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Journal of Intelligence Studies in Business 3 (2013) 5-28

Cloud solution in Business Intelligence for SMEs – vendor and customer perspectives

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Received November 12, accepted 20 December 2013

ABSTRACT: The aim of this study was to identify key success factor for SME customers of cloud based Business Intelligence products. A deep interview was made with four producers and a questionnaire was carried out among 36 SMEs. The findings suggest that the most important CSFs were the level of software functionalities, the ubiquitous access to data, responsive answers to customer support requests, handling large amounts of data and implementation cost. Each of these factors addresses a specific area that customers pay close attention to during the adoption process of a cloud BI solution. Offering ubiquitous access to date and respsonsive answers to customer requests are particularly emphasized for SMEs. We also found that industry tailored software is preferred, monthly or quarterly billings, and contact by email or phone for service. The paper shows recommendations, implications of research and suggests further research on the topic.

KEYWORDS: Business intelligence, SME, cloud computing, ubiquitous computing

Introduction

The amount of data available for analyses is growing considerably and IBM estimates 90% of the data in the world has been created in the last three years (IBM research, 2011; Negash, 2004). In the last thirty years, storage space has been increasing dramatically whereas its cost has followed the opposite trend (Storage Trend study). More businesses are realizing the massive potential that lies in their data. This is a potential that can be leveraged to make better decisions, offer more value to both customers and shareholders, and discover patterns that could be "disruptive" (Scholz et al., 2010; Sheikh, 2011; Nyblom et al., 2012). The discipline that specializes in turning data into useful information is sometimes called Business Intelligence (BI). Why it is important for the bottom line of a company to have better information, is a crucial question and has been

addressed by Nyblom et al. (2012) and Watson and Wixom (2007).

Having access to the right information at the right time increases the likelihood of making better decisions (Yeoh and Koronios, 2010). These will bring tangible benefits to the organization, both in terms of "increased revenue" and/or "decreased costs". The importance of any IT solution can be measured in terms of how it affects, directly or indirectly, the two aforementioned basic metrics (Poston and Grabski, 2001; Tata Consulting Service White paper, 2012; Rust, 2002). A competitive advantage can be achieved not only through innovation in markets or products. Storing, collecting and analysing information have become a new frontier of competitiveness, and scholars foresee that data will become a new "corporate asset" and main source of revenue (Brown et al., 2011; Raisinghani, 2004). Many CIOs (Chief Information Officers) now consider Business Intelligence a top priority for their organizations (Gartner, 2013), after many data analytics best practices have proved to offer considerable benefits to enterprises and individuals (LaValle et al., 2011; May, 2009). Moreover, the benefits arising from the collection and analysis of data are not restricted to a specific industry, but may relate to the majority of organizations (Gangadharan and Swami, 2004; Raisinghani, 2004). Many sectors have already gained benefits from big data, but many organizations also still need to understand how to obtain value from it (LaValle et al., 2011).

Historically, BI systems have been mainly adopted in large and multinational enterprises (Olszak and Ziemba, 2012; Wong, 2005) which could afford the considerable cost required in terms of money, expertise and capabilities. As remarked by scholars (Solberg Søilen and Hasslinger, 2012b; Hwang et al. 2004), the resources necessary to implement a traditional BI tool are not available in most SMEs. Bergeron reports similar findings and suggests that conventional BI systems would not meet the needs of SMEs (Bergeron, 2000; InsideInfo Whitepaper). Furthermore, despite the precautions taken, the failure rate that characterizes BI projects, over 50%, (Beal, 2005; Meehan, 2011; Laskowski, 2001; Legodi and Barry, 2010 found in Adamala and Cidrin, 2011) does not encourage SMEs to invest in what is seen as risky activities.

Although major organisations have led the way in introducing and implementing Business Intelligence solutions, the recent speed of globalization, competition and the amount of data to be processed has forced SMEs to evaluate the purchase of BI tools (Olszak and Ziemba, 2012; Wong, 2005). These software applications help a small business compete with larger ones, increase market share or provide insights and patterns that otherwise cannot be seen (Grabova et al., 2010). Olszak and Ziemba (2012) surveyed business-owners and managers of SMEs, who confirmed the importance of analyzing data even in a small company:

Problem formulation

In the last few years, uncertain and turbulent economic conditions have forced companies, small as well as bigger ones, to find ways of streamlining operations and cutting costs in many areas (Östling and Fredriksson, 2012; Sheikh, 2011). The increase in data volume calls for an efficient way to manage the information within an organization, especially of a SME where the use of Information Technology consistently lag behind (Rath et al., 2012). The advent of cloud computing could represent a breakthrough for the IT segment, since the advantages brought in by this technology are particularly appealing to SMEs (Benlian et al., 2009; Rath et al.). The importance of this technology is also demonstrated by the growth achieved in this market in recent years. The Cloud Software-as-a-service (SaaS) market grew by over 17% in 2012, reaching $14.5 billion in revenue and is expected to hit $22 Billion in 2015 (Bucur, 2012). IDC forecasts that the amount of revenue generated by SaaS BI suppliers will expand three times as fast as the overall BI market for the year 2013, logging a Compound Annual Growth Rate (CAGR) of 22.4% (Deng and Zhang, 2012).

If SMEs can find ways to successfully deploy cloud BI systems, it is reasonable to assume that those solutions will boost their competitiveness and provide a means to manage the information more efficiently. However, despite the promising numbers and high expectations, the SaaS Business Intelligence market currently represents only 3% of the total BI turnover and the adoption rate among SMEs is still low (Figure 1; FSN, 2012; Rath et al.; Scholz et al., 2010).

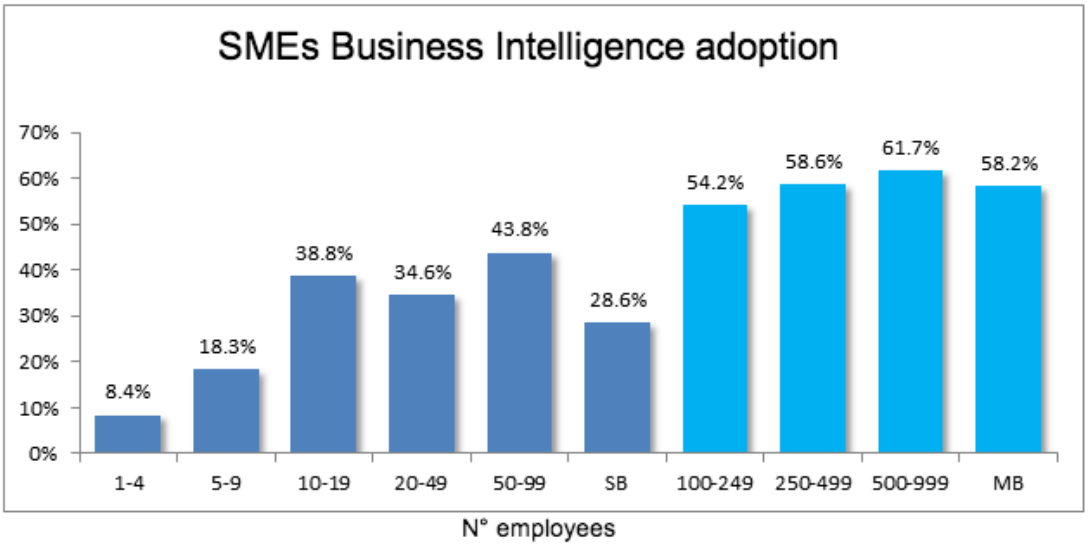

Figure 1. SMEs Business Intelligence adoption

A variety of factors might explain this poor result, such as the novelty of SaaS technology, which has still to spread, or the fact that applications characterized by a high strategic importance for a company, such as BI, experience lower adoption in a cloud setting.

