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INDOOR LOCATION-BASED ANALYTICS SYSTEMS: PORTUGUESE MARKET COMPETITIVE ASSESSMENT AND ENTRY-PRICING STRATEGY OF BIPS' TECHNOLOGY IN *SONAE SIERRA* SHOPPING MALLS STORES

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In memory of my beloved grandmother

Indoor Location-Based Analytics Systems: Portuguese Market Competitive Assessment And Entry-Pricing Strategy of BIPS' technology in *Sonae Sierra* Shopping Malls Stores

by

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Abstract: This project attempts to provide an in-depth competitive assessment of the *Portuguese indoor location-based analytics* market, and to elaborate an *entry-pricing strategy* for *Business Intelligence Positioning System* (*BIPS*) implementation in Portuguese shopping centre stores. The role of industry forces and company's organizational resources platform to sustain company's competitive advantage was explored. A c*ustomer value-based pricing approach* was adopted to assess BIPS value to retailers and maximize *Sonae Sierra* profitability. The exploratory quantitative research found that there is a market opportunity to explore every store area types with tailored proposals, and to set higher-than-tested membership fees to allow a rapid ROI, concluding there are propitious conditions for Sierra to succeed in BIPS store's business model in Portugal.

Keywords: *Entry-pricing strategy, Customer-value based approach, Indoor Location-based Analytics, Competitive Assessment*

What is a cynic? A man who knows the price of everything and the value of nothing.

- Oscar Wilde

1. General Overview

Introduction

Over the past decade, multi-channel strategies have transformed the retail landscape, merging more than ever physical stores and online markets. However, unlike their online counterparts who easily track users, bricks-and-mortar retailers have struggled to gather offline in-store customer analytics.

Recent advancements have brought *indoor location-based analytics technologies* as a valuable solution to track customer flows inside stores, making it possible to gather and analyze real-time consumer data to support business decision-making, without compromising on individual customer identification.

Not only retailers but also shopping centres can benefit from the potential opportunities this promising technology offers, and *Sonae Sierra*[1], as an international specialist mall operator, is not an exception. The main revenue source of the shopping centre industry relies on rents paid by tenants. However, as shopping centre sales are strongly affected by changes in discretionary consumption, *Sierra* was compelled to grant rebates on fixed and variable rents as a result of the lower consumption of the last years. Therefore, there is an urgent need to refurbish the business model and obtain additional revenue streams to balance these negative outcomes.

In this context, and considering the expected exponential growth of the emerging market of indoor positioning analytics, *Sierra* developed a partnership with *Around Knowledge*. This Portuguese start-up developed an innovative product called *Business Intelligence Positioning System* (BIPS) that captures radio frequencies emitted by mobile devices that, without revealing individual client identification, provide meaningful retail analytics to understand customer behavior. With this decision, *Sierra*

intends not only to generate critical knowledge about consumers, but also to integrate this service as part of the company's value proposal as a service provider, and financially benefit from BIPS' adoption by shopping centre brands.

Purpose

This project attempts to (1) provide a detailed competitive assessment of the *Portuguese indoor location-based analytics* market, and (2) to formulate BIPS *entry-pricing strategy* to Portuguese shopping centre tenants. The competitive assessment is developed through an analysis of the industry's forces and the firm's organizational resources platform, to determine the unique resources that could sustain the company's competitive advantage. To overcome incompleteness found in more traditional pricing procedures, a c*ustomer value-based pricing approach* is used to assess BIPS' value to brands, through the use of quantitative research, to build an effective price framework. Thus, this project highlights the importance of evaluating customer value, identifying those features that leverage customer benefits perception, and setting prices according to the true value delivered to buyers (Meehan *et al*., 2011).

Limitations

Considering the project focuses on developing an entry-pricing strategy, other relevant subjects such as sustainability of price positioning or pricing tactics throughout the service life cycle will not be covered. Furthermore, some competencies required to successfully develop an integrated pricing model such as pricing communication, implementation processes, organizational alignment structure, operational policies and processes, and incentive systems will not be subject of analysis.

Moreover, due to Portuguese privacy requirements, the competitive assessment will not include companies collecting customer metrics using video counters technology.

2. Literature Review

Customer value-based approach and pricing segmentation

Pricing is one of the core challenging decisions that managers have to undertake as it is considered one of the most powerful strategic tools to raise performance and profitability (Hinterhuber, 2008; Meehan *et al*., 2011). By setting the right price, firms are able to appropriate value from customers and contribute to rent generation (Dutta *et al.*, 2003). Academic researchers suggest three major pricing approaches: *cost-based*, *competition-based* and *customer value-based pricing.* Due to some incompleteness found in the first two, as shown in Appendix 1, the latter is consensually deemed the most accurate to drive firms' profitability (Hinterhuber & Liozu, 2012). By assessing customers' willingness to pay for the perceived benefits, firms intend to capture as much value as possible (Ingenbleek *et al.*, 2003; Meehan *et al*., 2011).

Nevertheless, each customer attributes different values based on personal criteria, motivating pricing segmentation (Nagle *et al*., 2011). According to Nagle (1984), segmented pricing refers to "the policy of pricing differently to different groups of buyers" aiming profit maximization as it intends to achieve a broader range of customers who, otherwise, would not be willing to pay. Generally, it takes the form of price discrimination, a tactic used to please the more price-sensitive buyers who can purchase the same product at a lower price (Nagle, 1984). Nonetheless, Nagle *et al.* (2011) warns that more important than understanding current customers' value is how to "raise [their] willingness to pay to a level that better reflects the product's true value". Therefore, firms must engage in marketing campaigns and effective selling strategies to communicate the differentiated value to customers and motivate them to link value to fair price (Hinterhuber, 2008; Meehan *et. al*, 2011, Nagle *et al*, 2011).

Price-setting process and pricing strategies

Price-setting process involves three steps: (1) *establishing pricing boundaries*, (2) *setting price strategy*, and (3) *communicating prices to consumers* (Nagle *et al*., 2011).

First, three economic factors determine the price options window: *perceived value, product's price* and *cost of goods sold* (Dolan & Gourville, 2009). The former sets the price ceiling that consumers are able to pay, whereas relevant costs help to set a price floor, resulting in a wide range of possible pricing options (Ingenbleek *et al.*, 2003). Hence, the firm will capture the maximum value if it is able to sell above its production costs, and if consumers perceive and are willing to pay the true economic value.

