NOVA IMS
Information Management School

PROCESS LOGIC

Report HOME BURGER

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BUSINESS PROJECT MANAGEMENT

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1. Introduction

This report describes a comprehensive process improvement project undertaken for Home Burger, a leading burger delivery company in Portugal. With growing competition in a fast-evolving market, Home Burger is looking at how to optimize its internal operations to better serve its customers.

Our analysis will focus on one of the important operational areas, identifying and addressing the inefficiencies to enhance overall performance. The study has been carried out following a structured Business Process Management (BPM) lifecycle approach with detailed process modeling, qualitative and quantitative analysis, and redesigning of process models.

We begin by understanding Home Burger's current operating model in detail, going through almost every aspect of the business, be it data, workflows or key performance indicators in multiple departments. The main focus of this project is to identify critical inefficiencies in certain workflows.

Based on this, we apply the necessary analysis methods: value-added and waste analyses, coupled with simulation tools to forecast the impact of changes. Based on these findings, we develop a detailed, improved process model that reduces bottlenecks and errors while optimizing processes. Several scenarios were considered in this new model to ensure that the solution is robust and adaptable.

The report concludes with implementation recommendations and considerations for future improvements to provide Home Burger with a roadmap for sustainable operational excellence.

About us

ProcessLogic is a dynamic consulting company specializing in designing and optimizing business processes in order to companies improve their productivity, optimize their processes, and attain their operational excellence.

Our mission:

In ProcessLogic our mission is to improve businesses by developing specialized solutions that address their particular problems. Through process analysis, modeling, and improvement, we seek to find organizations' hidden potential and promote long-term growth and increased productivity.

2. Background

Founded in 2016, Home Burger is a successful burger delivery company in Portugal. Today, with more than 100 employees, the company has six shops - three in Lisbon, one in Porto, one in Santarém and one in Portimão. The shops are open everyday from 12:00 PM to 3:00 PM and 7:00 PM to 12:00 AM.

The Lisbon office also manages key functions such as marketing, food safety, accounting, legal, operations and customer service with a team of 20 employees. While central office processes are outside the scope of this project', relevant assumptions can be incorporated into the recommendations.

In order to conduct an in-depth analysis of Home Burger's operations, we will analyze the company's performance (potential problems and errors) and opportunities to improve the business process. After inspecting and measuring potential errors and problems and redesigning the process in the old model, we will be able to create a TO-BE model, a prescriptive model of the real process. Here we want to improve the already existing model, as not all activities can be redesigned. But we have the goal of making the whole process more efficient. To do so, we will only be concerned with the store located in Lisbon Center from Home Burger

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2.1 Order-to-cash (O2C)

That process starts when the company receives an order and ends with the taking of the customer's order. There are three ways to place an order: telephone, website, or by than just walking into any store.

On average, 52% of the orders are received by the call center, 25.5% are from the website, 22.5% are done in the physical store.

2.2 Order processing

This business process begins with access to the registered order and finishes with the payment and delivery of the customer's order. In the middle of the process, in this case, we have the order being prepared and packaged.

3. Initial Assumptions

In this project, a few assumptions were made throughout since some information may not be provided, and this was necessary to standardize calculations and processes. For calculations involving months, we uniformly assumed that one month comprises 30 days in this study.

Furthermore, it has also been assumed that the receptionist employee is not the same as the website employee; in our belief, different reception and website employees' job descriptions call for varying amounts of hours put in for work and responsibilities too, in comparison.

The percentages regarding the distribution of orders by channel that we used in Bizagi simulations are as follows: 52% for call center, 26% for website orders rounded up, and 22% for in-person orders rounded down. This rounding adjustment was necessary because Bizagi does not allow the use of decimal values for percentages, thus forcing us to adapt the original values.

