ANÁLISE DE CONSUMO NUMA UNIDADE HOTELEIRA NO ALGARVE – PORTUGAL, COM O RECURSO DE FERRAMENTAS DE *BUSINESS INTELLIGENCE*

ANALYSIS OF CONSUMPTION IN A HOTEL IN THE ALGARVE – PORTUGAL, USING BUSINESS INTELLIGENCE TOOLS

ANÁLISIS DE CONSUMO EN UN HOTEL DEL ALGARVE – PORTUGAL, UTILIZANDO HERRAMIENTAS DE BUSINESS INTELLIGENCE

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RESUMO: O presente artigo tem como objetivo dotar o setor da hotelaria com dados relevantes para a previsão de vendas, receitas, ocupação e encomendas de *stock*, com base na análise de uma amostra de clientes de uma unidade hoteleira de quatro estrelas localizada no Algarve - Portugal, constituída pelas quinze nacionalidades com maior taxa de ocupação durante o ano de 2014. Desta forma, pretende-se aferir as preferências dos hóspedes relativamente a consumos nos estabelecimentos de restauração e bebidas, de acordo com a tipologia de quarto, regime de alojamento e agência de viagem/operador turístico, examinando igualmente, utilizando estatística univariada, as despesas com o alojamento e os consumos realizados no ano de 2014. A partir da análise e da interpretação dos resultados obtidos, foi possível verificar que, apesar de Portugal ser a nacionalidade com maior número de hóspedes na unidade em 2014, os portugueses despenderam menos do que os germânicos no que toca aos consumos nos estabelecimentos de restauração e bebidas. Todavia, os hóspedes portugueses foram os clientes mais assíduos do Restaurante X no último quadrimestre do ano e terão, efetivamente, efetuado maiores despesas com o alojamento e os respetivos regimes em todo o ano civil.

PALAVRAS-CHAVE: *Business Intelligence*, Consumos, *Data Warehouse,* Hotelaria.

ABSTRACT: This article reports on a study carried out with relevant data concerning stock, occupancy and sales forecasts and estimates of revenue for the hospitality industry, analyzing a sample of guests of a four-star hotel located in the Algarve, Portugal, which comprises the fifteen nationalities with the highest occupancy rate during 2014. The aim was to assess the guests' preferences according to their consumption in the hotel's restaurants and bars, their room type, their accommodation type, and their travel agency/tour operator, whilst examining the univariate data on the accommodation and consumption expenses in 2014. Based on an analysis and interpretation of the results, it was found that although

Portuguese was the nationality with the highest registered number of hotel guests in 2014, the Portuguese spent less than the German on food and beverages in the establishments. On the other hand, the Portuguese were the most regular customers to Restaurant X during the third quarter of the year, and may have spent larger amounts of money on accommodation throughout the calendar year.

KEYWORDS: Business Intelligence, Consumption, Data Warehouse, Hospitality.

RESUMEN: El presente artículo tiene como objetivo proporcionar al sector de la hotelería los datos relevantes para la previsión de ventas, ingresos, ocupación y pedidos de *stock*, con base en el análisis de una muestra de clientes de un hotel de 4 estrellas localizado en el Algarve ▯ Portugal, constituida por las quince nacionalidades con mayor tasa de ocupación durante el año 2014. De esta forma, se pretenden evaluar las preferencias de los huéspedes respecto al consumo en los establecimientos de alimentación y bebidas, de acuerdo con el tipo de habitación, el régimen de alojamiento y la agencia de viaje/operador turístico, examinando también, a través de estadística univariada, los gastos con el alojamiento y los consumos realizados en el año 2014. A partir del análisis e interpretación de los resultados obtenidos, se ha podido verificar que, aunque Portugal sea la nacionalidad con mayor número de huéspedes en el hotel en 2014, los portugueses han gastado menos que los alemanes en los establecimientos de alimentación y bebidas. Sin embargo, los huéspedes portugueses han sido los clientes más asiduos en el Restaurant X en el último cuatrimestre del año y, en efecto, habrán efectuado mayores gastos con el alojamiento y los regímenes en todo el año civil.

PALABRAS CLAVE: *Business Intelligence;* Consumos; *Data Warehouse;* Hotelería.

INTRODUCTION

Nowadays, Information Technology (IT) plays an increasingly crucial role for companies in various sectors of the economy, including the hotel industry. IT is critical for human resource management, financial and accounting management, customer and supplier management, and inventory and production management. In addition to the abovementioned operational processes, these systems and technologies generate a considerable amount of useful information for the organization of a company (Oliveira, 2010).

In addition, IT is designed to support knowledge management activities, and has been considered as a crucial tool for innovation, intelligence, learning and organizational creativity in post-industrial institutions. In recent years, information technology applications have given rise to new organizational practices such as e-commerce, customer relationship management, also known as CRM (Customer Relationship Management), and SCM (Supply Chain Management) (Turban, Sharda, & Delen, 2011).

On the other hand, the so-called Business Intelligence (BI) systems, composed of Data Warehouse (DW), On-Line Analytical Processing (OLAP) and Data Mining

technologies, "use the available data in the organizations in order to provide relevant information for decision-making " and extend the memory and reasoning skills of the company's employees (Santos & Ramos, 2006, p. 2)**.**

The purpose of this paper is to carry out an in-depth analysis of preferences of hotel guests, using univariate statistics associated with consumption in the catering and drinking establishments of the hotel unit, the accommodation type, the amounts paid for the stay, the room type, and the intermediate entity used for hotel bookings. This data was cross-referenced with the guests' nationalities, using BI tools to determine their preferences. In fact, hotel units collect and store large amounts of data related to their operational activity concerning the interactions of its customers during their stays. However, due to gaps in the Property Management System (PMS) in the consolidation and summarization of information for the creation of management indicators, this information is not fully utilized due to a failure to use analytical tools, such as BI, to extract trends and patterns that help in decision-making processes.

This paper begins with a discussion of the importance of the role of IT and BI in companies, followed by the characterization and description of DW functionalities, the distinction between a DW and a Transactional Database (DB), the description of the concept of Multidimensional Modeling and its graphical representations, and the listing of OLAP and Data Mining techniques. The methodology used in the study is then explained, followed by analysis and discussion of the results obtained through the relationships created between the data, using the Microsoft Powerpivot and Powerview tools. This is followed by the final considerations and, finally, the bibliographical references used.

LITERATURE REVIEW

BUSINESS INTELLIGENCE

The BI system can be defined as "a tool that allows business managers an intelligent analysis of the multitude of data generated by their various systems and processes. As its name indicates, BI solutions are adopted to render intelligence to a company's business" (Curcio, 2011).

BI is a support system that provides appropriate and timely information for managers. BI includes tools and systems designed to collect and analyze data for the company in an organized and strategic way. It is fundamental for assisting companies seeking to understand customer behavior and increase their awareness of the potential risks to their businesses. This is only achieved through BI, particularly when it comes to outlining the profile of their clients, conducting market research and segmentation, and developing statistical analyses and inventories (Curcio, 2011; Chen, Chiang, & Storey, 2012).

BI provides other advantages for companies, such as: reducing administrative costs and the costs of software and project assessment; increasing return on investment (ROI); more accurate data; greater information security; more consistent information, regardless of the databases in which it is dispersed; and, finally, alignment of strategic and operational information (Curcio, 2011).

A BI system can provide information on clients, human resources, and accounting, among other aspects, depending on the size of the company. However, according to Marcos Chomen, regional director of Cognos in Brazil, "the need to know, for example, who the best salesman is, which product generates greater profit margin, and other information of this kind, is common to companies of all sizes" (Curcio, 2011).

Over the years, BI has developed significantly, and its functionalities have been greatly improved. Formerly, according to Câmara of Infobuild, BI "was a tool for medium and long-term planning and control which issued annual and semi-annual reports." Nowadays, it is clear that BI has become a huge predictive analytics application, endowed with the capability to gather and examine all data collected by companies through enterprise management systems, SCM tools and, in particular, CRM management solutions (Curcio, 2011).

In fact, it can be concluded that BI systems play an important in increasing: i) the company's collective intelligence, since they facilitate the construction of knowledge that is essential for the planning and implementation of solutions to combat threats to the survival and prosperity of the institution; ii) the learning capacity of the organization, as they help its members adapt to a working practice in continuous renewal and iii) organizational creativity, as they contribute to

the creation of new services, products or ideologies favorable to intrinsic and extrinsic challenges and opportunities (Santos & Ramos, 2006, pp. 2-3).

