycle which requires an alignment of respective marketing strategies. The factor sets that emerged from a literature review were extended by factors identified from case analysis. It has been discovered that participants' perceived stage may vary from the actual stage of adoption. The barriers and catalysts perceived by each employee vary perhaps because of a lack of marketing competencies and different world views. Potential areas for change have been identified and future directions are made for this particular SME.

Keywords: Marketing, Innovative Software, New Zealand

Introduction

In this research project a model that has evolved from Moore's (2002) 'crossing the chasm' metaphor is used as an appropriate tool with which to identify catalysts required to move from: innovators to early adopters; and early adopters to early majority. The research questions asked are: what are the main factors that impact on marketing new innovative software products? and what are the interrelations among these factors? Applying the model developed suggests that these two sets of marketing catalysts (innovators to early adopters, and early adopters to early majority) may be different.

First the MISP model (Marketing Innovative Software Products) (Figure 1) is outlined. This is followed by a brief review of the literature on marketing strategies for innovative software products. The case study research method to apply this model to a small innovative software organization in New Zealand is then described. Significant findings include: exploitation and saturation of each stage of the adoption life cycle is critical for overall product success; Relevant catalysts and barriers vary in each phase of the adoption life cycle; alignment of respective marketing strategies is required; participants' perceived stage may vary from the actual stage of adoption; and barriers and catalysts perceived by each employee vary perhaps because of a lack of marketing competencies and different world views. The paper concludes by identifying potential areas for change and future directions for this particular SME.
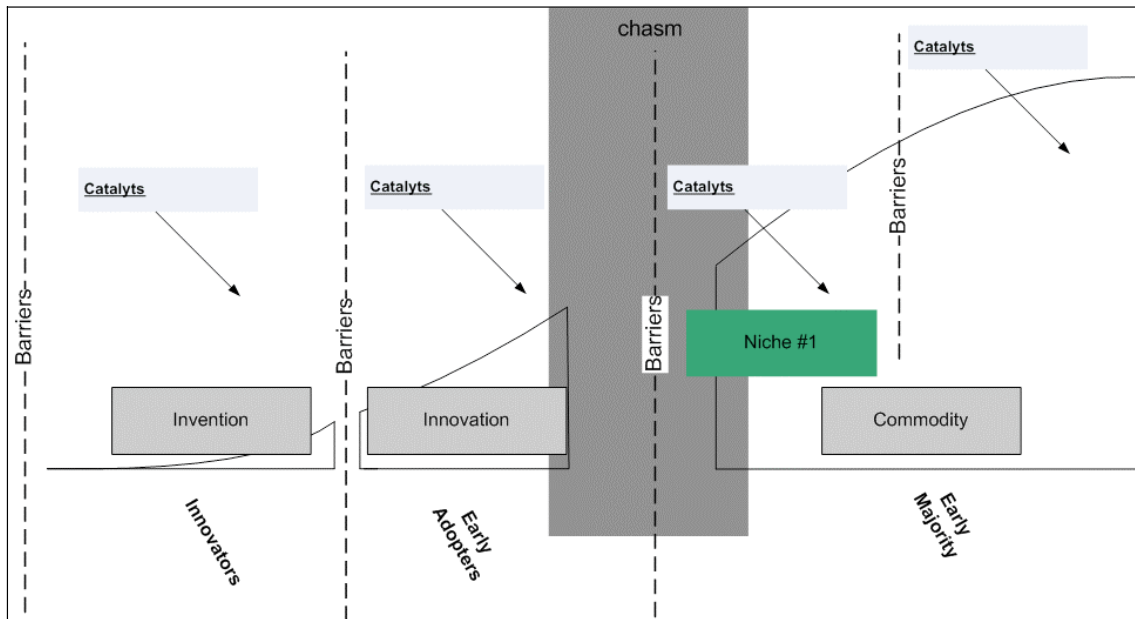
Figure 1 MISP Model (Marketing Innovative Software Products)

The MISP Model

Key to the adaptation of Moore's (2002) 'crossing the chasm' metaphor is the identification of catalysts required to cross the divide between different adopter groups. Catalysts are considered to be any factors that influence the uptake of an innovative software product in the case being studied. These catalysts are influenced by both the marketing context of the firm and the firm's characteristics that inform an appropriate marketing mix. Marketing plays a key part in realizing both transitions from invention to innovation and from innovation across the chasm to a commercial product by identifying and implementing catalysts. The MISP model extends Moore's (2002) model by providing a theoretical mechanism for identify marketing catalysts to cross the chasm.

