How pricing of business intelligence and analytics SaaS applications can catch up with their technology

Aaron Wolfgang Baur, Julian Bühler and Markus Bick
ESCP Europe Business School, Berlin, Germany

Received 30 March 2015
Revised 9 April 2015
Accepted 11 April 2015

Abstract

Purpose – The purpose of this paper is to investigate the development of software pricing, following the advent of cloud-based business intelligence & analytics (BI&A) Software. A value-based conceptual software model is developed to ignite and structure further research.

Design/methodology/approach – A two-step research approach is applied. In step one, the available literature is screened and evaluated, and this is followed by ten semi-structured expert interviews. With that input, a conceptual software pricing model is designed. In step two, this model is validated and refined through discussions with representatives of the five leading business intelligence suites.

Findings – The paper sheds light on the value perception of customers and suggests a clear focus on the interaction between customers and vendors, and less on technical issues. The developed customer-centric, value-based pricing framework helps to improve pricing techniques and strategies.

Research limitations/implications – The research is focused on the pricing strategy of software houses and excludes differentiations of technical specifications and functionalities.

Practical implications – The research can support practitioners in the field of BI&A in rethinking their pricing methods. Placing the customer at center stage can lead to lower customer churn rates, higher customer satisfaction and more pricing flexibility.

Originality/value – This empirical study reveals the importance of a customer-centric pricing approach in the specific case of BI&A. It can also be applied to other fast-developing sectors of the software industry.

Keywords Business model, Business intelligence, Cloud computing, Pricing, Business analytics, Software as a service (SaaS)

Paper type Research paper

1. Introduction and background

Cloud computing, virtualization and Software as a Service (SaaS) shift the delivery of software from physical distribution and installation on local hardware to a provision via the Internet. Analysts like Maynard from Credit Suisse therefore describe this shift using strong words: "Traditional software is dead" (The Economist, 2006, p. 1). Examining the shift from a more sober, scientific perspective, however, it is likely that rather than a switch to complete virtualization, there will be a harmonization of the different extremes of pure on-premise and pure over-the-cloud delivery (Carraro and Chong, 2006).

SaaS delivery has ignited a gradual estrangement from perpetual licenses, with its traditional focus on a large sales force, up-front payments, physical product delivery

Journal of Systems and Information Technology
Vol. 17 No. 3, 2015
pp. 229-246

1328-7265
DOI 10.1108/JSIT-03-2015-0024

and a frequent and tedious updating process. Now, vendors can update their products "on-the fly", receive a steady stream of revenue and focus on a closer client relationship and greater penetration within the client's organizations (Gruman *et al.*, 2007).

These technological and business model changes influence how vendors can set and communicate their pricing policy. Due to the decreased variable costs of vendors, there is a gap between the prices of software and the incremental costs of adding a new customer. Rohitratana and Altmann (2012) show that this misalignment is perceived as unfair and, therefore, criticized by software customers. Ironically, it is through the pricing strategies themselves that software houses can prevent their customers from focusing only on price as a choice parameter, although there is generally a high sensitivity to the applied pricing techniques (Bertini and Wathieu, 2010). That is why understanding the client is a key characteristic, as pricing should be designed upon the variables that the buyer will use in measuring value realization (Bontis and Chung, 2000). This is what the customer is willing to pay, based on the actual benefit. The result should be a win-win scenario, in which customers see the value of the software reflected in their business processes and vendors benefit from recurring payments (Gruman *et al.*, 2007).

Consequently, choosing the right pricing model is of high importance for software vendors in attracting and retaining customers, as well as keeping competitors at bay. To justify such a "cost-price gap" and to focus on the added value for the customer, pricing models are now increasingly taking into consideration a customer-centric mindset, by associating price perceptions with product configurations (Schneider, 2012).

Analyzing the real value that the software represents for the customer needs to be the central focus. Hence, the price of the software must be aligned with the customer's value realization, i.e. the shift from cost-based software pricing to a more dynamic value-based software pricing (Baker and Hatami, 2004). In the latter case, the price is continuously adapted to the market and is demand-driven, based on a deep knowledge of the customers (Lehmann and Buxmann, 2009).

Numerous studies have attempted to analyze pricing techniques in the SaaS age (Heffron, 2013; Harmon *et al.*, 2009; Choudhary, 2007). However, there has not yet been an analysis of pricing techniques and their correlation with customer value realization that has been specifically applied to business intelligence & analytics (BI&A) solutions for companies. BI&A tools may be the key to dealing with today's data glut, and customers place high expectations upon the performance and quality of these software suites (Chen *et al.*, 2012; Swoyer, 2013). They are of pivotal importance in the management of a company, which explains the presence of hundreds of offered software tools, low transparency, lack of consolidation and very high growth rates (see Figure 1). According to Redwood Capital (2014), the BI market can be segmented into traditional, mobile, cloud and social business intelligence, depending on product architecture and user interface. Although growth of traditional BI is projected to slow to low single-digit rates, newer BI technologies are expected to grow at rates of between 20 and 30 per cent over the next five years, starting from a smaller base. Among the fastest growing segments, cloud-based BI is estimated to grow nearly fourfold, from $0.75 billion in 2013 to $2.94 billion by 2018, resulting in a Compound Annual Growth Rate of 31 per cent

Due to the complexity of the tools, business intelligence is the software stream for which the virtualization process has been among the most challenging (Van Der Lans, 2012). Additionally, it is an area of the software industry that is faced with fierce

competition and the need for a customer-centric approach. Hence, its pricing models present an ideal object for study.

The focus of this research is on the effects of this radical change in the software supplier's business model and the resulting customer relationship. Through a review of the available literature in this field and the empirical findings of semi-structured interviews, a conceptual model for customer-centric SaaS BI&A pricing is developed. Therefore, the identified research gap – a missing application of value-based pricing to BI&A tools – is reduced.

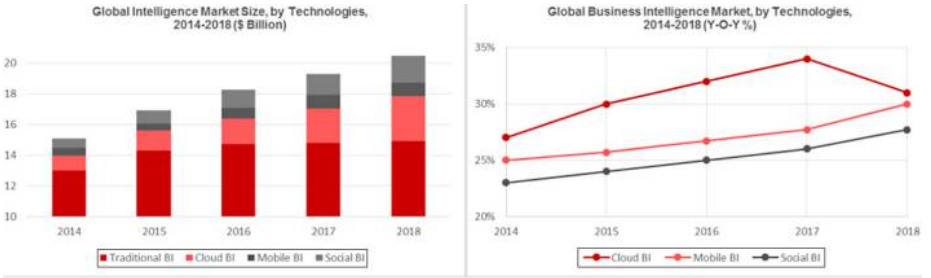
The remainder of this paper is structured as follows: Chapter 2 introduces a theoretical foundation for the common pricing concepts of (traditional and SaaS) software products and the important area of customer lock-in. Chapter 3 explains the research methodology applied, while Chapter 4 presents the results and the implications of the research, i.e. findings in regard to software pricing concepts and the set-up of a customer-centric framework. Finally, a summary of the paper with its contributions, limitations and areas of future research is provided in Chapter 5.

