

Benchmarking bundling practices in the software industry

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Benchmarking Bundling Practices in the Software Industry

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Abstract. Pricing comprises a crucial part of software product management. One strategy to follow is bundling; the sale of two or more products or services as one package. So far, little is known about the use and acceptance of bundling as a pricing tool within the software industry, especially when it comes to combining products and services into one package. In this paper we present the results of a small sample survey conducted with software companies, to both identify the bundling strategies that are employed and to let these companies benchmark their strategies with their competitors. In total, twenty-three companies took part in a web survey. Amongst others, results show that currently 71% of the companies make use of bundling and the average size of their packages is equal to five components. The configuration of such a package proceeds by assembling components around the product or service that is closest to the core competence of the organization.

Keywords: software product management, software business, product software, software related services, pricing strategy, bundling

1 Introduction

Software product management is becoming ever more important, with many businesses relying on virtual products (e.g. software products) for their revenue. Software product management is defined as: “the discipline that governs a software product over its whole life cycle, from its inception to customer delivery, in order to generate the biggest possible value to the business” [4]. The responsibilities within the discipline of SPM cover areas, such as requirements engineering and release planning. Because SPM involves generating the biggest possible value to the business, the responsibilities also evolve around price models and pricing strategies. A proper pricing strategy is of vital importance for a successful software company [12], and therefore needs more attention.

One of the topics covered within the domain of pricing is product bundling. Most definitions of bundling originate from either marketing or economics. From a marketing perspective, Gultinan [7] defines bundling as: “the marketing of two or more products and/or services in one package at a special price. Stremersch

& Tellis [18] define product bundling from a more generic perspective as: “the sale of two or more separate products as one package”. While multiple definitions exist, the core of the definition remains the same, being: the practice of selling two or more products or services as one package. So far, attention for bundling mainly stemmed from researchers out of the domains of economics and marketing. The main focus of these researchers has been on different methods to maximize revenues and profits out of bundling by optimizing the product and service mix for a package. Also the domain of marketing regards bundling as a main strategy to attract customers. Examples of these studies are the work by Bakos & Brynjolfsson [1], or more recently by Gurler, Oztop & Sen [8].

Because of the intensive service flows within the product software industry the definition of bundling is not entirely satisfying. According to Cusumano [3], the revenue of a software vendor is comprised out of products (i.e. software and hardware), maintenance and services. A product software company can, for example, supply their customers with a software product that requires hardware. A software product in this sense is: “a packaged configuration of software components or a software-based service, with auxiliary materials, which is released for and traded in a specific market” [19]. Apart from that, this product may also require an array of services which are related to these products or even a mainframe. These services range from implementation services and training to customer-specific customizations. Furthermore, this system requires maintenance. All these artifacts and services can be an integral part of one package. On the contrary, a software vendor can also decide to offer the software product almost free of charge. However, it requires specific implementation services from the vendor in order to utilize the product. We regard both of these situations as instances of bundling and therefore we will refer to both of these forms of delivery as a package. A package in this sense can contain any configuration of software, maintenance, services and hardware. The artifacts that are part of such a package, we refer to as components.

As already acknowledged by Penttinen [17] back in 2004, the concept of bundling is not often studied within the research domains of information systems, product software and software business in general. When bundling is studied however, the emphasis is on bundling essentially separate products in one package. Lehmann & Buxmann [13] name the Adobe Creative Suite as an example of this, since it apart from photo editing also contains software to create PDF files. Due to this lack of attention, this paper directs attention to bundling of software, services and hardware. Through a small sample benchmark survey with software vendors, service providers and system integrators we map the influence bundling has on pricing strategies for components of a package. In order to achieve this, topics, such as the way in which a package is composed, how revenue can be attributed to components that comprise this package as well as bundle strategies and how these findings relate to different company types are addressed. The findings presented in this paper can be utilized by organizations within the software industry to benchmark their performance or to embrace bundling. Out of a researchers perspective, this paper is the first step towards

filling the void on the edge of the research domains of bundling and product software business and management.