Volatile market conditions force Business Intelligence suppliers to adapt their offerings to current customers' needs. The knowledge of which key factors affect the decision of a SME to adopt a cloud BI solution is mostly unexplored. The ability to investigate this problem will have practical as well as theoretical benefits:

- Understanding the real needs of SMEs in terms of managing information, through the adoption of BI systems, in a more comprehensive way. The "use" of information has a dramatic influence on the performance of a SME (Lybaert 1998 found in Scholz et al., 2010). In addition, BI systems appear to be adopted mostly in large and international companies, so previous studies have been focused on those organizations (Scholz et al., 2010; Olszak and Ziemba, 2012; Wong, 2005). The needs of SMEs are quite different than for big companies (Scholz et al., 2010; Olszak and Ziemba, 2012).
- Preventing the development of initiatives or projects with poor market appeal or suggesting that BI suppliers should focus on critical issues that otherwise would have been overlooked – resulting in a more compelling offering for the customers.
- Providing a solid ground for future research by validating and adding new perspectives to the current body of knowledge in the field of Business Intelligence, well aware that the value of these studies will decline rapidly with time, given the advancement of technological innovation (Yeoh and Koronios, 2010).

Based on this we have defines the following Research Question (RQ) for this study:

> *RQ. What are the key success factors for the adoption of a cloud BI solution in small and medium sized enterprises (SMEs)?*

Organization perspective	Process perspective	Technology perspective
Adequate budget	Well defined business processes and issues	Integration between BI system and other systems (Desktop applications, software..)
Support from senior management	Well defined users' expectations	Data quality
Competent BI project manager	Adjusting the BI solution to users' business expectations	BI flexibility and responsiveness on users' requirements
Sufficient skilled staff/team	Understanding how and when data will be delivered	Appropriate technology and tools
Clear business vision and plan		User-friendly BI system
Past experience and cooperation with a BI supplier		Delivers actionable Information
Rolling out training initiatives		

Table 1. Key adoption factors in Business Intelligence

Previous research

A unique definition of small and medium sized enterprise has not been put forward yet (Carter and Jones-Evans, 2006). For the purpose of this study, a company is considered a SME if it fulfills the following requirements:

- Up to 500 employees and $25 M in annual revenue in the Unites States (Carter and Jones-Evans, 2006).
- Less than 250 workers; a maximum annual turnover of €50 million or €43 million in the balance-sheet, for European enterprises (Carter and Jones-Evans, 2006).
- For Asian companies there is not an official definition and it varies greatly from country to country. For instance, Chinese companies with 2000 employees can still be considered medium businesses, whereas in Lao, a company with more than 100 employees is considered a big company (Harvie, 2004; Xiangfeng, 2007).

According to Rockart (in Vodapalli, 2009), Critical Success Factors (CSFs) represent a number of areas where the achievement of great results will ensure a competitive position for the individual, department or organization (Anthony, Dearden and Vancil, 1972 found in Olszak and Ziemba, 2012). It is worthwhile remembering that a mere list of key success factor *does not* automatically imply the success of the project (Adamala and Cidrin, 2011). As remarked by scholars (Yeoh and Koronios, 2010), a list of key success factors identified for the development of Information Systems, such as BI, is only a part of the task necessary to ensure the project's completion. The key factors represent the areas that, if successfully managed, can *increase the likelihood* of a successful adoption. Software evaluation criteria refers to making preference decisions over the available alternatives that are characterized by multiple attributes (Jadhav and Sonar, 2009).

An initial research revealed that the key factors concerning the adoption of a Business Intelligence software have been considerably covered (Adamala and Cidrin, 2011; Yeoh and Koronios, 2010; Vodapalli, 2009), both in term of SMEs (Olszak and Ziemba, 2012; Wong, 2005) and Software-as-a-service (Godse and Mulik, 2009). However, the key factors in adopting SaaS Business Intelligence solutions in SMEs have not been sufficiently treated. Little has been said regarding the connection between SMEs and cloud BI, therefore there is a lack of a proven framework that can be used for analyzing the domain. We developed these ideas following a similar approach adopted by other scholars (Scholz et al., 2010; Yeoh and Koronios, 2010), represented in table 1.

Other scholars (Scholz et al., 2010) have faced a similar challenge during an investigation of traditional BI systems. They have developed a framework to link IT software adoption in SMEs, BI adoption and BI success factors. Based on this we present here two areas which will be taken into consideration in building the framework that helps answer the RQ:

- Critical success factors: CSFs for IT/BI software implementation: focus on SMEs
- Evaluation Criteria: IT packages and Software-as-a-Service evaluation criteria

The factors belonging to these distinctive areas will be combined, resulting in a table that will be initially refined with the results from the qualitative interviews and then tested with a self-completion questionnaire.

Critical Success Factors (CSFs) in BI have been treated by many authors (Eckerson, 2005; Wise, 2007; Yeoh and Koronios, 2010*;* Olszak and Ziemba, 2012) and they could be considered a set of tasks and procedures that should be addressed in order to ensure BI systems accomplishment (Olszak and Ziemba, 2012). In this paragraph, these factors are reviewed and particular attention is paid to the ones related to SMEs. Table 2 summarizes the literature on the argument.

Functionality	Architecture	Usability	Vendor's reputation	Cost	Risk mitigation
Customization of the interface **Enhance capabilities** **Embed reports on multiple platform (blogs, web, email..)** **Ability to deliver *ad-hoc* business analyses** **Capability of the software package to run on wide variety of computer platforms** **Present and display data effectively** **Error reporting**	Integration (API, connectors..) Scalability and system response time Reliability Security (Backup, recovery)	Simple User – interface Offline support platform Support for Mobile/Tablet Devices Ubiquitous access Collaborative reporting and analytics Ability to support different combination of user types (beginners, intermediate, advanced)	Number of clients/users Brand Value and popularity Certificates and standard requirements Effective Manuals and Training tools Level of Service offered	Annual subscription One time implementation costs Maintenance cost	Easy to buy Special contractual agreements Flexible subscription

Table 2: Software-as-a-service evaluation factors (Godse and Mulik, 2009; Benlian et al., 2009; Sheikh, 2011; Sharma et al., 2010, Saugatuck Technology report, 2009, Jadhav and Sonar, 2009)

The bulk of studies on Critical Success Factors have focused on large companies and it is believed that not all the factors are applicable to the small and medium sized enterprise environment (Wong, 2005; Bergeron, 2000; InsideInfo Whitepaper). These studies analysed traditional and expensive IT/BI projects, commonly characterized by long implementation periods; whereas the typology of BI systems we focus on in this study requires a minimal implementation effort (Sheikh, 2011). Given this premise, the use of past research on critical success factors seems inappropriate for the purpose of this study. Indeed, there are substantial differences between cloud and traditional BI implementation, in terms of resources, complexity, and architecture. This research offered valuable foundations applicable throughout the whole research. Not all factors presented in table 1 and 2 will appear in the final framework and some of them have been adjusted to fit the context of this investigation. Elements such as *clear business vision and plan, support from senior management, well defined business processes and issues, sufficient skilled staff* are typical of long IT projects, which require multiple interactions between the client and the vendor, given the amount of resources required to roll-out the initiative. The overall process of adopting a cloud

Business Intelligence solution is less complex and these factors do not play a major role. Another example is *Rolling out training initiatives*, which represents a customer support activity. Generally, SaaS BI software is easy to use and the training support is mainly delivered through online libraries, tutorial videos, 24/7 call center, and email services.