2. Theoretical foundations

2.1 Pricing of software products

As Heffron (2013, p. 3) notes, "understanding software pricing is challenging even for the most savvy business people and seasoned technology veterans". Therefore, in this chapter, a short overview of software pricing determinants and dynamics is provided.

From a holistic and general viewpoint, pricing depends on three important variables, namely, costs, customers and competition, which, in the literature, have been referred to as the *Three Cs of Pricing* (Mohr *et al.*, 2010). First, the *cost structure* of software vendors has changed with the advent of SaaS (Churakova and Mikhramova, 2010). According to traditional economic theory, prices were set on the measurement of "replications", i.e. based on the incremental cost of each additional product (O'Connor, 2009); however, such a theory has been called into question within the software industry. Here, the replication costs of each additional software license sold are practically nonexistent (Ojala and Tyrvainen, 2006). For example, the hosting, management and recovery of systems (including a 99.9 per cent availability) now take up a much higher percentage of costs than physical reproduction and distribution, or customization according to the different hardware specifications of clients. The expenses are amortized once the number of users grows, which explains the initial difficulty of SaaS providers in achieving profitability (Desisto and Paquet, 2007). Second, the *customers' perception* of



Source: Own visualization, based on Redwood Capital (2014)

Figure 1.
Global business intelligence market size

a price constitutes the top ceiling, above which the vendor should not price the product (Marn *et al.*, 2003). According to Mohr *et al.* (2010), correctly judging this perception is especially challenging for companies in the high-tech and software businesses. Finally, the *competition* serves as a benchmark to compare the prices set according to the other two variables (Shipley and Jobber, 2001).

Within the *Three Cs of Pricing*, concepts can be structured in cost- and value-based models. In cost-based pricing models, price is determined by the production and delivery costs of the service. Relevant examples include *flat and user-based pricing* (Harmon *et al.*, 2004, 2009), *usage-based pricing* (Singh, 2010; Ojala, 2012; Waters, 2005; Choudhary *et al.*, 1998) and *performance-based pricing* (Keränen, 2010; Harmon *et al.*, 2004, 2009).

On the other hand, value-based pricing models help software vendors to set the price according to the value received by the customers, and not primarily according to their willingness to pay (Monroe, 2003; Harmon *et al.*, 2004). Important and widely used forms include *penetration pricing* (Rohitratana and Altmann, 2012; Harmon *et al.*, 2004), *skimming pricing* (Rohitratana and Altmann, 2012; Singh, 2010; Monroe, 1973) and *hybrid pricing* (Harmon *et al.*, 2004, 2009).

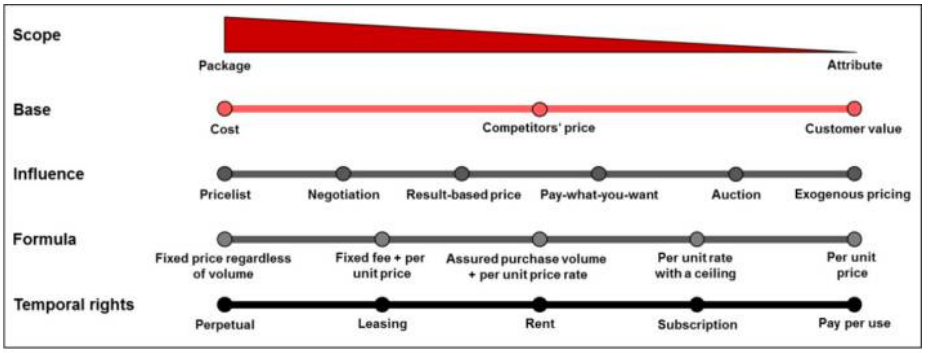
Due to high complexity, in the past, software vendors often adopted an "intuitive" approach: They took their development costs as a basis and then subjectively assessed the product in the market and set the price accordingly, with no objective scientific rationale (O'Connor, 2009). This is especially true for "disruptive" offerings like new BI tools because comparable products are often unavailable (Kittlaus and Clough, 2009). Although such a method has been popular in the past, it obviously lacks effectiveness, and its outcomes are basically random (Hinterhuber, 2008).

Therefore, new pricing models had to be introduced that were less random and that were more able to justify the gap between the cost of an additional product and the price paid by the customer. For this purpose, vendors try to examine the pricing strategy from the customer's perspective and assign a price that is the monetary equivalent of the value the customer perceives in the product while meeting profit and return on investment goals (Kortge and Okonkwo, 1993). They are hence moving toward a customer-value-based approach, which has the highest potential to appeal to customers and effectively position the product in the market (Desisto and Paquet, 2007; Cavusgil, 1996).

Among the interesting contributions to software pricing research that incorporate those ideas and approaches are the general software framework of Iveroth *et al.* (2013) and the modified cloud service version of Laatikainen *et al.* (2013). Another widely known model that sees this customer-value creation as the basis for setting each software price is the *strategic pricing pyramid* of Kittlaus and Clough (2009), which is based on a large-scale antecedent study in different software settings. All three of these frameworks will be briefly presented hereafter.

First, Iveroth *et al.* (2013, p. 113) developed the SBIFT software pricing model, which differentiates according to the value of five dimensions, i.e. scope, base, influence, formula and temporal rights (SBIFT) (see Figure 2). They define pricing models as "systems of price-related aspects of the agreement between a seller and a buyer".

Within each of the five dimensions, several values are possible, ranging from one extreme to the other, with hybrid-like characteristics in-between. This model works well for traditional, on-premise software delivery.