4. AS-IS Process Model

4.1 Order-to-cash (O2C)

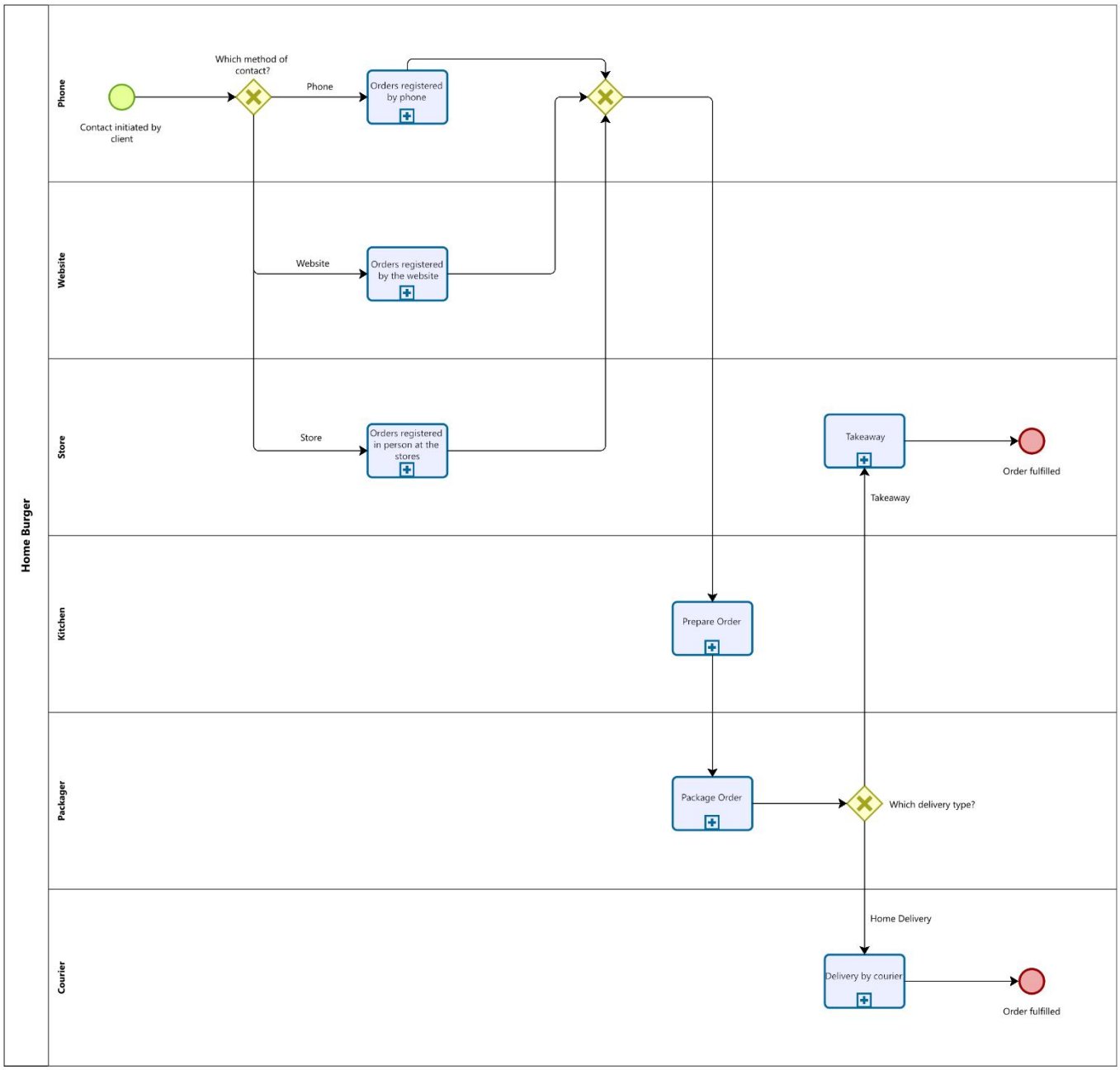
4.1.1 Level 1

This diagram illustrates the Level 1 process flow for Home Burger's order-to-cash (O2C) cycle. It starts with the customer contacting them and placing an order, either by phone, online through their website, or in person at the store. Regardless of the method, the order is then recorded in the system.

The order goes into the kitchen for preparation. After preparation, the order advances to packaging. At this stage, the process again splits at the point when the order is either for home delivery or takeaway.

If the order is for takeaway, the process ends when the customer collects the order, and the system marks the order as delivered. If the order is for home delivery, after packaging, a courier delivers the order, upon which the order is marked as delivered in the system.

This Level 1 diagram shows a high-level overview of the entire O2C process, highlighting the key steps and decision points.


Home Burger
Phone
Website
Store
Kitchen
Packager
Courier
Contact initiated by client
Which method of contact?
Phone
Orders registered by phone
Website
Orders registered by the website
Store
Orders registered in person at the stores
Prepare Order
Takeaway
Order fulfilled
Takeaway
Package Order
Which delivery type?
Home Delivery
Delivery by courier
Order fulfilled

