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THE IMPACT OF COVID-19 IN HOSPITALITY OPERATIONS' COSTS

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## Abstract

The aim of this study is to understand the impacts of COVID-19 in the hospitality operations' costs, specifically in the housekeeping (HK) and food and beverage (F&B) areas, with data from 8 hotels. The study analysed the general costs' trends, compared the behaviour of hotels with different capacities and evaluated some customer's behaviours. This research found evidence that, with the changes in the operations' processes, the costs of HK and F&B per occupied room increased but hotels with different capacities had different cost behaviours. Lastly, some of the changes occurred benefited the hotels and could be applied in the future.

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Keywords: Hospitality Costs, Housekeeping, Food and Beverage, COVID-19, Process Analysis

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## 1. Introduction

In 2020, our lives were deeply affected by the spread of the so known SARS-CoV-2 virus. The installed pandemic caught the world by surprise and required drastic changes in our day-to-day life. From travel constraints to community lockdowns, social distancing measures and events cancellation, all the implemented measures impacted negatively almost all economic sectors. The hospitality sector was not an exception and, in fact, is among the hardest hit.

This industry was not only affected by ‘stay at home’ orders. Since it is a sector that relies on transportation infrastructures, mobility constraints were also an important reason that explains the huge negative impact in the area. As soon as countries started to close borders and impose travel bans, such as negative COVID-19 tests and mandatory quarantine, domestic and international tourism sharply fell over the following weeks. It is estimated that 90% of the world’s population was affected by these travel restrictions (Gössling, Scott, and Hall 2020), leading specialists to expect a fall in the 2020 world tourism between 60-80% (UNWTO 2020).

This forecast concerned countries or specific regions within each one of them that deeply depend on tourism. This is the case of Portugal that is considered one of the countries where the tourism sector more contribute to the countries’ GDP (Cruz 2018). In 2018, the tourism revenues represented 8,2% of Portugal’s GDP. The Algarve region usually accounts for 18-19% of the total number of guests in Portugal, which remained in 2020. Despite that, the absolute values were seriously smashed due to the pandemic. The total number of Portugal arrivals passed from 27,1M in 2019 to 7,3M in 2020, which consist in a 60,3% drop (*Turismo de Portugal* 2020). Because of this huge impact of COVID-19 pandemic and the high contribution of Algarve to the summer Portuguese tourism, the following study will be focused and based on data of this specific region.

The virus affected not only the hotels and accommodations itself but also all the hospitality supply chain. Catering and laundry were two areas that felt the shock the moment all events

were cancelled and accommodations and attractions were closed (Gössling, Scott, and Hall 2020). Restaurants were also forced to close but, fortunately, some restructured themselves and switched to take-away/delivery service.

Hospitality businesses had to adapt and make significant changes in their operation processes to guarantee both the safety and health of its employees and customers. At the same time, it was important to assure that the image of a safe environment was being clearly transmitted, in order to keep attracting customers (Gössling, Scott, and Hall 2020). This consists in a priority due to the fact that, further from personal disposable income and changes in costs, perceived health risk is also one important factor that influences consumers' behaviour (Lee and Chen 2011). Following the COVID-19 crisis, this is presently even a bigger concern.

Fortunately, there are already some COVID-19 vaccines in the market. Despite this good news, the impact of the vaccines will depend on factors such as how quickly they are approved, manufactured, and delivered and how many people get vaccinated (*WHO* 2020). It is then expected that the vaccine effects should not be felt until the end of 2021 (DN/Lusa 2020). This implies that the changes applied in the operational processes will still remain for a considerable period of time. Additionally, it is expected that COVID-19 will have permanent effects on the way we work, socialise and move about the world (*BBC* 2020). This means that many of the changes that have occurred due to the pandemic are here to stay. As we will see, the hospitality sector had to adapt itself by changing many processes. Will any of these changes be permanent?

Lastly, according to a McKinsey's study, the hotel industry will only be fully recovered to pre COVID-19 levels in 2023 (Krishnan et al. 2020). All this information proves the importance of studying the impact of this pandemic in the operations of hospitality and tourism businesses.

### ***1.1. Company A***

The hospitality sector, undoubtedly, faced unprecedented challenges and suffered major changes. The following study intends to analyse the impact of this virus in the operations' costs

of hotels. These hotels are managed by a company that for confidential motives cannot be identified, and thus, it will be referred as Company A. This Company has different business types in the hospitality sector. It manages hotels owned by the company, hotels owned by others entities and franchised hotels of international hotel brands.

