

A Comparative Study on Marketing Mix Models for Digital Products ^{*}

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Abstract. The rise of the Internet and electronic commerce provide a huge marketplace and unique transaction process for digital products. It is significant to discuss whether established marketing models can be revised for digital products. First, the unique features of digital products are systematically reviewed, and then three typical digital products, including e-books, anti-virus, and online translation services, are analyzed and compared utilizing three established marketing models, including 4P, 4C, and 4S. We find that these marketing mix models have different suitability for three typical digital products. The intention of this paper is to provide a reference for enterprises in selecting marketing mix model according to product's categories and to provide a marketing strategy tool kit.

1 Introduction

The integration of technology will lead to an overall shift in the behavior and competition strategy of market participants [1]. It is interesting to discuss whether established marketing models can serve for digital products while great changes happen in market environment and in product's characteristics. By nature, digital products can be transacted and delivered through the Internet [2]. Information, payment, and delivery related with digital product's transaction are integrated into the Internet channel. For the transactions of physical products, it must be accompanied by off-line or physical logistics [3].

With unique characteristics in economic and physical property, digital products have many differences from physical products in marketing strategy. For example, all digital products can be transacted without the need for a medium to carry them, since the cost of distribution and production is near zero. The problem is that margin-cost pricing is not available. So the suitability of 4P (product, price, place, promotion) marketing model in an E-environment has been questioned [4]. Mahajan and Venkatesh [5] share the same opinion, opportunity and challenge are brought to E-Business with the rapid development of the Internet, still existing models may have objective conflicts, long-term profit

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maximization is appropriate for E-Business firms as well, yet, increasing customer share and realizing profits and/or cash flow may be important in the short term, so existing models may not fit well in E-Business situations.

About the validity of 4P marketing mix model in digital space, a typical argument is "...marketers should focus on playing an active role in the construction of new organic paradigms for facilitating commerce in the emerging electronic society underlying the web, rather than infiltrating the existing primitive mechanical structures... [6]". Following this issue, many new models are put forward to replace the 4P model in digital marketplace[2][7][8][9][10][11][12][13], such as 4C, 4S, 5P, 7P, ICDT and three "flow" models. Among these alternatives, the 4C and 4S model have wildspread influence. According to Lauterbor, the 4P model can not fit well in E-market, which should be replaced by the 4C model (consumer wants and needs, cost to satisfy, convenience to buy, and communication)[7]. The 4S web marketing model (scope, site, synergy and system) is put forward by Constantinides [10], which is designed for depicting enterprise strategy in E-Business.

Therefore, the 4P marketing mix model may not valid on the Internet age, the 4C and the 4S model are some alternatives. The intention of this research is to study the suitability of those three marketing mix models for digital products in digital space. It is hoped to find which marketing mix model fit well for different types of digital products. Therefore, a tool kit of marketing strategies is developed for professionals selling digital products.

2 Characteristics and Categories of Digital Products

Different marketing strategies may be applied to different types of digital products due to their unique characteristics [14]. It is very important to sum up the characteristics of digital products for investigating the suitability of the established marketing mix model. Most digital products share the following economic characteristics.

Production The production of digital products is always associated with a huge fixed cost and negligible margin cost [15].

Public goods Digital products have some consumption characteristics of public goods, such as non-exclusiveness and non-rivalry [16].

Network externality Contrary to the basic principle of traditional economics, digital products with positive feedback abide by the principle of "more abundant, more precious" [17].

It is possible that non-digital products share some characteristics above. But digital products also possess some unique physical characteristics at the same time.

Attrition-free Once produced, they will exist forever with the same quality. Furthermore, the competition must spread between new digital products and second-hand digital products.

Changeability The content of digital products can be changed or customized easily [18]. The integrity can not be controlled by manufacturer after downloaded by users.

Replication It is most meritorious that digital products can be shared, replicated, stocked and transferred easily. After the first copy of a digital product is created, it can be manufactured with a very low marginal cost. Digital products are composed of text, graph, and voice etc. They are heterogeneous because all the components can be reconstructed quickly and easily. Therefore, it is important to classify various digital products.

In this paper, we adopt the framework put forward by Hui & Chau [19] which classified digital products into three categories according to three dimensions including trialability, granularity and downloadability (Fig. 1). Those are utilities and tools, content-based digital products and online services.