4.1.2 Level 2

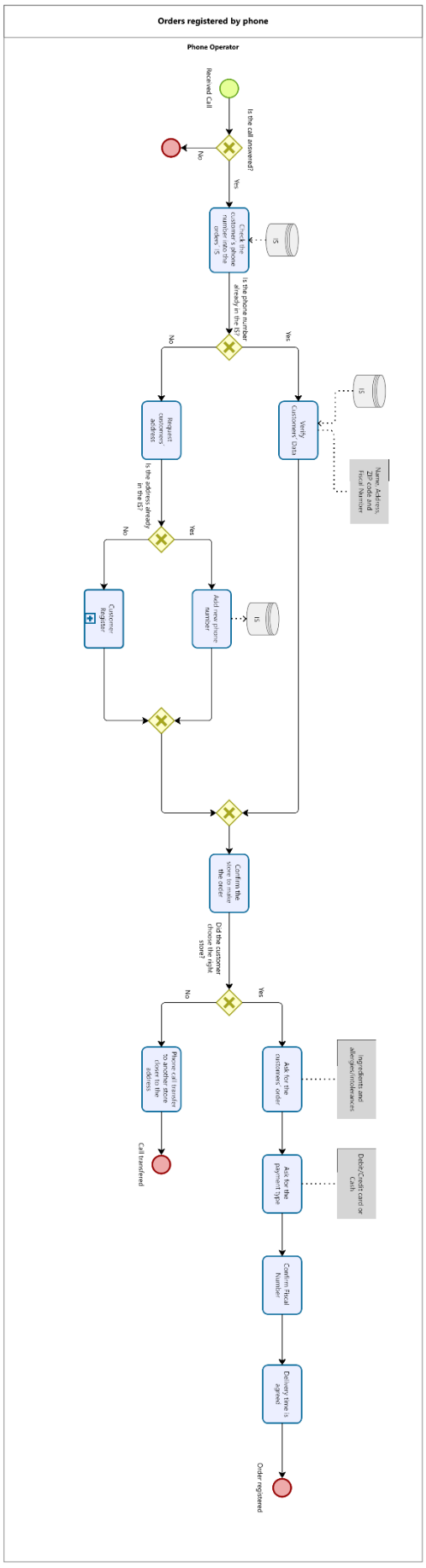
4.1.2.1 Orders registered by phone

The order of a Home Burger starts with an incoming cal which is then checked to see if it's answered. If unanswered, the process ends. If answered, the operator inputs the customer's telephone number into the system, which forwards the signal to check if this is an existent number. If so, it provides the already-registered customer data: name, address, zip code, and fiscal number. If the address is already in the system, the new phone number is simply added to the existing customer record, and the process proceeds to confirm the store selected by the customer. If not, the address entry requires the operator to collect all data concerning the customer: name, address, zip code, and fiscal number before proceeding to confirmation of the store chosen by the customer.

Once all of the customer's information has been completely and accurately obtained, the system confirms the store that the customer selected from the initial menu choices. It then checks to see if that store is the closest to the customer's address. If not, the system transfers the call to the correct store to complete the processing.

Once the store is identified, the order will be taken along with any special requests, dietary needs of the customer, allergies or ingredients, and preferred method of payment, debit/credit card or cash on delivery. Then, the operator confirms twice with the customer their fiscal number before ending with an agreement on the delivery time, allowing for delays in busy periods.

Only after all this information is collected and verified is the order officially registered within the system. The entire process is streamlined to ensure a quick and efficient ordering experience for each customer.


Orders registered by phone
Phone Operator
Received Call
Is the call answered?
No
Yes
Check if the customer's phone number into the orders IS
IS
Is the phone number already in the IS?
No
Yes
Request customers address
Verify Customers Data
IS
Name, Address, Zip code, Fiscal Number
Is the address already in the IS?
No
Yes
Customer Register
Add new phone number
IS
Confirm the store to make the order
Did the customer choose the right store?
No
Yes
Phone call transfer to another store based on the address
Call transfered
Ask for the customers order
Ingredients and allergies/intolerances
Ask for the payment Type
Debit/Credit card or Cash
Confirm Total Number
Delivery times is agreed
Order registered

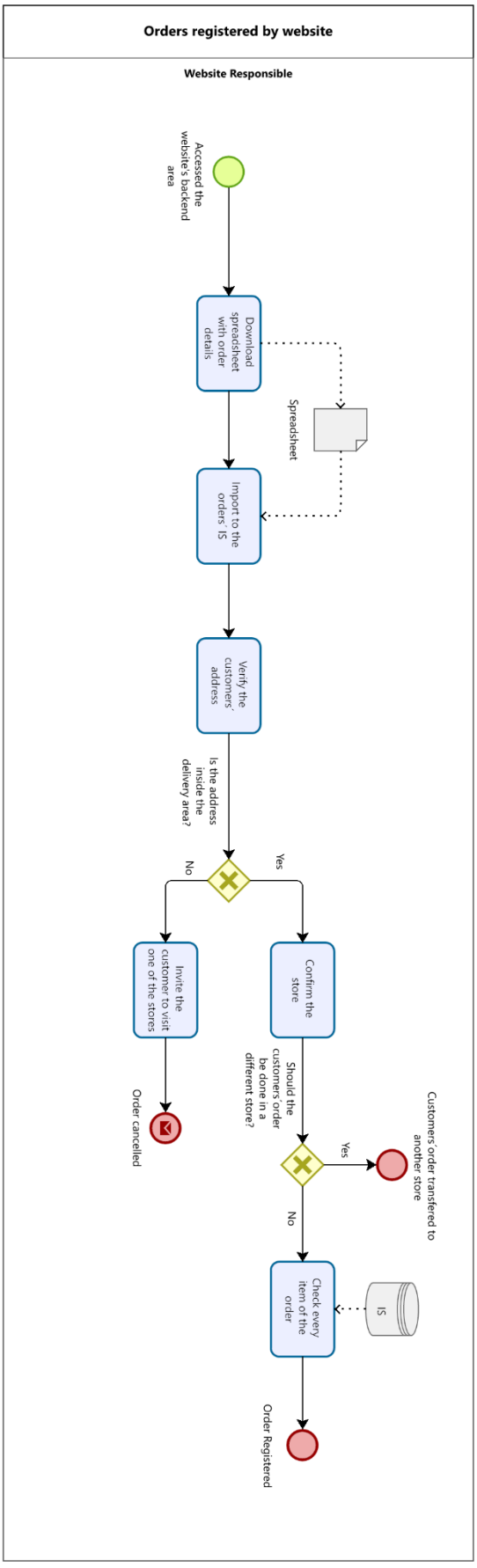
4.1.2.2 Orders registered by website

The Home Burger website order process begins when a website employee accesses the website's backend area and downloads a spreadsheet containing order details. The spreadsheet is then imported into the company's order information system, which is the same system used to process orders phoned directly to the company.