This study will focus on the analysis of 8 hotels managed by Company A, 2 four star and 6 five star hotels, with a number of rooms between 98 and 283. Five of the hotels belong to a hotel chain, two are independent and one is a franchise agreement, all located in Algarve, Portugal. In order to assure the confidentiality of all the data each hotel will be referred as one letter code from A to H. Moreover, two of the studied hotels use an all-inclusive scheme, meaning that all meals are included in the room price.

Portugal entered a mandatory lockdown that started in March and lasted 2 months. After that period, the considered hotels started reopening to the public: the firsts reopened in the 31<sup>st</sup> of May and the last one in the 3<sup>rd</sup> of July. The following table specifies the main characteristics of each one of the hotels.

Table 1 - Hotels' characterization.

Hotel	*	Location	# rooms	Reopening Date	Type	Observations
A	5*	Algarve	176	1 July 2020	Franchise Agreement	
B	5*	Algarve	163	8 June 2020	Independent	
C	5*	Algarve	113	5 June 2020	Independent	
D	4*	Algarve	283	5 June 2020	Hotel Chain	All Inclusive Scheme
E	5*	Algarve	228	27 June 2020	Hotel Chain	All Inclusive Scheme
F	5*	Algarve	156	31 May 2020	Hotel Chain	
G	5*	Algarve	149	31 May 2020	Hotel Chain	
H	4*	Algarve	98	3 July 2020	Hotel Chain	

### ***1.2. Scope limitation***

The current pandemic affected the hotels managed by Company A in countless aspects. For example, due to lower demand the occupancy rates were below the normal level, decreasing rooms' revenues but also reducing costs such as water and electricity. Additionally, spas were forced to shut down, which also allowed the hotels to have less maintenance costs. The virus

also required the hotel to change some check-in and front desk procedures such as the need to check the temperature of guests entering the property or drive check-ins.

Despite that, some of these changes did not occur directly because of COVID-19 or did not impact the procedures and the costs enough in order to be considered a priority. Because of that, the present study focuses only on analysing the impact of COVID-19 in the hotel operations' procedures and respective costs. More precisely, the study focuses on the housekeeping (HK) and on the food and beverage (F&B) processes. These two areas were chosen because they were the ones that suffered major changes due to the pandemic restrictions. In some cases they were even totally restructured, impacting deeply the operations in general.

The negative impact of COVID-19 in the world and specifically in the hospitality industry is beyond question. Nevertheless, it is also possible to find some shifts in the consumer behaviour that, in fact, benefited hotels. These behaviours are also going to be explained and studied, in order to understand their final impact.

### ***1.3. Thesis structure***

This research will first explain in detail what were the processes' changes in the housekeeping and Food and Beverage sectors. Then, an analytical analysis of the processes' costs will be conducted in order to understand, quantitatively, what were the impacts of such changes. This analysis will be done for each one of the 8 hotels in study and for an average hotel, created using the data of the individual hotels. After that, hotel groups will be formed in order to compare the behaviour of hotels with different capacities. Lastly, some recommendations will be made on what processes changes should prevail even after the pandemic and the respective benefits. This will be further complemented with suggestions for following studies that should be conducted.

## **2. Literature Review**

### ***2.1. Hospitality key indicators***

Hotels can have many sources of revenues and costs. For this reason, it is crucial to analyse its financial performance at the end of the day. In this industry, a set of specific metrics is normally used to complete that analysis. Since this study focuses only on evaluating the operational costs of hotels, the metrics used will be also oriented towards costs.

The first metric used is the Occupancy Rate. This is the calculation that shows the percentage of available rooms being sold in a defined period of time. It is then calculated by dividing the number of rooms sold in a hotel by the total number of available rooms (Barrows, Powers, and Reynolds 2012).

One other essential indicator that will be used in this research is the Cost per Occupied Room (Uysal, Schwartz, and Sirakaya 2017). This is calculated by dividing the total costs of a certain department by the total rooms occupied. This value evaluates whether the operating cost for any given room is reasonable. In this study, this calculation will indicate how much it cost to clean a room and replace the towels and other products such as shampoo, when applied to the housekeeping department. For the Food and Beverage operations, this ratio shows the cost of delivering breakfast, lunch and dinner per occupied room.

### ***2.2. Inputs from Company A***

Company A also pointed out two trends on their consumer behaviour. These new trends are directly related to the two studied areas, which means that, further from the cost's analysis, it is also necessary to verify the existence of these trends and understand their weight.

In hotel A the room's daily cleaning started to be made only by customer request. This in itself can lead to a decrease in the housekeeping costs. Moreover, even in hotels that have not adopted this strategy, hotel managers noticed that, guests started asking for the room not to be

cleaned so often, or not clean at all during their stay. This reaction is expected to be related with the fear of COVID-19 and can deeply impact the costs of the housekeeping activity. Taking this into account, in this research an analysis on that impact will also be made.