DATA WAREHOUSE

DW "is a set of business-oriented, integrated data, variable over time and non-volatile to support the decision-making process of managers" (Inmon W. H., 2002, p. 31). In other words, DW essentially consists of a data repository that enables information relating to the organization's decision making to be stored. The DW is subject-oriented, since the data is separated and organized by subject, depending on the topic that the managers wish to analyze and interpret. It is not oriented to the tasks that are part of the company's daily life, but offers a very simple and brief perspective on a certain subject, eliminating all non-relevant data. Another great advantage is that it is catalogued over time. This allows the DW to store data over a period of time, which can vary between 5 and 10 years. Thus, DW gives the user a historical perspective of the information, unlike operating systems, which accumulate limited historical data over a much shorter period of time (Turban, Sharda, & Delen, 2011).

DW is also characterized by a lack of volatility, i.e. the data cannot be deleted or modified as soon as they are loaded. The technique of data integration, which consolidates data consistency, can be defined as "the process by which the characteristics of the source data are modified to allow their insertion into a Data Warehouse" (Santos & Ramos, 2006, p. 64). In other words, the data must be processed and organized before being inserted into a DW, in order to enable a simpler analysis.

According to (Kimball & Ross, 2013, pp. 3-4), the DW system must have the following requirements: it must i) "make the information easily accessible", and to this end "the DW/BI system must be understandable", "data must be intuitive and clear" and BI tools and applications must be "easy and simple to use" in order to simplify the user's work; ii) "present information in a timely manner", that is, data conversion must be done in a matter of seconds, minutes or hours, and "in a consistent manner", since the data must be aggregated from a variety of sources and only released when they are considered "eligible" for analysis; iii)

have the "ability to adapt to change" because "user needs, business conditions, data and technologies" are constantly being updated, which could invalidate BI data and applications.

In addition, it should: iv) "be a secure foundation for the protection of information assets", that is, know how to maintain data confidentiality, thereby preventing its access to users who, for example, do not belong to the organization; v) "serve as a reliable and credible basis for the improvement of the decision-making process"; vi) the DW/BI system must be accepted and considered useful by organizations, since the use of this system is still optional in the business world, regardless of being a "simple and fast" process, and despite the excellent quality of its tools, applications and platforms.

DATA WAREHOUSE VS TRANSACTIONAL DATABASE

Firstly, it should be noted that a transactional DB contains all the operational information of the company, organizing in a very detailed and sometimes disorganized way, including data of little relevance, and contributing very little to the analysis carried out by the managers. In a transactional DB, the user is faced with a structure that is quite complex and difficult to understand, due to the high number of tables and associations and the lack of concern with the organization and the availability of data. On the other hand, in a DW, data from transactional DBs and other systems are transformed into smaller diagrams organized according to the organization's business rules, and there is a notable concern with the data presented to the user (Oliveira, 2010).

While transactional DBs support OLTP (On-line Transactional Processing), which is dedicated to automating day-to-day data processing, recording redundant data, and modifying information already present in systems, the DWs support OLAP, tools that deal with multidimensional data analysis (Chaudhuri, Dayal, & Narasayya, 2011).

Transactional DBs are more commonly used by IT technicians or employees specialized in routine and operational tasks, while DWs, as previously mentioned, are more directed to managers who analyze the most relevant and indispensable

data for strategic decisions. It should also be noted that DWs are generally kept separately from the transactional DBs.

The use of DW instead of transactional DBs in organizations is more advantageous in that it reduces the time the managers need to obtain the information needed for their decision-making processes, while enabling information dispersed across a wide range of databases and platforms to be gathered more easily and efficiently. In addition, enterprise DWs are designed to occupy hundreds of gigabytes or terabytes, thus, they tend to have a greater capacity than transactional DBs. The historical, summarized and consolidated data contained in the DW are more important than the huge and confusing number of detailed individual entries generated by transactional DBs (Rodrigues & Ferreira, [s.d.], pp. 5-6).

MULTIDIMENSIONAL MODELING

Multidimensional modeling can be described as a simplification technique for querying the information stored in the DW under different perspectives, and is represented by cubes. It is a methodology that aims to provide easy interaction with the end user and high performance in query processing.

In order to facilitate interaction with the user, the tables of the databases must be denormalized, that is, all the attributes present in the tables should be presented, regardless of whether or not they are relevant to the analysis and the final result. It is very common to find the same data appearing repeatedly in several tables.

The DW can be represented by three types of schema: star, snowflake or fact constellation. These representations are the result of multidimensional modeling, which is composed of a database structure that is accessible to the user.

The star schema is the most common representation of DW. The structure of this schema aims to facilitate the data query and increase the speed of data exploration. It consists of a single fact table, which appears in the

center of the schema, and the dimension tables that are interconnected with it (Oliveira, 2010).

The fact table "integrates a set of numeric attributes (facts) and a set of foreign keys that relate the fact table to the various dimensions associated with it" (Santos & Ramos, 2006, p. 67). These dimensions can be found in the so-called dimension tables, which contain data generally separated at different hierarchical levels, and that determine possible relations with the fact table.

As shown in Figure 2.1, the Sales table corresponds to the fact table. Thus, relations can be established with any of the several dimension tables: Products, Customers, Time, Stores and Sellers, and the absence of normalization of the dimension tables should be pointed out, i.e. the presence of redundant data, although these may include distinctive hierarchies. For example, in the Time dimension, the WeekDay field could be divided into Monday, Tuesday, Wednesday, Thursday, Friday, Saturday and Sunday.

In the snowflake schema, although it is composed of a fact table and several dimension tables, the structure is no longer regular and it can therefore display a different outline in the branches. Although both the star and the snowflake schemas are similar in terms of data content and query capacity, the latter is characterized by the complexity of its structure (Santos & Ramos, 2006, pp. 68-69). The great disadvantage of the snowflake diagram is the frequent difficulty in its interpretation, due to its intricate image, while there is a decrease in performance quality when it comes to processing queries (Han, Kamber, & Pei, 2012, p. 140).

However, the snowflake schema has two advantages over the above-mentioned schema. There is a normalization of the dimensions, thus avoiding information redundancy, whereas the structure of each of its dimensions is much more explicit and hierarchized in the snowflake schema than in the unstructured diagram of the star schema. As can be seen in Figure 2.2, the Stores dimension table is related to two sub dimensions, States and Regions, simplifying its identification, while in the star schema (Figure 2.1), the Region and State fields are in the same Stores dimension table (Moody & Kortink, 2003, pp. 9-10).

Figure 2.1 - Star Schema
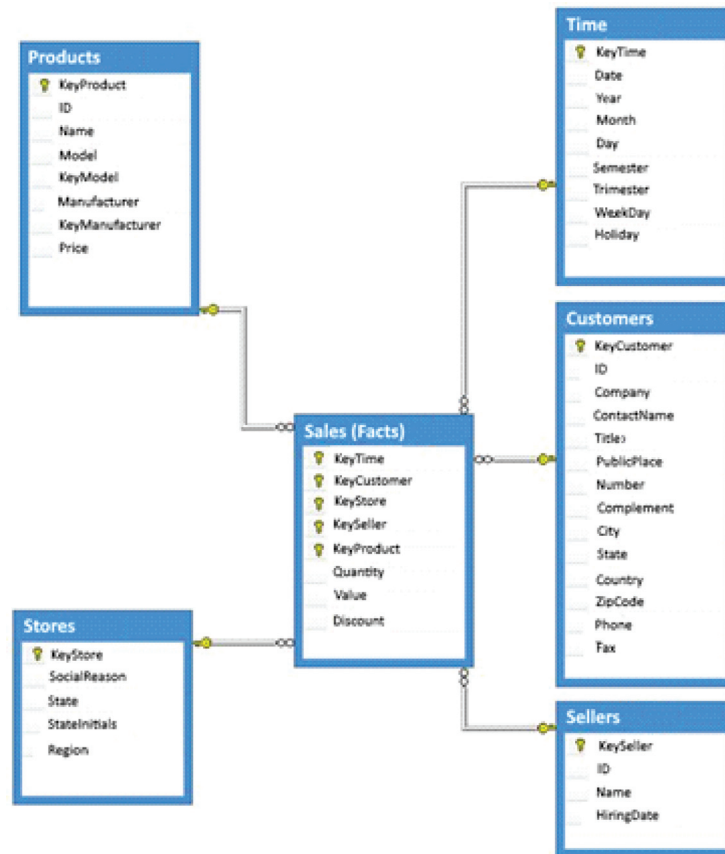
Source: (Nardi, 2007)