The system checks the customer's address. If within the delivery area, the process moves to the store confirmation step. However, if the address is out of the delivery area, it cancels the order, and invites the customer-if possible-to visit one of the stores.

Additionally, if the order needs to be fulfilled by a different store, the system flags this and the employee proceeds with the order at the appropriate location.

Therefore, once the data is imported, the employee manually verifies each item in each order for accuracy before its actual registration.

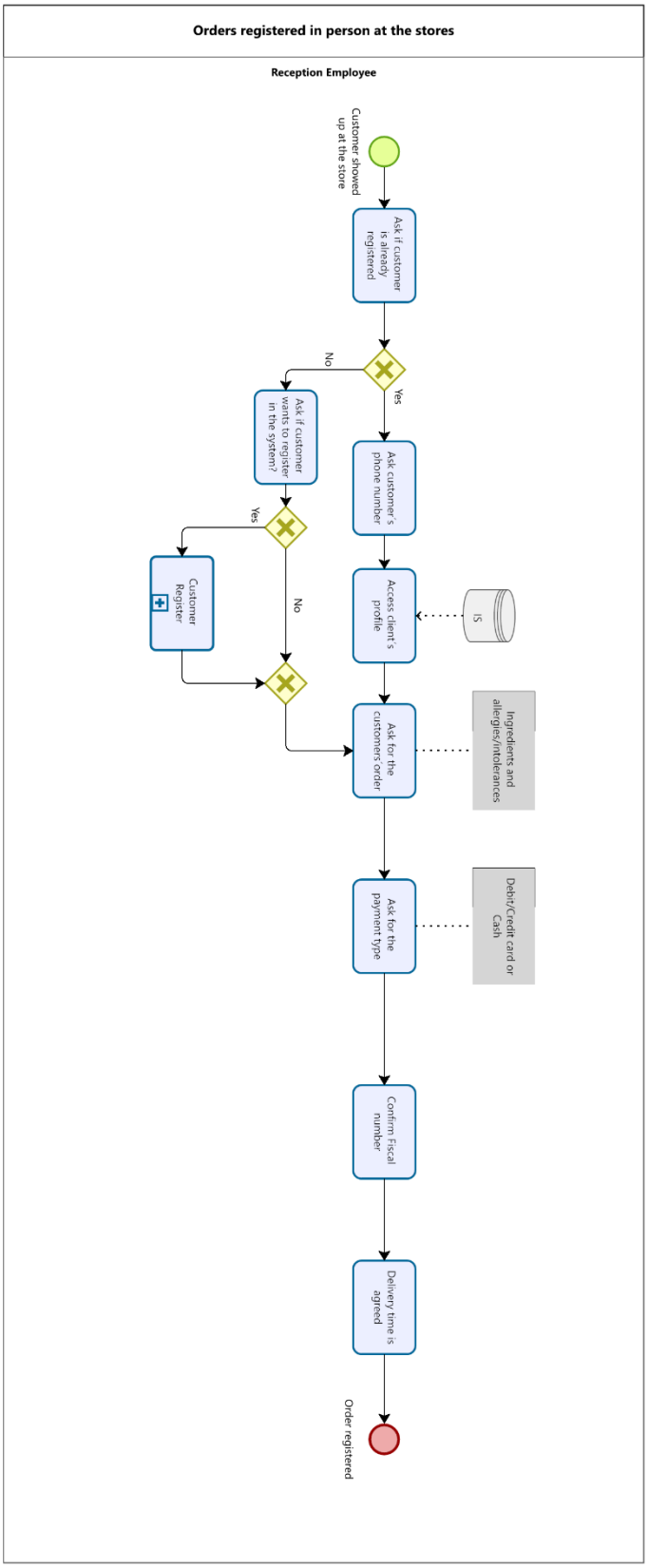

Orders registered by website
Website Responsible
Accessed the website's backend area
Download spreadsheet with order details
Spreadsheet
Import to the orders IS
Verify the customers' address
Is the address inside the delivery area?
No
Yes
Invite the customer to visit one of the stores
Order cancelled
Confirm the store
Should the customers' order be done in a different store?
Yes
Customers' order transfered to another store
No
Check every item of the order
IS
Order Registered

4.1.2.3 Orders registered in person at the stores

The process starts when the customer arrives at the store. The first thing the reception employee does is to find out whether the customer is in the system.