Second, two major pricing strategies are commonly used: *skimming* and *penetration strategies.* The former manages heterogeneity among customers by setting an initially high relative price in relation to customers' perception, which will tend to be reduced to meet the value given by customers along the product diffusion curve. (Jobber & Shipley, 2010; Meehan *et al.*, 2011; Tellis, 1986). It is especially used when a new product is perceived to offer superior advantages over rivals (Calantone & Di Benedetto, 2007), which can be sustained to foster long-term profitability. The latter sets initial lower prices in relation to the perceived value of the customers' segment to increase market share via a large volume of sales (Nagle *et. al*, 2011). This strategy is often implemented when new entrants represent a significant threat, when a product is at the maturity stage and pricing effectiveness is a competitive solution, and to satisfy price-sensitive consumers (Tellis, 1986; Meehan *et al*., 2011). However, product's value perception can be compromised if consumers associate low price with poor quality. Third, in accordance to the strategy chosen, companies should invest in marketing campaigns to communicate the unique value offered by the product or service.

Entry pricing strategies for innovative products

Innovative products are usually shrouded in an unknown concept, which leads buyers to undervalue them initially as they do not fully realize their potential.

Therefore, Docters *et al.* (2010) developed a framework for customers' product adoption pattern with three stages: (1) *learning*, (2) *usage*, and (3) *reassessment*.

Learning assumes a crucial role on product innovations in a specific market. Indeed, outstanding innovations are sometimes underpriced because firms decide according to what uninformed potential buyers are willing to pay (Nagle *et al.*, 2011). For technological durable goods, marketing communication tactics can focus on a strong *direct sales force* (Nagle *et al.*, 2011), as it is expected that customer's acceptance will be greater as "more information becomes available, uncertainty is resolved, and availability is extended" (Montaguti *et al.*, 2002).

Usage is a relevant driver as there is empirical evidence that a product's overall market acceptance will only take place after the first 2 to 5% customers buy the product, because early majority and late adopters will wait to see how they react (Nagle *et al.*, 2011). In new product introductions, firms usually plan skimming strategies to set high prices for early adopters and progressively reduce them to meet willingness to pay of the remaining customer segments (Meehan *et al*., 2011; Nagle *et al*., 2011).

In the *reassessment* phase, those customers who have already experienced the product begin to search for similar alternatives at a lower price (Docters *et al*., 2010). This fact stresses the importance of understanding the firm's core competencies and the competitive environment that helped to achieve an effective entry strategy (Montaguti *et al*., 2002; Cooper & Edgett, 2010), and most important, if it will guarantee long-term sustainability of competitive advantage.

Drivers of Competitive advantage

Firms are able to generate competitive advantage over rivals if they gain a higher rate of profit than the industry average, by providing a wide range between customer's willingness to pay and production cost (Ghemawat & Rivkin, 2006; Grant, 1991). Two factors trigger firm's profitability: *industry attractiveness* and the *creation of competitive advantage over rivals* (Grant, 1991).

The latter assumes a prominent position being performance differentials mainly explained by unique resources and capabilities over other firms, as conveyed by the *resource-based theory* approach (Barney, 1991; Grant 1991). In order to be considered strategic and with potential to sustain competitive advantage, these resources and capabilities should be *valuable, rare, inimitable, non-substitutable* and *organizationally bundled* (Barney, 1991, 2002; Wilk & Fenterseifer, 2003). This analysis must consider firm's organizational resources platform as *core competences, specialized assets* and *architecture of relations* to appraise which of them present strategic importance and relative strength to create unique value. However, in today's dynamic markets, the sustainability of competitive advantage is only possible via *isolating mechanisms* (Rumelt, 1984) to protect against imitation, and by capturing value from *innovation* (Pisano & Teece, 2007).

3. BIPS

System Description

BIPS solution is a state-of-the-art tagless traffic positioning system that provides in-depth visitor flow analytics. Unlike GPS technology, BIPS works inside buildings by capturing radio frequency signals (GSM, Wi-Fi, and Bluetooth) emitted by mobile

devices to calculate a visitor's location with a high accuracy. Each radio frequency device sends a signal with small-encrypted data packages. BIPS captures this signal from at least three nodes in order to estimate the distance. The data packages are encrypted and sent automatically to the data server, so that visitor privacy is never compromised, and individual client identification is never possible. The data collected is available through a customizable web-based dashboard with relevant customer metrics to help in strategic and operational retailer decision-making process.

Architecture and Installment requirements

Two types of components are needed for a successful operation: *bNodes* to capture the location data, and an *external data server* to process the desired outputs. The number of nodes installed in stores will depend on *data specificity required* and *store size*. A retailer aiming to get basic consumer insights as the number of visitors or average visiting time will need to install fewer nodes than the ones who want to track visitor flow inside the store, implying therefore triangulation methods. Moreover, the larger the store, the greater the number of nodes required to collect visitor monitoring data.

4. Market and Competitive Assessment

External analysis

The market covered in this project is the *Portuguese Indoor Location-Based Analytics*, where BIPS will be firstly implemented.

Globally, the *Indoor Location-Based Analytics* market is a submarket that, paired with Indoor Maps and Navigation, constitutes the Indoor Location market. In response to the poor performance of successful satellite-based location technologies for outdoor positioning environments within buildings, indoor technologies have been recently

explored (Mautz, 2012). According to Gartner (Appendix 2), location intelligence technology is now becoming more widely familiar and its business benefits highlighted. With an exponential global market growth expected for the next years[2], visionary start-ups are funding pilots and investing in the development of indoor location analytics equipment with applications across several businesses (Nandakumar, 2013). With a customer-centric approach, Retail is one of the verticals boosting tremendous benefits. Despite being considered an emerging industry, the adoption stage of this technology differs worldwide. Main innovators are located in North America, being the most promising market, while Europe is expected to present relative smaller growth rates[2]. In Portugal, due to the economic crisis that affected investment in the recent years, indoor analytics is still in its infancy, which means an opportunity to new start-up companies.

The rivalry among existing competitors in this market is influenced and extended by several forces (Porter, 2008; Brandenburger & Nalebuff, 1998).