A gap has been identified between scientific academic marketing theories, practitioner application and execution of marketing. Consequently, a more suitable approach is required that captures the dynamic and often chaotic growth, development and interaction of SMEs. An integrated approach that combines a post-positivist philosophy with a more interpretive approach is more suitable in the context of internationally operating SMEs according to Carson and Coviello (1996). Sinkovics Penz & Ghauri (2005) suggest a qualitative research approach that is flexible and open but that still follows conventional procedures of data gathering, analysis and interpretation. This research follows these recommendations for acceptance by academics as well as marketing practitioners.

Literature Review

Successful innovations require successful marketing. A marketing concept "holds that the key to achieving organisational goals consists in determining the needs and wants of target markets and delivering desired satisfaction more effectively and efficiently that your competitors " (Dalgic & Leeuw, 2006, p. 12).

A different marketing strategy needs to be applied in moving from early adopter to early majority to accommodate different buying patterns. It appears that market entry can be

achieved reasonably easily whereas survival cannot (Argarwal & Audretsch, 2001). The release of an innovative product to the mass market carries high levels of risk as well as manifold opportunities (Botting, 1997). The selection of a target market is a prerequisite to pursuing a niche marketing strategy within the early majority segment. As this has been identified as a main challenge in commercialising an innovative product, the capabilities of a firm should be aligned with the required strategies and tasks that are necessary to accomplish this goal (Slater & Mohr, 2006). A dilemma for small innovative software organizations is having an appropriate mix of marketing expertise in entering a mainstream commercial software environment (Dunn, Hulak, & White, 1999). Discovering the whole product solution including added-value and alignment with market needs (Cooper, 2000; Davis & Moe, 1997; Moore, 2002) is necessary to establish and to isolate catalysts. Close customer relationships help to identify the needs of the target market. In SMEs this is most likely to be conducted through business networks. Dunne (1999) suggests that a direct sales approach is best suited to early adopters. Small firms often have limited resources for sales and marketing for commercialising products themselves. Marketing alliances through strategic networking therefore become important. Strategic alliances also encourage product promotion through word-of-mouth among industry consultants (Kohli,1999; Goldenberg, Barak, & Muller, 2002). To stimulate word-of-mouth communication, interpersonal communication and networking are important abilities that are required to actively promote the firm and the product to key contact points of the target group's network. Rowley (2004) describes three ways in which virtual marketing communication could be effective: creating presence, relationships and mutual value.

Research Method
An exploratory single case applying a deductive framework approach has been adopted for this study. The case explored for this study was a small innovative software organisation in New Zealand whose core business is the design and implementation of a secure, spam-free interoperable grid infrastructure. The research questions were: (1) what are the main factors that affect marketing strategies of radical software innovations? and (2) what are the interrelations amongst these factors? Interviews and organisational documentations were used as sources of qualitative data. Four participants from the SME were interviewed: Chairman of the organisation (CH), the Chief Technology Officer (TO) (and founder of the organisation), a member of the board of directors with experience in marketing and sales (BM1), and another member of the board of directors with expertise in sales and marketing (BM2). Existing documents such as the company's business plan, financial projections and the marketing plan served as additional sources of qualitative data. A research journal in which ideas, impressions and reactions were recorded also served as a further source of data. Content analysis and clustering of results on the MISP model to identify catalysts and barriers is shown in Figure 2.