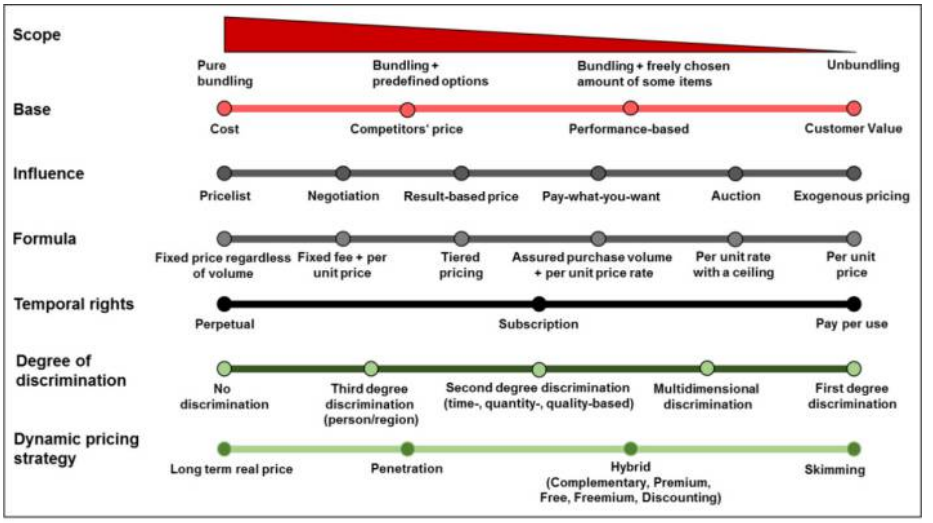


Source: Own visulization, based on Iveroth *et al*., 2012

Figure 2.
The SBIFT model

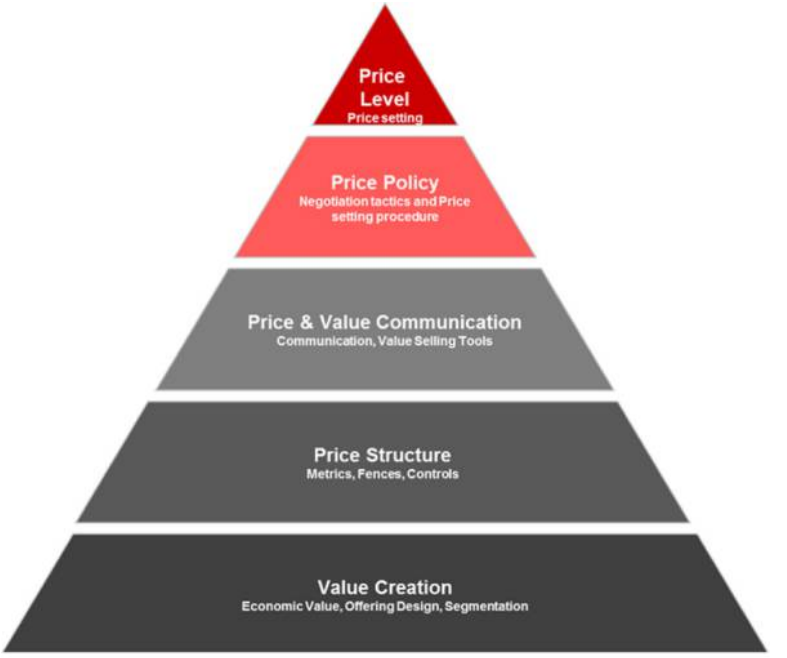
Laatikainen *et al.* (2013) then modified and expanded it to address the specific case of cloud computing services (see Figure 3). In their work, they include two new dimensions, i.e. the degree of discrimination and the dynamic pricing strategy. More values within the existing concepts are also added, e.g. tiered pricing in the formula dimension; also, they merge two values (leasing and rent) into subscription in the temporal rights dimension because in cloud computing, these concepts are virtually melded.

Finally, Kittlaus and Clough (2009) designed their strategic pricing pyramid (see Figure 4). Again, the basis and the core fundamental of this model are represented by value creation. Other factors, i.e. price structure, price and value communication, price policy and the absolute and relative price, then build upon this foundation.



Source: Own visulization, based on Laatikainen *et al*., 2013

Figure 3.
Cloud solution pricing framework



Source: Own visualization, based on Kittlaus and Clough, 2009

Figure 4.
Strategic pricing pyramid

Value creation, i.e. the satisfaction of the users' needs in such a way that builds customer loyalty in the long term and attracts new buyers, must serve as the core of price determination. Gruman *et al.* (2007) express this notion clearly:

> Vendors can no longer solely dictate the terms of how they sell and price their products. They must take into account a new breed of customer that judges software by its ability to contribute value to the organization, measuring where, when, how much, and how well software is used.

2.2 Lock-in effects in business intelligence and analytics

As described previously, through the use of data to gain business advantages, BI&A tools can assist in the management of information, helping executives to make more informed decisions (Muntean and Muntean, 2013). A wide array of solutions is available, and new players are constantly entering the market (Baur *et al.*, 2014). Although the variety of services available in the market is growing steadily, one of the most discussed phenomena in practice and literature persists: the lock-in effect, to which services or technologies are subject, and which, sometimes, is purposely imposed by vendors. According to Zhu and Zhou (2012, p. 536), the term:

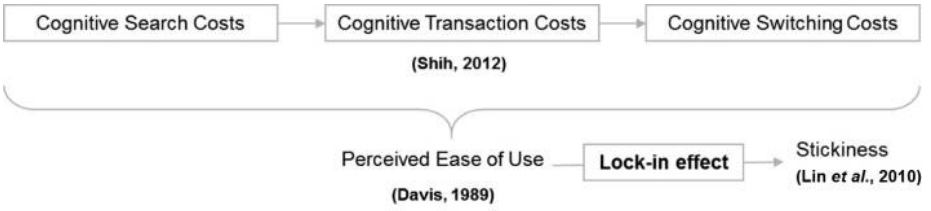
> […] refers to a situation in which a customer is dependent on a vendor for products and services such that he or she cannot switch to another vendor without suffering substantial costs.

BI solutions are expensive to implement and maintain, and they require powerful infrastructure. Thus, a lock-in effect is likely to occur in this environment after a decision-making process has resulted in the selection of one BI service. In traditional software selection processes, once individuals and companies have chosen a service, they often rely on the service for several reasons. One such factor is loyalty, although they are often locked in due to a focus on short-term advantages, rather than long-term synergies. Zauberman (2003, p. 410) describes it as a "trade-off" between the rapid results of standard solutions and those provided by tailored, customized solutions, which are more effective in the long run.

This process also includes several psychological elements; cognitive behavior plays an important role during all stages of usage. Lock-in effects are often triggered by perceived costs, which create a mental barrier preventing one from changing a system or service. Time spent early on in retrieving information about BI solution features can be classified as "cognitive search costs", efforts to facilitate the transfer of data and routines to a new service can be described as "cognitive transaction costs" and investments in time to adapt and learn the routines in a new work environment are referred to as "cognitive switching" costs (Shih, 2012, p. 739).