Currently, the most difficult barrier for firms aiming to enter the Portuguese market are the *legal requirements*. Whether an experienced player or a new start-up, every firm needs a license from National Data Protection Commission (CNPD) providing evidence that the system automatic and irreversibly encrypts personal data collected, which is a very complex and time-consuming process due to the early-stage of this "polemic" technology dealing with consumer privacy rights in Portugal. Additionally, new start-ups have large capital investment requirements in software R&D and patents. However, if really innovative, start-ups can be supported by venture capital funds, enjoying the positive funding environment expected in Europe in the coming years[3], mainly for high-tech start-ups. In turn, this barrier will not be an issue for healthy expert players such as

Euclid, Nomi, and YFind when they decide to expand to European countries. Concluding, new entrants are currently a *low threat but will increase soon.*

Hardware device producers, *venture capital funds*, and *human capital* are the main market *suppliers*. The first belongs to a highly fragmented market where players have little influence and offer similar and substitutable products at low costs, due to scale economies, and with low switching costs. Venture capital funds are relevant as capital suppliers, since their equity participations create an incentive to high standards of rigor in exchange for capital injections, management know-how, and access to a broader range of experts, suppliers and buyers (Lee *et al*., 2001). However, their bargaining power will decrease if the number of venture capital funds interested in European high-tech start-ups continues to grow in the near future. Finally, intellectual property still plays a particular role in knowledge industries due to the scarcity of "specialized personnel, whose expertise in a certain area may increase the project's productivity" (Banker & Kemerer, 1989). Therefore, suppliers have also a *low but increasing* power.

The most relevant *buyers* of this market are *bricks-and-mortar stores*. Although buyers' price-sensitivity is still high as most retailers are assuming a "wait-and-see" approach about indoor analytics systems, large retail chains with financial wherewithal and small retailers who want to create competitive advantage will invest in large-scale Big Data in the coming years[4] and, therefore, will influence skeptical retailers. Concluding, buyers have a *high but decreasing* power.

Substitutes are the lowest threat to the industry: *manual collection data*, *traffic counters*, and *loyalty programs*[5]. The first not only is not so effective since antennas can gather a greater amount of customer data, but also is very expensive when scalability is required and has human error associated. Traffic counters are a conservative solution for retailers

who require simple information such as number of visitors and average time in store. Loyalty programs provide detailed insights about members, but do not cover the remaining customers. Therefore, substitutes have a *low and decreasing power*.

Three major *complementors* arise as players that can create market value to the technology: (1) *universities and research institutes* that provide technical knowledge and highly-specialized human capital (Lee *et al*., 2001); (2) firms in the *indoor navigation and mapping field* that are acquiring indoor analytics start-ups worldwide to generate synergies and increase market opportunities; and (3) relevant players such as *shopping mall operators* like *Sierra* that make referrals to bricks-and-mortar tenants on behalf of the partner. With a high degree of cooperation but some potential to become competitors in the future, complementors are a *low but increasing* threat.

Concluding, in the Portuguese market operate only a few small competitors, almost "equal in size and power" (Porter, 2008). With a focus on product differentiation to satisfy buyer's heterogeneous needs, there is a chance to easily recover initial costs incurred by setting a higher initial price. However, counting on the expected increasing threat of new entrants, industry rivalry is *low but will increase* in the future.

Concluding, Portugal offers now an opportunity to invest and grow.

Internal Analysis

Taking advantage of the lack of significant national competition, and the potential of an untapped market, *Around Knowledge* arose with the intent of raising indoor location-based technology awareness among national retailers by offering an innovative product with differentiated features in relation to its European counterparts. Using the BIPS competitive assessment detailed in Appendix 3, a matrix with company resources classified according to their strategic importance and relative strength is presented in

Appendix 4 to determine the organizational resources that represent key strengths and have potential to create competitive advantage.

Around Knowledge is the only firm to handle GSM, Wi-Fi and Bluetooth signals, alongside with *Path Intelligence*, which generates an error margin of less than 1%. The patent prevents BIPS from being copied in the next 30 years. BIPS is endowed with a sophisticated algorithm that allows the highest degree of accuracy, handling data in real time, and providing a wide range of customer metrics including predictive analytics. Furthermore, BIPS is an adaptable solution that allows personalization and unique service through the integration of additional layers of service. Additionally, BIPS satisfies the demanding Portuguese privacy requirements regarding data protection, which gives it credibility and lead time over rivals. Furthermore, *Around Knowledge* mainly stands out due to its architecture of relations. The partnership with *Sierra* enables the use of partner sales channels to easily reach a wide range of potential brands interested. Likewise the strategic alliance with national telecommunication operators reduces sales costs, which brings opportunity to explore scale economies.

Key Success Factors

Although valuable and rare, most of the organizational resources provide just a temporary competitive advantage; even considering isolating mechanisms against imitation such as exclusivity clauses with partners and product patent. Therefore, BIPS' key success factors rely on *continuous strategic innovation* through (1) overcoming the main key weaknesses, such as the lack of geo-pushing ads and indoor mapping functionalities (Appendix 4), and (2) additional sources of competitive advantage such as, for instance, an effective price-setting process that can be a capability and opportunity to capture more value and increase benefits perceived (Dutta *et al.*, 2003).

5. Customer Value Analysis

Notwithstanding some of the BIPS' rivals hold a high-price perception in the indoor location-based analytics market, considering that (1) this technology is still in an early-stage phase in Portugal, (2) BIPS offers powerful differentiated features that can be a source of competitive advantage, (3) relevant competition in the near future is insignificant mainly due to legal requirements, but (4) there is an expected threat of new entrants in the medium term, there is an interesting window of opportunity to develop BIPS' entry-pricing strategy supported on a *skimming strategy*. However, there is little research on customer predisposition to adopt these systems in Portugal. Therefore, in order to understand the feasibility of implementing this pricing strategy, an *exploratory research* on customer value was performed among shopping mall brands.

Research Methodology

Data Collection and Sample

Given the scope of the project, there was a need to adopt a discrete approach in the research methodology. First, the usual difficulty felt by *Sierra* in gathering information due to time-constraints of shopping centre tenants made unfeasible the development of a typical two-stage empirical approach based on qualitative and quantitative research, and only the latter was performed. Second, since BIPS was not yet released and as it involves a truly technological innovation in Portuguese retail, the size of the sample was controlled to include only tenants with whom *Sierra* has a trusted business relationship.