Findings
It can be seen from Figure 2 that in this SME each participant is positioned differently on MISP. These appear to be due to different participant worldviews and a lack in marketing competencies within the organization. All participants stated that catalysation of the platform was important. Each participant viewed the marketing stage differently according to MISP, had different product definitions, target market selection strategies to enter the main market and growth strategies. Also each participant perceived the catalysts and barriers to product success differently.
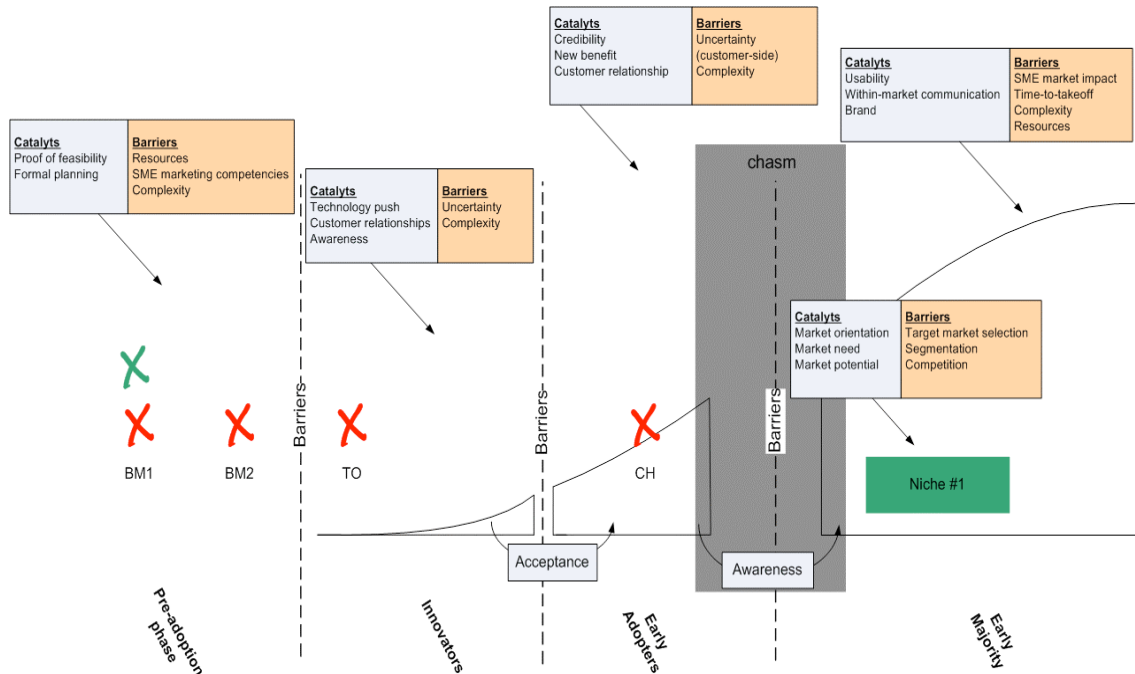
Figure 2: MISP model applied to the SME

The theoretical positioning according to the MISP model is that one product should be identified and marketed, refined to incorporate innovators, work with early adopters and then take this one product across the chasm once the technology has been proved to work and is acceptable to clients. Once critical mass is achieved, platform applications can be broadened to a wider audience. Additional products can then be released leveraging off the success of the first one – which happens beyond the chasm (Moore, 2002).

The launch of the platform therefore starts with a release of a new software product utilising a new technology in the background. This technology may be of interest for innovators and early adopters, however, all adopter groups beyond the chasm place their adopter criteria on factors other than technological newness. This would require the organization to decide upon one application before product launch with which the main market will be entered.

It appears that the participants from this particular SME have not yet reached agreement for the pre-launch stage. The organization has not engaged in marketing activities as they perceived that it was too early. It seems evident that a marketing plan is required for this SME to establish feasibility. Because the organization proposes to release the software platform as open source software, marketing of the 'killer' application in the optimum manner is paramount.

The members of the organisation have identified a lack of resources as a barrier to engage in marketing activities. This SME currently employs 14 developers. Members within the SME perceive that once the platform is released, it will be necessary to develop and release applications as fast as possible. Without a defined business model the employment of technical staff while cutting down on managerial jobs is perceived as sub-optimal in this stage. Once the organization is able to cross the chasm and more software applications are released that leverage off the success of the first application more technical staff will be required.