Figure 2.2 – Snowflake Schema
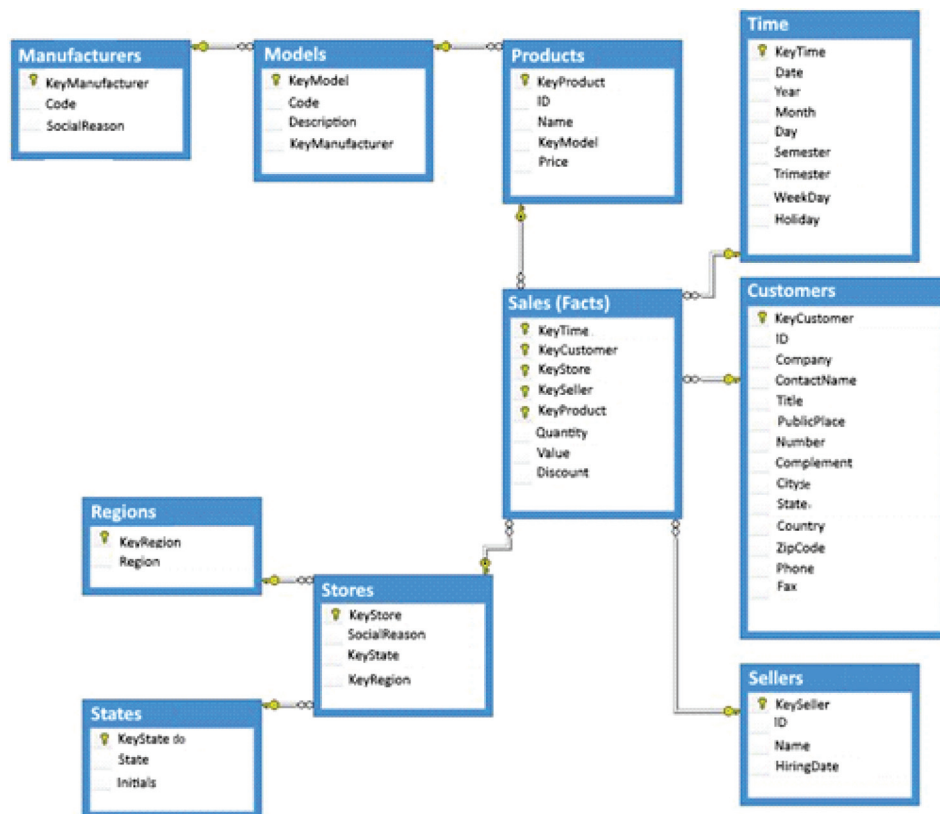
Source: (Nardi, 2007)

The constellation schema allows more than one fact table to be integrated. These are usually interconnected with dimension tables shared between each other. Therefore, this type of structure is like a star schema in duplicate, although it may also take triplicate or quadruplicate form, and so forth.

OLAP (ON-LINE ANALYTICAL PROCESSING)

The OLAP and Data Mining tools are two very useful technologies for analyzing the information stored in the DW. OLAP enables the user "to create cubes to analyze information from different perspectives" (Santos & Ramos, 2006, p. 72). The cubes represent a method of analyzing the facts contained in the fact tables under the different views encompassed by the dimensions in the modeling offer.

The multidimensional cubes can undergo several transformations through manipulation techniques, including the following (Santos & Ramos, 2006, pp. 74-75):

- Drill-down, which provides a more detailed view of the data, thus allowing the transition from generalized data visualization to more detailed data. For example, this technique makes it possible to transition the company's annual expenditure data to semi-annual, quarterly, and so on.

- Roll-up, which is exactly the opposite to drill-down, as it gathers all data displayed in the cube through hierarchies. The clusters increase in size as the analysis is repeated. Taking the example above, the analysis moves from monthly expenditure data to quarterly, half-yearly, and yearly data.

- Slice and dice, which is used to select a certain part of the information the users wishes analyze. "The cut (slice) allows you to select a subset of cube data (...). The reduction (dice) allows you to define a sub cube for which you can specify selection criteria for two or more dimensions".

- Pivot or rotation, which "allows you to rotate the axes data visualization", enabling analysis of the same data under a different perspective.

DATA MINING

Data Mining consists of "looking for relations, patterns or models that are implicit in the data stored in large databases" (Santos & Ramos, 2006, p. 103). Classification, estimation and prediction are the three techniques of direct Data Mining, and aim to "use available data in order to construct a model of description of a variable of interest related to the remaining available data" (Berry & Linoff, 2000, p. 8).

METHODOLOGY

The present study consists of an in-depth analysis of the consumption habits of a hotel unit according to the guests' country of origin, as well as their preference for room and accommodation type, and intermediate entities (agencies or tour operators (OT), using univariate statistics to analyze the amounts spent on accommodation, and on consumption within the hotel's commercial establishments. It should be mentioned that for reasons of confidentiality, the names of the hotel and its establishments have been omitted, and are replaced by Restaurant X, Bar X and Bar Y. Guests' data confidentiality was also guaranteed in this study, and data such as first names or Identity Card numbers were not considered in this analysis.

In order to carry out this study, it was necessary to use the software Enterprise Resource Planning (ERP) linked to the PMS of the hotel chain, which enabled the issue of monthly or quarterly reports on consumption at the hotel's points of sale: Bar X, Bar Y and Restaurant X. These data were obtained from the Point of Sales (POS) installed at each establishment, which was directly connected to the hotel's PMS. However, in order to collate the consumption data on guests' nationalities, it was necessary to use the Rooming List, a report that contains a wide range of detailed data about all the guests who stayed in the hotel, from the client's name to the type of room booked, and even the check-in and check-out dates.

It should be noted that the reservations analyzed were mostly made on an individual rather than on a group basis. It is difficult to discern whether all members of a group would have the same nationality, and this would give the analysis a much larger margin of error, making it less accurate.

To establish relations between the data, certain tools associated with BI, namely Microsoft Powerview and Powerpivot, were used in Microsoft Excel 2013.

As shown in Figure 3.1, the representative structure created is the snowflake schema, since there is only one fact table (Fact_Reservations). This is linked to all the other dimension tables, one of which is connected to a sub-dimension table (DimNationality).

To produce this schema, the Fact_Reservations table was created from a set of tables containing data about the consumption in each point of sales, and from the data in the Rooming List report. This was followed by the elaboration of the dimension tables DimSalesPoint, DimConsumptions, DimCustomers, DimNationality, DimRoomType, DimEntity and DimTime.

Figure 3.1 – Schema

Source: Authors

RESULTS

In order to develop this study, the first step consisted of assessing the total number of guests. Taking into consideration that the Rooming List (which is partially incorporated in the Fact_Reservations table, but better reflects, in its entirety, the reality of the occupation than the fact table) was organized by number of reservations and not by guests, it was necessary to resort to the sum of the number of adults and children per reservation.

The total number of guests that visited the hotel in the calendar year 2014 was 32,919. However, after eliminating duplicates, this number decreased to 32,360, comprising approximately 98% of the total universe of guests in 2014. Based on the data obtained in the Rooming List, Chart 3.1 was drawn up, with the number of guests corresponding to each nationality, in order to be able to use it in the analysis of the remaining data.

As shown in Chart 3.1, Portugal and Germany are the most represented nationalities, making up about 74% of the total number of guests. Spain, UK, USA, Poland, France, the Netherlands and Brazil jointly represent values close to 19%, meaning that only 7% belong to the remaining 79 nations. It is only the 15 countries highlighted in Chart 3.1, which makes up about 93% of the number of guests in 2014, that were the subject of an in-depth study of different periods of the year, since the other nations, having each contributed less than 100 guests, would reveal uninteresting values for analysis.