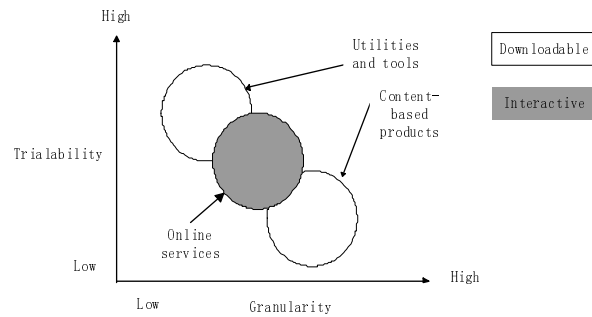


Fig. 1. classifying digital products [19]

These three categories of digital products exhibit differences in trialability, granularity and downloadability(See Table 1). We argue that different categories of digital products require different marketing mix models .

Table 1. Characteristic comparison of different categories of digital products [19]

| Category | Trialability | Delivery mode | Granularity | Example |
|--------------------------------|--------------|---------------|-------------|---------------------|
| Content-based digital products | Low | By download | High | e-book |
| Utilities and tools | High | By download | Low | Anti-virus software |
| Online services | Medium | Interactive | Medium | Online translation |

3 Marketing Strategy Analysis of Different Digital Products

The classic 4P marketing model, the 4C marketing model and the 4S marketing model are summarized from different business backgrounds. Constantinides suggest that the background of 4P is industrialization which is characterized

by enterprise-centric[10]. With the shift of power from enterprise to consumer, the 4C model is put forward, which is characterized by customer-centric. The 4S marketing model was created for E-Business environment [10]. For different business backgrounds of three marketing mix models, We argue that the 4P, 4C and 4S marketing mix models have different suitability for three categories digital products.

In this section, we will analyze the suitability of three models for three different categories of digital products.

3.1 4P Marketing Mix

The 4P model delimit four distinct, well-defined and independent management processes. Despite the consistent effort by many physical businesses to deal with the 4P in an integrated manner, the drafting but mainly the implementation of the P policies remains largely the task of various departments and persons within the organization. Even more significant thought is the fact that the customer is typically experiencing the individual effects of each of the 4Ps in diverse occasions, times and places, even in case that companies take great pains to fully integrate their marketing activities internally[10]. Enterprise can promote products through mixing four “P” strategies. A clear marketing strategy tool kit for enterprises selling digital products is provided through analyzing different categories of digital products with 4P as shown in Table 2. We find that promotional tools of content-based digital products are more than others and combining trialability is different in three categories of digital products shown in Table 1. We argue that the less trialability a digital product is, the more promotional tools it needs.

3.2 4C Marketing Mix

With market competition shifting from product-oriented into customer-oriented, some defects of 4P emerge. Under this condition, 4C marketing mix model is put forward by Lauterborn who suggest the marketing strategies that involved product, price, place and promotion are passe. Consumer wants and needs, cost to satisfy, convenience to buy and communication are the catechism for our times[7]. This model considers a marketing problem from the consumer perspective[10]. The content includes four points. First, what the customer want should be sold rather than what you can manufacture. Second, enterprise should take every efforts to decrease the cost of fulfilling the customer’s demand. Third, enterprise should take every efforts to give convenience to customer for purchasing. Finally, communication with customer is more important than promotion. Analysis based on the 4C model of three categories digital products is shown in Table 3.

Now that we have a marketing strategy tool kit which are from customer’s perspective for enterprises selling digital products. At the same time, we find that the less trialability a digital product is, the more communication tools it needs, which is the same finding as the 4P model.