Formal planning is also required to supply evidence of feasibility in concept and evaluation of a defined strategy. A lack of marketing competencies especially in this phase constitutes a barrier for market entry. Once a business model is in place, a marketing plan can follow from there. Marketing strategies depend mainly on ways of generating revenue which may be through license fees, transaction fees or software sales.

Innovators

Barriers exist for marketing to the innovators sector. Feedback has come from innovators who are interested in the technology. There were fundamental concerns questioning the validity of the statements made on the company's website. The technology seems to be complex and even innovators quarreled with the basic design of the technology. It appears as if they could not believe what the company claims to have invented. However, since the website and provided information have not changed and since no other attempts have been made to communicate with the first adopter groups the uncertainty on the part of the customers is unlikely to disappear. A technology resulting from an enhancing of technological state-of-the-art is generally attractive to the innovator segment. However the organization has not been able to attract this segment partly because of disbelieve in the authenticity of the technology. Although the acceptance of new technologies within this segment has a positive impact on the adopter behaviour of later groups (Alves & Castro, 2006), it does not guarantee success in later phases of the adoption life cycle (Mahajan & Muller, 1998). But as early adopters use innovators as a reference in the choice of technologies they adopt (Goldenberg, Barak, & Muller, 2002; G. A. Moore, 2002), it is important to capture the first adopter segment. Effective cross-market communication exists between the first adopter segments. It seems therefore that the organization should strive for acceptance of the technology within the innovators segment. Only one participant perceived the bridge between the first adopter segments as important.

According to MISP it would be ideal to create awareness and excitement among innovators before product launch by preannouncement. None of the participants considered this as important. All four interviewees agreed upon going public with information once the technology is complete. This might be true for certain adopter groups in later stages however the early adopters groups generally respond with interest to preannouncement and want to learn more about new technologies upfront. Given that preannouncement increases with purchase cycle length and increasing learning requirements, the timing of preannouncement is perceived as optimal.

The release of the website a year before the technology was completed was a pre-announcement strategy pursued by the company because of pressure from investors. However, it appears that customers or interested parties are only originating from direct personal contacts, and that no contact has been established through the website, which was the preannouncement channel.

Another technique pursued by the company is to create awareness among innovators with the release of OSS. An interface definition will allow third parties to connect their own applications to the network. The company anticipates open source developers creating an interest in the technology. They hope to achieve the catalysation of the network through this special adopter relationship by people creating complementary products. With this strategy, network externalities for the platform could be achieved as the value of a network not only increases with growing number of customers but also with increasing number of complementary products (Wang, Wu, & Lin, 2005). It is not yet understood however what

would attract open source developers and motivate them to start developing applications utilising the new infrastructure. To be able to develop applications, users need to acquire the skills of the object oriented development language that is used by the company. A user manual of 61 pages and a more detailed book of 286 pages introduce potential innovators to this new technology. Also, there are perceived to be differences between the adoption and usage behaviour of technology innovators and OSS developers. Innovators want to try out the technology 'just to see if it works' (Moore, 2002, p. 33). They are not interested in utilising the network to build applications. On the other hand, the motivation to develop open source software is generally to create new applications that fulfill a purpose for the developer.

Early Adopters

This SME currently focuses on market needs and improving existing problems within existing markets. When creating a technology-push product, the new product competes on a new level of competition (Danneels, 2004). With the applications proposed by the company, the performance metrics of existing markets will not change; the company will only have the advantage of offering a more secure solution. For some this may constitute the compelling reason that triggers adopter decision. A new, unprecedented benefit leveraging the features of the company's network might be required to trigger adoption beyond solving current problems. Nairn (2005) recommends therefore to pursue a different approach in which solutions are provided for new problems rather than improving existing solutions.

The lead-user method or market experiments can be an adequate approach to gain deeper insights in market's future requirements.