Chart 3.1 – Number of Guests per Nationality
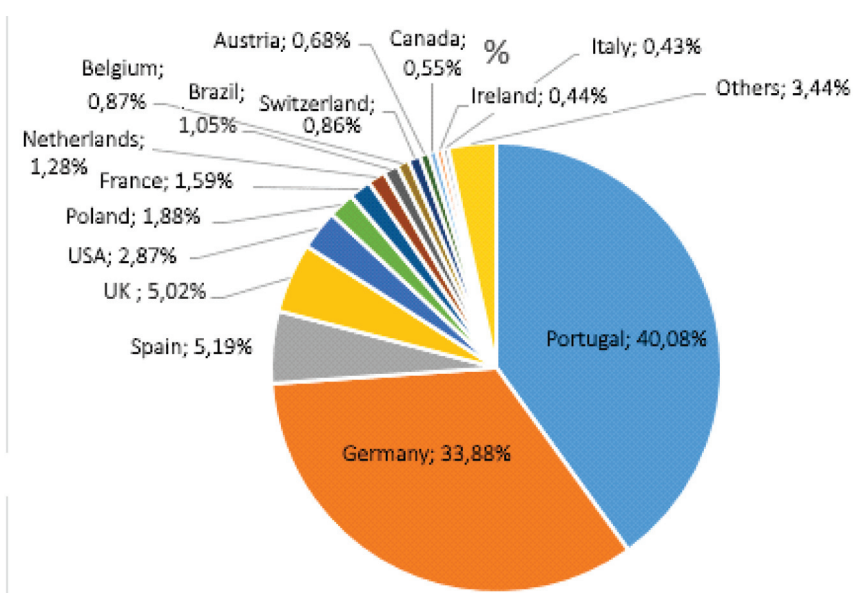
Source: Authors

The total number of guests who consumed in the hotel's establishments was 21,692, that is, roughly 67% of the sample analyzed. It is estimated that the guests of the hotel spent an average of 416 € per on accommodation and consumption in the hotel's establishments.

Figure 3.2 shows the predominance of German guests between January and April, making up 52.77% of the total (15 nationalities). Portugal is obviously the

second most represented nation, with 31.51%. This means that approximately 84.28% of the guests with consumption between January and April were either German or Portuguese.

Figure 3.2 – Number of Guests with Consumption in the 1st Quarter

Row Labels	CheckIn Count (Month)	Guests Total	% Guests Total
Austria	35	56	1,16%
Belgium	11	23	0,48%
Brazil	15	29	0,60%
Canada	5	7	0,14%
France	22	39	0,81%
Germany	1357	2552	52,77%
Ireland	3	6	0,12%
Italy	4	7	0,14%
Netherlands	33	64	1,32%
Poland	8	15	0,31%
Portugal	640	1524	31,51%
Spain	42	89	1,84%
Switzerland	30	55	1,14%
UK	116	207	4,28%
USA	84	163	3,37%
Total		2405	4836	100,00%

Nationality			CheckIn	
Angola			jan - apr 2014	MONTHS ˅
Antigua and Barbuda			2014	
Argentina			JAN FEB MAR APR MAY JUN JUL	
Australia				
Austria				

Source: Authors

Figure 3.3 shows the main tour operators and travel agencies that served as intermediaries for the arrival of guests at the hotel. It is important to point out that the criteria for choosing these 22 entities out of 522 in total was based on the largest number of check-ins and the greatest possible diversity of nationalities among the entities.

Entity Q, a Portuguese agency based on the island of Funchal, stands out clearly from others as it served as an intermediary for 82.13% of the total guests, as shown in Figure 3.3. This was also the only agency that included guests of all 15 nationalities analyzed in this study.

Figure 3.3 – Number of Guests per Travel Agencies/OT in the 1st Quarter

Rows Labels	Austria	Belgium	Brazil	Canada	France	Germany	Ireland	Italy	Netherlands	Poland	Portugal	Spain	Switzerland	UK	USA	Total
Entity A						41		4			2		5		4	56
Entity B						1								2		3
Entity C		2	1			16		2			41	15		10		87
Entity D		2				2	2	4			2			10	39	61
Entity E						2		3			7			4	5	21
Entity F											15					15
Entity G													2	11	2	15
Entity H											2	3				5
Entity I											3			2	4	9
Entity J				3										3	2	8
Entity K									1					4		5
Entity L	6			2		14									2	24
Entity M		2									2			2		6
Entity N									1		3	2			4	10
Entity O						18										18
Entity P		2		1							4					7
Entity Q	37	2	11	3	12	1999	2	3	30	13	176	4	18	33	56	2399
Entity R												4				4
Entity S		5													2	7
Entity T		2				118		2			4		2	3	4	135
Entity U											21					21
Entity V											1		3		1	5
Total	43	11	15	6	18	2209	4	5	47	13	283	33	25	84	125	2921

Source: Authors

In second place, with 4.62%, was Entity T, a British agency, which in this particular case, has a branch office in Germany. Hence, the majority of guests who used this entity were German. Entity T, among the agents with more than two nationalities, was the one that presented the greatest discrepancy between nationalities, with a German figure of 87.41%. Entity C is ranked 3rd, with 2.98%, while Entity D, a North American company, is ranked 4th, representing 2.09% of the total number of guests in Figure 3.3. Interestingly, these 3 intermediaries are the only ones, with the exception of the Entity Q, to be represented by 7 different nationalities.

Regarding nationalities, the USA stood out, with 4.28% of the total guests, as shown in Figure 3.3, being the 3rd nation, just behind Germany (75.62%) and Portugal (9.53%). However, although there are not many USA tour operators/agencies represented in Figure 3.3 (4 out of 22), this classification is due to the 76% coming from North America through Entity D and Entity Q. On the other hand, Poland is the only country whose guests used just 1 of the 22 tour operators/agencies.

Figure 3.4 –Occupation by Room Type per Night in the 1st Quarter

Row Label	SJ Total	SJ Average	SJVM Total	SJVM Average	TW Total	TW Average	TWF Total	TWF Average	TWFV Total	TWFV Average	TWV Total	TWV Average	Total	Average
Austria					20	32,35 €	2	45,50 €			13	57,95 €	35	42,61 €
Belgium	2	74,30 €			3	42,00 €					6	62,12 €	11	58,84 €
Brazil	1	104,00 €			5	37,00 €	2	74,90 €	1	96,00 €	6	24,60 €	15	45,49 €
Canada					3	35,00 €					2	44,34 €	5	38,73 €
France	1	80,08€	2	88,93 €	9	39,76 €	1	70,22 €	1	79,80 €	8	59,95 €	22	56,61 €
Germany	9	69,08 €	9	60,04 €	1019	34,16 €	33	48,57 €	12	66,20 €	275	51,44 €	1357	38,70 €
Ireland					1	40,00 €					2	54,60 €	3	49,73 €
Italy					3	31,17 €					1	34,00 €	4	31,88 €
Netherlands			2	86,52 €	16	33,41 €	2	78,60 €			13	49,47 €	33	45,70 €
Poland					6	31,26 €	1	40,00 €			1	68,00 €	8	39,65 €
Portugal	52	98,69 €	20	97,97 €	101	45,85 €	81	81,81 €	62	85,16 €	324	66,22 €	640	70,44 €
Spain	2	87,04 €			5	49,56 €	3	83,96 €	5	92,54 €	27	68,50 €	42	71,09 €
Switzerland			1	53,03 €	9	34,44 €	1	53,00 €	1	64,00 €	18	54,15 €	30	48,49 €
UK	3	89,96 €	3	65,80 €	35	39,17 €	4	67,62 €	3	55,83 €	68	62,36 €	116	56,18 €
USA			1	30,60 €	31	33,65 €								
Total	70	93,29 €	38	82,41 €	1266	35,30 €	133	71,57 €	88	81,38 €	810	58,81 €	2405	49,34 €

Date		Nationality		RoomType	
jan - apr 2014		Angola		SGVM	
2014		Antigua and Barbu...		SJ	
JAN FEB MAR APR MAY		Argentina		SJVM	
		Australia		TW	

Source: Authors

In Figure 3.4, which shows the number of rooms occupied according to their category, the room type TW (Twin Land View) was the most searched by all 15 nationalities, making a total of 52.64%, as opposed to 33.68% for TWV (Twin Sea View). As in Figure 3.2, Germany remains at the top, with just over half of occupied rooms (56.42% of the total), while Portugal remained in second

place, with 26.61%. Germans are also the nation with the highest proportion of occupied TWs (75.09%) compared with the other typologies. On the other hand, the TWV is mainly represented by the Portuguese (40%), although the Germans also occupy a substantial share (33.95%).

As regards the average accommodation costs per night, Spain obtained the highest total (71.09 €), as a result of the TWFV (Twin Family Sea View), the 2nd most expensive of the hotel, which represented 11.90 % of the number of occupied rooms by Spanish. The 2nd place was occupied by Portugal, as it was the nationality with highest occupation in the room types with higher monetary value: SJ (Junior Suite Land View), SJVM (Junior Suite Sea View) and TWFV.

These figures contrast with the situation for Italy, Poland and Germany, which are 3 of the 4 nations with average expenses below 40 €. This is not surprising, since these 3 nationalities showed a greater preference for the TW option, which, in addition to being the cheapest accommodation, also includes, in the total average, the prices for single room reservations, i.e. for 1 guest.