IT packages and software-as-a-service (SaaS) evaluation criteria

In this section we discuss the different criteria that are evaluated before the purchase of a software. Focus is on the IT solutions evaluation criteria, with a specific consideration for SaaS cloud factors. Research on the key criteria for purchasing cloud SaaS software has been carried out by several authors (Godse and Mulik, 2009; Benlian et al., 2009; Sheikh, 2011; Sharma et al., 2010; Xin and Levina, 2008; Jadhav and Sonar, 2009). Given the focus of this paper on cloud SaaS software, it's necessary to understand precisely which are the fundamental factors that drive the purchase of these solutions. Table 2 was originally developed by Godse and Mulik (2009) and grouped together, in s simple and comprehensive way, the more important evaluation factors characterizing cloud SaaS software. However, during our research we found other factors not listed in the original version of the table, which help explain new discoveries:

1. *Functionality*: It represents the sum or any aspect of what a product, such as a software application or computing device, can do for a user (SearchSoa, 2005). One of the main concerns that potential customers have, before buying any SaaS product, is to understand the real functionalities. In the previous paragraphs we highlighted some benefits of cloud products. However, by comparing cloud BI and traditional BI functionalities, the former comes off worse. The limited
2. customization allowed by a SaaS products is far outdone by traditional solutions, which provide cutting-edge analyses created specifically for the needs of a different set of clients.
3. *Architecture*: In this category we refer to the security, reliability, scalability and integration of the IT architecture. *Security* is a crucial aspect that every SaaS vendors should address, clarifying doubts that companies have in letting third-parties manage confidential and sensitive information (Godse and Mulik, 2009). *Scalability* refers to the ability of the product to maintain the same performance despite the increase in utilization. *Reliability* indicates the product's ability to work and remain available to the users under specific environmental conditions for a given amount of time. Finally, a product is easily *integrated* if it can be combined with other applications.
4. *Usability*: this section refers to the features that facilitates the interaction between the user and the software. Examples are the user-interface and all the tools that support the customers in troubleshooting (Godse and Mulik, 2009). Even though the SaaS products are generally easier to use than traditional software, there are different level of "usability".
5. *Vendor reputation*: This specific attribute is valid for all software purchases, irrespective of the product's features and architecture. Therefore, our initial assumption is that it should be taken into consideration for cloud solutions.
6. *Cost*: The total cost of ownership is composed of two elements. The consulting and configuration services go under the name of *implementation cost*. The monthly or annual fee that is due to the supplier in exchange of the right to utilize the software is named *subscription cost* (Godse and Mulik, 2009).
7. *Risk mitigation*: In this section we grouped all the activities that facilitate the transition to a new product.

Purpose of Research	Research Methods	Research Group
1. Previous theories in light of cloud BI. Gaining new insights on the BI market. Help in the categorization process	Semi-structured interviews	Case. Four interviews with BI experts, vendors and customers of Business intelligence software solutions
2. Ranking the importance of key adoption factors	Questionnaire	36 SMEs who have implemented a cloud BI solution

Table 3: Research method

Method

Our research follows a two-stages approach, qualitative and quantitative, as summarized in the table below.

Stage one: qualitative – Defining the previous theories, gain up-to-date market insights and categorization of key factors.

An extensive literature review in two main domains was conducted. The subsequent step involved the analysis of the table, aimed at identifying possible weaknesses or improvements agreed by BI experts, daily BI users and BI vendors. Indeed, some previous theories explain the factors in generic terms, while this investigation is aimed at representing key adoption factors for SMEs in a more detailed manner. This process is done through four interviews. The research assumes that experts' judgments and experience could add important value in situations where theory is incomplete or obsolete (Yeoh and Koronios, 2010). Finally, factors coming from the literature review, improved with the interviews' data, and were consolidated into a single table.

Stage two: quantitative - Empirical assessment of the model.

Due to the limited academic literature about our problem, stage one was used to provide a solid ground for the following analysis. Here, the preliminary table (table 4), resulting from the qualitative interviews was further assessed and validated with a quantitative method. Based on this table, all the content was carefully shaped into a survey. The research instrument was used to capture respondents' perceptions and empirically classify the importance of the factors. A pool of candidates, who fulfilled the following requirements, were selected: "SMEs' employees who use a cloud Business Intelligence solution". None of the participants had any relationship with the authors.

To deepen the understanding and assure a certain level of reliability, three different data sources were used:

Secondary data. As this is a fast changing research area, papers older than five years could not offer much value. Therefore, throughout the paper not only did we use books or publications, but we also extensively relied on recent research papers and analyses made by trustworthy professional firms and as found at recent conferences (Gartner, Aberdeengroup and IDC) or information was found directly by Business Intelligence suppliers.

Qualitative interviews. All interviews were held through Skype and notes were taken for future reference. Even though face-to-face interviews are preferred for in-depth studies aimed at grasping nuances in the interviewees' behaviours, video-calls through Skype can also represent an effective way, given money and distance constraints (Hay-Gibson, 2009).

The first BI expert is the co-founder of RJ Metrics (www.rjmetrics.com), a Philadelphia based company that sells cloud Business Intelligence/Analytics solutions, with a focus on e-commerce organizations. The other knowledgeable person in the area of Business Intelligence is the Marketing Manager of Insightsquared (www.insightsquared.com), whose main offering is centred on sales analytics, optimization and forecasting. Both companies deal repeatedly with small and medium sized business owners. Regarding the BI users' point of view, a first interview was conducted with the marketing

director of a Mexican company with less than 150 employees, which provides solutions for Human Resource departments. The second was an interview with the head of the analytics department of Soliditet, a 100+ years old Stockholm based company with 250 employees, market leader in providing credit and business information for companies based in the Nordic regions. Anonymity has been preserved according to wishes

The web-based questionnaire. Another source of primary data comes from the self-completion questionnaire. The purpose of the questionnaire was to rank the importance of the factors listed in table 4. The limitations posed by the RQ restricted the available representative sample. Being aware of this difficulty, we made sure to have a pool of respondents large enough to draw insightful conclusions. The structure of the questionnaire's questions, the language used in formulating them, and the recommendations made by Bryman and Bell's (2011) have been taken into consideration. Nine questions were asked, both open-ended and with multiple choices, with a preference for the latter. Indeed, Bryman and Bell (2011) remark that closed-questions are more suitable for comparison among variables, which also represent the nature of our research here.