Table 2. 4P marketing strategy of different digital products

| | Content-based digital products (e-book) | Utilities and tools (anti-virus software) | Online services (online translation services) |
|-----------|---|--|--|
| Product | <p>Products individual (the ssreader divided e-book into single chapter to sell)</p> <p>Lock in (caj browser used by China National Knowledge Infrastructure)</p> | <p>Quickly update version (kv3000 anti-virus software put new version each year)</p> <p>Products individual (if you purchase UFIDA U8 soft, you can choose the module you need)</p> <p>Binding (WPS Office)</p> <p>Versioning (all version of WPS Office)</p> | <p>Lock in (QQ client)</p> <p>Products individual (stock trade online of West Stock)</p> |
| Price | <p>Nonlinear pricing (ssreader's reading card: RMB35/quarter, RMB100/year, RMB180/two years)</p> <p>Individual price (products sold in second hand market)</p> <p>Value transfer (e-journal provided in cfan web site, sell quantity of journal is one of the largest.)</p> <p>Two-part price (fix monthly fee of telephone and payment each time)</p> | <p>Group price (user of kv3000 net version/RMB10/month)</p> <p>Name your price(priceline.com.tw)</p> <p>Two-part price(after purchase U8 soft of UFIDA, you should pay for using every year)</p> <p>Value transfer(newhua.com is free , revenue come from advertisement for huge visiting stream)</p> | <p>Individual price (lesson online service of new oriental in second hand market)</p> <p>Two-part price (there are initial ISP service payment then pay for using each year)</p> |
| Place | <p>Web store (dangdang.com)</p> | <p>Web site constructed by manufacturer (jiangmin.com)</p> <p>web store (newhua.com)</p> | <p>Web site constructed by manufacturer (russky.com)</p> |
| Promotion | <p>Recommendation(top 10 of ssreader.com)</p> <p>Personalization(When Mary returns to the dangdang.com, it responds "Hello Mary")</p> <p>Comparison shopping (pconline.com)</p> <p>Customization (Yahoo China)</p> <p>User comment list (ssreader.com)</p> <p>Individual recommendation ("we know you buy some E-business books last time, there are some related books for you")</p> <p>Rules-based system("the exercises book is a good complement to this book")</p> <p>Ordering tools(shopping baskets)</p> <p>Advertisement is involved in product(book of ssreader.com)</p> <p>Requirement register (ssreader.com)</p> <p>Digital watermark (photosl.net)</p> | <p>Rules-based system (before downloading update package, please select version)</p> <p>Ordering tools (shopping baskets)</p> <p>Advertisement is involved in product (flashget)</p> <p>Trial (WPS Office provide limited trial)</p> <p>Authorization limitation (KV3000 net version can check virus, but can not update)</p> <p>FAQs (jiangmin.com)</p> | <p>Affiliates(russky.com)</p> <p>FAQs (russky.com)</p> <p>Instant Message (QQ)</p> <p>BBS (bbs.russky.com)</p> |