Figure 3.5 – Number of Guests with Consumption in the High Season

Row Labels	CheckIn Count (Month)	Guests Total	% Guests Total
Austria	59	123	0,80 %
Belgium	83	189	1,23 %
Brazil	52	119	0,78 %
Canada	35	67	0,44 %
France	100	228	1,49 %
Germany	3499	6940	45,21 %
Ireland	32	68	0,44 %
Italy	27	59	0,38 %
Netherlands	82	180	1,17 %
Poland	178	470	3,06 %
Portugal	1901	4890	31,85 %
Spain	305	775	5,05 %
Switzerland	58	122	0,79 %
UK	340	768	5,00 %
USA	166	353	2,30 %
Total			%

Nationality			Checkin		
Angola			may - oct 2014	MONTHS	
Antigua and Ba...			2014		
Argentina			MAY JUN JUL AUG SEP OCT		
Australia					
Austria					

Source: Authors

As shown in Figure 3.5, the Germans were the ones with the most level of consumption during the high season (between May and October), with about

45.21% of the total number of guests, 15351. Germany surpassed Portugal, which had around 31.85%. The two nations jointly accounted for 77.06% of the consumption during high season.

Figure 3.6 shows data on beer consumption according to the guests' nationality during the high season (between May and October). Germany is the country with the highest preference for this type of alcoholic beverage, representing roughly 72.58% of the total consumption, in Figure 3.6. This value, besides representing considerable way higher dominance than in Figure 3.5, reveals the Germans' fondness for beer, clearly demonstrating a keener interest than the other nationalities in the four types of beer.

Larger is the most appreciated category of beer, much at the expense of the Bavarian (78.06%), while Portugal is, curiously, the only nation that prefers lager, the cheapest beer, representing 59.13 % of Portuguese beer consumption. This may explain why the Portuguese had the lowest average expenditure (3.23 €). All the other nationalities seem to share the same preference as Germany. For instance, the proportion of the larger consumption by the British, compared with the total sum of the four categories, is very high (72.82%), which explains why the British had the highest average consumption expenses (4.02 €). Bottled beer and alcohol-free beer were the least favorite, with low levels of consumption.

Figure 3.6 – Beer Consumption in the High Season

Row Label	Alcohol-free Beer Total	Average	Beer (bottle) Total	Average	Lager Total	Average	Large Beer Total	Average	Total	Average
Austria	9	3,14 €	2	3,25 €	52	2,86 €	139	3,61 €	202	3,43 €
Belgium	2	2,44 €	6	2,93 €	72	2,51 €	77	4,39 €	157	3,40 €
Brazil			4	6,10 €	52	2,77 €	53	3,79 €	109	3,39 €
Canada	6	2,93 €			13	2,64 €	31	3,67 €	50	3,34 €
France			6	3,66 €	62	3,00 €	67	3,96 €	135	3,55 €
Germany	265	2,75 €	130	2,98 €	4322	2,64 €	10291	4,21 €	15008	3,72 €
Ireland			4	2,64 €	8	2,26 €	43	3,73 €	55	3,43 €
Italy			4	2,44 €	9	2,61 €	32	4,16 €	45	3,67 €
Netherlands			5	4,88 €	57	2,88 €	80	4,14 €	142	3,68 €
Poland	9	2,44 €			45	2,54 €	71	4,52 €	125	3,59 €
Portugal	28	2,73 €	114	3,24 €	1568	2,79 €	942	3,87 €	2652	3,23 €
Spain	21	2,70 €	14	2,93 €	193	2,66 €	366	4,67 €	594	3,85 €
Switzerland	2	2,44 €			39	2,83 €	94	4,41 €	135	3,92 €
UK	4	3,25 €	31	3,67 €	221	2,53 €	686	4,58 €	942	4,02 €
USA	20	2,44 €	11	3,46 €	86	2,77 €	211	4,00 €	328	3,57 €
Total	366	2,73 €	331	3,18 €	6799	2,68 €	13183	4,20 €	20679	3,66 €

Date
may - oct 2014   MONTHS
2014
JUN   JUL   AUG   SEP   OCT   NOV   DEC

Nationality
Austria
Belgium
Brazil
Bulgaria

Consumption
Lager
Large Beer

Source: Authors

In terms of liters (lt) of consumed beer, the difference between Germany and Belgium is huge: bottled beer – 42.9 liters for Germany versus 1.98 liters for

Belgium; larger beer – 4116.4 lt for Germany against 30.8 lt for Belgium; lager - 864.4 lt versus 14.4 lt; alcohol-free beer – 66.25 lt for Germany versus 0.5 lt for Belgium. These figures again denote a high preference for beer on the part of the Germans and a clear dominance in the percentage of consumption in the hotel's catering and drink establishments.

Overall, the guests from the 15 nationalities consumed and estimated 109.23 lt of bottled beer, 5273.2 lt of larger beer, 1359.8 lt of lager and only 91.5 lt of alcohol-free beer.

Figure 3.7 shows some of the different types of wine sold in the catering establishments of the hotel. It is quite clear that the brand Beta is the most popular wine among the guests of the unit (66.12% versus 33.88% of Alfa), with Red and White Beta wines representing the top preference. Although Beta Red was the variety with greater consumption, Beta White was the most popular among the majority of the 15 nationalities, although the margin is minimal (7 vs. 6 of the Beta Red).

Figure 3.7 – Wine Consumption in the High Season

Row Label	White Alfa Wine Total	Average	Rose Alfa Wine Total	Average	Red Alfa Wine Total	Average	White Beta Wine Total	Average	Rose Beta Wine Total	Average	Red Beta Wine Total	Average	Total	Average
Austria	14	6,33 €	4	7,72 €	15	5,99 €	40	3,22 €	28	3,79 €	33	3,51 €	134	4,26 €
Belgium	15	5,99 €	6	7,72 €	9	5,87 €	43	3,98 €	19	7,95 €	46	7,39 €	138	6,30 €
Brazil	5	6,33 €	3	5,69 €	6	5,97 €	17	4,47 €	5	3,94 €	13	5,93 €	49	5,21 €
Canada	2	7,72 €			6	6,71 €	16	2,37 €			10	6,72 €	34	4,80 €
France	9	6,35 €	18	7,68 €	17	7,72 €	52	3,67 €	43	3,54 €	41	3,32 €	180	4,63 €
Germany	1327	5,79 €	787	7,50 €	1218	6,09 €	2202	3,38 €	1997	3,77 €	2490	3,72 €	10021	4,61 €
Ireland	2	7,72 €	7	5,70 €	1	7,72 €	18	4,71 €	3	10,57 €	6	4,39 €	37	5,71 €
Italy	5	6,11 €			3	7,72 €					5	7,25 €	13	6,92 €
Netherlands	15	5,58 €	16	7,42 €	14	7,02 €	42	4,02 €	16	6,33 €	17	3,77 €	120	5,36 €
Poland	10	5,45 €	7	7,72 €	10	6,10 €	11	4,17 €	16	3,54 €	12	4,27 €	66	4,94 €
Portugal	219	6,30 €	140	7,16 €	321	6,72 €	264	4,01 €	229	4,62 €	334	5,08 €	1507	5,62 €
Spain	31	6,14 €	12	7,59 €	51	5,49 €	36	3,96 €	15	4,52 €	51	3,99 €	196	5,06 €
Switzerland	9	5,91 €	7	6,85 €	24	6,17 €	14	3,19 €	5	6,99 €	25	7,95 €	84	6,43 €
UK	48	6,32 €	27	7,89 €	48	7,17 €	221	4,45 €	160	4,14 €	111	4,40 €	615	4,95 €
USA	23	5,77 €	6	7,72 €	26	6,63 €	49	3,40 €	59	4,27 €	54	5,63 €	217	4,96 €
Total	1734	5,89 €	1040	7,45 €	1769	6,25 €	3025	3,54 €	2595	3,95 €	3248	4,04 €	13411	4,80 €

Date	Nationality
may - oct 2014	Angola
2014	Antigua and Barbuda
MAY JUN JUL AUG SEP	Argentina
	Australia

Source: Authors

The USA and Poland are the only nations to show a preference for Beta Rosé. On the other hand, Spanish guests did not show a greater preference for either any of the two wine brands in Figure 3.7, with the difference being minimal.

As in Figure 3.5, the German trend (74.72%) remains the same when it comes to total consumption, while Portugal shows poor adherence to this range of wines, with 11.24%, far lower than the 31.85% shown in Figure 3.7. The main negative highlight was Spain, with only 1.46% of consumption (5.05% in Figure 3.5), being superseded by the USA (1.62%).