Complexity as a barrier exists for the company in attracting early adopters. A clearer and simpler approach needs to be adopted by the company to be able to market the revolutionary technology. Awareness that serves as a catalyst is assumed to exist between early adopters and early majority. Although there is no effective cross-market communication that effects purchase behaviour directly (Goldenberg, Barak, & Muller, 2002), the creation of awareness fulfils the first prerequisite to adopt a new technology.

It became apparent that from the data collected that target market selection for the first niche market constitutes the main barrier for the small company. Selecting a beachhead (Moore, 2002) depends on the target market. The whole product solution components may be altered to deliver high value to the first customer segment, but the product and purpose remains the same. For their beachhead product, the company attempted to select a new product and target markets that were completely different products to those in earlier stages.

The company's technology network provides a basis for the creation of security solutions. It remains a challenge to find out which target market requires and depends heavily on secure data transmission using mobile devices. According to Dalgic and Leeuw, (2006) besides characteristics as sufficient size and purchase ability, niche markets have no competitors and consider markets which have been ignored by others so far.

Alves and Castro (2006) suggest that in order to launch a product, estimated development cost and potential business scenarios should be addressed. All participants agreed that these factors were important for proposed beachhead products. So the requirement for a beachhead product is a closed niche market segment with a great market need for a security application for which a current application does not exist or can be completely replaced. A closed niche means also that the border of the system is strictly controlled. The beachhead product

therefore needs to maintain security within the niche and strictly control the border security of the niche.

The 'crossing the chasm' metaphor by Moore (2002) that is based on a bell-shaped technology adoption model was found to be very appropriate as a guideline in commercialising innovative high-tech products. One weak spot in the model has however been identified that needs to be taken into account by those who follow the model as a marketing blueprint. If the goal of a company is to generate revenue, and not solely increasing the number of adopters this should be emphasised as an additional measure of success. The technology adoption model by Moore (2002) considers number of adopters only.

One new marketing strategy factors has been identified. The brand name for the organisation has been identified by BM1 as an important marketing tool. Literature on brand marketing is extensive. However, it was not considered as important earlier as a start-up SMEs is unlikely to have a brand name established when entering the market with a first product.
The low number of new marketing factors identified might be due to that fact that all participants involved in marketing activities at the company lack in formal marketing competencies. However, an overall strategic guideline has been adopted by the particular organisation. Single steps in the process towards bringing the new innovative platform to the market are 'hands-on' as opposed to formal marketing tools.

Four newly identified factors are related to the radical-ness and newness of the proposed platform and related products. The disruptive and new-to-the-world nature of the technology influences its marketing. This is reflected in the interviewees' responses. The four factors (1) level of innovation, (2) complexity, (3) proof of feasibility, and (4) usability are relevant for the company because of the disruptive nature of the platform. Literature did not reveal these topics or did not highlight those as important. The degree of radical-ness of the company's technology is very high. As very radical new products appear infrequently, research on the phenomenon is minimal. As there was a lack of literature on radically innovative products, it was expected that the case study research would inform the MISP model by identifying new factors in the area of innovation marketing.

Factors identified retrieved from literature that have not been named by any of the participants are: (1) industry norms, (2) the role of the entrepreneur and (3) innovative marketing. It is suggested that these factors were not named because they do not apply for the specific case of this SME from the participants' point-of-views. This does not mean that they are generally unimportant in the context of MISP.

Apparently, the members of this SME do not perceive themselves as within the norms of the software industry as they believe their product will revolutionise the entire software industry.
The entrepreneur is generally the key actor in SMEs and is central to all decision-making processes and the central contact point for formal and informal networks. For this SME, a manager with experience in the management of start-up firms replaced the founder of the firm. This step separated the technical from the managerial aspects of the firm. This SME has a board of directors that manage the firm on a democratic or collaborative basis. The role of the managing director is still very important because he is in charge of final decision-making. Nevertheless, the organisational structure allows for a decentralisation of power within the SME. Network contacts are not only established by the CH but also through BM1 and BM2, which further increases the decentralisation of power.