A potential lock-in can be confounded by satisfaction, resulting in no need for a person in charge to initiate changes, but this effect still has relevance in the BI field and must not be underestimated. Cloud computing can help to overcome mental lock-in barriers, as it provides the necessary IT capabilities and business agility to cut these costs and achieve much needed economies of scale. SaaS solutions provide a more flexible model that is better aligned with clients' business objectives (Thompson and Van der Walt, 2010). This can result in an increased "site stickiness" (Lin *et al.*, 2010, p. 132; Shih, 2012, p. 740) and can assure that users will benefit from these advantages. Some players particularly emphasize the simplicity of their cloud solutions, e.g. Cloud Lounge, which was implemented by Lufthansa Systems (2015) and is now operated in cooperation with IBM, directly addresses the "perceived ease of use" construct in the technology acceptance model proposed by Davis (1989). The connection between these elements is visualized in Figure 5.

The possibility of having an on-demand BI solution allows companies to benefit from the services on a subscription basis, with no need for long-term capital requests. Even if resources are available, BI via SaaS may still be preferable when time to market is an issue (Mitchell, 2010). The remaining sections of this paper therefore address this problem, by suggesting a value-based pricing model that is dynamic and customizable, but at the same time, transparent.



Source: Own visualization

Figure 5.
Connection of cognitive elements leading toward a lock-in effect

3. Research methods

To thoroughly analyze the pricing models applied in the BI&A SaaS industry, a two-phase approach has been applied: an exploratory phase that includes a literature review, qualitative expert interviews and the design of the model; and a confirmatory phase to validate the model through a dialogue with representatives of the five most important BI software vendors.

In the *first phase*, the available literature in the field of software pricing in BI&A was identified and screened. For this purpose, both scientific and more practice-oriented sources were used. In the former case, selected large-scale and reputable digital libraries in IT, engineering, business administration and related fields were searched. In concrete terms, these sources are EBSCO Business Source Complete, the ACM Digital Library, Web of Science, IEEE Xplore and Science Direct (Chen *et al.*, 2012). In the latter case, trade magazines, industry reports, IT/technology magazines, reviews, and blogs, market research publications and company Web sites were harnessed. This was deemed necessary to include the practitioner's view of the topic and to stay apprised of developments in the fast-paced software market. The search terms were composed of a variety of queries, including *software pricing*, *pricing models* and *value perception* in conjunction with *SaaS*, *Cloud* and others.

In the next step, an interview guideline was designed based on the prior literature review. It also included very general and open questions to motivate interviewees to express their own sentiments, thoughts and ideas. To gain insights into how different experts see the topic, the guideline was used to conduct semi-structured interviews. To obtain maximum diversity and coverage, ten interviews with individuals from three distinct groups were used as a sample (Denzin and Lincoln, 2005; Hair *et al.*, 2015). They were industry experts, i.e. software vendors, market researchers and software consultants (see Table I for the sample description). The variety of interview partners also provided a triangulation of the results (Flick, 2007, 2009), as they offered different perspectives on and knowledge about the phenomenon. The interviews were recorded and subsequently transcribed (Oliver *et al.*, 2005; Kuckartz *et al.*, 2008); each interview lasted between 57 and 92 minutes, with a median of 76 minutes.

After an introduction to the topic, several blocks of questions regarding the changing technological environment, the diffusion of SaaS, customer perceptions and satisfaction, pricing variables in relation to customers' values and the importance of this value

Individual	Group	Job title	Language of interview	Means of interview
IE1	Industry experts	CEO	German	Skype
IE2		Programmer	English	Face-to-face
IE3		Sales manager	English	Skype
MR1	Market researchers	Analyst	English	Face-to-face
MR2		Analyst	English	Skype
MR3		Head of innovation department	German	Face-to-face
SC1	Software consultants	Senior analyst	English	Skype
SC2		Manager	English	Skype
SC3		Partner	German	Face-to-face
SC4		Principal	German	Face-to-face

Table I.
Sample description

realization, among others, were asked. Finally, with the help of the existing literature and the interview findings, a novel conceptual software pricing model was developed.

In the *second phase*, the resulting model was then discussed, validated and refined with representatives of the five leading international BI&A software solution providers. These representatives were contacted via email and phone, and individual face-to-face discussions were held with each executive in Hanover, Germany at the CeBIT 2014, the world's largest and most international computer exposition[1]. The discussions provided confirmation of the validity of the model.

4. Results and implications

In this chapter, the results and implications of the aforementioned research process, i.e. the literature review, the expert interviews and the model conceptualization and validation with the software vendors, will be presented and discussed.

4.1 Leading BI vendors and their pricing concepts

In its *Magic Quadrant*, the market research service provider, Gartner, annually researches leading providers of BI tools according to a stringent set of criteria. Gartner defines BI and analytics as a software platform that delivers 13 critical capabilities across three categories – enable, produce and consume – in support of four use cases (Sallam *et al.*, 2015). The tools are evaluated and placed in a 2×2 matrix, with the ability to execute on the y-axis and the completeness of vision on the x-axis. The combination of the reached values then places the players in one of four categories, i.e. niche players, challengers, visionaries and leaders (see Figure 6). Gartner identifies nine BI platforms as leaders, of which IBM, SAP, Microstrategy, Oracle and Microsoft constitute the top five global BI software solution vendors (Sallam *et al.*, 2015; Business-Software Report, 2013; Dresner, 2013). Therefore, these five market leaders serve as the sample for this study.

In terms of the transparency of pricing, the vendors follow very diverse strategies. SAP, as the number one global market share leader in BI&A, does not disclose any of its price lists. The main reason for this behavior is that many of the company's clients receive customized solutions individually and, hence, publication of a general price list becomes unnecessary: "We want to ensure each customer or prospective customer gets product pricing that is tailored to their specific use case" (Interview with SAP's spokesman, Evan Welsh, as reported by Wailgum, 2011; p. 1). Oracle, in contrast, is well-known for its transparency, and it happily publishes its price lists, although virtually no customer will ever pay the (high) prices on the published lists. The other vendors fall somewhere between these extremes. Overall, many customers are resentful of their vendors' licensing practices; they need more transparency about the pricing models in general, not only about the exact price. This is especially true because, rather than just filling the role of a nice-to-have functionality, these tools are often key to the success of the enterprise. Konary explains that "the mystique around software pricing needs to go away. But it's not a veil that's going to come down quickly" (reported in Wailgum, 2011; p. 1). That is why enterprises should treat BI software and service issues not only from a technical point of view, but also from a business perspective.