The remainder of this paper continues with an explanation of the research question and all relevant sub questions in section two. The third section contains a process description of the data collection and analysis. Due to the exploratory nature of this research, results will be presented in the fourth section. We will elaborate on the gathered data set and we will conceptualize this data. An analysis and interpretation of these results is presented in section five. Section six contains a summary of the encountered validity threats as well as statements about possible generalization of the results presented. In section seven we draw the main conclusions and provide suggestions for future research.

2 Research Questions

The main research question answered in this paper is as follows: “*What is the influence of bundling on pricing mechanisms for components of a product package?*”. In addition to the main research questions, two sub questions have been derived.

1. **How does the composition of a package relate to the revenue per component?** - A package can consist of any configuration of components. Because of the variety of different service flows, prominent within the software industry, this can lead to a diverse set of configurations. This sub question will be answered by studying both the composition of the package of each participant and the revenue each component represents within this package.
2. **What is the relation between the composition of a package and over- or underpricing individual components?** - As noted by Mulhern & Leone [15], packages can be made more attractive for potential customers by over- or underpricing certain components. Within the software industry, this dynamic is ever more present. By answering this sub question, we will identify the relation between the composition of a package and over- or underpricing. We will also identify patterns within this relation.

Both sub questions will be answered in section four and five. The answers to the sub questions form the basis to provide an answer to the main research question. Contextual characteristics, such as the company type, industry type and market type are used to provide a further classification in answering all the research questions.

3 Research Design

For performing this research, we have chosen to conduct a benchmark survey, since for now few research has been performed on the subject of bundling within the software industry. Because of this, a broad input in the form of a web survey

suits the research objectives better than a more in-depth method, such as a case study [2]. Furthermore, this way we enable software companies to benchmark their performance, by delivering a benchmark report that compares their results to the entire dataset. The procedures employed for this research are similar to the ones used by Jansen, Brinkkemper & Helms [11].

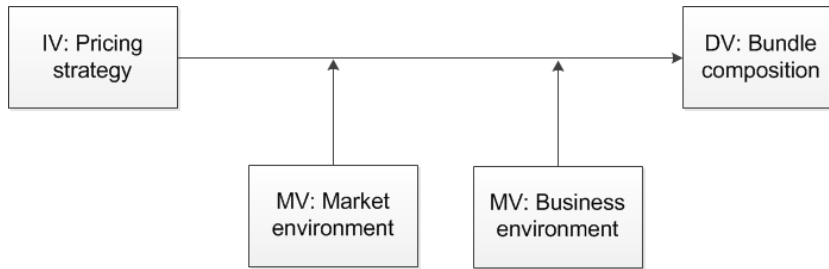


Fig. 1. Conceptual Model

As shown in figure 1, the core of the research involves investigating relations between the dependent variable bundling and the independent variable pricing strategy. However, various variables can have a moderating effect on this relation. These variables include the market and business environment. The variable market environment is measured by the perceived competitiveness of the market, market share and loyalty of the clients. The variable business environment is measured by the type of company and its dimensions. This research, for a large part, focused on quantitative data and for a smaller part on the amount of qualitative data that has been gathered. The qualitative part of this research aids in the effort of gaining new insights in rationale, while the quantitative part in this research intends to identify patterns and trends. Furthermore, basic quantitative methods were employed to prove or disprove the following hypotheses:

- **H1: The component being the core competence of the organization is the component that represents the highest annual revenue share.** Companies can focus on their core competences when doing business. Packages are then shaped around one main component, the component that the organization specializes in, the heart of the package and thus comprising the largest share.
- **H2: Software components as part of a package are purposely underpriced to stimulate sales of the total package.** The sale of software stimulates the sale of services within the package. Companies provide their software either at a lower price or for free to benefit the sale of services. The underlying assumption behind this is that it is easier for a potential customer to value the average market price for software and hardware. Doing this, the company attempts to benefit from recurring fees out of the intensive maintenance and support flows that are characterizing for the software industry [10].