Sample and limitations

Regarding sampling, the RQ and the framework represent the most important delimitation criteria for the sampling choice (Miles and Huberman, 1994). The cloud BI subject, accounting for only a small portion of the total BI market, restricted from the beginning the sampling procedure. In addition, the available sample was further restricted by considering other criteria such as the size of the companies (SMEs) and the actual utilization of a cloud BI software. Out of the total population composed of 388 BI customers, 342 "good" addresses were selected, which constitute the total sample. The rest of the contacts were either info@-addresses, phone numbers or e-form compilations which have been discarded. After completing the e-mail collection, a web-survey was created and published online. An email, including the link to the questionnaire, was sent to all 342 addresses and a time limit was set to 60 days. 19 emails were automatically received with the notification of maternity leave, job change, not availability or wrong address. 36 full responses were received, generating a ~10% response rate. According to Braun Hamilton (2003, found in Solberg Søilen and Sabanovic, 2012), the average response rate for web survey is roughly 13 percent, but he affirms that this number could vary.

This result could be seen in two ways. From one side, Bryman and Bell (2011) affirm that the *absolute size* of the sample carries the most weight. The two authors also claim that there is not a standard procedure for evaluating sample size. It depends on a number of considerations and there is not a definitive answer (Bryman and Bell, 2011). Returning to the results achieved by this study and considering the year 2012, the cloud BI segment represents 3% of total market (Figure 4; FSN, 2012; Rath et al. 2012; Scholz et al., 2010), hence the available representative sample was lower than other research conducted on traditional Business Intelligence (adjusted for the revenue difference).

Results and analysis

By combining the previously mentioned factors, we created a table that has been assessed and refined with empirical data. The development of this framework has been necessary to reach the objective stated earlier. The process of categorization showed to be a difficult one. On the one hand, authors who have previously studied BI suggest dividing critical success factors in four categories: Technological, Organizational, Process and Environmental (Yeoh and Koronios, 2010). Scholars who have studied cloud computing software have used a different approach, as shown in table 2 (Godse and Mulik, 2009). Since this research combines multiple aspects, previous suggestions are not fully applicable to this investigation. Others have recognized the limitation of pre-defined frameworks (Vodapalli, 2009). We decided to categorize and label the key factors according to both the author's previous experience and the results from the interviews. The decision to not apply other authors' categorization is not a critic of these studies, but has been necessary due to the nature of this research. The result of the process is shown in table 4. The concepts will be used as a guide for the questionnaire development.

Performance-Functionality	**Ability to share reports through the software web interface** **The level of functionalities and capabilities offered by the product** **The speed of the product in performing analyses** **The ability to handle data in real time** **The ability to manage different amount of data** **Ability to offer actionable insights** **The effort required to deploy the product on a large scale basis**
Integration	Tablet and mobile integration Ability to handle multiple sources of data (Excel, google documents, etc.) Level of integration with other BI applications or databases
Flexibility	The level of flexibility in terms of contract agreements and conditions The simplicity of the interface The level of skills needed to perform meaningful analyses Web-data analysis The level of customization and personalization Ubiquitous access to data Offline access to data The payment method Functional or Industry needs
Reliability	Provider's brand reputation (including partners, suppliers and testimonials) The level of security guaranteed by the vendor (Backup, recovery and privacy)
Support	Vendor's clarity to customer support requests Responsiveness to general support requests The level of support offered by the vendor (Chat, 24hour)
Cost of ownership	The amount of Implementation cost (Training, setup..) The amount Subscription cost (Monthly or yearly fee)

Table 4: Categorization of key adoption factors for SaaS BI

In creating the table, we prioritized the factors that have been discussed across all the interviews. Other factors, that represent a specific view of one or more interviewees (not all), have been included in the table only after careful evaluation, trying to separate subjective and objective views. The insights generated from the discussions reveal some differences with the information found in the theories.

Support: All four interviewees pointed out that supporting activities are becoming more crucial in establishing a good client-vendor relationship. This area has been emphasized both by customers and suppliers of BI software.

In table 2 there is mention of the *level of service offered,* which is a quite broad statement that might also include the support activities. However, after the interviews we considered appropriate to create the category *Support* (table 4*)*. This provides a more detailed representation of different elements.

Flexibility: flexibility has been mentioned by scholars as a critical factor for the BI adoption and implementation (Olszak and Ziemba, 2012; Sheikh, 2011). The interviews revealed that flexibility spans over multiple areas and customers pay attention to most of them before purchasing the solution. In addition to that, a discussion around the social network and web-data analyses came up multiple times. The increasing influence of social networks on the customers' opinion has attracted

the attention of companies, who monitor closely what happens throughout the web. The flexibility of a BI software to analyze not only common data sources (E.g. Csv or Excel), but also unstructured data (Text and social media content) is in high demand.

Integration: According to previous theories (table 3), the integration between the BI software and other applications already situated in the customer's organization represents a critical area. During one of the discussions, the interviewee linked to a market study carried out in 2012 by an independent advisory firm and a well-known authority in the area of Business Intelligence (Dresner Advisory Services, 2012). It revealed that over 66% of companies taking part in the study, rely on two or more BI tools at the same time. Therefore, integration is also referred to among different BI applications. However, given the focus of this investigation on small and medium sized enterprises, the integration among BI tools is more related to big and multinational companies with various business units.

Key factors from the qualitative interviews

RJ Metrics' co-founder

During the interview many factors were discussed and we will categorize them in four areas. The *functionalities* took a substantial part of the discussion, and the interviewee emphasized their importance for SMEs. In particular, he explained that the majority of customers are not interested in having a vast number of features across different domains, but prefer a software able to perform a few analyses, but of high quality. For example, RJ Metrics provides a software mainly to e-commerce companies, where cohort analyses and trends spotting represent two essential functionalities.

With the advent of social networks, *collaboration and sharing* have become pillars of many applications since they encourage users to communicate and work together. The interviewee mentioned that customers are not very keen on using multiple software tools at the same time. They prefer to have everything in one place and this is one of the main factor they look for before buying the software (E.g. "*Can we share reports within the software*?").

Cost and *deployment time* have been mentioned together and they do influence the final decision. RJ Metrics takes seven days to deploy the overall solution and customers appreciate this short installation time. Not only does it reduce the overall cost, but it also minimizes the number of problems typical of the implementation phase. *Supporting activities* are not only restricted to the after sales customer support, but represent the overall ability to assist users in using the software and provide a detailed explanation to doubts or questions. This includes the area of security, where prospects perform a detailed due diligence before letting external parties manage sensitive data.

Marketing manager of a Mexican company

The marketing department of the company uses BIRST software. The conversation lasted almost one hour and was detailed. After a brief introduction of his company's operations and analytics activities, we discussed his perspective on the key adoption factors. *The ability to produce fast analyses* was the first area in the dialogue. As previously mentioned, his company provides solutions for Human Resource (HR) departments, and payroll management is one of the most important service. Payroll activities are characterized by remarkable seasonal trends, since the bulk of the work is done at the beginning and at the end of each year. In these two periods, the interviewee explained, the company runs a lot of promotional campaigns, mainly delivered through the website. He personally has a six weeks time window to tweak the advertising material according to real time data response, delivered on a daily basis.

The ease of implementation was another concern he had before purchasing the solution, which has been deployed in three weeks. A long implementation time could reduce the overall ROI generated by the BI investment, and generally prospects pay close attention to this aspect and evaluate the track record of BI suppliers in previous projects.