Therefore, a sample of 6 retail brand groups and 25 shopping centre brands were asked to participate in the quantitative research, totaling 45 brands. Firstly, a phone contact was conducted to communicate the scope of the project and create awareness about the BIPS' technology. Afterwards, an online questionnaire was sent by email. Those six

groups contacted were allowed to respond as a single brand or as a group, knowing that, in the latter case, their responses would be multiplied by the number of brands owned by the group. The sample included brands from cross-sector activities, and five different store types' areas. After four reminders, a total of 19 questionnaires[6] were completed, representing a 42,2% response rate. As there were no respondents from stores with an area above 750sqm, entry-pricing strategy will not be presented for this group.

The questionnaire included an introductory explanatory note itemizing again BIPS' key value propositions. The first part consisted of a multiple-choice survey with the main intention of collecting insights regarding tenants' degree of knowledge and usage of counting and also monitoring systems. The second part included a *conjoint analysis*, considered the most accurate technique to collect deep insights about customer value drivers (Meehan *et al.*, 2011). A *full profile* conjoint was used; however, as it was infeasible to test all the possible combinations between attributes and levels, a *fractional factorial design* was performed using SPSS conjoint functionality to provide the minimal number of scenarios that ensure no multicollinearity and total independency between the attributes, "but still large enough to estimate the utility of each attribute-level" (Bakken & Frazier, 2006). Therefore, respondents were asked to rank only nine cards in descending order of preference considering their likelihood of buying the technology. Each card had three attributes: *indicators*, *membership fee*, and *monthly fee* described in detail in Appendix 5. Each factor had three levels; however, the levels of the last two attributes were presented differently among respondents depending on the answer to the average store area question, as installment costs are positively related to store's area. In order to understand brands willingness to pay, values tested on the conjoint question had a 20% margin over those established in the contract. This margin

represents a compromise between the minimum desirable margin that *Sierra* intended to achieve over the already agreed 50% revenue sharing between *AroundKnowledge* and *Sierra*, and values that are not discouraging for brands in a first approach.

Data Reliability and Validity

Reliability is the "extent to which results are consistent over time and an accurate representation of the total population under study" (Joppe, 2000, Golafshani, 2003). To ensure this property, one of the most used techniques is a *test-retest* method (Golafshani, 2003). However, given the limitations mentioned before, and the consequent requirement for a short-format questionnaire to guarantee the maximum number of completed surveys, the main method to guarantee reliability was to design clear an easy to answer questions. The introductory explanation displayed to clarify the technology and the concepts employed during the survey helped to avoid uncertainty about the questions asked. Most of the questions had an intuitive multiple-choice format. The online questionnaire was previously tested by individuals outside the sample, and their feedback about survey structure and clarity was taken into account.

Validity is the "extent to which observations accurately record the behavior in which the researcher is interested" (Sapsford & Jupp, 2006). In a conjoint analysis, results can be evaluated using *content-validity* and *criterion-related validity*. The former "examines the plausibility, the completeness and the adequateness of an analysis" (Klein *et al*, 2010; Albrecht, 2000). To satisfy this condition, preferences were predicted to test if the final outputs correspond to what was previously expected. The latter refers to the "relation of the predictor and the criterion" (Klein *et al*., 2010), which was tested using Pearson's R and Kendall's tau correlation coefficients. As expected, the large majority presented an inverse relation between monthly payments and utility, classified it as the

most important factor, and there was an overall high-correlation between expected and observed results. However, some brands referred a different preference from what was expected regarding membership fee and indicators. Additionally, as "the number of parameters is similar to the number of profiles rated"[7], correlations can be "artificially inflate[d]"[7], indicating that this research is *exploratory*.

Data Analysis and Results

Quantitative research results provide valuable, but also unexpected results.

First, only about 53% of the brands have a counting system in their stores, and none of the type 3 stores has one. Main reasons for this low uptake are not only technical questions, lack of opportunity and the relationship between price/quality, but also the fact that the price perception is fairly high. Those with counting system installed have it for more than six months, and 60% paid a membership fee that in some cases exceeded €1.000. Additionally, although 80% of the counting system's users pay a monthly fee lower than 100€, 10% pay more than three times this value and have a store area of less than 100sqm, which reflects the wide range of prices settled in this industry due to some lack of price transparency usual in a B2B environment.

Second, more than 70% of the brands claimed to be familiar with the monitoring technology concept applied to retail stores before participation in this study, mainly stores larger than 100sqm. However, 75% of them do not know any supplier firm, and only two brands belonging to the same group have an indoor monitoring system implemented in a pilot stage in one store each. The system was installed in the last six months, without standby duty, does not require a membership fee payment as it is just an experiment, and demands a monthly payment between 100€ and 150€. This price provides access to data concerning total visitors, average time in store, marketing

campaign impact, and visitor density inside store. However, these brands are also interested in additional information regarding shopping centres and benchmark of competitors that BIPS can also provide. Although 75% of the brands without a monitoring system perceive this technology as expensive or very expensive, the major reasons stressed for not having it are technical questions regarding the technology and lack of opportunity, revealing the communication gap existent between the technology's potential customers and sellers, and therefore, missing opportunities to expand.

Regarding conjoint analysis, two major elements must be analyzed: *attribute relative importance* and *utilities' scores*. The former concerns the "absolute ranking respondents place on the individual product attributes tested" (Meehan *et al.,* 2011). The latter reflects respondent's relative preference towards each level (Rusetski *et al.*, 2008).

Results showed that, on average, attributes are ranked equally regardless of store size type as shown in Appendix 6.1. Overall, monthly payment was clearly considered the most important factor in the decision-making process, especially in type 3 stores, which can be explained by the fact that the values presented to bigger brands were significantly higher, due to the number of antennas required, which motivated a more price-conscious decision. Furthermore, monthly payment was also the most consensual and rational parameter within all types of stores confirming the expected inverse relation between price and utility, as depicted on Appendix 6.2.

Indicators and membership fee presented a similar importance. The wider the utility ranges of attributes, the greater the role they play but, as shown in Appendixes 6.3 and 6.4, preferences between attribute levels were not clear. Unlike the remaining groups, the positive utility attributed by type 1 stores to basic indicators may reflect their usual limited willingness to invest in state-of-art technology considered too sophisticated for

their store's size and strategic goals. Moreover, there is a noticed preference of type 3 stores for in-depth indicators at the expense of higher membership fees.