3.1 Survey Design

The survey has been constructed out of three parts. Two parts of the survey refer to the measurement of factors related to the moderating variables; business environment and market environment. The other part aimed to elicitate all knowledge about bundling (i.e. the composition of a bundle) and pricing strategies (i.e. over- or underpricing). Each part consisted of around six to nine questions. The survey contained both open and closed questions and also included a number of multiple-choice questions and statements to be answered on a five point Likert scale [14].

Most multiple choice questions were employed to identify the decisions made with regard to pricing and package composition (e.g. the components that a bundle consists of or the revenue share that each of these components represents). Accompanying open questions provide insight into the rationale behind pricing strategies for components of a package. Most information related to the moderating variables is elicited by employing categorized multiple choice questions as well as closed questions. At the end of the survey some statements on the basis of a Likert scale were included to measure customer loyalty and the attitude of companies with regard to bundling.

With regard to construct validity, findings from previous research [3,13,15] did form the basis for this survey. To further enhance construct and internal validity, the survey does adhere to the survey heuristics as defined by Fowler [5]. Furthermore, a pilot survey has been employed. Two participants have been asked to complete the survey to ensure the questions in the survey are unambiguous and result in the intended type of answers. These two participants have been excluded from further participation in this research. With the received feedback from these participants, approximately 5% of the survey was modified.

3.2 Data Collection and Sample Selection

To be able to conduct the survey, a digital survey environment has been set up with the open source software LimeSurvey, which includes Extensible Markup Language (XML) export functions in order to create a small bridge with other applications. The application that is connected with LimeSurvey is a self-written Hypertext Preprocessor (PHP) script that uses the open source library fPDF to generate the Portable Document Format (PDF) feedback report.

By means of a benchmark survey, potential participants found a strong incentive to participate in this research. A representative from a company that did complete the questionnaire and did submit his or her email address has received a simple benchmark PDF report. In this benchmark report, the scores of their company are compared with the scores of the total dataset.

Software vendors, system integrators and service providers have been contacted to take part in this survey. Desired respondents from a company were employees residing from management, sales or software product management functions. There were no restrictions in the geographic location of potential participants. Start-ups and companies employing less than five people were excluded

from the targeted participants. Another requirement was that their presence within the product software industry has to be significant and thus one of their main business functions.

Potential participants have been contacted through direct and indirect channels. Around twenty companies have been contacted directly through email and have been invited to fill in the questionnaire. Furthermore, the digital survey has been spread by means of professional network portals. Companies that are active within relevant groups on social networks have been invited to take part in this survey. The data gathering process took place for three weeks, starting in the middle of December until the end of the first week of January.

Because of the limited timeframe in which this research took place, the desired number of respondents is relatively low. To analyze results on a percentage scale we did at least need ten to fifteen respondents. In case of more than thirty responses, analysis could be more statistical and elaborative, however, to achieve a higher level of generalizability the number of respondents has to be higher than the indicated figures.

3.3 Data Analysis

For the purpose of data analysis both a qualitative and quantitative analysis have been fulfilled. For the qualitative analysis, rationales of respondents about over- or underpricing decisions and package composition were the data sources. This data, in term provides for a high-level analysis of the managerial decisions that have been made during the creation packages. Accordingly, these data are employed for conceptualization purposes, brief classification and are compared with findings described in previous research.

For the second part of the analysis, quantitative methods have been employed. This is done by a percentagewise comparison. This comparison analysis pinpoints variances that occur in groups between contextual information (e.g. core business, core industry) package configuration choices and resulting revenue. The latter is done through a pattern analysis. The contextual information encompasses two focus fields, namely the company and market information. Because of the relatively small sample size, we refrain from performing a more in-depth stastical analysis.