Because software pricing has become increasingly complex ("constantly changing labyrinth of pricing", Laatikainen *et al.*, 2013; p. 127), one of the most important factors for a pricing model is simplicity ("the vision is that less is more", Luoma, 2013; p. 7). The

Source: Gartner (2015)

Figure 6.
Magic quadrant for business intelligence and analytics platforms

customers need to immediately understand how their value creation is represented in the pricing of the software ("Firstly, be boring. Secondly, license your software as your customers expect it be licensed – fit in with their business model", Davidson *et al.*, 2009; p. 58). Therefore, it is also vital to act as a sparring partner to your client, showing him that you engage with and embrace his business model and specific situation.

Additionally, to achieve an effective value co-creation, it is important to have a flexible model, which reflects the client's need to iteratively address its potentially changing costs (Kauffman and Ma, 2013; Lehmann and Buxmann, 2009). In such a way, it is possible to lock in the customers by offering a mutually beneficial impact, which must be clearly understood and perceived in the marketplace. The software vendor needs to leverage SaaS cost efficiency to deliver a stronger market position to its clients (Kauffman and Ma, 2013). Because "users need clarity without surprise" (Schneider, 2012; p. 5), having an open, fair and transparent model will pay off.

4.2 Interview findings

The ideas set forth in the literature were cross-checked in the interviews. The opinion of experts working in and with the sector, who are accustomed to the requirements of

companies using BI software products, reaffirmed the findings in respect to the importance of customer value realization and perceptions within this software sector.

Although there was, of course, no common answer to the question, *What should the ideal customer-centric pricing model look like*, the results underpin one common theme: the model must be customizable and flexible, to better represent the needs of each client. This underlines the impression that clients are not focused so much on the exact price, but on the adaptability of the pricing scheme to their business model. The need to offer an easy-to-understand pricing scheme was the most agreed-upon statement within the whole interview sample. All of the interviewees stressed the fact that transparency and honesty are paramount when communicating with clients.

However, a dynamic concept that allows the client to reassess the price is not suitable for every vendor's business model. The largest vendors in the industry deal with large multinational clients that have typically had the same contract for many years and do not change it regularly. They might not wish to offer the client the possibility of reassessing the price after one year because that would potentially result in a loss in revenue. Hence, software vendors' customer relationships are often perceived as weak, and the clients' satisfaction rate is frequently negatively influenced by factors not involving the qualities of the product, but the complementary service. Therefore, providing clients with the opportunity to reassess the price and change the variables could be a way to address customer dissatisfaction.

The interviews also revealed that, in the future, software vendors will tend to offer a more complete product, with different functions interfaced as a whole bundle. This means that the biggest actors in the market will continue to buy smaller companies to increase their offerings and to beat the competition. Thus, it will become more difficult for small software vendors to survive and to remain in the market. Here again, offering the client the opportunity to reassess the price of the software after one year – and communicating this flexibility – could be an effective way for new actors in the industry to gain loyal customers and to survive in the market.

What is interesting and somewhat unexpected, is that there was neither a clear preference for one particular pricing model, nor one specific technique for value-based pricing. Instead, the interviewees indicated that software vendors should try to adapt their strategy to the *client's* business model. A concern about which the interviewees agreed, however, was that such flexibility, and the investigation of the client's needs, business models and willingness to pay, requires patience, time and personnel, as well as financial resources.

4.3 Framework conceptualization

In light of the results of the literature review and the empirical research, a customer-centric framework to represent the effort of software vendors to support the value creation of their clients has been designed (see Figure 7). This serves as a conceptual model. Furthermore, it represents the role of pricing models in ensuring the clients' loyalty, which is of pivotal importance in the SaaS business model.

The model is developed around the customer because it is the client who plays the most important role in a value-based pricing model. As a matter of fact, as the interviews revealed, the vendor needs to truly understand the client's needs and perceptions.

The model is then divided into two phases, characterized by the two different colors in the figure. First, the vendors need to attract the customers to their offerings, through

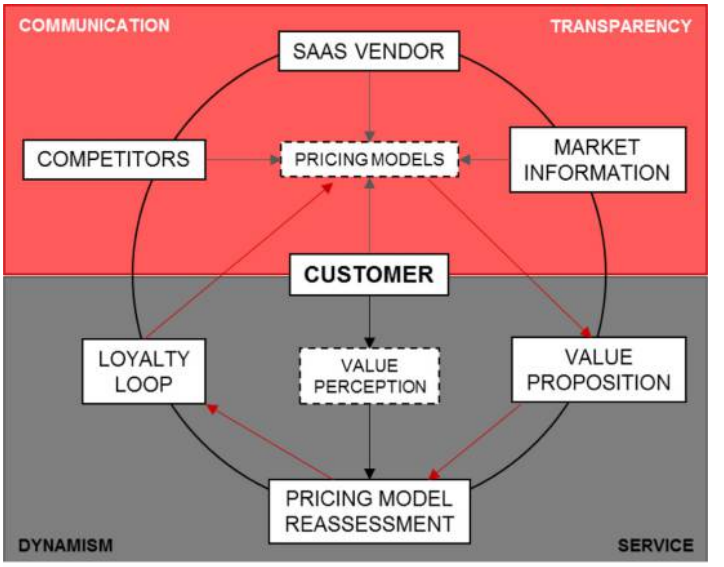


Figure 7.
Customer-centered value proposition for software pricing models

Source: Own visualization

a transparent display of their pricing model. This does not mean that the vendor has to publish the exact price of the offering online; on the contrary, it should share the process that leads to the price with the customer. This gives the client the opportunity to choose between pricing models based on different variables, so that the client is aware of the final result of his or her choices. However, as the literature review revealed (e.g. Laatikainen *et al.*, 2013), it is not realistic to suppose that the price is derived only from the value realization of the client. Hence, the model depicts the different variables that lead to the price designation. These variables include primarily the client, but also, the competitors' offerings, the specific market information (including the geographical market, and the different industries and sectors that the offering is targeting), and finally, the vendor itself, through the cost structure of the product.

In this way, the conceptual model displays a more harmonized pricing framework, which focuses on the client's value, not only during the price designation phase, but also and, most importantly, in the subsequent stages. Finally, the first stage also includes communication, a key word that previous pricing models have ignored completely. This empirical research has confirmed that the communication of the pricing model is essential in value-based pricing models because value realization often does not take place solely due to a lack in the clients' understanding. It is a concept that needs to be directly linked to pricing techniques.

The second phase of the conceptual model illustrates the post-purchase stage, which is focused on two additional key words: service and dynamism.

The first concept is self-explanatory because SaaS involves the offering of a service, instead of a product. However, in the interviews and discussions with the top five BI vendors, it became apparent how important it is for vendors to offer full service. This full

service is not limited solely to the functioning of the software itself; rather it also encompasses the guidance of the customer and a focus on relationship management.