After the conjoint analysis, 42,1% of the respondents were interested in BIPS and available to implement within the next six months (classified seven or more out of ten). These respondents are from across the three types of stores' area, including the two brands that have an indoor location-based system already implemented, mainly Fashion brands, and classified monthly payment and indicators as the most relevant factors, which means that BIPS' technology was perceived with a fair price/quality relationship. A similar percentage is still undecided (classified five or six out of ten); and the remaining 15,8% represent mainly stores with less than 100sqm have no intention to implement this technology. However, 45,5% of the skeptic and undecided respondents are interested in an experimental module of the technology for a month.

These results allow very significant conclusions to be drawn to support the price strategy decisions: (1) there is a market opportunity to explore all the store types with tailored proposals; (2) generally, brands prefer to pay the lowest monthly amount possible, even if it implies less information and a higher membership fee, being necessary to set monthly payments similar to the values tested; (3) nonetheless, there is a general interest among larger stores in obtaining in-depth information about customers, shopping centres and benchmark; (4) and finally, there is opportunity to set higher-than-tested membership fees to allow a rapid ROI, as only three brands classified it as the most important factor, although not detached from the remaining attributes.

6. Pricing Strategy Framework

Considerations and Assumptions

BIPS' price framework was constructed to meet certain criteria and considerations.

First, as in a *customer value-based pricing approach*, prices were settled specially taking into account conjoint analysis outputs in the sense that customer's relative attributes' importance ranking and utilities were considered, and care was taken to avoid price proposals similar to those classified in the conjoint analysis as the least preferred options. However, in order to define minimum price boundaries, floor values established in contract between *AroundKnowledge* and *Sierra* were taken as a starting point. Second, as explained before, *Sierra* will receive 50% of each membership fee and a monthly payment paid by shopping centres stores. Besides the creation of a new revenue stream, *Sierra's* role in this partnership allows it to have no costs in store's business model. However, BIPS's installment in six *Sierra* shopping centres during 2014 will require a significant investment with a fourteen-year payback, on average. Therefore, considering that the contract establishes only a three-year exclusivity period with *Sierra*, store's business model aims to generate enough revenue to recover the entire investment incurred in shopping centres in this period of time. Third, a *skimming pricing strategy* is suggested with revenue margins settled purposely high as an entry-strategy to allow a price reduction in a second stage, when the demand from the early adopters' stores segment will be exhausted.

Furthermore, BIPS pricing strategy was constructed based on several assumptions.

First, prices are differently settled based on *store's area* (type 1, 2 or 3) and *metrics required* (*Basic; Composed*; and *Extra*). Second, BIPS' installment in stores will only occur one year after the implementation inside shopping centres to (1) open the possibility of offering an *Extra indicators* package with shopping centre metrics to tenants, and (2) to provide a more accurate technology already tested in malls. This implies that the revenues stream coming from store's business model will have to

payback shopping centres in two years. Third, therefore, two-year contracts will be required in an effort to also provide year-on-year data, engage retailers loyalty to BIPS, guarantee a more stable return, and create barriers to market entry. Forth, price frameworks developed represent *Sierra's* entry-pricing proposals sent to brands during the first two years. However, if a brand intends to implement in more than ten stores, a customized price re-evaluation will be taken based on scalability plans; thus it will not be developed in the scope of this project. Fifth, a cancellation fee will be demanded in case of contract dropout and will correspond to 150% of the initial membership fee. Sixth, the commercial strategy will not be covered in the scope of this project. This means that several issues concerning first stores to be contacted and how many they should be, or even the best way to effectively communicate price will not be discussed. However, (1) a specific strategic objective for each store area segment was settled taking into account some commercial issues, and (2) a worst/best-case scenario will be given providing information about the minimum amount of stores needed to install BIPS to allow *Sierra* to recover investment costs in shopping centres.

Price Framework Proposal

Sierra's strategy for stores with less than 100sqm aims to achieve scale inside a shopping centre. In order to sell the *Extra indicators* package containing metrics about competitors' brands on the same shopping centre, there is a need for a large and diversified brand database in each activity sector. Thereby, as they represent on average 60% of the total shopping centre stores, and as they are not expected to initially demand extra indicators in exchange for higher monthly payments, they become a relevant target for the success of BIPS' adoption. Additionally, a two month 'free of charge period' is proposed on each contract to overcome the lack of knowledge about the system. In

order to set lower monthly payments in accordance with conjoint analysis results, a higher-than-expected membership fee was applied, allowing *Sierra* to collect between 60% and 150% revenue margin above values laid down in contract as exhibited in Appendix 7. However, although BIPS prices are relatively high to what customers may be willing to pay, it represents 2% of what they pay for two-year rents. Therefore, this framework intends to entice both skeptical brands to install the *Basic model* and those tenants who already have expensive counting systems to experiment with a more sophisticated technology with *Composed* or even *Extra* features.

Stores between 100sqm and 250sqm are expected to be a great challenge (Appendix 7). Representing a quarter of total shopping centres stores, and considering that each one of the brands showing interest in implementing BIPS have more than 20 stores in Portugal, the main goal consists in convincing *Composed package* implementation in the widest range of brands and, at the same time, fostering scalability inside brands. For the success of this objective, the *Basic package* price was significantly increased and *Sierra's* total margin over the *Composed package* was decreased to the minimum, in order for the latter to sound quite attractive in comparative terms, and potentiate some store's scale. This strategy is also a reflex of brands' needs, as it offers *Composed indicators* with membership fee proposals that, although not inexpensive, hold the lowest margin return to *Sierra*, on average of the three packages. As in the first store type, the first two months are given to allow brands to become familiar with BIPS.

Finally, stores between 250sqm and 750sqm present a huge potential. On one hand, larger stores covered in the survey are not only interested, but also willing to pay a high membership fee to obtain *Extra* insights, meaning that *Sierra* can rapidly recover investment in shopping centres if they implement it. On the other hand, they have also

significant bargaining power. Consequently, if successful, not only larger stores will be a powerful vehicle to communicate BIPS' good reputation to the market; but also *Sierra* will need to present a compelling proposal to convince stores. Therefore, two main goals were defined: (1) convince brands to implement the *Extra package,* and (2) ask brands for which BIPS helped to achieve their goals to create case-studies to use as a selling argument in future negotiations with other brands. Following this strategy, two options are presented in Appendix 7: (1) if a brand does not want to provide internal data for a case study, it will only have a free-month for experimentation; however (2) if it allows, the first four-month charges will be offered. In order to meet brands' needs, membership fee was greatly increased at the expense of high monthly tuitions, which means that, because it represents just a single-payment, total margins were reduced in these stores' segment. Following the previous stores' group strategy, *Composed* and *Extra packages* prices are similar in order to encourage the purchase of the latter. Owing to the existence of large chain stores with this store's dimension, it is expected that this will be the group with the greatest willingness to progressively implement in more than ten stores, so prices may fall during negotiations.