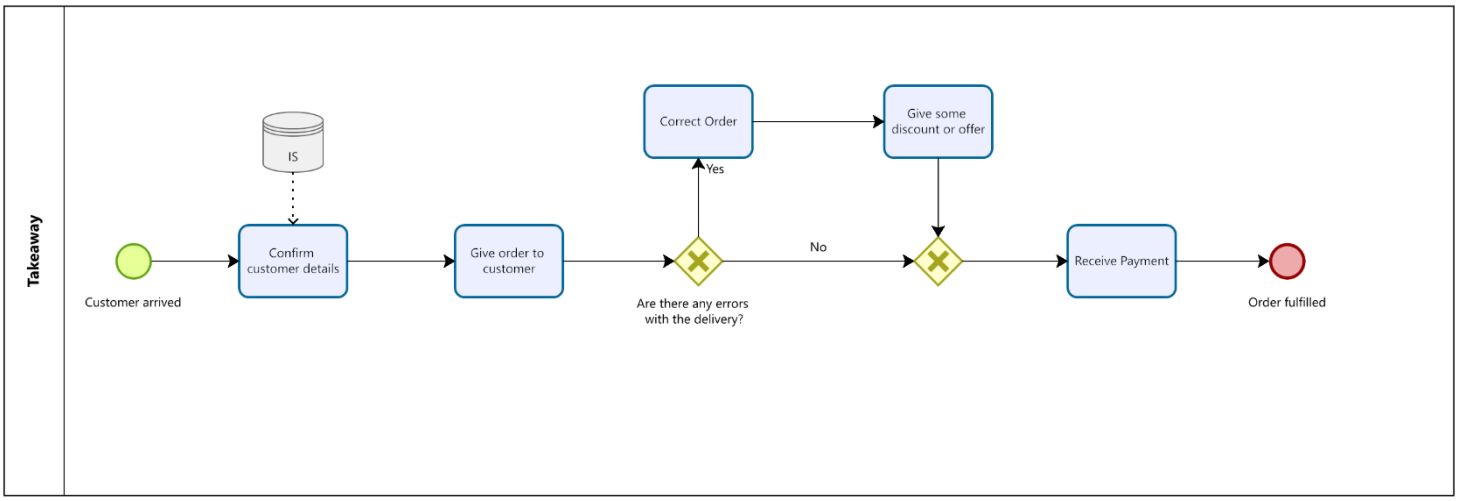
For repeat customers, the system retrieves their profile and automates the ordering process. New customers encounter a registration gate; if they register, their phone number is collected, and a new customer account is created. Otherwise, registration is skipped.

Anyway, the employee proceeds with the order process, asking for the customer's order specifications, such as ingredients and possible allergies or diets. Then, the payment method will be asked: cash, credit card, or debit card. Crucially, confirmation of the fiscal number of the customer is performed for record-keeping accuracy. Once verification of the fiscal number has been done, confirmation of the agreed delivery time is confirmed. At the end of the process, the order is registered in the system, which means the in-person order process has been completed.


Orders registered in person at the stores
Reception Employee
Customer showed up at the store
Ask if customer is already registered
No
Yes
Ask if customer wants to register in the system?
Ask customer's phone number
Yes
No
Customer Register
Access client's profile
IS
Ask for the customers order
Ingredients and allergies/intolerances
Ask for the payment type
Debit/Credit card or Cash
Confirm Fiscal number
Delivery time is agreed
Order registered

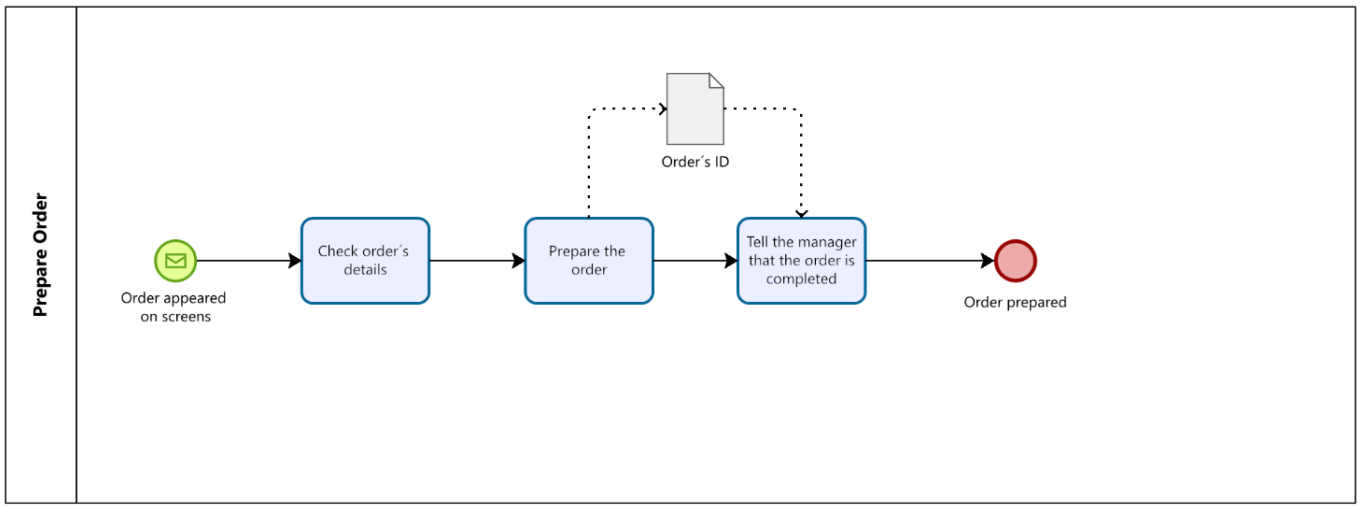
4.1.2.4 Takeaway

It begins when a customer arrives at the store. In this process, the employee reconfirms the customer's details about the order through the restaurant information system (IS). The order is presented to the customer for verification. In case of the correctness of the order, the process would shift to payment. If errors are present, the process will require a customer service intervention that may need discounts or adjustments to satisfy the customer. Once payment is received, the order is marked as fulfilled, ending the process. The diagram shows a major decision point regarding order accuracy.