The client has chosen the software because of the value proposition of the vendor. However, the conceptual model also illustrates the follow-up of this proposition, with the value perception that is essential to reassess the price in collaboration with the vendor. It repeatedly emerged in the interviews that customers usually value a trial period as an essential tool to understand the product and to decide whether it meets the needs of their businesses.

Within the model, the same concept of a trial is included, but it is applied to the after-purchase phase. Hence, the client has a period of time to determine whether the variables he has chosen as a fundament for the price of the service are the ones that best depict his or her business and best represent the value realization. In this way, clients can then reassess the price according to their business model needs, through a pricing concept that is dynamic and allows for alterations. In contrast with previous pricing models, the dynamism here concentrates on the client's needs and not on the vendor's strategy (as in the traditional value-based pricing models, namely, *penetration pricing* and *skimming pricing*).

The reassessment of the price aims to shift the client's investigation from an *ex ante* to an *ex post* stage. As a matter of fact, the vendor needs to maintain a healthy and personal relationship with the client through a well set up customer relationship management, including constant and frequent exchanges of knowledge and new developments. Through this dialogue, the vendor can save resources, time and money by investigating the client's needs before reaching out to him.

Finally, in the model, this leads to a loyalty loop, as in McKinsey's consumer decision journey model (Court *et al.*, 2009). Because the clients see their needs being fulfilled and the value being exploited, they do not seek other software vendors, but remain loyal to the service offered. This is important in light of recent research publications, which were analyzed in the previous chapters. They revealed that customers, in the majority of cases, show a low level of client satisfaction and are not pleased with their relationships with vendors (Sallam *et al.*, 2015; Business-Software Report, 2013; Dresner, 2013). This impression was also confirmed by the largest five BI vendors: More customer-centricity and a deeper understanding of clients' business models would significantly increase customer loyalty, elevating the relationship to a new level. All in all, switching to and constantly striving for a customer-centered value proposition can be seen as crucial.

5. Conclusion

5.1 Contributions

After the software revolution and the introduction of SaaS, the end customer has become essential in the definition of the overall strategy of a software vendor. Therefore, the client's needs and expectations must be reflected, to an even greater degree, in the BI&A software supplier's pricing strategy. The research aim, therefore, was to develop a customer-centric conceptual model for the pricing of SaaS BI&A software. To achieve this goal, a thorough literature study, both of scientific and practice-oriented publications, was conducted, followed by a round of ten semi-structured expert interviews. With this data pool, a conceptual model that consolidates and compresses prior models was developed. To validate this conceptual model, it was discussed with representatives of the five leading BI&A software vendors.

In the course of the study, it became clear that first, each software pricing model has its own unique strengths and weaknesses and, second, each customer achieves value in a different way. Therefore, the conceptual model developed here caters to these two aspects, taken together, and is intended to show the need for flexibility and scalability on behalf of the software vendor to meet its clients' expectations.

The contribution of this research is two fold:

(1) In the scientific community, there is very little pricing research in the unique but important case of business intelligence software. The conceptual model presented in this study can help to stimulate discussion to ignite further necessary research. It may contribute toward a greater focus on value perception and the interaction between the customer and the vendor, and less on technical issues, which have already been thoroughly researched.

(2) The findings and the model can help practitioners in rethinking their pricing methods. Higher market pressure and increased competition in this field in the software industry are causing customer satisfaction and loyalty to be increasingly more important. Thus, having a strategic and customer-centric perspective toward the current pricing practice can lead to lower customer churn rates, higher customer satisfaction and more pricing flexibility.

5.2 Limitations and future research

However, the study also contains a number of limitations: first, the research has been conducted without investigating the technical characteristics of the software products under examination. This would have allowed a deeper understanding of the cost structure and, hence, the possible pricing techniques that could be applied. Moreover, the findings have only been discussed with the five largest BI&A software vendors, and small-and mid-sized companies have been ignored. As this particular share of the software market is very dynamic, partly due to constant start-up activity (Baur *et al.*, 2014), a generalization of the findings may be problematic at this point in time in the research.

Future research may address these shortcomings. In particular, the above-mentioned cognitive effects on customers that lead to technological lock-in should be studied extensively. In addition, this conceptual model is just a starting point to initiate more research in terms of putting the client at center stage concerning value delivery, value communication and value pricing in the software and BI&A industries. The model needs to be further tested and validated in practice. Comments and suggestions of experts need to feed back and initiate a constant improvement process.

Note

1. www.cebit.de/home

References

Baker, W. and Hatami, H. (2004), "Software license and maintenance pricing principles – best practices and case studies", available at: www.softsummit.com/library/presentations/2004/McKinsey_BakerHatami.ppt (accessed 30 December 2014).

Baur, A.W., Breitsprecher, M. and Bick, M. (2014), "Catching fire: start-ups in the text analytics software industry", *Proceedings of the Americas Conference on Information Systems (AMCIS), Savannah, GA*.

Bertini, M. and Wathieu, L. (2010), "How to stop customers from fixating on price", *Harvard Business Review*, Vol. 88 No. 5, pp. 85-91.

Bontis, N. and Chung, H. (2000), "The evolution of software pricing: from box licenses to application service provider models", *Internet Research*, Vol. 10 No. 3, pp. 246-255.

Business-Software Report (2013), "Top 10 business intelligence software report – comparison of the leading business intelligence software vendors", Business-Software, available at: http://c3330831.r31.cf0.rackcdn.com/top_10_bi.pdf (accessed 18 January 2015).

Carraro, G. and Chong, F. (2006), "Software as a service (SaaS): an enterprise perspective", Microsoft Corporation, available at: http://msdn.microsoft.com/en-us/library/aa905332.aspx (accessed 20 February 2015).

Cavusgil, S. (1996), "Pricing for global markets", *The Columbia Journal of World Business*, Vol. 31 No. 4, pp. 66-78.

Chen, H., Chiang, Roger, H.L. and Storey, V.C. (2012), "Business intelligence and analytics: from big data to big impact", *MIS Quarterly*, Vol. 36 No. 4, pp. 1165-1188.

Choudhary, V. (2007), "Software as a service: implications for investment in software development", *Proceedings of the 40th Hawaii International Conference on System Sciences in Hawaii, IEEE Press, New York, NY*, p. 209a.

Choudhary, V., Tomak, K. and Chaturvedi, A. (1998), "Economic benefits of renting software", *Journal of Organizational Computing and Electronic Commerce*, Vol. 8 No. 4, pp. 277-305.