With this price framework, in a worst-case and almost impossible scenario where only less-than-100sqm stores install BIPS and even then just the *Basic package*, *AlgarveShopping* needs to contract with 26 out of 128 stores in two years to payback investment in shopping centres, whereas *Centro Colombo* needs 45 out of 354. However, if considering that larger stores would buy *Extra* package and make a case study, 8 and 14 stores will be enough to recover the investment, respectively. Concluding, besides challenging to reach if first-year roll-out has little take up, there are favorable conditions for Sierra to succeed in BIPS store's business model in Portugal.

7. Conclusions and Future Research

This project reveals some limitations that create opportunities for future research.

First, besides the effort to approach the subject with the maximum rigor, the sample size was too restricted to draw statistically significant conclusions that could theoretically support the pricing framework presented. Deeper investigation with a wider range of brands would be needed to confirm pricing preferences and brand's willingness to pay presented before, when BIPS is officially released into the Portuguese market.

Second, BIPS' release commercial approach and pricing communication not covered in this project will have to be thoroughly planned in the near future in order to guarantee BIPS' successful adoption. Case studies intended to be done with larger stores could assume here a significant role and be a powerful tool to be used by sales forces during BIPS' disclosure and negotiations with potential brands. Moreover, *Sierra* will have to work on a set of best-practices to allow people who do not want to be tracked to opt-out to avoid public criticism. Nevertheless, this exploratory research generated valuable outputs about customer predisposition to adopt an innovative technology able not only to provide critical knowledge to brands, but also to enrich *Sierra*'s value proposition as a service provider. The incredible competitive advantage of having National Data Protection Commission endorsement, the interest shown by relevant chain brands to implement BIPS' system in the near future, and a price framework tailored to customer needs do predict positive signals of a promising successful and scalable implementation in Portugal. It will also allow the creation of critical mass and enough experience to easily support BIPS' international expansion to other *Sierra* geographies in the medium term, where, thanks to the solid reputation built in Portugal, the system could be more valuable, and therefore, more expensively released to the market.

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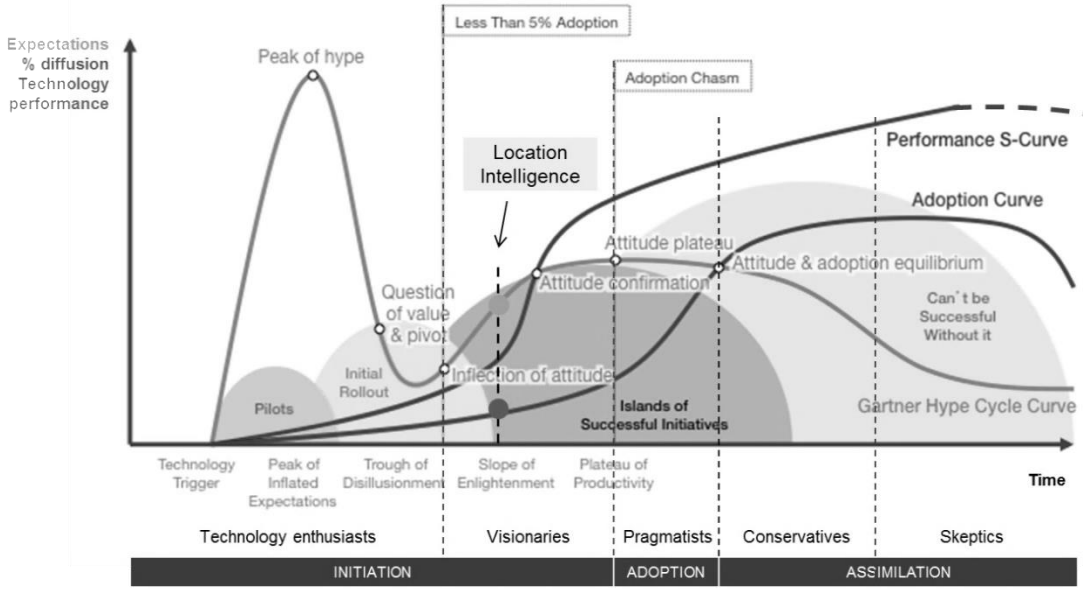
Appendices

1. Pricing Approaches Overview

	PRICING APPROACHES		
	COST-BASED	**COMPETITION-BASED**	**CUSTOMER VALUE-BASED**
DEFINITION	Determine prices primarily with data from cost accounting to get a certain ROI or markup costs	Uses antecipated or observed price levels of competitors as primary source	Uses primarily insights about the value a product or service delievers to a specif segment of customers
MAIN ADVANTAGES	- Simplest approach to calculate - Sets a floor price for the pricing strategy	- Least risk approach for reinvented products - Enables a quantitative assessment of the firm's relative position	- Ignore customer's willigness to pay - Firm do not benefit completly from truly differentiated features - "Only short-term market advantage at the expense of permanently lower margins" Nagle *et.al* (2011)
MAIN DISADVANTAGES	- Ignore competition and customer's willigness to pay - Cost change with volume; product's unit cost impossible to know -"Over-pricing in weak markets and underpinning in strong ones" Nagle *et.al* (2011) - Reduces revenue potential	- Ignore customer's willigness to pay - Firm do not benefit completly from truly differentiated features - "Offers only a short-term market advantage at the expense of permanently lower margins" Nagle *et.al* (2011)	- Data is difficult to collect and analyze - Can induce customer resentment if the product is insufficient differentiated - Experienced buyers underprice how much they are willing to pay

SOURCES: Hinterbuber (2008); Meehan et al. (2011); Nagle et al. (2011); Ingenbleek (2003)

2. Global Indoor Location-Based Analytics Industry: Garter Hype Curve position and Dynamic Relationships with Performance and Adoption Curves



Note: Gartner Hype Cycle provides a graphic representation of the maturity and adoption of emerging technologies and applications, and how they are potentially relevant to solving real business problems and exploiting new opportunities *(Gartner, 2014)*