4 Results

In total, twenty-three product managers, CEOs, pricing managers or marketing and sales representatives did respond to the survey. Out of these twenty-three respondents, six were excluded from the final dataset. Their responses were either incomplete or they were not part of the target group. The final dataset consists of seventeen entries, 74% of the total number of respondents in the initial dataset.

4.1 Respondents

The majority of participants that completed the survey come from the Netherlands. A total of ten companies (59%) indicates their headquarters are located in the Netherlands. Three companies (17%) originate from the USA, two (12%) from the United Kingdom, one (6%) from Australia and one (6%) from France.

Because of targeting multiple company types we did ask participants to indicate the type of company that characterizes their organization the best. By far, the most companies are software vendors, followed by service providers. We did furthermore ask all participants to indicate what their core business is. The majority of respondents stem from the business process application segment, focusing on the development, integration or service provision of or for enterprise resource planning and business productivity applications. Figure 2 provides a full overview of how the respondents have been spread over the different categories.

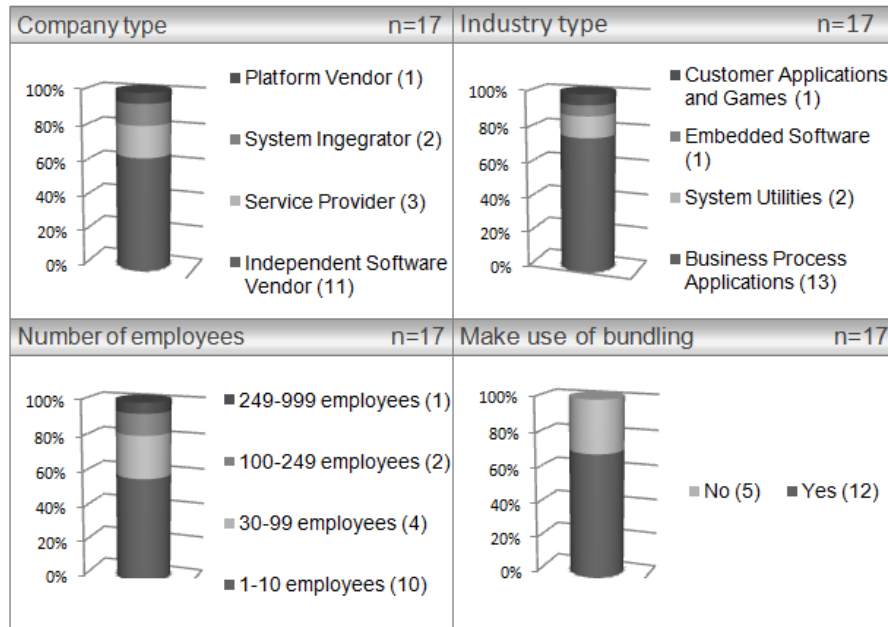


Fig. 2. Distribution of Respondents

Out of the seventeen respondents, twelve companies (71%) indicate to use bundling. The companies that do not employ bundling solely belong to the smallest company size. This corresponds with the maturity model for evolutionary growth of a software firm as proposed by Nambisan [16]. According to Nambisan, small companies are in a “start-up phase. Within this phase, the size of the product and service portfolio is limited, as well as the relative size of the

individual offerings, since they focus on their core asset. In the case of a software vendor, this focus lies on software development and testing. As a consequence, bundling becomes less relevant because the firm lacks resources to even compose a package. Even though the small companies comprise 59% of the total dataset, the majority of companies indicates to use bundling, we can therefore conclude that bundling is a popular approach within the software industry.

This conclusion is supported by the overall opinion the respondents have about bundling. Even though not all the respondents are currently using bundling, when asked only 14% of them indicates to not see much added-value in such a mechanism to stimulate sales of packages. Measured on a five-point Likert scale the average satisfaction equals a score of 3.57.