Churakova, I. and Mikhramova, R. (2010), "Software as a service: study and analysis of SaaS business model and innovation ecosystems", Master Thesis, Faculteit Economie en Bedrijfskunde, Ghent University, Ghent.

Court, D., Elzinga, D., Mulder, S. and Vetvik, O.J. (2009), "The consumer decision journey", McKinsey Quarterly, available at: www.mckinsey.com/insights/marketing_sales/the_consumer_decision_journey (accessed 30 January 2015).

Davidson, N., Factor, P. and Pryor, M. (2009), *Don't Just Roll the Dice: A Usefully Short Guide to Software Pricing*, Red Gate, Cambridge.

Davis, F.D. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", *MIS Quarterly*, Vol. 13 No. 3, pp. 319-340.

Denzin, N.K. and Lincoln, Y.S. (2005), *The SAGE Handbook of Qualitative Research*, 3rd ed., Sage Publications, Thousand Oaks, CA.

Desisto, R.P. and Paquet, R. (2007), "Learn the economic advantages of a Pure SaaS vendor", Gartner, available at: www.gartner.com/doc/537208/learn-economic-advantages-pure-saas (accessed 21 December 2014).

Dresner, H. (2013), "Wisdom of crowds embedded intelligence market study", Dresner Advisory Services, available at: www.dundas.com/wisdom-of-crowds-embedded-bi-study (accessed 7 March 2015).

Flick, U. (2007), *Managing Quality in Qualitative Research*, Sage, Los Angeles, CA.

Flick, U. (2009), *An Introduction to Qualitative Research*, Sage, London.

Gruman, G., Morrisson, A. and Retter, T. (2007), "Software pricing trends: how vendors can capitalize on the shift to new revenue models", PriceWaterhouseCoopers, available at: www.pwc.com/en_us/us/technology-innovation-center/assets/softwarepricing_x.pdf (accessed 21 January 2015).

Hair, J.F., Wolfinbarger, M., Money, A.H., Samouel, P. and Page, M.J. (2015), *Essentials of Business Research Methods*, 2nd ed., M.E. Sharpe, Armonk, New York, NY.

Harmon, R., Demirkan, H., Hefley, B. and Auseklis, N. (2009), "Pricing strategies for information technology services: a value-based approach", *Proceedings of the 42nd Hawaii International Conference on System Sciences in Hawaii, IEEE Press, New York, NY*, pp. 1-10.

Harmon, R., Raffo, D. and Faulk, S. (2004), "Value-based pricing for new software products: strategy insights for developers", *Proceedings of the Portland International Conference on the Management of Engineering and Technology, IEEE Press, Portland, New York, NY*, pp. 1-24.

Heffron, P. (2013), "Understanding software pricing models", available at: http://web.esna.com/blog/bid/177126/Understanding-Software-Pricing-Models (accessed 18 March 2015).

Hinterhuber, A. (2008), "Customer value-based pricing strategies: why companies resist", *Journal of Business Strategy*, Vol. 29 No. 4, pp. 41-50.

Iveroth, E., Westelius, A., Petri, C.-J., Olve, N.-G., Cöster, M. and Nilsson, F. (2013), "How to differentiate by price: proposal for a five-dimensional model", *European Management Journal*, Vol. 31 No. 2, pp. 109-123.

Kauffman, R.J. and Ma, D. (2013), "Cost efficiency strategy in the software-as-a-service market: modeling results and related implementation issues", in Altmann, J., Vanmechelen, K. and Rana, O.F. (Eds), *Economics of Grids, Clouds, Systems, and Services, Lecture Notes in Computer Science*, Springer International Publishing, Cham, Vol. 8193, pp. 16-28.

Keränen, T. (2010), "Value-based pricing of ICT services at CITIUSNET ltd", Master Thesis, Engineering, Kajaani University of Applied Sciences, Kajaani.

Kittlaus, H.-B. and Clough, P.N. (2009), *Software Product Management and Pricing: Key Success Factors for Software Organizations*, Springer, Berlin.

Kortge, G.D. and Okonkwo, P.A. (1993), "Perceived value approach to pricing", *Industrial Marketing Management*, Vol. 22 No. 2, pp. 133-140.

Kuckartz, U., Dresing, T., Rädiker, S. and Stefer, C. (2008), *Qualitative Evaluation: Der Einstieg in die Praxis (Qualitative Evaluation: Entry to Practice)*, 2nd ed., VS Verlag Für Sozialwissenschaften, Wiesbaden.

Laatikainen, G., Ojala, A. and Mazhelis, O. (2013), "Cloud services pricing models", in Herzwurm, G. and Margaria, T. (Eds), *Software Business: From Physical Products to Software Services and Solutions*, Springer, Berlin, Heidelberg, pp. 117-129.

Lehmann, S. and Buxmann, P. (2009), "Pricing strategies of software vendors", *Business & Information Systems Engineering*, Vol. 1 No. 6, pp. 452-462.

Lin, L., Hu, P.J.-H., Sheng, O.R.L. and Lee, J. (2010), "Is stickiness profitable for electronic retailers?", *Communications of the ACM*, Vol. 53 No. 3, p. 132.

Lufthansa Systems (2015), "CloudLounge – self-managed cloud services: design your virtual data center – perfectly suited to your needs", available at: www.lhsystems.com/solutions-services/cloud-services/cloud-services-for-other-industries/cloudlounge.html (accessed 22 March 2015).

Luoma, E. (2013), "Examining business models of software-as-a-service firms", in Altmann, J., Vanmechelen, K. and Rana, O.F. (Eds), *Economics of Grids, Clouds, Systems, and Services, Lecture Notes in Computer Science*, Springer International Publishing, Cham, Vol. 8193, pp. 1-15, available at: http://link.springer.com/book/10.1007%2F978-3-319-14609-6

Marn, M.V., Roegner, E.V. and Zawada, C.C. (2003), "Pricing new products: companies habitually charge less than they could for new offerings: it's a terrible habit", *McKinsey Quarterly*, Vol. 3 No. 30, pp. 40-49.

Mitchell, R.L. (2010), "Is SaaS a good fit for BI?", available at: www.computerworld.com/article/2550506/business-intelligence/is-saas-a-good-fit-for-bi-.html (accessed 10 February 2015).

Mohr, J.J., Sengupta, S. and Slater, S.F. (2010), *Marketing of High-Technology Products and Innovations*, 3rd ed., Prentice Hall, Upper Saddle River, NJ.

Monroe, K.B. (1973), "Buyers' subjective perceptions of price", *Journal of Marketing Research*, Vol. 10 No. 1, pp. 70-80.