Table 3. Marketing strategy of different categories digital products based on 4C

| | Content-based digital products (e-book) | Utilities and tools (anti-virus) | Online services (online translation services) |
|--------------------------|--|--|---|
| Consumer wants and needs | <p>Products individual (the ssreader divided e-book into single chapter to sell)</p> <p>Binding(browser is bind into e-book)</p> <p>E-coupons(sozhao.com/tools/yhq/dangdang.asp)</p> <p>User comment list (ssreader.com)</p> <p>Requirement register (ssreader.com)</p> <p>Classified advertisement (8848.com)</p> | <p>Quickly update version (kv3000 anti-virus software put new version each year)</p> <p>Products individual (if you purchase UFIDA U8 soft, you can choose the module you need)</p> <p>Binding (WPS Office)</p> <p>Versioning (all version of WPS Office)</p> <p>Advertisement of different category (newhua.com)</p> | <p>Products individual (stock trade online of West Stock)</p> <p>Version (online translation of netat.net.cn can restrict different subject)</p> <p>Advertisement of different category(multi-language translation of netat.net.cn)</p> |
| Cost of satisfy | <p>Nonlinear pricing (ssreader's reading card: RMB35/quarter, RMB100/year, RMB180/2 years)</p> <p>Individual price (products sold in second hand market)</p> <p>Two-part price (fix monthly fee of telephone and pay each time)</p> <p>Value transfer (e-journal provided in cfan web site, sell quantity of journal is one of the largest.)</p> | <p>Group price(user of kv3000 net version/RMB 10/month)</p> <p>Name you price (priceline.com.tw)</p> <p>Two-part price (after purchase U8 soft of UFIDA, you should pay for using every year)</p> <p>Value transfer (newhua.com is free , revenue come from advertisement for huge visiting stream)</p> | <p>Individual price (lesson online service of new oriental in second hand market)</p> <p>Two-part price (there are initial ISP service payment then pay for using each year)</p> |
| Convenience to buy | <p>Web store (dangdang.com)</p> <p>Ordering tools (shopping baskets)</p> <p>Security policy (see the privacy and security notice on ssreader.com)</p> <p>Comparison shopping (pconline.com)</p> <p>Virtual reality (e360.cn)</p> | <p>Web site constructed by manufacturer (jiangmin.com)</p> <p>Ordering tools (shopping baskets)</p> <p>Security policy (see the privacy and security notice on ssreader.com)</p> <p>Trial (WPS Office provide limited trial)</p> | <p>Web site constructed by manufacturer (russky.com)</p> <p>Security policy (see the privacy and security notice on ssreader.com)</p> |
| Communication | <p>Recommendation (the suggestion on ssreader.com)</p> <p>Personalization (When Mary returns to the dangdang.com, it responds "Hello Mary")</p> <p>Customization (Yahoo China)</p> <p>Individual recommendation ("we know you buy some E-business books last time, there are some related books for you")</p> <p>Rules-based system ("the exercises book is a good complement to this book")</p> <p>Trial (free 17 pages in ssreader.com)</p> <p>Online auction (ebay.com.cn)</p> <p>FAQs (ssreader.com)</p> <p>Digital community (Sun digital community)</p> | <p>Rules-based system (before downloading update package, please select version)</p> <p>Advertisement is involved in product (flashget)</p> <p>Trial (WPS Office provide limited trial)</p> <p>Authorization limitation (KV net version can check virus, but can not update)</p> <p>FAQs (jiangmin.com)</p> <p>Auction (ebay.com.cn)</p> | <p>Affiliates (russky.com)</p> <p>FAQs (russky.com)</p> <p>Instant message(QQ)</p> <p>BBS (bbs.russky.com)</p> <p>Digital community (Sun digital community)</p> |

3.3 4S Marketing Mix

The 4S model (web-marketing model, WMM) was put forward by Constantinides [10]. It describes web marketing strategy with four elements begin with “S” including scope, site, synergy and system. The goal of this model is to design and develop marketing mix for BtoC online projects through controlling four “S” elements. In 4S model, the scope element is of primarily strategic character and outlines the decisions to be made on four areas: (a) the strategic and operational objectives of the online venture; (b) the market definition including measuring the market potential and the identification/classification of the potential competitors, visitors and customers of the site; (c) the degree of readiness of the organization for E-Commerce; (d) the strategic role of E-Commerce for the organization. The web site is therefore the functional platform of communication, interaction and transaction with the web customer. The prime mission of the web Site is to attract traffic, establish contact with the online target markets and brand the online organization. The synergy factor embraces a wide range of issues divided into three categories: the front office, the back office and the third parties. The front office refers to conventional corporate communication and distribution strategies; The back office synergy includes three issues: (a) the integration of E-Commerce physical support into existing organizational processes; (b) the legacy integration; (c) integration of the online operation into the company’s value system. The success in virtual marketplace often requires co-operation with Internet partners outside the organization and its value system. Finally, the system factor identifies the technological issues as well as the site servicing issues to be addressed by the E-Commerce management.

The 4S model brings out how to prepare a web marketing strategy on two issues. First, on strategic layout, the main strategic problem is planned which is insurance of creating successful web marketing strategy. The 4S model emphasizes that web marketing strategy should consistent with enterprise strategy. Web marketing strategies should integrate with other operation strategy and take full advantage of competition advantage. Second, on operation layout, a methodology for making web marketing strategy is provided.

4 Discussion

There is an interesting finding in Table 2 and Table 3 that the lower trialability of digital products is, the more promotional tools it needs. A probable explanation is that digital products are a kind of experience products, consumers can understand the product after purchasing it [3]. So the best promotion tool is trial, through trial, consumer will persuade himself to purchase. Referring Table 1, utilities and tools is the best in trialability while content-based product is the worst in trialability. So promotion of content-based product should be achieved by multi-marketing tools except trial. The other two categories of products can be promoted by trial. That is to say, three categories of products have notable difference in promotion tools. We can sum up this point as:

Trial is the best promotion tool for digital products. With high trialability, the digital products needs less promotion tools. At the same time, with low trialability, the digital products needs more promotion tools.