4.2 Package Composition

An important aspect of bundling is the actual composition of a package. We have asked the respondents to indicate which components together comprise their most prominent (e.g., most popular or best selling) package. The alternatives they could choose from have been derived from the notion of Cusumano [3] that the revenue of a software firm comes from products, maintenance and additional services. In correspondence, we did ask the respondents to indicate what percentage of total package revenue, each of these components represented. For this we employed the following categories; hardware, software products, customer specific customizations, implementation, maintenance, training and consultancy. Figure 3 provides an overview of the answers provided by the respondents.

As shown in figure 3, most respondents comprise their packages out of a wide array of products and services, providing for a strong diversification of offerings. Just two companies include respectively two or three components into their main package. Two other companies indicate that their bundle even consists of six or seven elements. On rounded average, the number of components in a package is equal to five.

Because of the large number of components within the package, not all customers will buy the entire bundle; rather they decide to take part of this composition. Hitt & Chen [9] refer to this as customized bundling. This variant of bundling appears to be most applicable for software companies, since it offers higher flexibility compared to pure bundling or mixed bundling and therefore facilitates the creation of large diverse packages.

With regard to this package composition, software components and accompanying implementation services are ever present within the described packages. This also goes for the service providers and system integrators, who, in correspondence with their business model, diversificate their total offering by reselling an existing software product, accompanied by implementation services and customer specific customizations. This is supported by the corresponding revenue shares, where only a small percentage originates from software. Furthermore, most companies indicate to benefit from recurring fees. Benefiting from intense service and maintenance flows they accompany their software products with specific implementation, maintenance and training.

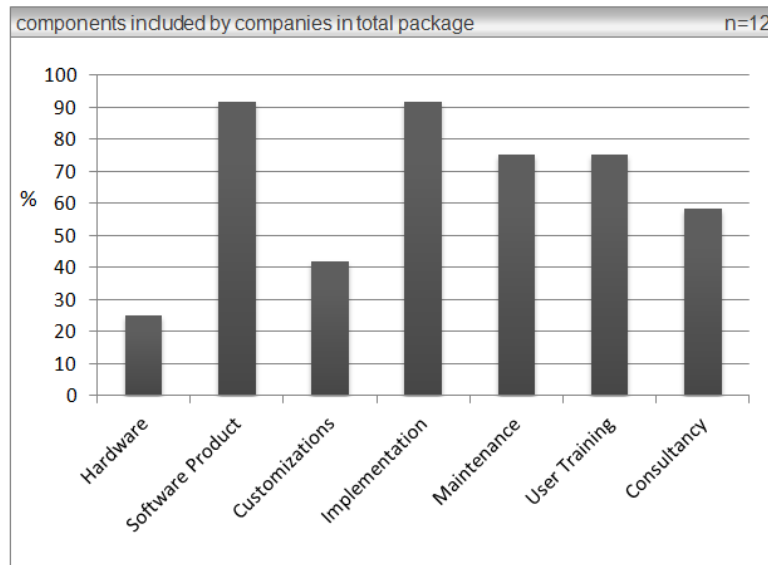


Fig. 3. Components included by software companies in total package

Physical goods, such as hardware and mainframes, are not included by the majority of the companies. Only two software vendors indicate to offer hardware components along with their software and services. This can either be caused by the large number of smaller companies that did fill out the questionnaire, or by the advent of Software as a Service. Also one system integrator indicates to resell hardware components.

4.3 Pricing Mechanisms

Companies were asked whether they under- or overprice (e.g. related to the market-price) software or service components. For software components, 17% indicates to overprice their software, 17% indicates to underprice while the rest conforms to a market-price. For services, only 8% indicates to underprice and also 8% indicates to overprice. Hardware components are also overpriced by 8% of the respondents. In total, five out of twelve companies indicate to use flexible pricing for individual components, the other seven companies indicate to not employ any flexible pricing mechanism. The firms that indicate to not employ flexible pricing mechanisms belong to the companies with a market share higher than the market share of companies employing these mechanisms. This supports the finding from Gallagher & Wang [6] that there is a relationship between market share and pricing strategies. However, it can also be the case that these companies employ price bundling, a form of bundling in which the price of the total package is subject of fluctuation instead of varying prices of individual components.