Before analyzing the average prices without VAT, it should be noted that the Beta brand is 0.80 € more expensive than Alfa in sales by the glass and 3.50 € in sales by the bottle.

The lowest average consumption was for Austria (4.26 €), although that country had one of the highest proportions of the total for consumption of the Beta brand (75.47%), while Italy had the highest average (6.92 €). Belgium had the third most expensive average, as Beta accounts for 78.26% of total consumption by Belgians, one of the largest consumption records of this brand among the 15 nationalities

As shown in Figures 3.8 and 3.9, Soft Drinks were the most consumed beverage in Bar Y and Coffee in Bar X, although the difference in quantity between the two points of sale was quite considerable. Between May and October, Bar Y obtained about 11% more consumption than Bar X.

Coffee was the most requested item in Bar Z and the second most requested in Bar Y by the Portuguese, representing 47.33% of the total consumption by the Portuguese. Although Soft Drinks were the most consumed item by Brazilians in Bar Y (41.86% of total consumption in Brazil), they also showed considerable propensity for coffee consumption (39.53%). Considering that Coffee is the most affordable item in both figures (1.80 €), this may explain the lower consumption average of Bar X (Brazil) and Bar Y (Portugal).

As far as the Daily Cocktail is concerned, consumption in Bar Y was just over half (51.61%) that of the same item in Bar X. Surprisingly, the UK was the second nationality with more cocktail consumption, surpassed only by Germany, in the two bars. On the other hand, in Bar Y, Port Wine and Pina Colada were requested much more than in the Bar X, representing around 88.31% and 95.58% of the totals, respectively, of the corresponding items at both points of sale.

Figure 3.8 – Beverage Consumption in the High Season (Bar X)

Row Label	Caipirinha Average	Caipirinha Total	Cappuccino Average	Cappuccino Total	Coffee Average	Coffee Total	Daily Cocktail Average	Daily Cocktail Total	Mojito Average	Mojito Total	Natural Fruit Milk Shake Average	Natural Fruit Milk Shake Total	Pina Colada Average	Pina Colada Total	Porto Average	Porto Total	Sangria Average	Sangria Total	Soft Drinks Average	Soft Drinks Total	Teas Average	Teas Total	Average	Total
Austria			2,98 €	15	1,46 €	1	9,76 €	2									8,94 €	1	2,96 €	23	1,79 €	1	3,27 €	43
Belgium			2,19 €	21	2,28 €	4	6,27 €	9			7,32 €	8					8,94 €	1	3,97 €	90			3,96 €	133
Brazil	5,28 €	1	2,08 €	6	1,71 €	34	4,88 €	3	5,19 €	6									3,26 €	36			2,80 €	86
Canada	5,28 €	1			2,93 €	4			5,28 €	1									3,44 €	15			4,62 €	23
France	5,28 €	1	3,15 €	37	2,50 €	10			5,28 €	1	7,32 €	2					8,94 €	1	4,00 €	56			3,76 €	108
Germany	7,71 €	22	2,78 €	1066	2,09 €	339	6,86 €	45	7,55 €	10	3,66 €	5	6,79 €	9	6,62 €	14	9,16 €	30	3,39 €	503	1,93 €	39	3,13 €	2082
Ireland			3,58 €	14															4,39 €	5			3,82 €	19
Italy			2,69 €	3	1,85 €	4													3,86 €	33			3,54 €	40
Netherlands			2,63 €	25	1,72 €	10	4,88 €	4	10,57 €	2	3,66 €	3					8,94 €	2	3,97 €	60	1,79 €	2	3,57 €	108
Poland	10,57 €	4	2,15 €	12	1,87 €	14	4,88 €	2	7,93 €	6	3,66 €	2	15,85 €	3			8,94 €	2	3,07 €	12	1,79 €	1	3,92 €	58
Portugal	5,29 €	26	2,67 €	83	2,13 €	952	5,79 €	5	7,04 €	12	4,17 €	38	6,34 €	4	6,10 €	6	8,65 €	58	3,24 €	991	1,66 €	11	3,08 €	2200
Spain	5,15 €	4	2,30 €	31	2,21 €	88	7,89 €	10	8,59 €	13	3,48 €	2	6,70 €	4			8,64 €	3	3,47 €	92			3,47 €	247
Switzerland			2,98 €	6					29,07 €	11									4,04 €	18			6,05 €	40
UK			2,71 €	87	2,02 €	26	9,31 €	25	5,28 €	4	5,29 €	13	7,66 €	9	3,30 €	6	11,44 €	15	3,92 €	439	1,92 €	13	4,11 €	637
USA	5,28 €	3	2,36 €	33	1,85 €	8	5,86 €	5	7,40 €	3	5,13 €	3					8,94 €	4	3,31 €	110	1,79 €	1	3,44 €	170
Total	6,21 €	62	2,74 €	1438	2,11 €	1500	6,85 €	124	8,07 €	69	4,53 €	76	7,42 €	29	5,41 €	26	9,20 €	119	3,46 €	2483	1,87 €	68	3,10 €	5994

Slicers: Date: may – oct 2014, MONTHS (JUN JUL AUG SEP OCT NOV). Nationality: Angola, Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada. SalesPoint: Fashion bar LAG, Inevitavel LAG. Consumption: Campari, Cappuccino/Chocolate, Coffee, Daily Cocktail.

Source: Authors

It is also curious that in Bar X, Mojito had a balanced number of orders between 4 countries (Germany, Spain, Portugal and Switzerland) but in Bar Y, the percentage is heavily biased towards the German side (47.92% of the total).

Figure 3.9 – Beverage Consumption in the High Season (Bar Y)

Row Label	Caipirinha Total	Caipirinha Average	Cappuccino Total	Cappuccino Average	Coffee Total	Coffee Average	Daily Cocktail Total	Daily Cocktail Average	Mojito Total	Mojito Average	Natural Fruit Milk Shake Total	Natural Fruit Milk Shake Average	Pina Colada Total	Pina Colada Average	Porto Total	Porto Average	Sangria Total	Sangria Average	Soft Drinks Total	Soft Drinks Average	Teas Total	Teas Average	Total Total	Total Average
Austria			3	2,69 €	4	1,63 €			3	7,93 €	1	3,66 €	8	5,28 €	20	3,59 €	1	8,94 €	5	4,31 €			45	4,12 €
Belgium	26	12,49 €	19	2,43 €	31	2,21 €	6	9,76 €	8	5,96 €			4	7,04 €	16	4,22 €	1	8,94 €	35	3,06 €	6	2,69 €	152	4,43 €
Brazil			5	1,79 €	6	2,12 €			4	5,28 €			2	5,28 €	1	7,32 €			5	2,49 €			23	3,28 €
Canada					4	3,58 €			5	6,60 €					3	3,05 €			1	2,44 €			13	4,52 €
France	5	5,28 €	6	2,69 €	24	1,92 €			9	7,93 €			5	8,81 €	10	4,62 €	1	8,94 €	21	3,26 €	9	1,99 €	90	3,72 €
Germany	219	6,42 €	537	2,64 €	481	2,23 €	41	11,11 €	161	6,45 €	9	3,66 €	135	6,52 €	397	4,79 €	73	8,99 €	318	3,10 €	31	2,40 €	2382	4,24 €
Ireland			3	1,79 €	4	1,58 €									1	3,05 €			16	4,79 €			25	3,23 €
Italy	1	5,28 €			2	1,46 €			2	5,28 €									2	2,56 €			9	3,05 €
Netherlands	11	14,53 €	6	1,79 €	11	2,57 €	1	4,88 €	5	6,47 €					2	6,10 €	2	8,94 €	21	3,42 €	4	1,79 €	63	4,55 €
Poland			2	3,58 €	13	2,72 €			10	8,81 €			2	5,28 €			3	10,03 €	6	3,66 €	5	2,24 €	41	5,17 €
Portugal	78	5,98 €	70	2,13 €	685	2,09 €	8	5,23 €	48	5,44 €	14	4,18 €	29	5,19 €	39	4,01 €	7	9,52 €	164	2,74 €	117	2,12 €	1259	2,89 €
Spain	15	6,52 €	39	2,38 €	33	2,28 €			29	7,92 €	7	3,61 €	3	5,19 €			1	8,94 €	20	2,88 €	17	2,62 €	170	3,98 €
Switzerland	8	6,04 €	13	2,57 €	16	1,93 €	1	4,39 €	6	7,93 €			7	7,19 €	12	5,03 €			22	3,23 €			85	4,02 €
UK	10	6,47 €	71	2,70 €	22	1,84 €	3	4,88 €	40	7,29 €	14	4,66 €	15	5,55 €	52	4,98 €	6	9,48 €	111	3,16 €	10	1,99 €	354	4,07 €
USA			12	2,64 €	12	2,36 €	4	9,76 €	6	7,93 €	2	7,32 €			6	6,41 €	7	8,94 €	32	3,10 €	3	1,79 €	90	4,41 €
Total	373	6,63 €	790	2,56 €	1324	2,14 €	64	8,84 €	336	6,58 €	47	4,16 €	219	6,15 €	562	4,69 €	102	9,08 €	779	3,06 €	205	2,18 €	4801	3,86 €

Slicers: Date: may – oct 2014 (APR MAY JUN JUL AUG SEP OCT NOV). Nationality: Argentina, Australia, Austria, Belgium. SalesPoint: Bar piscina LAG, Fashion bar LAG, Inevitavel LAG. Consumption: Irish Coffee, Jerez, Lager, Large Beer.