The other guest's attitude that caught the manager's attention was the fact that, in 2020, customers preferred to have more meals at the hotel than in previous years. Also due to the fear of COVID-19, it is expected that guests preferred to stay more in the hotel rather than going out and enjoy their meals outside. This can be explained by the perception of security customers had during their stay. This trend is not yet proven, and so, this study will also understand if this behaviour was indeed true.

### **3. Data**

All the used data was given directly from the managers of the studied hotels. This data is both qualitative and quantitative and will be next described in detail. First, a deep explanation will be made of the overall changes and more specifically in the housekeeping and food and beverage's processes. Then, a description of the variables used in the quantitative part of the analysis will also be provided.

#### ***3.1. Qualitative Data***

In order to organize the information, a description of each occurred change in the processes will be done and assigned a number between 1 and 11. Table 2 lists the changes and indicates which hotels adopted each process change.

Since the safety of both customers and employees should be a priority, the use of personal protective equipment (PPE) was reinforced in all hotels (1). The PPE were similar in all hotels and consisted in 2 masks per employee per day and gloves, protective suits, caps, glasses, aprons and shoes' protection, depending on the characteristics of the work they perform.

In what concerns new equipment, the hotels had to invest in machines for different purposes (2). Since there was a need to sanitize many more surfaces and much more often, specific machines were bought to allow full sanitation more effectively. These machines were used not only by the housekeepers in all the fixed textiles of the rooms (such as curtains and cushions) and in the meals' room on chairs and sofas, but also in pool loungers and air conditioning systems. Water vacuum cleaners and ozone machines were also purchased, in order to meet the recommendations of the authorities.

Additionally, a huge number of alcohol-gel dispensers and acrylics were installed in all critical points of the units (reception, meals' room, service stations, elevators, etc.) (3). Beyond this, sanitation was reinforced with additional disinfection of all the points of contact, and so, the necessary quantity of cleaning and disinfectant products has undergone a great increase (4).

Regarding the housekeeping area, some hotels restructured the existing process. Before this pandemic, the whole housekeeping process was performed by just one team. In order to adapt to the new rules, these hotels had to form two different teams, each one with specific goals (5). The first team is responsible for the airing of the room and for removing waste and dirty cloths, such as sheets and towels. As for the second team, it is responsible for cleaning the room and subsequent replacement of textiles and amenities. In some cases, between the two teams, an ozone machine is placed in the bedroom for 40 minutes. Furthermore, some hotels even changed the cleaning sequence (6). For Hotel B this meant that the cleaning procedure has to be done from the inside out, starting on the terrace and ending at the entrance of the room. Each zone must be finalized immediately, which decreases the efficiency of the whole process. For hotel C, it meant using an opposite process in the bathrooms and housekeepers starting to use an AirTop nebulizer to finalize the process. Hotel C even claimed to have an increase in the laundry cost due to the fact that uniforms had to be washed at higher temperatures, as required by the Clean & Safe seal. As happened with hotel C, other hotels had to add new disinfection and

cleaning products (7). Lastly, for the occupied rooms, hotel A adopted a strategy where cleaning is only made by customer request (8).

In the Food and Beverage service (F&B), breakfast used to be self-service buffet, lunch was *à la carte* and dinner also self-service buffet during high season and *à la carte* during low season, for most of the hotels. In order to adapt to the new rules, the way meals were served had to change (9). At an early stage, some hotels started serving breakfast and other meals in the room or pool and others *à la carte*. With the increase in occupancy, some hotels changed gradually their strategy (10) and adopted a hybrid model. This means that, for breakfast, some items were served *à la carte* and others as an assisted buffet, that is, served by hotel employees and not by guests. In *à la carte* service, all the authorities' health rules were adopted: limitation of seats, security distance, hygienic menus, the preparation of the table in the presence of the client and the disinfection of tables and chairs between customers.

To ensure that the new procedures were correctly applied, general and specific training sessions for each department were conducted before reopening (11). For the hotels belonging to the hotel chain, a total of 48 training sessions were held, with a total duration of 69 hours and aimed at a universe of 632 employees. The first trainings were addressed to heads of department. After ensuring their involvement, training was given to the remaining employees.