Table 4. Marketing strategy of different category digital products based on 4S

| | Content-based digital products (e-book) | Utilities and tools(anti-virus) | Online services(online translation services) |
|---------------------------------|---|--|--|
| Scope (strategy and objective) | Market segmentation (demographic variables, geographic variables, psychographic variables and behavioral variables) Potential customers (profiles, motivation, behavior and needs) Internal analysis(internal resources, value process, and the web sustaining technology) Strategic role of the web activities (information platform, educational, promotional and transactional) | Same as left | Same as left |
| Web site (online experience) | Link exchange (Coolgo e-book, sreader) Advertisements Factors of web site (domain, content, design, layout, atmosphere etc) | Optimize of speed of web site Factors of web site (domain, content, design, layout, atmosphere etc) | Optimize of speed of web site Factors of web site (domain, content, design, layout, atmosphere etc) |
| Synergy (integration) | Web store (dangdang.com) The back office (physical book store) | Web site construct by manufacturer (jiangmin.com) The front office (updating product installed in client) | Web site construct by manufacturer (russky.net/trans/) Third parties (outsourse of logistic) |
| System (technology requirement) | Technology requirement of web site (stabilization, security, software, hardware, protocol, system service etc) Preliminary payment system (sreader) | Technology requirement of web site (stabilization, security, software, hardware, protocol, system service etc) Instant payment system (kv3000) Post-payment system (net version RMB10/month) | Technology requirement of web site (stabilization, security, software, hardware, protocol, system service etc) Instant payment system(in web site (russky.net/trans/) payment can be finished by SMS(short message system) and network) |

Delivery mode in Table 1 can partly explain different place strategies in Table 2. Value of content-based products can transfer through download mode, if adopting a web store, the distributions cost is low. Value transfer of online services need to interact with the customer, web site construction by manufacturer is only a feasible way. For frequent updates (e.g., update of the package) of utilities and tools, enterprises selling utilities and tools often constructed web site by itself. Web stores is a feasible tool on condition that updates are not required.

Comparing 4S model with the 4P and 4C models, we find strategic elements involved in 4S model that distinguish from others. It is combined of strategy marketing with tactics marketing. For products needing manufactures construction web site by itself as a distribution channel, it is necessary to select a target market from the market segmentation according to position. Those are important to design web site. The web site of online service is often constructed by manufacturers and there are some strategic elements, including position and target market selection, affect web site's business status except promotion instrument

including advertisement etc. That is to say, the 4S model is a feasible marketing strategic tool kit for enterprises selling online service. There are parts of enterprises of selling utilities and tools constructing a web site by themselves, the 4S model is suitable for them. Enterprises selling content-based products seldom construct web site by itself, the suitability of 4S model is low. The 4C model considers a marketing problem from the consumer perspective. Customer's demand can be easily fulfilled while the difference ability of products is high. Therefore, 4C model is suitable for products with high difference ability. Content-based products have the highest difference ability, which can be reconstructed with different segments to distinguish from others and with no additional cost. Online services have a medium difference ability which is decided by its high trialability, but some cost accompanies trialing. Utilities and tools have low difference ability which can not be reconstructed randomly. In summary, the 4C model has high suitability of content-based products and medium suitability of online service and low suitability of utilities and tools. The 4P model has more controllable ability of four elements than others, so the 4P model is suitable for utilities and tools well. The 4S model is suitable for utilities and tools on condition that manufacturer constructs web site himself. Under this condition, it is best to combine the 4P model and the 4S model. The other two products have medium suitability for the 4P model. Analyzing of the above can be summarized into three findings:

For content-based products, the 4P model is much more suitable than the 4C model, while the 4C model is more suitable than the 4S model.

For utilities and tools, the 4P and the 4S models are more suitable than the 4C model.

For online service, the 4S model is more suitable than the 4P and 4C models.

5 Conclusion

There are three contributions of this study. First, with unique characteristics in economic and physical property, the classic marketing models including 4P, 4C and 4S have different conditions in applying to the selling of digital product. Second, for each category of digital products, the priority of suitability of established marketing mix models is provided. Third, there is an interesting finding that the less trialability a digital product is, the more promotional tools it needs.

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