Monroe, K.B. (2003), *Pricing: Making Profitable Decisions*, 3rd ed., McGraw-Hill/Irwin, Boston, MA.

Muntean, M.I. and Muntean, C. (2013), "Evaluating a business intelligence solution: feasibility analysis based on Monte Carlo method", *Economic Computation & Economic Cybernetics Studies & Research*, Vol. 2 No. 47, pp. 85-102.

O'Connor, S. (2009), "How indigenous software companies price their product and service offerings: an exploratory investigation", Master Thesis, Department of Accountancy and Finance, Waterford Institute of Technology, Waterford.

Ojala, A. (2012), "Comparison of different revenue models in SaaS", in Prakash, E. (Ed.), *Proceedings of 5th Computer Games, Multimedia & Allied Technology Conference (CGAT 2012), GSTF, Singapore*, pp. 120-123, available at: https://jyx.jyu.fi/dspace/handle/123456789/38559

Ojala, A. and Tyrväinen, P. (2006), "Business models and market entry mode choice of small software firms", *Journal of International Entrepreneurship*, Vol. 4 Nos 2/3, pp. 69-81.

Oliver, D.G., Serovich, J.M. and Mason, T.L. (2005), "Constraints and opportunities with interview transcription: towards reflection in qualitative research", *Social Forces*, Vol. 84 No. 2, pp. 1273-1289.

Redwood Capital (2014), "Sector report on business intelligence", available at: www.redcapgroup.com/media/98e342dd-420c-4716-be25-f21a14f46691/Sector%20Reports/2014-04-09_Business_Intellegence_Report_April_2014_pdf (accessed 25 January 2015).

Rohitratana, J. and Altmann, J. (2012), "Impact of pricing schemes on a market for Software-as-a-service and perpetual software", *Including Special sections SS: Trusting Software Behavior and SS: Economics of Computing Services*, Vol. 28 No. 8, pp. 1328-1339.

Sallam, R.L., Hostmann, B., Schlegel, K., Tapadinhas, J., Parenteau, J. and Oestreich Thomas, W. (2015), "Magic quadrant for business intelligence and analytics platforms", available at: www.gartner.com/technology/reprints.do?id=1-2AEKLJ3&ct=150223&st=sb (accessed 22 March 2015).

Schneider, S. (2012), "The dirty little secret of software pricing", RTI Whitepaper, available at: www.rti.com/whitepapers/Dirty_Little_Secret.pdf (accessed 10 March 2015).

Shih, H.-P. (2012), "Cognitive lock-in effects on consumer purchase intentions in the context of B2C Web Sites", *Psychology & Marketing*, Vol. 29 No. 10, pp. 738-751.

Shipley, D. and Jobber, D. (2001), "Integrative pricing via the pricing wheel", *Industrial Marketing Management*, Vol. 30 No. 3, pp. 301-314.

Singh, J. (2010), "Software pricing strategies", available at: http://de.slideshare.net/Alistercrowe/software-pricing-strategies (accessed 27 February 2015).

Swoyer, S. (2013), "Analytics in the cloud: the challenges and benefits", TDWI Report, available at: http://tdwi.org/research/2013/11/tdwi-ebook-analytics-in-the-cloud-the-challenges-and-benefits.aspx (accessed 18 December 2014).

The Economist (2006), "Universal service? Proponents of 'software as a service' say it will wipe out traditional software", available at: www.economist.com/node/6838606 (accessed 18 March 2015).

Thompson, W. and Van der Walt, J. (2010), "Business intelligence in the cloud", *SA Journal of Information Management*, Vol. 12 No. 1, pp. 1-5.

Van der Lans, R.F. (2012), "Data virtualization for business intelligence systems: revolutionizing data integration for data warehouses", Morgan Kaufmann, Waltham, MA, available at: http://store.elsevier.com/Data-Virtualization-for-Business-Intelligence-Systems/Rick-van-der-Lans/isbn-9780123978172/

Wailgum, T. (2011), "Why doesn't SAP publish its price list?", available at: www.asugnews.com/article/why-doesnt-sap-publish-its-price-list (accessed 18 March 2015).

Waters, B. (2005), "Software as a service: a look at the customer benefits", *Journal of Digital Asset Management*, Vol. 1 No. 1, pp. 32-39.

Zauberman, G. (2003), "The intertemporal dynamics of consumer lock-in", *Journal of Consumer Research*, Vol. 30 No. 3, pp. 405-419.

Zhu, K.X. and Zhou, Z.Z. (2012), "Lock-in strategy in software competition: open-source software vs: proprietary software", *Information Systems Research*, Vol. 23 No. 2, pp. 536-545.

Further reading

Hatami, H. (2006), "Software license and maintenance pricing principles – best practices and case studies", available at: www.softsummit.com/library/presentations/2006/HomayounHatami_McKinseyandCompany.pdf (accessed 6 February 2015).

About the authors

Aaron Wolfgang Baur holds a degree in Business Administration (Dipl-Kfm.) from the University of Mannheim, the College of Charleston and the Hong Kong University of Science and Technology and an MSc in Real Estate Finance and Investment from the University of Reading, UK. He is currently a PhD student and a scientific assistant at the Chair of Business Information Systems at the ESCP Europe Business School Berlin. His research focus is on text analytics, market research and business intelligence. He also serves as the CFO of Anacode, a firm specializing in automated market research applications, based on textual user-generated content. Aaron Wolfgang Baur is the corresponding author and can be contacted at: abaur@escpeurope.eu

Julian Bühler holds a degree in Business Information Systems (Dipl-Wirt-Inf) from the University of Duisburg-Essen, with E-Business & E-Entrepreneurship and Information Systems in Procurement and Logistics as the main subjects. He also majored successfully in Organizational Psychology, with the initial courses also at the University of Lübeck. He completed the PhD program at the ESCP Europe Business School in Berlin and works as a doctoral student and a scientific assistant at the Chair of Business Information Systems. In addition to lecturing and organizing academic projects with companies, he publishes research in the fields of social media and technology acceptance.

Markus Bick holds the Chair of Business Information Systems (BIS) at the ESCP Europe Business School Berlin. He earned a Doctorate in Economics from the University of Duisburg-Essen and a Diploma (MSc equivalent) in BIS from the University of Essen. He publishes regularly in international journals and on conferences, and he lectures on business and management information systems in the Master's, PhD, and MBA programs of the ESCP. He also teaches MSc Virtual Education in BIS (VAWi) classes at the Universities of Bamberg and Duisburg-Essen. His main research interests are knowledge management, e-learning, social media and ambient intelligence.