Source: Authors

Finally, it should be noted that the highest average consumption was for Sangria (9.14 €), while Poland, taking into account both figures, had the most expensive consumption average (5.17 €), despite having the highest coffee consumption.

In conclusion, Bar X obtained more requests from the Portuguese (36.70% of consumption compared to 34.73% for Germans), while Bar Y showed a higher consumption for Germans (49.61% against 26.22 % for Portuguese). The UK was the nation with the second highest consumption in three of the items (Cappuccino, Daily Cocktail and Port Wine), while Belgium, as well having

the third highest consumption for Soft Drinks and "Caipirinha", was in overall consumption in Bar Y (Figure 3.9), with 2.60%.

Figure 3.10 shows higher consumption by Germans (59.71% of the total) than in the high season (Figure 3.5), since September and October are two of the months where the hotel is most visited by Germans (92.16% of the 3278 shown in Figure 3.10 consumed during one of these months), leaving Portugal far below compared with the first four months (Figure 3.2) and the high season (Figure 3.5), with only 19.84%.

In Figure 3.11, only 12 of the 15 nationalities analyzed appear due to the absence of consumption by Austrian, Italian and Polish guests. The most requested main course between September and December was Baked Cod Fish, although it was not a major trend (14.65%), while the least sought after were, curiously, vegetarian dishes: Vegetarian Lasagna (2.53%) and Asparagus Risotto (2.78%).

The Sirloin Steak, although with a lower level of consumption than the Baked Cod Fish, with 12.63%, was the main course with the highest number of preferences among the 12 nationalities (4 against 3 of Baked Cod Fish), despite being the most expensive option (22 €) of the 13 dishes shown in Figure 3.11.

Figure 3.10 –Number of Guests with Consumption in the 3rd Quarter

Row Labels	CheckIn Count (Month)	Guests Total	% Guests Total
Austria	8	17	0,31%
Belgium	22	46	0,84%
Brazil	8	20	0,36%
Canada	25	44	0,80%
France	45	96	1,75%
Germany	1686	3278	59,71%
Ireland	28	56	1,02%
Italy	6	12	0,22%
Netherlands	28	54	0,98%
Poland	30	69	1,26%
Portugal	489	1089	19,84%
Spain	88	214	3,90%
Switzerland	24	47	0,86%
UK	171	361	6,58%
USA	45	87	1,58%
Total	**2703**	**5490**	**100,00%**

Nationality: Angola, Antigua and Ba..., Argentina, Australia, Austria

CheckIn: set - dec 2014 | 2014 | AUG SEP OCT NOV DEC

Source: Authors

In contrast to Figure 3.10, Portugal had a higher level of consumption (22.98%), surpassing the 20.71% of Germany and the 15.15% of the UK. On the

other hand, still in comparison with Figure 3.10, Spain, despite having higher consumption (5.30%), was surpassed by the USA (9.09%), France (8, 33%) and even Switzerland (7.07%), which indicates a clear preference of the Swiss for attendance in Restaurant X.

Vegetarian dishes were the least favorite among the Portuguese (9.89%), which is also reflected overall, since the four courses belonging to this sector only represent 16.41% of the total value. On the other hand, meat dishes account for 44.44% of consumption, superseding fish (39.14%), which is not unexpected, given that there are 5 meat courses and only 4 fish courses represented in Figure 3.11.

The highest expenditure on consumption per person was for Switzerland (19.48 €), as the sirloin steak, the most expensive course, constitutes 39.29% of its total consumption. Conversely, the country with the lowest average was Portugal, which capitalizes on the fact that 2 of the cheapest courses, Fish Fillet and Chicken Breast (12 €), jointly constitute an approximate value of 31.87% as regards to consumption by the Portuguese.

Figure 3.11 – Main Courses Consumption in Restaurant X in the 3rd Quarter

Row Label	Belgium Total	Average	Brazil Total	Average	Canada Total	Average	France Total	Average	Germany Total	Average	Ireland Total	Average	Netherlands Total	Average	Portugal Total	Average	Spain Total	Average	Switzerland Total	Average	UK Total	Average	USA Total	Average	Total	Average
Asparagus Risotto							3	9,76 €			1	9,76 €	1	9,76 €	1	9,76 €	1	9,76 €	1	9,76 €	3	9,76 €	1	9,76 €	11	9,76 €
Baked Cod Fish	1	12,20 €	1	12,20 €	1	12,20 €	9	21,95 €	9	11,93 €	2	12,20 €	2	12,20 €	16	11,71 €	9	21,95 €	1	12,20 €	2	12,20 €	5	30,49 €	58	14,90 €
Baked Salmon					1	12,20 €	4	11,90 €	6	12,20 €			1	10,98 €	5	10,49 €			6	18,30 €	2	12,20 €	5	20,33 €	30	13,65 €
Beef			1	9,76 €	1	9,76 €			4	9,76 €							5	11,22 €	1	9,76 €	4	9,76 €	1	9,76 €	17	10,13 €
Beef Steak	1	10,98 €	1	12,20 €	1	12,20 €	2	12,20 €	3	11,79 €	1	12,20 €	1	12,20 €	13	11,07 €	1	12,20 €	2	12,20 €	15	12,90 €	2	12,20 €	43	12,03 €
Chicken Chest					1	9,76 €	4	9,76 €	13	9,53 €	1	9,76 €			13	9,76 €	1	9,76 €	1	9,76 €	3	9,43 €	3	9,76 €	41	9,66 €
Fish Fillet	1	9,76 €	1	9,76 €			2	9,76 €	10	11,95 €					16	10,81 €	4	13,01 €			8	11,01 €	1	9,76 €	43	11,14 €
Grilled Octopus			3	14,63 €			1	14,63 €	4	19,51 €					3	10,73 €			2	29,27 €	5	18,29 €	6	17,56 €	24	16,97 €
Linguine Nero							2	12,20 €	7	17,08 €	1	12,20 €	2	10,98 €	1	10,98 €	1	12,20 €	3	12,20 €	2	12,20 €	21	14,03 €		
Pork Sirloin			1	9,76 €	2	19,51 €	3	14,64 €	4	9,27 €					5	9,61 €			7	11,39 €	3	14,64 €	25	11,49 €		
Ravioli					1	9,76 €	2	9,76 €	10	9,76 €					6	10,93 €					2	9,76 €	23	10,03 €		
Sirloin Steak	2	17,00 €	1	17,89 €					9	19,90 €	3	26,83 €	7	17,89 €	6	17,29 €	4	17,89 €	11	39,35 €	6	17,89 €	1	17,89 €	50	21,13 €
Vegetarian Lasagna							1	9,76 €	3	9,76 €					1	9,76 €			1	9,76 €			4	9,76 €	10	9,76 €
Total	5	13,39 €	9	12,83 €	8	12,20 €	33	13,11 €	82	12,99 €	8	16,03 €	15	14,29 €	91	11,24 €	21	16,52 €	28	22,18 €	60	12,64 €	36	14,58 €	396	13,26 €

Date: sep - dec 2014 (MESES), 2014, JUL AUG SEP OCT NOV DEC
Consumption: Petit gateau, Pork Sirloin, Porto
Nationality: France, Germany, India
SalesPoint: Fashion bar LAG, Spa LAG

Source: Authors

Figure 3.12 shows the amount of consumption through the hotel's accommodation typologies according to nationality. The higher consumption by the Portuguese and the Germans is again evident compared with the others, and the sum of the percentages of both nationalities is 83.72%. Both Portugal (44.95%) and Germany (38.77%) show a high propensity for consumption through Adult Half-Board (HB). In fact, the percentage of consumption of

the Portuguese, through Adult and Children Half-Board, is quite unequivocal: 87.19% of the total of 8 modalities.