Flexibility has been debated. In his department, the users analyse data for different purposes, including tracking campaigns' results, evaluating new opportunities and measuring customers' satisfaction. The employees in charge of each analysis, examine data and present results in different ways. The BI software should be able to

accommodate all the users' needs. In addition, he mentioned the importance of offering *insights* to the customers. Often BI solutions not only provide an answer to many questions, but also leave users with new doubts.

Head of analytics department at Soliditet

Soliditet's analytics department makes use of two BI tools. One is SPSS software for statistical calculations, while for the cloud part it uses a Microsoft product. The conversation started with a brief overview of the Business Intelligence market and how Soliditet is trying to exploit some opportunities through analyses of the company's spreadsheets. The discussion became particularly interesting since the beginning, when the interviewee mentioned that Soliditet is looking for another BI solution and it is in the process of evaluating different options. One of the main requirement was *"We want a solution well-integrated with tablets"*, which is one of the main tools used by the company to interact with the customers. Therefore, this type of integration was important not only for the company itself, but also for fostering the relationship with customers and prospects. The integration aspect came out again when he made clear that SPSS software will remain the main tool used by the business analysts and both solutions should work together.

Then the discussion moved towards the *cost of ownership*, which was an important point for the company. The interviewee was well aware of the costs for different BI solutions and he explained that SPSS software was chosen as a compromise to the expensive, although powerful, traditional BI applications. Another area that got considerable attention was the *reliability* of the software. The company is looking for a solution that fits the budgetary requirements, but it does not want that the financial limitations would lead to the purchase of a solution with limited value for the company.

Marketing manager of InsightSquared

The *Simplicity* criteria was the central point of the discussion, since interviewee claims InsightSquared acquired many customers primarily by luring them with an easy-to-use software. Indeed, the software sold by the company takes only 48 hours to get installed and it is intuitive. According to him, it is difficult to create a general list of the most important *functionalities* for a cloud BI software, because it is highly dependent on the industry segment. However, he did think that a few of them should represent a cornerstone of every BI software: *Ease-of-use* has already been mentioned. *Configurability* is another one, since companies have their own way of using data, which is often unique. Hence, the level of customization for the cloud software is fundamental. Nonetheless, provided the limitations of cloud technology, customization cannot reach the same levels of the traditional BI implementations. However, the software has to be able to accommodate *different users' needs*, not only in more superficial subtleties such as colour or font preferences.

Moving to a different area of discussion, the marketing manager claims that a very simple software, such as Facebook or Twitter, simplifies the activities related to *the customer service*. By creating a self-explanatory product, there is a little need for online tutorials or pop-up guides. However, he agrees that technical problems do occur and a customer support team is essential to promptly solve some targeted questions. For instance, each screen of InsightSquared software is equipped with an "about this report" section to guide users when they need a little more information on how certain calculations are made.

Integration also came up as an interesting part of the dialogue and the interviewee provided insightful information on this point. He states that his company often receives questions related to integration with third party data source solutions. For this reason, InsightSquared is currently dedicating a good amount of resources to improving the offering in this area. Nonetheless, he points out very clearly that it is complex to find a trade-off between the financial investment necessary to develop a new integration and the total number of integrations available. Indeed, the development of new connectors is important, but scaling up the product is also a crucial aspect. It is not possible to satisfy all the customers and therefore it's fundamental to prioritize and integrate the most popular systems such as CRM and ERP solutions. Lastly, *flexibility* was the last argument of the discussion. Surprisingly, not only has InsightSquared not built the software around flexibility, but it has also put some limits on the level of flexibility.

Stage two: findings and discussion

In this section we will present and discuss the findings of the quantitative analysis. Further, we provide an analysis regarding the implications these results might have, both practically and in future research. The section begins with the analysis of the overall results and then it focuses on the comparison between the categories mentioned in table 4. Due to the inability to draw significant statistical conclusions from the data gathered, the analysis will be centred on polar results or, to be more precise, on results that scored extremely well or poor in the questionnaire. Figure 2 represents the overall results and it can be understood that the higher the value in the bar chart, the more important is the specific key adoption factor, according to the survey's respondents. Hence, in figure 3, we represent the key adoption factors in descending order.