Table 2 - Visible changes in each Hotel

	A	B	C	D	E	F	G	H
1 - PPE	✓	✓	✓	✓	✓	✓	✓	✓
2 - New equipments	✓	✓	✓	✓	✓	✓	✓	✓
3 - Dispensers and acrylics	✓	✓	✓	✓	✓	✓	✓	✓
4 - Increase used disinfection products	✓	✓	✓	✓	✓	✓	✓	✓
5 - Two teams in HK	✓	✓		✓	✓	✓	✓	✓
6 - Change cleaning sequence		✓	✓					
7 - New products	✓		✓					
8 - Cleaning by request	✓							
9 - Change process of F&B	✓	✓	✓	✓	✓	✓	✓	✓
10 - Gradual process change	✓	✓	✓					
11 - Training		✓		✓	✓	✓	✓	✓

### 3.2. Quantitative Data

In this section the variables used in the analysis, listed in Table 3, will be explained in order to better understand their meaning. This will also allow to have a better comprehension of the assumptions made during the study and, later, their implications.

Table 3 - Variables collected for each analysis.

<b>HK Cost</b>	<b>F&amp;B Cost</b>	<b>F&amp;B Sales</b>	<b>Meals</b>
Laundry costs HK	Cleaning products F&B	F&B Sales	Breakfast
Cleaning products Hk	Permanent personnel expenses F&B	Guests	Main Meals
Amenities	Temporary work expenses F&B		Guests
Permanent Personnel expenses HK	Total cost of goods		
Temporary work expenses HK	PPE F&B		
PPE HK			

Some variables, such as cleaning products, permanent personnel expenses, temporary work expenses and personal protective equipment, are common to both the housekeeping and food and beverage processes. The cleaning products include the cost of all the detergents and disinfectants used in each procedure. The permanent personnel expenses and temporary work expenses represent all the required costs the hotel has with employees, both the permanent jobs and the temporary ones, respectively. This can include the salary, social security and any other benefits given to collaborators. For the hotels D, E, F, G and H the distinction between permanent and temporary work was not available. Therefore, the values for these five hotels were calculated based on the average of the hotels A, B and C. That is, for hotels A, B and C it was computed, for each month and year, an average of the permanent, temporary and total employee expenses. Then, the percentage that each variable, permanent and temporary, represented in the total employees' cost was also calculated. Finally, these percentages were applied to the remaining hotels, resulting in an approximation of the values of the two variables. This assumption will not affect the final total costs of housekeeping and food and beverage, but can affect the conclusions of the study. This information was obtained by conducting a scenario

analysis, modifying the percentages assigned to the permanent personnel expenses and temporary work expenses variables. The test showed that, when changing those values, the weight that the change of each variables has in the total cost change is deeply affected, and so, it can lead to incorrect conclusions.

The personal protective equipment variable was just introduced in 2020 since their use was implemented due to the pandemic sanitary requirements. It intends to include the cost of all the respective equipment used by the employees working on the housekeeping and food and beverage areas. Since some of this equipment is used in all areas by all employees, such as masks, it is quite difficult to get the exact real value for each area and month. Due to this, for some hotels, the values used consist in an approximate cost of what is actually spent. The values were estimated by adding the cost of acquisition of all the individual protection material bought by each hotel and multiplying that value by the employees' percentage of each area. That is, for example, in hotel A 47,6% of the hotel's employees belong to the food and beverage area. This means that the total cost of personal protective equipment was multiplied by 47,6% and divided by the number of months under analysis. In order to test whether this assumption would affect the final results a scenario analysis was also performed. Different scenarios were created between the extreme values (0% and 100%) for the employees' percentage. When applied those different percentages, the final results did not change significantly, meaning that the assumption does not affect the final results.

In addition to the common variables presented above, some factors specific to each process were also used. The variables collected were laundry costs and guest supplies for the housekeeping sector and total cost of goods for the food and beverage process. The laundry costs incorporate all the internal and external expenditure the hotels have to endure in order to carry out the entire process of cleaning the rooms. The variable guest supplies consists on the sum of the price paid for all the amenities that are provided. It can include multiple products

such as shampoo, shower gel and body lotion. Lastly, the total cost of goods is the sum of the ingredients' cost used in the cooking process of all meals served.

Beyond this, it was also performed an analysis on the customer's behaviour. For such calculations the monthly number of guests and the monthly revenue from the food and beverage sector (Sales F&B) were gathered. Lastly, the number of breakfasts and main meals (sum of lunch and dinner) served monthly was also used.

#### **4. Methodology**

The aim of this research is to understand the impact of COVID-19 on the hotels' operational costs. As explained before, this study will focus its analysis only on two areas, housekeeping and food and beverage, since they were the ones suffering bigger and significant changes due to the pandemic. Having in consideration the hotels gradual opening, the analysis was only performed between June and September (of 2019 and 2020) for those reopening in May and in early June, and between July and September (of 2019 and 2020) for the remaining.

The objective is to calculate six indicators: two that are cost related (HK cost, F&B cost) and four related to the consumer behaviours (Laundry, Sales F&B, Breakfast and Main meals).