However, it can be argued that the preference for accommodation types among the 14 nationalities (Italy does not appear in the figure, so it is assumed that the Italians enjoyed only the BB regime, i.e. Bed and Breakfast) is quite divided, 8 of which have chosen more often Adult HB and 6 of which the All Inclusive (AI), although this type represented 59.45% of the total consumption in Figure 3.12. HB includes breakfast and dinner only, while AI includes all meals for the day and some of the drinks served at Bar X and Y or Restaurant X. Thus, taking into account that the HB cost is 30 € less than AI, this may have been the deciding factor in the choice of one or the another.

Figure 3.12 – Accommodation Types in 3rd Quarter

Row Label	Adult Full-Board		Adult Half-Board		All Inclusive Adult D		All Inclusive Adult Meals		All Inclusive Children Drinks		All Inclusive Children		Children Full-Board		Children Half-Board		Total	
	Total	Max	Total	Max	Total	Max	Total	Max	Total	Max	Total	Max	Total	Max	Total	Max	Total	Max
Austria			14	13,01 €	80	12,68 €	80	29,59 €									174	29,59 €
Belgium			206	13,01 €	142	12,68 €	142	29,59 €									490	29,59 €
Brazil					12	12,68 €	12	29,59 €									24	29,59 €
Canada	44	13,01 €															44	13,01 €
France			60	13,01 €	36	12,68 €	36	29,59 €					7	3,25 €			139	29,59 €
Germany	26	26,02 €	5053	243,25 €	3252	19,02 €	3262	110,57 €	142	6,34 €	142	14,80 €			104	6,50 €	11981	243,25 €
Ireland			44	13,01 €	2	12,68 €	2	29,59 €									48	29,59 €
Netherlands			14	13,01 €	46	12,68 €	46	29,59 €									106	29,59 €
Poland					547	19,02 €	547	44,39 €	85	6,34 €	85	14,80 €					1264	44,39 €
Portugal	160	39,02 €	12009	238,21 €	736	19,02 €	736	44,39 €	68	6,34 €	68	14,80 €	12	6,50 €	104	6,50 €	13893	238,21 €
Spain	31	39,02 €	345	19,51 €	164	19,02 €	164	44,39 €	8	6,34 €	8	14,80 €			38	6,50 €	758	44,39 €
Switzerland			102	13,01 €	32	12,68 €	32	29,59 €									166	29,59 €
UK	6	26,02 €	483	26,02 €	575	19,02 €	575	44,39 €	71	6,34 €	71	14,80 €			2	6,50 €	1783	44,39 €
USA					18	12,68 €	18	29,59 €									36	29,59 €
Total	223	39,02 €	18374	243,25 €	5642	19,02 €	5652	110,57 €	374	6,34 €	374	14,80 €	12	6,50 €	255	6,50 €	30906	243,25 €

Date
sep - dec 2014
2014
JUL   AUG   SEP   OCT   NOV   DEC

Consumption
- All Inclusive Adult Drinks
- All Inclusive Adult Meals
- All Inclusive Children Drinks
- All Inclusive Children Meals

Nationality
- Mexico
- Morocco
- Netherlands
- Norway

Source: Authors

Regarding Full-Board (FB), which includes breakfast, lunch and dinner, with the exception of beverages, it is interesting to note that none of the countries shows a predilection for this mode. This is due to the fact that FB is 16 € more expensive than HB, but the difference consists only of the inclusion of lunches, for which the daily number was quite reduced compared to that of dinners in the hotel. In regard to the maximum consumption per stay, it is curious to note that the Germans (243.25 €) had a higher amount than the Portuguese (238.21 €) through the Adult HB, even though they consumed less 37.86% than the Portuguese tourists in this accommodation type.

Finally, it is also relevant to mention that it is not possible to specify the amount of consumption through BB, since, for example, several FB customers

may have consumed drinks in one of the bars or some HB guests may have had lunch in one of the restaurants, which is not recorded as such in the POS of the hotel, since they are not included in it.

CONCLUSIONS

The hotel industry needs to progressively manage unpredictability. The more predictable the business becomes, the more control the hotel board holds over the finances of their institutions. To counter this unpredictability, the best solution is to be able to control the guest preferences, which, quite often, becomes an ingrained habit and therefore more difficult to change.

This study aims to serve as a contribution to the hotel industry in general. This in-depth analysis of consumption preferences, room typologies, accommodation types, and travel agencies, as well as the univariate statistics of accommodation and consumption expenses carried out at the hotel, gives more detail and accuracy to the sales forecasts, consumption and occupation in the hotel. It is particularly important for the Economat, Reception and Administration sectors, because it allows, for example, a more precise forecast of orders, type of hotel occupancy, and the revenue associated with consumption, across the different periods of the year. Armed with these forecasts, it is possible to reduce/optimize hotel costs, especially in relation to stock orders.

On the other hand, the hotel is provided with an even greater perception of the market segments that it can already reach with relative ease, and those that need greater investment. For example, the Scandinavian market (Denmark, Norway, Sweden and Finland), although they only represented 0.88% of the total number of guests in 2014, could warrant more investments during the weaker months of the low season, such as January and November, in order to generate more revenue.

This study demonstrates the importance of the BI system, DW and Multidimensional Modeling, for analyzing the numerous data that are part of the commercial reality in a hotel. This analysis aims to promote greater rigor, predictability and financial security to the business, filling the existing gaps in

the availability of information, which aids the process of decision-making and forecasting in hotels.

Finally, one should note that this study presents some limitations, such as the use of data for one calendar year only (2014); it would be important to extend the time base in order to achieve customer consumption trends; the fact that this study is limited to only one hotel in the chain; and the need to define Key Performance Indicators (KPIs) that allow comparison with other hotels and verification of the level of performance and success as regards their consumers consumption.

REFERENCES

Berry, M. J., & Linoff, G. S. (2000). *Mastering Data Mining: The Art and Science of Customer Relationship Management.* . United States of America: John Wiley and Sons, Inc.

Chaudhuri, S., Dayal, U., & Narasayya, V. (2011). An overview of business intelligence technology. *Communications of the ACM, 54(8)*, 88–98.

Chen, H., Chiang, R., & Storey, V. (2012). Business Intelligence and Analytics: From Big Data to Big Impact. *MIS Quarterly, 36(4)* , 1165–1188.

Curcio, T. (27 de Abril de 2011). *O conceito de Business Intelligence.* Obtido em 15 de Setembro de 2015, de Revista PC World: http://www.tiagocurcio.com/o-conceito-de-business-intelligence/

Han, J., Kamber, M., & Pei, J. (2012). *Data Mining: Concepts and Techniques* (3ª ed.). Waltham, USA: Morgan Kaufmann Publishers.

Inmon, W. H. (2002). *Building the Warehouse* (3ª ed.). United States of America: John Wiley & Sons, Inc.

Kimball, R., & Ross, M. (2013). *The Data Warehouse Toolkit* (3ª ed.). Indianapolis, EUA: John Wiley & Sons, Inc.

Moody, D. L., & Kortink, M. A. (2003). From ER Models to Dimensional Models: Bridging the Gap between OLTP and OLAP Design, Part I. *Business Intelligence Journal*, 7-24.

Nardi, A. R. (4 de Outubro de 2007). *Fundamentos e Modelagem de Bancos de Dados Multidimensionais.* Obtido em 30 de Setembro de 2015, de Microsoft Brasil: https://msdn.microsoft.com/pt-br/library/cc518031.aspx

Oliveira, R. (2010). *Framework de Business Intelligence para o Setor Elétrico Português.* ISCTE-IUL: Tese de Mestrado em Engenharia Informática.

Rodrigues, A. V., & Ferreira, C. F. ([s.d.]). An Overview of Data Warehousing and OLAP Technology. (U. d. Porto, Ed.) Porto.

Santos, M. Y., & Ramos, I. (2006). *Business Intelligence - Tecnologias da Informação na Gestão do Conhecimento.* Lisboa: FCA - Editora de Informática, Lda.

Turban, E., Sharda, R., & Delen, D. (2011). *Decision Support and Business Intelligence Systems* (9th ed. ed.). Upper Saddle River, New Jersey, USA: Pearson Education.

CONTRIBUTION OF THE AUTHORS TO THE CONSTRUCTION OF THE ARTICLE

GUERREIRO: Theoretical revision, data modeling, content analysis and conclusions.

CORREIA: Theoretical revision, data modeling, content analysis and conclusions.

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