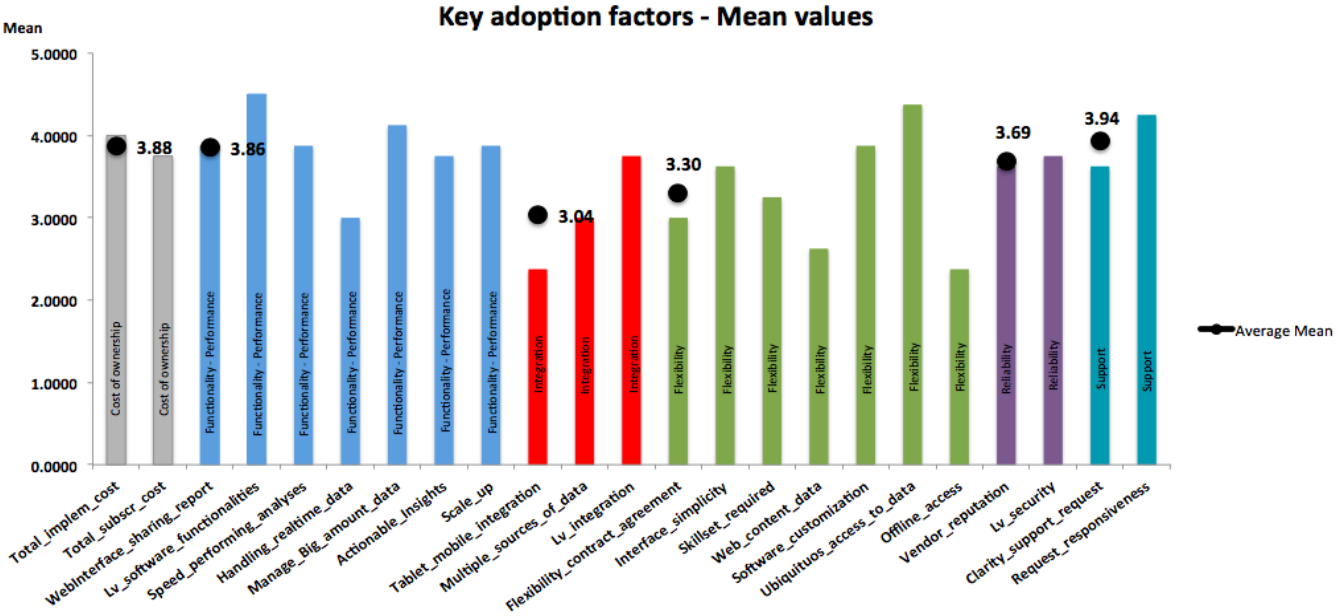

Figure 2. Key adoption factors - Mean Values

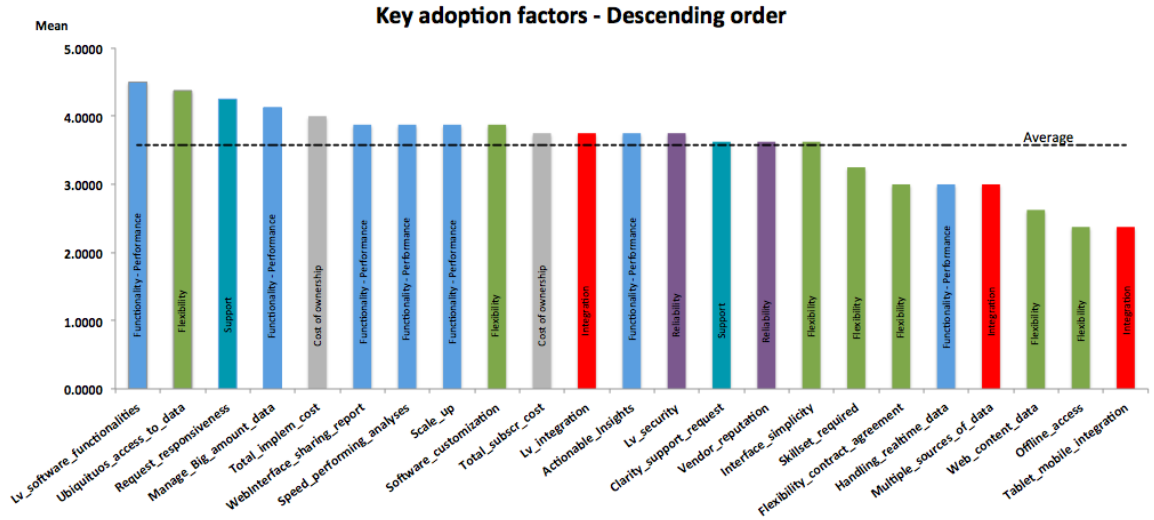

Figure 3. Key adoption factors – descending order

Order	Key adoption factors
1	The level of functionalities and capabilities offered by the product
2	Ubiquitous access to data
3	Responsiveness to general support requests
4	The ability to manage different amount of data
5	The amount of Implementation cost (Training, setup..)
6	Ability to share reports through the software web interface
7	The speed of the product in performing analyses
8	The effort required to deploy the product on a large scale basis
9	The level of customization and personalization
10	The amount Subscription cost (Monthly or Yearly fee)
11	Level of integration with other BI applications or databases
12	Ability to offer actionable insights
13	The level of security guaranteed by the vendor (Backup, Recovery and privacy)
14	Vendor's clarity to customer support requests
15	Provider's brand reputation (Including partners, suppliers and testimonials)
16	The simplicity of the interface
17	The level of skills needed to perform meaningful analyses
18	The level of flexibility in terms of contract agreements and conditions
19	The ability to handle data in real time
20	Ability to handle multiple sources of data (Excel, Google documents, etc.)
21	Web-data analysis
22	Offline access to data
23	Tablet and mobile integration

Table 5: Key adoption factors - descending order

Overall results

From the analysis of the questionnaire's results, the single most important factors are represented by the *software functionalities*. Other authors discuss this element in their works (Sheikh, 2011; Jadhav and Sonar, 2009), but without paying particular attention to its importance. From these results, it is clear that cloud BI's customers care about the software's functionalities. Even though it is quite normal that a prospect pays attention to the functionalities of an application, the highest score achieved could be explained in the following way: As previously mentioned, in the past years the number of Business Intelligence vendors have increased greatly. Some of them specialize in a particular niche of the market; for instance RJ metrics provides solutions for e-commerce businesses. Therefore, the customers expect a software that effectively addresses most of the problems in a specific domain.

We will not analyse minutely all the other key factors in this short paper, but it is interesting to provide a more detailed picture of the most and least important ones; *Ubiquitous access to data* (using any device, in any location, and in any format), *responsive answers to customer support requests, handling big amount of data and implementation cost* earned their position in the highest end of the table. All of these factors belong to different categories, resulting in four different categories for the first five elements. This is a remarkable finding and stresses the significance of excelling in multiple areas and not focusing on a single one. *Ubiquitous access to data* is an

important factor that confirms the results of previous studies (table 2). In addition, with increasing access to the Internet and the internationalization of many companies, BI customers know that their data reside in multiple locations and thus expect the BI software to connect all the sources together. In this way, *data accessibility from anywhere and at any time* (Sheikh, 2011) becomes not only feasible, but also necessary to have a better understanding of the overall company's performance. Cloud computing and its technological architecture foster data accessibility whenever a connection is available. The users do not have to worry about different data formats or computer platforms (table 2), since the files containing the data are stored in a separate location ("the cloud"). In order to offer the customers real ubiquitous access to data, we suggest cloud BI vendors to focus on two aspects: web browsers and multiple devices integration. It is true that cloud technology works whenever a connection is available, but users have different preferences regarding web browsers (Oh and Lee, 2011). As a consequence, it is the vendors' duty to make sure that data is represented in the correct way, irrespective of the web browser used by the customer.

Moving to devices integration, Gartner research (2013) forecasts a shift from desktop PCs to mobile devices in the following years. This escalation of smartphones and tablets' sales undoubtedly promotes ubiquitous data accessibility, provided that cloud BI sellers are able to show the same results on multiple devices.

Responsive answers to customer support requests achieved the third highest position. This factor does not represent a specific software functionality but is more related to the perceived experience that customers have during and after the purchase. This result gives evidence to the importance of serving customers in a professional way, in addition to offering a valuable software. If we look at the other key adoption factor belonging to the category "Support", it scored slightly above average and strengthened the importance of providing a good customers service in the decision process of choosing a cloud BI software.

Why is the *customer service* so important? It might be that small and medium sized enterprises can only rely upon a limited number of resources in comparison with big enterprises. The latter often have an appropriate department responsible for solving IT-related problems while SMEs might not have the technical or financial capabilities to deal with complex problems of this sort. This could explain why SMEs rated so highly the importance of the customer service.

Further, a software capable of handling *big amount of data* is a fundamental requisite for the customers. Given the rapid growth of data available (IBM research, 2011), a cloud BI software should be able to combine millions or even billions of data points and detect valuable trends or patterns. Doing this operation within an acceptable time span represents a challenge from a technological point of view and BI suppliers should dedicate resources to address this important matter.

Finally, the *total implementation cost* is the last factor that scored 4 or above. Cost is definitely one of the main benefits offered by SaaS products and customers still pay attention to this aspect (table 2). However, what is interesting to highlight is that the highest ranking was achieved by the *implementation cost* rather than the *subscription cost*. By looking at traditional BI implementation projects, the implementation phase is the most critical one and it may last for years (Watson and Wixom, 2001), demanding important resources. Despite this cloud BI implementation is not a process as critical as in traditional BI, customers may still be worried and this can explain why the one-time implementation cost scored higher then subscription costs.

Moving to the opposite side of the table, three factors stand out for their low scores: *tablet and mobile integration, offline access to data and web-data analysis*.

In light of the precedent analysis pertaining ubiquitous access to data, the position reached by *tablet and mobile integration* seems counterintuitive. Given the previous considerations and the Gartner research (2013), analysing data through multiple devices should have been an obvious necessary functionality. Nonetheless, our research reveals that this factor bears the lowest value. On the one hand, the representative sample of 36 respondents is not sufficient to draw a reliable conclusion and, as aforementioned, the results of this study can only provide a direction for

more in-depth research. On the other hand, it is possible that SMEs are not fully interested in displaying data on multiple devices. If they have a business restricted to a limited region or if they dispose of only a single office, the utility of having data everywhere loses some importance since there is no need to bring data around and display it on multiple devices. Alternatively, the purchase of a cloud BI software might be the first data analysis solution adopted by some SMEs. Hence, they would be more interested in basic functionalities and overlook others of minor importance. In any case, these are only tentative explanations and only represent the authors' perspectives.