Besides the innovative product, no participant specified innovation on other levels such as business model innovation or innovative marketing. It is believed that this arises from the fact that no formal planning has been pursued yet nor has the business model been defined.

The SME under consideration in this study was expected to have a defined position on the MISP model. The different world-views of the participants and the different levels of involvement in the organisation resulted in different perception of the actual position on the model. The participants all had different views on what catalysts and barriers exist to enter the market and how to achieve the desired catalysation of the network.

As suggested by the proposed MISP model, technology push and awareness serve as main catalyst to attract the first adopter segment. For this particular case, catalysts to enter the innovators groups are: awareness of the technology and proof of feasibility on a conceptual and implementation level. Due to the highly innovative nature of the technology developed by this SME, the proof of feasibility is important to convince first adopters of the authenticity of the proposed technology. Catalysts to move from innovators to early adopters were expected to be product credibility derived from information from external sources; acceptance by the innovator community and evidence of functionality regardless of cost. The study further suggests that the early adopter group makes high demands of a technology provider in that a solution not only needs to provide competitive advantage but also the way in providing advantageous solutions needs to be different and revolutionary in uncovering new market opportunities.

The literature suggested that catalysts from early adopters to early majority posed a problem as there seemed to be no effective cross-market communication between early adopters and the mass market of early majority adopters (Goldenberg, Barak, & Muller, 2002; G. A. Moore, 2002). This study however suggests, based on Dunn et al. (1999), that there exists a connection between these two adopter groups as the niche market product leverages off the experience and credibility of earlier adopters. This may not influence ultimately adopter decisions however it may remove barriers of uncertainty and risk associated with any purchase decision. Therefore, product awareness is considered as a cross-segment catalyst between early adopters and early majority. Early majority adopters need to: solve an existing business problem with new benefits; minimise risk; and have sufficient trust and credibility in the new product.

The early majority can be approached by selecting a niche market with a high need. With the prospect of improvement of a critical problem, adopters of the first niche market tend to place less emphasis on factors that will be important for later customers within the same adopter segment. Once a firm has managed to exploit one niche market within the early adopters segment, within-market communication appears to facilitate adoption of a broader audience.

Throughout the whole production lifecycle, SME marketing competencies form a barrier for the small company to achieve. Results arising from a lack of understanding of marketing terms and a lack of understanding of complex coherences that exist between firm actions, customer behaviours and product adoption are apparent. These need to be understood in advance to be able to take decisions.

The complexity and the revolutionary nature of the product result in high uncertainty and disbelief involved with customer purchase considerations. Acceptance that is based on

product and firm credibility within the first adopter group is therefore an essential requirement to achieve first market results.

There arises a dilemma for a small software development company as the available capabilities interfere with requirements of the market. An innovative marketing approach and alternative to conventional high-cost, high resources marketing will be the key for the small company.

Future Directions

Potential areas for change have been identified and the following recommendations are made for this particular SME. The identification of marketing catalysts and barriers at the first stages of the technology adoption life cycle aided in developing a marketing plan for the particular SME. It is also expected that MISP will be applicable for further organisations.

The firm's credibility to prospective clients can be improved through: realigning their website as a marketing tool by including an easy verification of information, provision of contact facilities, a professional design and usefulness of information to various stakeholders; establishing a brand; creating a profitable business model that defines the ways in which revenue will be generated; establishing an innovative marketing plan; choosing an appropriate single application with which to cross the chasm; focus on innovators and early adopters; create awareness via appropriate preannouncement; reduce learning requirements and uncertainty; choose customers within the respective adoption segment; improve internal communication; think from the end-customer back; and develop marketing competencies within the organization.

Conclusion

In this paper an evolutionary model (extended from Moore's (2002) crossing the chasm metaphor) for marketing innovative software products (MISP) has been proposed. One weak spot identified in Moore's model is the lack of consideration of the need for a company to generate revenue. The technology adoption model by Moore (2002) considers number of adopters only.

This research has identified the marketing catalysts required to move from innovator to early adopter and from early adopter to early majority for one SME. These findings can not be generalised, however development of MISP adds to the body of knowledge for marketing innovative software products.

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