For the cost analysis, the main goal was to calculate the cost of housekeeping per occupied room and the cost of food and beverage per occupied room, for both 2019 and 2020. These values demonstrate how much does it cost to clean a room and how much does it cost to serve meals in each of the months evaluated, respectively.

As for the consumer behaviour analysis, three different behaviours were studied. To understand whether guests had more meals in the hotel, the percentage of guests having main meals at the hotel was calculated for both years. In order to verify whether guests spent more in the food and beverage area of the hotel, the average F&B sales per customer was computed for 2019 and 2020. Since hotel D and E use an all-inclusive scheme, they were not included in this last two analysis. Lastly, the laundry cost per occupied room for both years was determined

with the aim of confirming if customers preferred not to have the room clean so often. The table below presents all the formulas used in order to compute the described indicators.

Table 4 - List of formulations used to determine the indicators used.

<b>Name</b>	<b>Formula</b>
Total Costs HK	$Laundry\ Costs_{HK} + Cleaning\ Products_{HK} + Guest\ Supplies + PPE_{HK} + Permanent\ personnel\ Expenses_{HK} + Temporary\ Work\ Expenses_{HK}$
Average Rooms Occupied per Day	$Occupation\ Rate \times N^{\circ}\ of\ Rooms$
Total Rooms Occupied per Month	$Average\ Rooms\ Occupied\ per\ Day \times Month\ Days$
Average Cost of HK per Occupied Room	$\frac{Total\ Costs\ HK}{Total\ Rooms\ Occupied\ per\ Month}$
Average Laundry Costs per Occupied Room	$\frac{Laundry\ Costs_{HK}}{Total\ Rooms\ Occupied\ per\ Month}$
Total Cost F&B	$Cleaning\ Products_{F\&B} + Permanent\ Personnel\ Expenses_{F\&B} + Temporary\ Work\ Expenses_{F\&B} + Total\ Costs\ of\ Goods + PPE_{F\&B}$
Average Cost of F&B per Occupied Room	$\frac{Total\ Costs\ F\&B}{Total\ Rooms\ Occupied\ per\ Month}$
Average Sales per Customer	$\frac{F\&B\ Sales}{Guests}$
Monthly Percentage of Guests Having Meals at the Hotel	$\frac{Breakfast}{Guests} \quad \frac{Main\ Meals}{Guests}$

After computing the six indicators for each one of the eight hotels for each month and year, an average hotel, called Hotel Global, was created. This hotel represents the average of the 8 hotels studied having 170 rooms (average of the number of rooms of the hotels studied). The hotel was formed by averaging the value of each given variable for each specific month and year. In order to properly calculate the average occupancy rate, instead of a simple average it was calculated the weighted average by number of rooms of each hotel. Then the six indicators in discussion were obtained through this information.

If the eight hotels were compared normally, any drastic and specific event could deeply impact the discussion and even lead to hasty conclusions. Using this method allow us to decrease the weight of such events and better understand the major trend of each indicator.

After the analysis of the indicators’ trends and explanation of the respective causes, hotel groups will be formed having into account their room capacity. For each group, an average hotel will be created, their behaviour will be compared and possible explanations for differences will also be discussed.

**5. Results and Discussion**

In order to simplify, whenever costs are mentioned, they should be interpreted as costs per occupied room and not as total costs. Figure 1 presents the change (in percentage) that the six indicators suffered from 2019 to 2020.