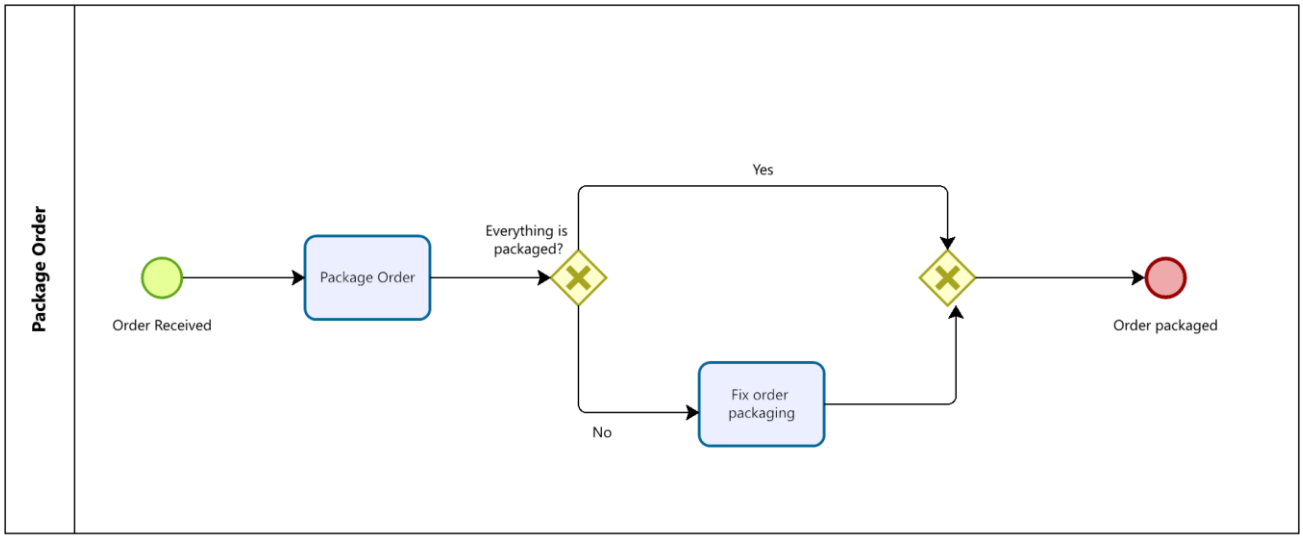
4.1.2.5 Prepare Order

The process starts when an order appears on the kitchen screens, where the kitchen staff just verifies whether the order coming is correct and complete-checking all items, their quantities, and any particular instructions or modifications. Then it is prepared as per those specifications. When the completion is done, the kitchen staff in charge informs the manager on the order ID to show that that order is ready for the further stage of packaging. It then gets marked as "prepared," which completes this stage of the process.



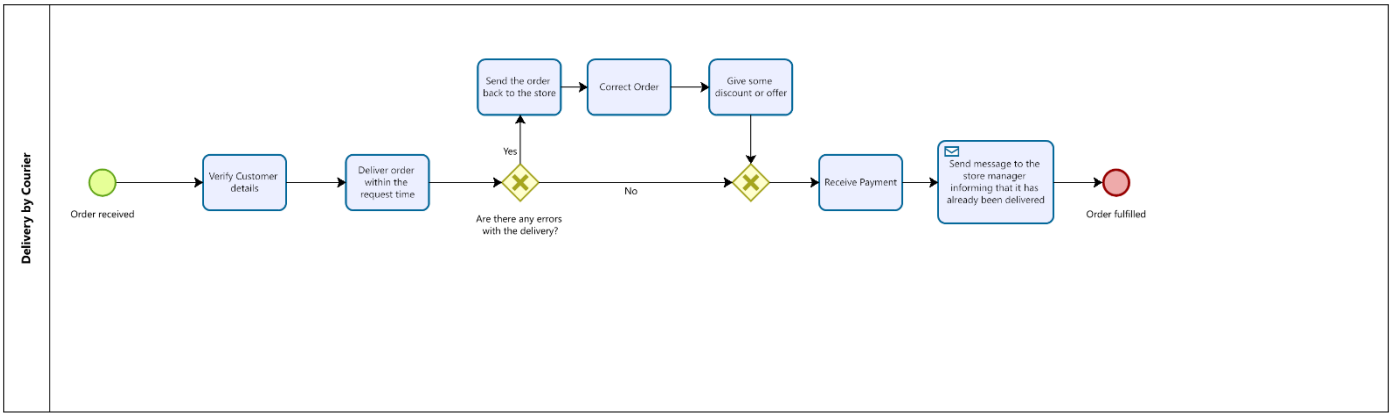
4.1.2.6 Package Order

It starts with receiving an order. Then, the order is packaged. The next activity is a decision point: if everything was correctly packaged, the process moves to the next stage, which is delivery or pickup. If not, then a step is added in to correct the packaging problems before moving on. When the order is completely and correctly packaged, the process is complete, and the order status is set to "Order Packaged."