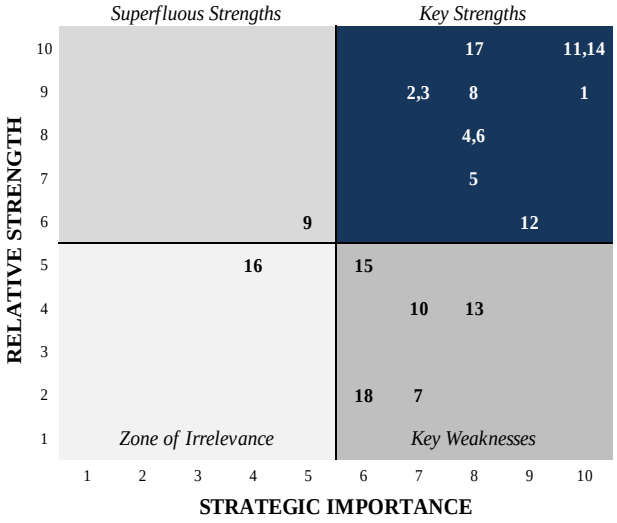
Source: Adaption from Gartner Research (Linden & Fenn, 2003); Gartner Hype Cycle for Emerging Technologies, July 2013**; Moore, G. 1991. "**Crossing the Chasm"

3. BIPS' Competitive Assessment

		BIPS	Path Intelligence	Insiteo	Walkbase	Smart Footfall	Bluetrace	Purplewifi
BUSINESS MODEL	Current Industries	**Pilot in Malls and soon in stores**	Malls and Stores	Malls and Stores	Mainly Stores	Malls and Stores	Stores, Traffic, Crowd control, Wi-Fi access provider	Malls and Stores as a Cloud-based social WiFi provider
	Potential industries	**Traffic, Security, Airports**	None	Transportation Fairs and Events, Museum, Offices and Industry	Malls, Airports	Airports, Train stations	Real Estate, Public Roads, Train Stations, Airports	Hospitality, Health, Education, Transportation, Telecommunications, Event management
	Current Geographies	**Pilots in Portugal, Brazil, EUA Japan**	>16countries (UK, USA, Europe, HK)	Worldwide.Sales offices in UK, France, Netherlands, US, Germany, Asia and soon in other countries	Europe (mainly Finland and Russia)	Pilots in Netherlands, Paris, and other european countries	70 countries (main focus on Netherlands, Poland, UK, Italy, Spain, Portugal and Germany)	UK and other 49 countries
TECHNOLOGY	WiFi	✓	✓	✓	✓	✓	✓	✓
	GSM	✓	✓					
	Bluetooth	✓		✓		✓	✓	
	Beacons			✓		✓		
FEATURES	Accuracy	**<60cm**	1m	2m	3-5m	1-1.5m	2m	10-15m
	Technology Scope	**99%**	98%		40%-70%	90%-95%	95%	Only customers who connect to WiFi hotspots
	Real Time	✓		✓				✓
	# Customer analytics metrics	**VERY HIGH**	VERY HIGH	HIGH	MEDIUM	LOW	LOW	MEDIUM
	Queueing optimization	✓	✓	✓			✓	
	Predictive analysis	✓	✓					
	Shopping centre Benchmarking	✓	✓					
	Marketing promotions evaluation	✓	✓	✓	✓		✓	✓
	Shopping centre data to retailers	✓						
	Geo-pushing ads	**In development**		✓	✓			✓
	Portuguese privacy requirements	✓						
PRICING	Long-term contracts		✓	✓			✓	✓
	Start-up fee		✓					✓
	Price perception in relation to competitors		VERY HIGH	HIGH	MEDIUM	HIGH	MEDIUM	LOW

Note: Criteria to define competitors – firms to whom *Sierra* asked proposals and *Around Knowledge* internal information. *Sources*: Internal data. Competitors' websites with last update on April 15nd (www.pathintelligence.com, www.smartfootfall.com, www.walkbase.com, www.footfall.com, www.purplewifi.net, www.bluetrace.eu). **Liu, Shu, & Striegel, Aaron. 2011.** "Accurate Extraction of Face-to-Face Proximity Using Smartphones and Bluetooth. *ICCCN meeting presentation*: 1-5. **Kashevnik, Alexey, & Shchekotov, Maxim**. 2012. "Comparative Analysis of Indoor Positioning Systems Based on Communications Supported by Smartphones". *Proceedings of 12th Conference of Fruct Association: 43-48* **Mautz, R**. 2012. "Indoor Positioning Technologies". *Habilitation Thesis at ETH Zurich*

4. BIPS Resource Matrix



1 Patent
2 Technology Scope (error margin)
3 Accuracy
4 Predictive analytics
5 Real time data
6 Diversity of metrics
7 Push up ads (Geo-fencing advertisment)
8 Adaptablity to add new services
9 Cloud-based solution
10 Diversity of geographies and industries
11 Portuguese Legal requirements
12 Potential to Scale economies
13 Reputation
14 Partnership with Shopping centre operators
15 Partnership with Venture capital funds
16 Partnership with Universities
17 Partnership with national telecoms
18 Partnership with Indoor mapping and navigation companies

5. Conjoint analysis attributes and levels description

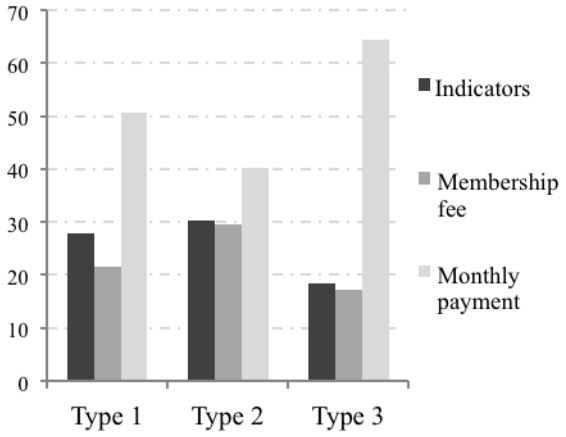
INDICATORS*	Metrics provided about customer's behavior pattern
Basic	Total Visitors (by time period), Average Visiting Time, Campaign impact on total visits, Visitor's forecast
Composed	BASIC + Conversion rate (Visitors who stop on storefront; Visitors who enter inside store; Visitors who bought); Heat Maps; Zone weight and comparison
Extra	COMPOSED + Shopping centre indicators (Total Visitors, Average Visiting Time, Conversion Rate from shopping centre visitors) and Benchmark indicators (cross-shopping between stores of the same brand/group, Basic Indicators' Benchmark analysis with the average of the sector
MEMBERSHIP FEE	Amount paid in advance to subscribe BIPS' system
MONTHLY PAYMENT	Monthly amount paid to use the system