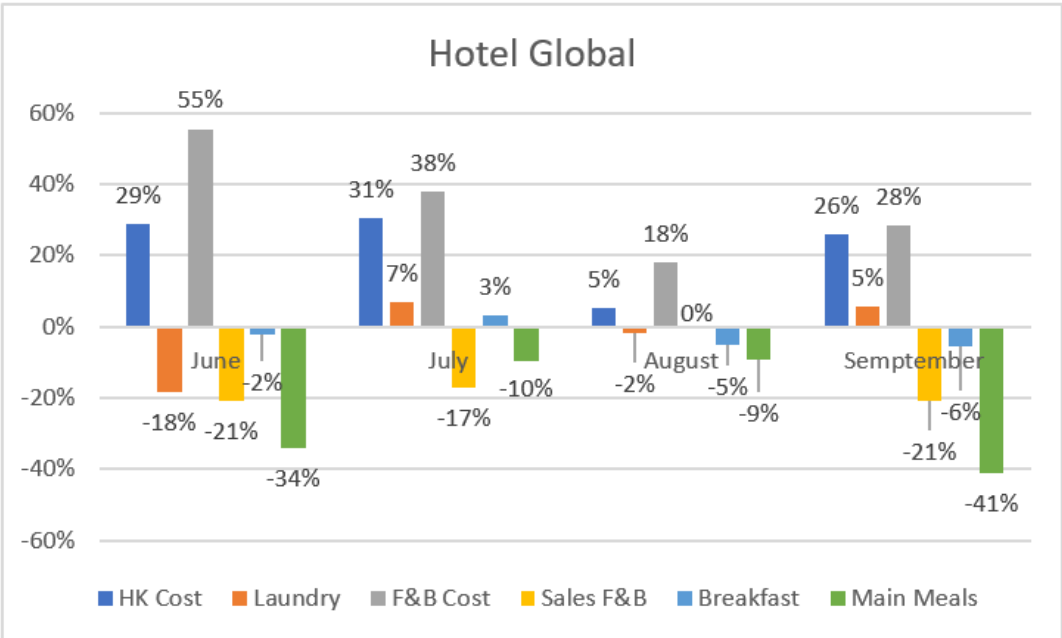


Figure 1 - Indicators change percentage from 2019 to 2020.

The results show clear trends for most of the variables. The housekeeping costs suffered an increase in the four studied months, with a minimum of 5% in August and a maximum of 31% in July. Despite that, the laundry costs, which are integrated in the HK overall costs, show a

reduction in June (-18%) and August (-2%). In the remaining months the costs increased slightly, 7% in July and 5% in September. As for the food and beverage costs, 2020 registered a sharp rise, with the difference reaching the maximum of 55% in June. Although lower, the increase in the following months was still very high with a minimum of 18% reached in August. The F&B sales per customer in 2020 recorded a considerable decrease in almost all months, being -21% in June and September and -17% in July. A possible reason that explains this decrease is the fact that Portugal faced an economic recession of around 8% (EWP 2020). It is estimated that this crisis has affected the income of 45% of the Portuguese people (Pimenta 2020), which means less purchasing power. Contrary to what would be expected, in 2020 guests decided to have less meals in the hotel than in 2019. Both the indicators breakfast and main meals, in general, show a slight decrease. The two most important values to mention are the 34% and 41% decrease in the main meals in June and September, respectively.

After the behaviour of the variables under study has been described, it is extremely important to understand which factors are responsible for such behaviours. Table 5 firstly presents the absolute change in euros both for the housekeeping costs in total and for each of the variables used in the housekeeping calculations. At the bottom, it is calculated the weight percentage that the change of each variable had in the final change in housekeeping costs.

Table 5 -Variables' weight in the housekeeping costs' change.

Month	HK	Laundry costs	Cleaning products HK	Amenities	Permanent personnel expenses HK	Temporary work expenses HK	PPE HK
June	5,43 €	-1,04 €	1,22 €	0,14 €	6,92 €	-2,10 €	0,29 €
July	6,05 €	0,41 €	0,85 €	-0,12 €	9,18 €	-4,65 €	0,38 €
August	1,08 €	-0,12 €	0,31 €	-0,13 €	3,35 €	-2,63 €	0,30 €
September	4,84 €	0,30 €	0,64 €	0,04 €	1,76 €	1,83 €	0,27 €
June		-19%	22%	3%	128%	-39%	5%
July		7%	14%	-2%	152%	-77%	6%
August		-11%	29%	-12%	309%	-243%	28%
September		6%	13%	1%	36%	38%	6%

The values highlighted in the table are the ones that most impacted the result, both positively and negatively. In this way, it is possible to conclude that the cost of employees in general was the factor that most contributed to the total increase in costs. One of the reasons that may explain this result is the fact that the process has been changed in such a way that more employees were needed to perform the tasks. As stated before, for almost all hotels, there was the need to create a second team for the housekeeping process. This probably implied the need to involve more employees, leading to an increase in costs. Another aspect to be taken into account is the fact that personnel costs are considered fixed costs. Fixed costs can be defined as “the costs that will occur regardless of volume of sales” (Barrows, Powers and Reynolds, 2012), meaning that they are not affected by the change in the occupancy rate. In this context, since the results are evaluated per room, with a decrease in the occupancy rate, the cost of permanent employees per occupied room increases even if the absolute value does not change. In this case, since the personnel costs are divided into permanent and temporary work, the impact of evaluating fixed costs can be lessened. From the data in Table 5 above it is possible to conclude that, considering the two personnel variables, the permanent work expenses is the one responsible for the increase in the HK costs. It is even possible to see that the temporary work decreases the total costs. This can be explained by the considerable decrease in the number of rooms sold in 2020. That is, even though more staff was needed to perform the tasks, since 2020 had lower occupancy rates, the permanent staff managed to ensure the majority of the additional tasks, decreasing the need to resort to temporary work. These results are real, at least, for the hotels A, B and C. However, as explained above, for the remaining hotels the breakdown was based in those three hotels. For this reason, it is not possible to say with certainty, for the hotel Global, which is the impact of each one of these two variables on the change in the final cost. In addition to personnel expenses, it is also possible to see the positive impact that the personal protective equipment and the cleaning products have on rising housekeeping costs.