4.1.2.7 Delivery by courier

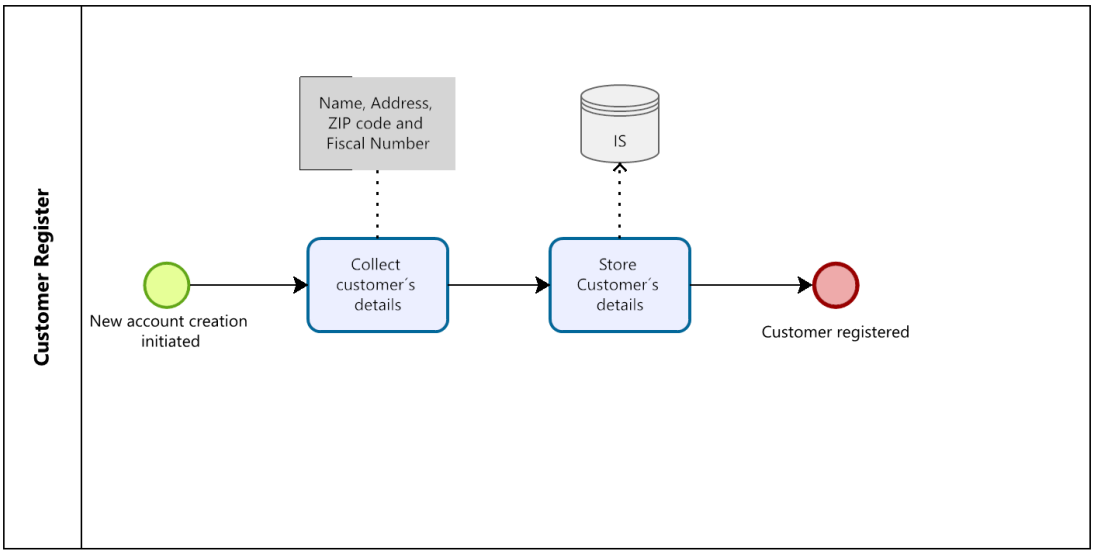
It starts with receiving a delivery order. The courier first confirms the customer's information. The order is delivered according to the customer's requested time. There comes an important decision point: if during the delivery, due to any problem, the courier sends the order back to the store. If it gets delivered successfully, then the courier gets paid. The confirmation of delivery is then sent to the store manager. Finally, the order status in the system is marked as 'delivered'. This diagram illustrates a process susceptible to errors. Returning the wrong delivered orders back to the store through the inclusion of a feedback loop, as well as a confirmation message for the store manager, shows the consideration of error handling and accountability.



4.1.3 Level 3

4.1.3.1 Customer Register

It starts with the need to create a new customer account, usually in cases of phone order or an in-person order when the customer is not registered. The first step is the collection of customer details, such as name, address, ZIP code, and fiscal number. The information collected would be securely stored in the IS of the restaurant. After successful storing, the process is completed, and the customer is considered registered. This simple process plays a great role in maintaining good order management and ensuring data integrity through all channels of ordering.



5. Qualitative Analysis

5.1 Value-Added Analysis

This report section details a Value-Added Analysis (VAA) conducted to identify and optimize processes. VAA is a crucial methodology for streamlining operations by systematically evaluating each step within a process to determine its contribution to customer value. This analysis distinguishes between Value-Adding (VA) steps that directly benefit the customer, Business Value-Adding (BVA) steps necessary for efficient operation, and Non-Value-Adding (NVA) steps that contribute neither customer value nor business efficiency. By identifying and eliminating or improving NVA steps, we aim to enhance efficiency, reduce waste, and ultimately improve customer satisfaction and overall business performance.

5.2 Waste Analysis

Waste analysis identifies and quantifies non-value-adding activities—those consuming resources without benefiting the customer or business—categorized as Move, Hold, and Overdo. Move encompasses wasteful transportation and motion of resources; Hold includes excessive inventory and unnecessary waiting; and Overdo involves defects, overprocessing, and overproduction. By analyzing these, waste analysis pinpoints inefficiencies to enable workflow optimization, resource conservation, and improved customer experience while boosting profitability.

Orders registered by phone

Action	Performer	Classification
Answer Call and Greet Client	Phone Operator	VA
Verify phone number	Phone Operator	BVA
Check if the customer's phone number exists in the system	Phone Operator	BVA
Verify customer's data	Phone Operator	BVA
Request customer's address	Phone Operator	VA
Check if address is in the system	Phone Operator	BVA
Add new phone number	Phone Operator	BVA
Register Customer	Phone Operator	BVA
Confirm the store to handle the order	Phone Operator	BVA
Ask for customer's order	Phone Operator	VA
Ask for payment type	Phone Operator	VA
Confirm fiscal number	Phone Operator	BVA
Agree on delivery time	Phone Operator	VA
Transfer call to another store if incorrect	Phone Operator	NVA

Action	Move	Hold	Overdo
Verify phone number			Overprocessing
Check if the customer's phone number exists in the system	Transportation		
Verify customer's data		Waiting	Overprocessing
Request customer's address		Waiting	
Check if address is in the system	Transportation		
Add new phone number		Inventory	
Confirm the store to handle the order			Overprocessing
Ask for customer's order		Waiting	
Ask for payment type		Waiting	
Confirm fiscal number		Waiting	
Transfer call to another store if incorrect	Transformation		