The rationales for the use of flexible pricing strategies for different components vary per company. When underpricing, companies indicate to do this to either *increase market penetration* or to stimulate *tie-sales*. Companies that indicate to be active in highly competitive markets underprice part of their main components in order to compensate for this on the long-term through recurring fees, flowing in through long-term service contracts. Tie-sales are also employed to benefit from those recurring fees.

With regard to overpricing, it is found to be most applicable for the main component within the package or the core competence of the company. *Individual value propositions* and the *relative position of a product in relation to the products of competitors* are considered to be the main motives for overpricing.

5 Analysis

H1: The component being the core competence of the organization is the component that represents the highest annual revenue share.

Because of the relative small sample size we chose to apply and test this hypothesis with the largest company group within this dataset; the independent software vendors. In total, seven software vendors (e.g. the ones that did indicate to employ bundling) have been selected to test this hypothesis. To provide a detailed insight into the bundle composition decisions of software vendors, we created a table 1. For every component, this table describes how many software vendors did indicate to include this respective component in their offering. Furthermore, the respondents did provide an indication of the revenue contribution each of these components represents within the total package on an annual basis. To put these percentages into perspective, we computed the relative contribution to the total revenue for each of the components.

Table 1. Average distribution of revenue over package components as indicated by seven software vendors

Component	# times included in package	Contribution to revenue
Hardware	2	22,5%
Software product	7	41,50%
Customizations	2	2,5%
Implementation	7	19%
Maintenance	7	22%
Training	7	6%
Consultancy	4	9%

As can be noted from table 1, the majority of software vendors create packages that consist of five to seven different components. With a weighted average contribution of 41,50% to the total revenue, software comprises by far the largest

revenue share of the entire bundles offered. In the context of the hypothesis; software vendors surround their core competence, the software product, with an array of accompanying complementary services. This finding supports the formulated hypothesis.

The most prominent supporting components within the packages are implementation and maintenance. This corresponds with the revenue distribution for software firms as described by Cusumano [3]. Consultancy services and training comprise a very small part of the revenue per package. This supports the notion that these services are not very prominent within the package; they rather are employed for package completion or diversification. Another explanation could be that the majority of this task is being taken care of by partners. Doing so, the company can focus on its core competence, which lies in software development, assembly or implementation and maintenance. Furthermore, these additional services can be subject to underpricing, either to lower the costs of the total package or to make the package more attractive for customers.

The previously provided spreading of respondents in figure 2 reveals that the average number of employees for most companies is predominantly between one and ten employees. Accordingly, this indicates that there are not much resources left for dedicated support and implementation services. This either correlates with the employment of strategic partners to provide training and consultancy to benefit from an increased focus on software development or the “start-up” phase as elaborated on previously.

H2: Software components as part of a package are purposely underpriced to stimulate sales of the total package.

This hypothesis is tested by looking at the over- and underpricing decisions made by participants alongside with the rationale they did provide for this. As mentioned earlier, 20% indicates to purposely underprice their software product, while 20% indicates to overprice and the remainder does conform itself to market-price or has an internal view on pricing (e.g., they solely add a margin on top of their costs to determine the cost price). For services, only 10% indicates to underprice while also 10% indicates to overprice.

Based on these percentages and the small sample size, we cannot conclude whether there is a significant relation, if at all, between underpricing and the increased sale of accompanying components or the package as a whole. It only indicates that software companies are eager to employ bundling to benefit from flexible pricing mechanisms for individual components. This supports the findings from Mulhern & Leone [15] who noted that packages can be made more attractive by fluctuating prices of individual components. However, according to the responses, this decision is not related to the number of compositions that comprise the bundle as a whole.