The period between June and September shows contrasting laundry costs swings, with relatively modest rises in July and September, and more significant dives in June and August. This decrease can be explained by the fact that hotel A adopted the strategy of cleaning the rooms only at the customer's request. In hotels that did not adopt this strategy, it was also observed that some customers asked for the room not to be cleaned, which may also have contributed to the result presented. The decrease observed in amenities may be correlated to this behaviour, explaining its significant decrease in August.

As for the food and beverage, Table 6 first shows the absolute change in euros both for the F&B costs in total and for each of the variables used in the F&B calculations. Then, the weight that the change in each variable had in the final change in the F&B costs is also presented.

Table 6 - Variables' weight in the food and beverage costs' change.

Month	F&B	Cleaning products F&B	Permanent personnel expenses F&B	Temporary work expenses F&B	Total cost of goods	PPE F&B
June	<b>21,03 €</b>	0,34 €	22,80 €	-3,47 €	0,48 €	0,88 €
July	<b>18,25 €</b>	0,18 €	18,70 €	-2,60 €	0,78 €	1,18 €
August	<b>8,55 €</b>	-0,22 €	8,28 €	0,07 €	-0,46 €	0,89 €
Semptember	<b>12,64 €</b>	0,10 €	9,58 €	2,22 €	-0,10 €	0,84 €
June		2%	108%	-16%	2%	4%
July		1%	102%	-14%	4%	6%
August		-3%	97%	1%	-5%	10%
Semptember		1%	76%	18%	-1%	7%

As explained before, the expected increase in main meals did not occur. This means, and can be seen in the table above, that the cost variation of ingredients did not impact the F&B cost change. Thus, it is possible to confirm that the huge increase in the F&B costs was highly imposed by the personnel costs. The reason behind this result is probably the occurred changes in the food and beverage processes. All hotels changed the self-service buffets to assisted buffets or on-demand service, which significantly increases the number of employees needed for the process. In addition, and as explained earlier, the cost with an employee is a fixed cost and therefore the fact that in 2020 occupancy rates were considerably lower than in 2019 greatly

impacts the cost of employees per occupied room. As in the housekeeping calculations, Table 6 also presents a decrease in the temporary work expenses, which can be justified using the same explanation given for the HK analysis. However, these results are real for the hotels A, B and C but cannot be confirmed for the remaining. Therefore, it is not possible to confirm that the presented values for the two employee’s variables are real for the hotel Global. Despite that, the percentages of temporary and permanent work in the food and beverage area are considerably more stable than in the housekeeping area. This stability can indicate a greater proximity to the real values, thus giving greater confidence in the results.

In order to analyse possible different behaviours between hotels with different capacities, three average hotels were created: Big, Medium and Small. The hotel Big was built by averaging the data of the hotels that have more than 200 rooms, hotel D and E. The hotel Medium includes hotel A, B, F and G that have between 149 and 176 rooms. Lastly, the hotel Small has data from hotel C and H, which have 114 and 98 rooms, respectively. Figure 2 illustrates the cost changes from 2019 to 2020 of each average hotel.