Offline access to data is the second least important key adoption factor. We have not found this element mentioned in the previous literature, but it came out during the qualitative interviews. The interviewees mentioned that one of the drawback of cloud technology is its dependence from the availability of the Internet connection. It does not represent a problem in most western countries, but in the developing world it might be. This is the reason why *offline access to data* has been included in the study. However, the result speaks for itself. Customers are not interested in accessing data in offline mode and this could have been foreseen in advance to some extent. Indeed, when the decision of buying a cloud BI solution is made, the customer is well aware that most of the interactions with the software require an Internet connection.

The last element that scored poorly is the *ability to analyse data coming from web-sources.* Despite social networks' popularity having risen and fallen in the early 2000s (Ellison, 2007), in the past years it has gained considerable attention all over the world. Initially these social platforms were used only as a means to communicate with friends, but later many organizations understood the enormous potential behind them. In fact, spontaneous customer feedback quickly spreads throughout the social networks, blogs, newsgroups and it represents a potential source of information for Business Intelligence tools (Gamon et al., 2005). Recently, the techniques developed to analyze this type of unstructured data have made great progress and we had expected a different score for this factor. Most of the unstructured data belongs to web-content and a recent report released by MYOB Business Monitor reveals that the overall online social presence for small and medium sized companies is rather low (Stafford, 2012), even though it is on an upward trend. This result can partially explain why the analysis of web-data sources scored poorly in the questionnaire. However, given the benefits achieved by those who extensively use social media channels and the expected growth in this domain (Milman, 2013), the rank achieved by this key adoption factor may change substantially in the near future.

Three factors have been represented separately (Figure 4), given their different nature:

Figure 4. Payment method, customer service and type of preferred solutions

By looking at the figure 4, the first thing that immediately stands out is the staggering preference for solutions built towards the industry's needs. Therefore, from the result it's clear that customers prefer to buy applications that deliver analyses only relevant to a specific market sector, and not industry-wide. Indeed, buying a fit-all product offers minimal value. For instance, the type of analyses required in the supply chain industry differs from the ones needed by insurance

companies. In the former, customer will be more interested in spotting opportunities for cost reduction throughout the chain, by analysing performance level or by adjusting manufacturing production according to the different requests (Baars et al., 2008). In the latter, insurers can gain significant value by detecting fraud through the cross-analysis of multiple sources of data, such as fraud patterns, accidents, social networks, and medical and criminal records (Brat et al., 2013).

However, given the focus of our study on small and medium sized organizations, where the boundaries between departments may not be well-defined or even exist, the result makes more sense. SMEs want a solution that offers benefits for the *whole* company, not merely for a single business department. This conclusion could differ for big organizations, where the hierarchical structure is usually more rigid.

A second element appears in this study: customers prefer to pay the subscription costs either on a monthly or a quarterly basis. At first sight this factor seems not very important and we have not found any theory that discusses this in detail. However, it came out two times during the explorative interviews and it was included in the questionnaire. Common sense would suggest that paying a software on a monthly basis is a daunting process for a company. Nevertheless, SMEs prefer not to lock in with a single product for a long time and they reserve the right to cancel the contract anytime if the solution does not deliver the expected value. It is worthwhile remembering that for some SMEs the purchase of a cloud BI solution has never been done before and therefore there is an element of uncertainty and skepticism. By paying on a monthly or quarterly basis, having the freedom to cancel the contract *without* losing money becomes an important element and it could explain the outcome of the survey.

Lastly, it does not come without any surprise that phone and email are the most preferred methods for interacting with customer support. We included this question in the survey because various vendors extensively promote the availability of the live chat and the 24/7 support in their offering. Even though our data set is not representative for the population of SMEs, there is an initial indication that customers still rely on traditional communication media.

In the following paragraph we analyse the results for each category, referring to figure 4. As aforementioned, we can only draw tentative but still interesting conclusions by looking at the opposite results. There are three categories that got a similar score: *Support, Cost of Ownership and Functionality-Performance*.

Customer support is an essential part that has to be incorporated into the product offering. During traditional BI implementations, support is given through training initiatives, consulting services and other activities (table 3). Hence, there are often face-to-face interactions between the supplier and the customer. With cloud BI solutions, it's likely that most of the services will be delivered online, including the customer support. For this reason, it's crucial to adhere to certain quality standards and make sure the customer receive a good service.

As expected, the cost of ownership revealed to be an important area that SMEs pay attention to. The previous literature recognizes its importance, as shown both in table 1 and 2. In fact, a minor financial risk is one of the main benefits offered by cloud technology (Finch, 2007; Olszak and Ziemba, 2012). This is appealing for small and medium sized enterprises (Benlian et al., 2009). Hence, to some extent this result confirms previous theories. Moreover, by going into the details, it can be seen that both the subscription cost and the implementation cost achieved similar results. This is important because it implies that customers are not lured by cheap offerings that address only one part of the total cost of ownership**,** but they pay equal attention to all the parts of the financial investment. Therefore, cloud BI vendors should carefully balance their price regarding the total cost of ownership.

The last area with a relevant score is *functionality*. This result also strengthens the previous analysis, where a key adoption factor that belongs to this category reached the first position in the survey. Functionality is a big area that encompasses items quite different from each other. Despite this difference, all the elements scored similarly in the questionnaire, except *handling data in real time* which is well below the average. Generally, real time data comes from web-sources which are characterized by a quick spread of information: an article, an opinion or a statement. Therefore, *handling data in real time* and the *ability to analyse*

data coming from web-sources are closely related and can explain the poor results achieved by both of these factors. In all cases, functionality plays a big role for SMEs, and this may not come as a surprise because every company is in principal interested in this category. However, common knowledge about cloud BI would suggest that often the functionalities and performance do not reach the high standards of traditional BI. This is due to two reasons. On average, cloud solutions costs less than traditional ones and the overall quality might be affected as a consequence. In addition, traditional BI solutions are built and customized specifically around the needs of the clients and the functionalities will be more accurate than a "universal" tool. Despite these premises, the results of the study indicates that SMEs have high expectations in terms of performance and are not willing to pay for a cheap solution which does not add any specific value to the organization.

On the opposite spectrum, a category that did not score as well as expected is *Integration*. As remarked by the interviewees, one of the very first question asked by a potential customer is "How well does the solution integrate with my applications?". Thus, we expected a much higher consideration here. Nevertheless, by looking only at the average result, the conclusions we would draw may be misleading. If we pay attention to figure 4, the score of each element belonging to the integration category differs substantially. The general *level of integration* is positioned well and it partially contradicts the previous conclusion about Integration. The two key adoption factors that lowers the average result are *mobile devices integration* and *the ability to handle multiple sources of data.* We talked about the former in the previous section while it is necessary to think about the result achieved by the latter. As remarked by Gamon (Gamon et al., 2005), the potential sources of information for Business Intelligence are growing exponentially. Valuable data are found not only in traditional spreadsheets, but also in blogs, social networks, activity logs and many places. Therefore, if an organization is willing to have an overview of its customer base, it's necessary to analyze multiple sources of data. There is a possible explanation of why this is not the case for SMEs. Small and medium sized enterprises still rely heavily on data stored in traditional spreadsheet (E.g. Excel) and more than 80% of them use desktop spreadsheet as the only analytical tool in the company (Maguire and Magrys, 2007; Ashrafi and Murtaza, 2008). This might partially explain why they are not interested in analyzing different data formats, but prefer to have a product for spreadsheet analysis such as excel.