The provided reasons for underpricing software, however, correspond to the line of thought behind this hypothesis. The very open and direct way in which the questions were answered accounted for some clear statements. In two particular cases underpricing was applied with a view on benefiting from recurring revenue. According to the respondents, these recurring revenues from mainte-

nance and service flows make up for revenue losses that are a consequence of underpricing, while these flows also provide for a higher revenue on a longer term. Furthermore, underpricing is also indicated to be attractive when aiming for market share. Underpricing is, especially in highly competitive markets or project bids, considered to be a good method.

These rationales are in correspondence with the hypothesis. This, however, is still not enough to prove the hypothesis. A large sample survey needs to be employed to enable in-depth statistical analysis. This statistical analysis needs to be employed to either prove or disprove this hypothesis, by drawing significant relationships between different variables.

6 Discussion

In this paper we presented the research findings based on data gathered through a small sample benchmark survey. To ensure construct validity, this survey has been designed in correspondence with findings from scientific literature. To enhance internal validity, we did commit the survey to the heuristics for an unambiguous survey design as defined by Fowler [5]. Furthermore, we did use two test companies to verify whether the questions were interpreted in the way they were meant to be. Participation in this survey proceeded anonymously to minimize the influence of personal biases of company representatives. Even though these measures have been taken, we cannot completely exclude that participants are biased, especially since pricing strategies are considered to be highly confidential.

We did invite software companies to take part in this survey through both direct and indirect channels. A relatively small number of companies has been invited by sending them an email, the majority however, did get access to the web survey by means of professional networking portal spreading. Because of spreading the survey by means of professional network portals, it is difficult to indicate the exact response rate. After removing the incomplete responses and responses from companies outside of the target group from the final dataset the total number of respondents is considered to be relatively small, even though the participants were offered an additional incentive for participating in the form of a benchmark report. In relation to this, the external validity, and therefore the generalizability of the results presented, is considered to be limited. Especially since, according to estimations by Statistics Netherlands, the number of product software vendors is estimated to be 2200.

7 Conclusion

In this paper we presented the results of a small sample survey, employed to investigate the applicability of bundling in the software industry. This because so far, few empirical studies have been conducted to address the bundling of products and services in the product software industry and because existing theories from marketing and economics are not satisfying for this industry. In

a relative short period of time, twenty-three companies took part in a web survey. Software vendors, system integrators and service providers were invited to participate in this research. In return for their participation they did receive a customized benchmark report.

Results show that 71% of the companies currently employ bundling as a pricing, delivery and marketing mechanism. Companies that do not employ bundling are small software vendors because their product and service portfolio is too small to implement bundling. The average package consists of five different components, meaning that diversification is considered to be important amongst the companies. This also supports the notion that customized bundling is the most applicable form of bundling for the software industry, since it aids in achieving a higher degree of flexibility with regard to package composition. In total, five out of twelve companies indicate to over- or underprice individual components within their package, meaning that bundling provides for more flexibility in pricing mechanisms. The respondents furthermore indicate to regard bundling as a valuable approach to product and service pricing.

A study of the composition of packages offered by software vendors shows that they construct a packages around their core competence; the software product. With an average contribution to the total package revenue of 41,50% the software comprises the largest part of the total package. A large number of additional services and maintenance, directly related to the product is then added to diversify the offering as a whole and to benefit from recurring fees. These recurring fees and market penetration play a vital role in over- or underpricing specific components. Two companies did indicate to underprice software to benefit from recurring fees out of maintenance and services on the long-term while three other companies indicate to underprice to increase the degree of market penetration. Overpricing occurs less often and is justified by individual value propositions.

The findings presented in this paper provide a first step towards expanding the body of empirical knowledge and data on bundling in the software industry. Since the number of respondents was limited, more research needs to be addressed to generalize the presented results to a larger scale. To enable researchers in doing so, the conceptual model that we presented in this paper can serve as a starting point. Since a coarse-grained conceptual model similar to the one we did present in this paper only suffices for smaller samples that do not involve in-depth statistical analysis, some adjustments have to be made. Larger samples also need to be addressed to perform in-depth statistical analysis in order to identify significant relationships between bundle composition and pricing mechanisms.

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