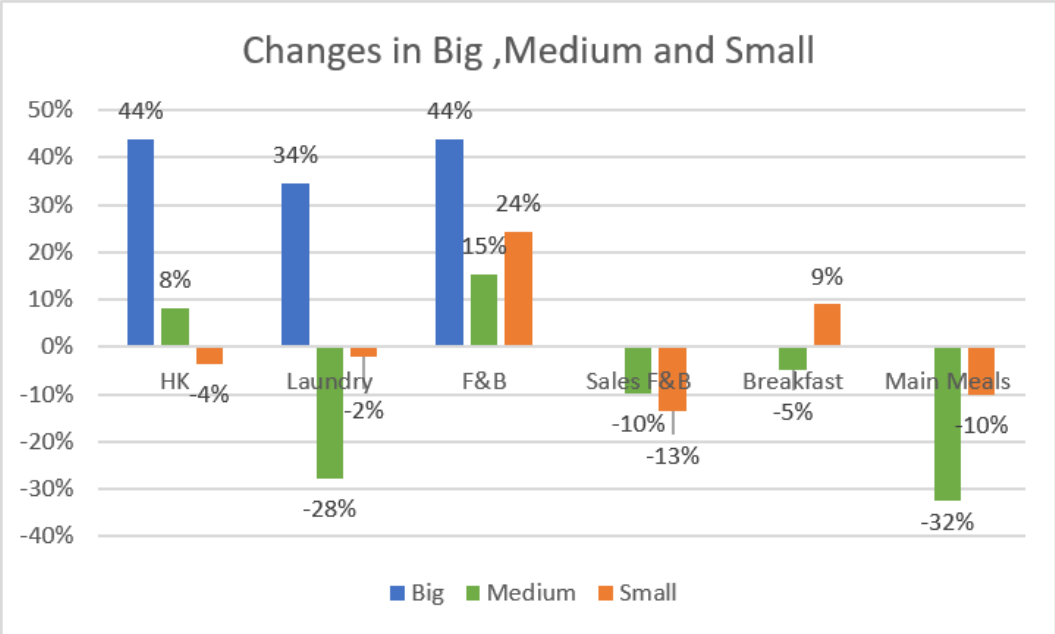


Figure 2 – Cost change percentage in hotels Big, Medium and Small.

As the results show, the three average hotels had significantly different behaviours. For starters, the housekeeping costs drastically increased in the hotel Big (44%) whereas in the hotel Small they decreased 4%. The laundry costs can justify this performance behaviour. As the hotel Global, both the hotels Medium and Small drop their laundry costs, especially the hotel Medium that show a drop of 28%. Hotel Big has the opposite reaction, with their laundry costs increasing by 34%. The possible reason that justifies this huge difference is the fact that hotel A is included in the hotel Medium, being the only one that implemented the on-request cleaning strategy.

Regarding the food and beverage costs the behaviours of the three average hotels were similar, with hotel Big, once again, showing the biggest rise. Since this group use an all-inclusive scheme, it was not included in the analysis of the remaining indicators. The hotels Small and Medium showed a similar guests' attitude concerning the F&B sales, having an identical behaviour as the global trend. As for the percentage of meals served, the impact in the hotel Medium was considerably higher than in the hotel Small, with a decrease of 32%.

## **6. Conclusion and Recommendations**

After all this analysis, it is possible to conclude that, in fact, the COVID-19 pandemic has significantly modified the processes of housekeeping and F&B and that these changes had a significant impact on the costs increase. However, it is also possible to confirm that these impacts were undoubtedly different between hotels with different capacities, being even opposite in some cases. Regarding the consumer behaviour hypothesis, it was also possible to confirm that, in fact, the explained changes impacted the housekeeping area and costs. Despite that, the suspected behaviour changes affecting the food and beverage area did not actually occur. The data collected showed that in addition to customers having less meals at the hotel restaurant, they even spent less in F&B in 2020 than in 2019.

All the occurred changes were forced by the pandemic. However, what if they are advantageous for the business? In this example it is possible to see that the adoption of the on-request cleaning strategy and the change in the consumer preferences, regarding the HK area, were beneficial for a lower increase in the housekeeping costs. This matter is even confirmed in a non-pandemic period (Knezevic Cvelbar, Grün, and & Dolnicar 2019). In this study it was proven that changing the defaults in the hotel room cleaning context significantly reduces rooms cleaning without diminishing guest satisfaction. This consequently results in a decrease of the respective costs, making the process more profitable.

Having these results into account, I would recommend to learn from this forced change and adapt it in order to better fit both the company and the customer needs. This adaptation could mean changing the default settings of cleaning all rooms everyday unless the customer asks otherwise. In my opinion, this should not be done only at guest request, however, it could be done, for example, every two days unless the customer asked otherwise, and if so, no extra fees should be charged. The company, and each hotel in specific, should analyse their situation and even run a survey to understand their customer's opinion and define a strategy having all that information into account.

Although this research helped understand a lot of what happened to these hotels during the most unpredictable period of greatest change in the last decades, many more questions can be answered with more studies. In order to complete the present study, a more global research could be done, including not only the areas of housekeeping and food and beverage but all the hotel's operations. This could incorporate information such as maintenance costs and energy and water bills, in order to understand, further from the processes' changes, how the hotel was affected by the pandemic. It could also observe not only how the costs were affected but also revenues, allowing to analyse a final balance.

The conducted study used eight hotels all located in the same geographic area. This study could be expanded through the inclusion of similar hotels located in other regions of Portugal, in order to have a broader picture of the pandemic impact. It would be also interesting to compare these hotels with others located in city centres or rural zones since they target different customer segments.

Lastly, this study used only Portuguese hotels that were forced to follow the rules and measures applied by the Portuguese authorities. However, each country defined its own rules, making it interesting to analyse the impact of the pandemic in different countries with different orders to follow.

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