*All the metrics can be consulted and compared by hour, day, week, month and year (if there is historical data enough)

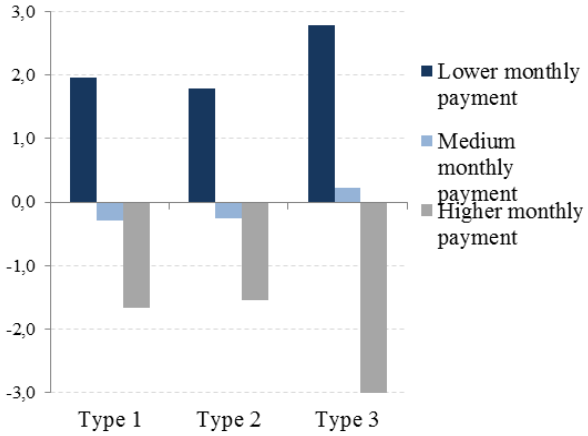
** Competition criteria concerns stores belonging to the same sector (Fashion, Electrical, Health and Beauty, Household Goods, Cultural, Restaurants, Services)

6. Data Analysis and Results

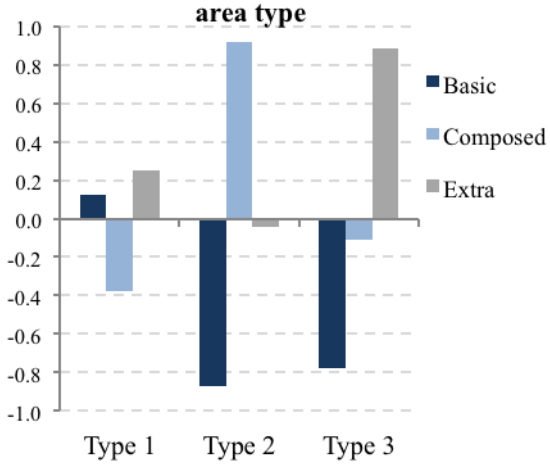
6.1. Average Relative Importance Values



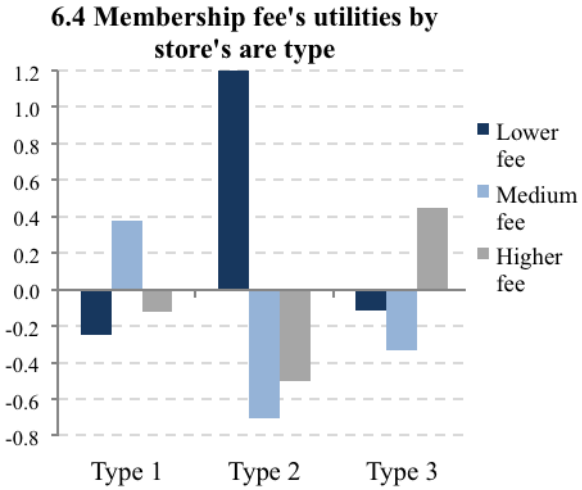
6.2. Monthly payment's utilities by store's area type



6.3. Indicators' utilities by store's area type



6.4 Membership fee's utilities by store's are type



Note: Legend of 6.2 and 6.4. Charts were simplified due to having different values across different types of stores. Therefore, a relative measurement of the numerical values presented was drawn using "Lower", "Medium" and "Higher" terms.

7. Price Framework Proposals

<100sqm	Basic	Composed	Extra
Membership fee	160 €	220 €	250 €
Monthly payment	70 €	80 €	100 €
TOTAL (2y)	1.700 €	1.980 €	2.450 €

<100sqm	Basic	Composed	Extra
% margin over contractual values	60%	120%	150%
	40%	60%	100%
	31%	52%	88%

100sqm-250sqm	Basic	Composed	Extra
Membership fee	200 €	240 €	270 €
Monthly payment	110 €	130 €	180 €
TOTAL (2y)	2.620 €	3.100 €	4.230 €

100sqm-250sqm	Basic	Composed	Extra
% margin over contractual values	100%	60%	80%
	120%	30%	80%
	102%	22%	66%

250sqm-750sqm	Basic	Composed	Extra
Membership fee	320 €	380 €	400 €
Monthly payment	170 €	200 €	220 €
TOTAL 1 (2y)	**4.230 €**	**4.980 €**	**5.460 €**
TOTAL 2 (2y)	**3.720 €**	**4.380 €**	**4.800 €**

250sqm-750sqm	Basic	Composed	Extra
% margin over contractual values	220%	52%	60%
	240%	33%	47%
	225%	**29%**	**42%**
	186%	**14%**	**25%**

Notes

[1] From now on, "*Sierra*" will stand as the acronym of *Sonae Sierra*

[2] MarketsandMarkets estimates indoor location market to have a CAGR in the next five years and predicts growth for North America and Europe. Extracted on March 13 from: http://www.marketsandmarkets.com/PressReleases/indoor-location.asp.

[3] "Global venture capital insights and trends 2014: Adapting and evolving". E&Y. Retrieved on March 20th from: http://www.ey.com/Publication/vwLUAssets/Global_venture_capital_insights_and_trends_2014/$FILE/EY_Global_VC_insights_and_trends_report_2014.pdf.

[4] "State of the Industry Research Series: Big Data in Retail", *EKN Research*. Retrieved on March 17th from: http://www.sas.com/content/dam/SAS/en_us/doc/research2/ekn-report-future-retail-analytics-106717.pdf.

[5] "Transforming Physical Retail: The Power of E-Commerce-Style Analytics for Brick-and-Mortar Stores". *RIS White Paper*. January 2014. Retrieved on March 18th from: http://retailnext.net/wp-content/uploads/2014/01/RetailNext-Transforming-Physical-Retail-Whitepaper-Jan2014.pdf.

[6] From the six brands' groups, one did not answered to the questionnaire, two filled the survey on the behalf of a specific brand, and three completed on behalf of the group

[7] Contents extracted from "SPSS Conjoint™ 17.0" manual retrieved on April 21st from: http://www.docs.is.ed.ac.uk/skills/documents/3663/SPSSConjoint17.0.pdf