Conclusions and implications

Based on the research findings, there are five key adoption factors that scored ≥ 4 and therefore are classified as the most important:

- The level of software functionalities (all)
- The ubiquitous access to data (SME)
- Responsive answers to customer support requests (SME)
- Handling large amounts of data (all)
- Implementation cost (all)

Each of these factors addresses a specific area that customer pay close attention to during the adoption process of a cloud BI solution. The importance of handling different amounts of data, the software functionalities and the implementation cost confirm what has been found in the previous research, both for traditional and cloud BI. On the other side, the score reached by the other two factors can be tightly connected to cloud technology. Providing an excellent customer service becomes important where the face-to-face interactions are kept at minimum. Finally, the increasing spread of data and the process of globalization calls for an ability to access data everywhere.

In terms of the categories, the results do not show any important dominance in a specific area, but rather, there are 3 categories that reached a similar level: *Support, Cost of Ownership and Functionality*. This outcome strengthens the statement that SMEs look for a software that is complete on multiple areas and do not stick to one area in particular.

Practical implications

This study has several important managerial implications, for providing more information and knowledge about the key factors for successful adoption of cloud BI software in SMEs. Managers and head of departments can leverage the findings in order to craft better value propositions or prioritize areas of development according to what customers value the most. We suggest to BI suppliers the following areas of discussion:

- It is commonly agreed that cloud software will become a cornerstone of almost every business (Sheikh, 2011). This revolution has already started: from email services to traditional systems like CRM, they are now being adopted in an On-Demand fashion (Sheikh, 2011). The classic concept of delivering goods to customers is being overcome by the idea of providing an ongoing service in exchange of a monthly fee (Östling and Fredriksson, 2012). Therefore, even the sales process has to change from the "one-time" selling to the development of long-lasting relationships, with the attitude of offering value to clients on an ongoing basis. One of the most effective and successful ways to address this issue is to meet the customers' expectations related to the specific software. From the questionnaire's analysis it's clear that successful cloud BI products excel in multiple areas, from the functionality to the reliability, going through customer support and a fair price-quality ratio. Hence, balancing the resources in the appropriate way becomes an important matter, avoiding overlooking some areas or focusing too heavily on others. Moreover, it is critical to shift the mentality from selling goods to delivering value to customers by building solid relationships (Östling and Fredriksson, 2012). Whenever the customer perceives that there is no cooperation, the relationship will likely interrupt. This means the cancellation of contract and a loss of income for the BI provider.
- BI Vendors' marketing managers should create material that reflects what customers really want. In this particular case, it's fundamental to promote a BI solution as a comprehensive package that delivers high value at a fair price point, supported by an excellent customer support service. Alternatively, it is also effective to mention the five most important key adoption factors and stress their importance.
- One of the main reasons that motivate small and medium sized enterprises to embrace the cloud solutions is the perspective of lowering IT costs (Östling and Fredriksson, 2012). This common perception is supported by real data and real companies who did experience a decrease of hardware and maintenance costs by adopting cloud technology (Perry et al., 2009). The importance of costs is also reflected by the results of this study, but there are other areas of equal significance from the customers' perspective. One of them is definitely *customer support*. In the past years, outsourcing has been grown steadily and became a global phenomenon (Rao, 2004). With the improvements of telecommunications infrastructure, IT operations can be managed efficiently in countries where labor cost is lower (Rao, 2004). Even though the financial benefits are immediately clear, the quality of the service can damage the reputation of the company, if it does not reach high standards. Given the previous premise of a model shifting towards a customer-relationship focus, we suggest to think carefully before outsourcing the customer support activity for cloud BI software. It is fundamental that requests are handled by experienced people, who knows the software well and can make specific recommendations to solve any issue. This will help building trust in the relationship.

The results of this paper can be leveraged by small and medium sized enterprises. They can benefit from a more comprehensive understanding of the factors that are critical for a successful adoption of a cloud Business Intelligence solution. On the opposite side, the factors that are not important can pose a serious threat to the achievement of adequate satisfactory levels. Unlike the majority of previous studies, this investigation proposes five factors which are specifically tied to the needs of small and medium sized enterprises, providing a ground for future empirical research in this domain.

The proposed set of key adoption factors is itself important, because it can act as a list of items to be checked during the evaluation process (Wong, 2005). This helps to ensure that essential issues and factors are covered when an organizational plan to adopt a cloud BI solution for managing information (Wong, 2005). Moreover, it is of primary importance for Business Intelligence newcomers, who are evaluating the purchase of these solutions for the first time and may be confused by the amount of different alternatives available in the market. Therefore, the results of this study can provide a guidance and a basis for evaluating and comparing different solutions.

Theoretical implications

This study has also interesting implications for future academic research. The literature highlights the necessity to study more thoroughly Business Intelligence in small and medium sized enterprises (Benlian et al., 2009), since the majority of studies were focused on big organizations and the same results may not be applicable to the SME's landscape. We found two areas where the contribution is substantial.

First and foremost, the results expand the body of knowledge related to small and medium sized companies. They confirm that the needs of SMEs, in terms of BI software, differ from large organizations, at least on certain areas (InsideInfo Whitepaper): Multiple sources of data, tablet and mobile integration and real-time data analysis. Moreover, our findings provide new information of how SMEs evaluate a certain typology of IT software.

In addition, this investigation adds knowledge in connection to an up and coming technology: cloud computing. In particular, it focuses on a specific context in which this technology is used, for SMEs, which has been poorly explored in the past. As mentioned by Yeoh and Koronios (2010), in the market sectors highly influenced by technological innovations, such as cloud services, the value of previous discoveries declines over time. By using recent primary data, future research on Critical Success Factors will be more reliable.

Suggestions for further research

The commercial availability of cloud solutions dates back only few years. This is the case especially for cloud BI, which is still in the early phase of the growth curve (Bucur, 2012). The implications of adopting a novel technology may not be fully understood yet. Therefore, the respondents' answers reflect this particular industrial situation.

Further research on the same topic in three or four years' time is suggested, if not before, when the adoption rates of cloud BI software will likely be higher and the sample of suitable candidates will be larger. It would be interesting to see if, in the future, the key factors for adopting a cloud solution will differ and help understand the underlying motivations. A research focused on the explanation of why some factors scored exceptionally well or worse could provide further insightful information. Nonetheless, the statistical power of this study is limited, and it would not be appropriate to dismiss all the other factors yet.

Secondly, the survey represents only the companies that have BI software applications already in place, for the reasons already provided. Yet, according to Gartner research (Gartner, 2013), 55% of companies are currently evaluating an adoption of a BI system. It could be interesting to find out which are the main factors relative to companies who have not purchased any cloud BI software yet. Therefore the focus could be more on evaluation criteria.

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