Orders registered in person at the store

Action	Performer	Classification
Greet Client	Reception Employee	VA
Ask if client is already registered	Reception Employee	BVA
Ask for client's phone number	Reception Employee	BVA
Access client's profile	Reception Employee	BVA
Ask if client wants to register	Reception Employee	BVA
Register new customer	Reception Employee	BVA
Ask for customer's order	Reception Employee	VA
Ask for payment type	Reception Employee	VA
Confirm fiscal number	Reception Employee	BVA
Agree on delivery time	Reception Employee	VA

Action	Move	Hold	Overdo
Ask if client is already registered		Waiting	
Ask for client's phone number		Waiting	
Access client's profile	Transportation		
Ask if client wants to register			Overprocessing
Register new customer		Inventory	
Ask for customer's order		Waiting	
Ask for payment type		Waiting	
Confirm fiscal number		Waiting	

Orders registered by website

Action	Performer	Classification
Download spreadsheet with order details	Store Employee	BVA
Import to the orders' IS	Store Employee	BVA
Verify the customers' address	Store Employee	BVA
Check if address is inside the delivery area?	Store Employee	BVA
Confirm the store	Store Employee	VA
Invite the customer to visit one of the stores	Store Employee	NVA
Check every item of the order	Store Employee	VA

Action	Move	Hold	Overdo
Download spreadsheet with order details	Transporting		
Import to the orders' IS	Transporting		
Verify the customers' address		Waiting	
Check if address is inside the delivery area?		Waiting	
Confirm the store		Waiting	
Invite the customer to visit one of the stores			Defects
Check every item of the order			Overprocessing

Takeaway

Action	Performer	Classification
Confirm customer details	Store Employee	BVA
Give order to customer	Store Employee	BVA
Check if there are any issues with the delivery/order	Store Employee	VA
Correct Order	Store Employee	NVA
Give Discount or Offer	Store Employee	VA
Receive payment	Store Employee	BVA

Action	Move	Hold	Overdo
Confirm customer details		Waiting	
Give order to customer	Transformation	Waiting	
Check if there are any issues with the delivery/order			Overprocessing
Correct Order	Transportation		Defects
Give Discount or Offer			Defects
Receive payment		Waiting	

Prepare Order

Action	Performer	Classification
Check order details	Kitchen Staff	BVA
Prepare the order	Kitchen Staff	VA
Check if everything is packaged correctly	Kitchen Staff	VA
Check if there are any issues with the delivery/order	Kitchen Staff	VA
Correct Order	Kitchen Staff	NVA
Notify the manager that the order is complete	Kitchen Staff	NVA
Order marked as prepared	Kitchen Staff	BVA

Action	Move	Hold	Overdo
Check order details		Waiting	Overprocessing
Prepare the order		Waiting	
Check if everything is packaged correctly			Overprocessing
Check if there are any issues with the delivery/order			Overprocessing
Correct Order			Defects
Notify the manager that the order is complete	Transportation		
Order marked as prepared		Waiting	

Package Order

Action	Performer	Classification
Package the order	Kitchen/Packaging Staff	VA
Check if everything is packaged correctly	Kitchen/Packaging Staff	VA
Fix packaging issues	Kitchen/Packaging Staff	NVA
Mark the order as packaged	Kitchen/Packaging Staff	BVA

Action	Move	Hold	Overdo
Package the order		Waiting	
Check if everything is packaged correctly			Overprocessing
Fix packaging issues			Defects
Mark the order as packaged		Waiting	

Delivery by courier

Action	Performer	Classification
Verify customer details	Courier	BVA
Deliver order within requested time	Courier	VA
Check if there are any errors with the delivery	Courier	VA
Correct the order (if errors exist)	Courier	NVA
Offer discount or other compensation (if errors exist)	Courier/Store Manager	VA
Receive payment	Courier	BVA
Notify the store manager that delivery is complete	Courier	NVA

Action	Move	Hold	Overdo
Verify customer details		Waiting	Overprocessing
Deliver order within requested time		Waiting	
Check if there are any errors with the delivery			Overprocessing
Correct the order (if errors exist)		Waiting	Defects
Offer discount or other compensation (if errors exist)			Defects
Receive payment		Waiting	
Notify the store manager that delivery is complete	Transportation		

5.3 Issue Register

Issue	Priority	Description	Data & Assumptions	Qualitative Impact
Customer selects the wrong store (Phone Orders)	4	Customers choose a store farther from their location.	15% of calls require transfer to the correct store.	Loss of time, missed calls, decreased customer satisfaction.
Calls unanswered during peak times	5	Insufficient operators and no overflow system to handle call volume.	30% of calls go unanswered during peak hours.	Missed orders, reduced revenue, poor customer experience.
Errors in packaging (Delivery Orders)	5	Items are packed incorrectly, leading to complaints.	10% of orders have packaging issues.	Customer dissatisfaction, potential revenue loss.
Manual handling of spreadsheets (Website Orders)	1	Staff download and upload spreadsheets manually.	100% of orders require manual data entry into systems.	Inefficiencies, delayed order processing.
Repeated order corrections	3	Errors are discovered late in the process.	5% of orders require correction after packaging.	Delays in delivery, dissatisfaction.

5.4 Why-Why Diagram

1. Customer selects the wrong store (Phone Orders)
Why?

Customers choose a store farther from their location.
Why?

They are unaware of the correct store for their location.
Why?

Lack of a clear system to guide customers to the appropriate store.
Why?

No automated call-routing system to assign stores based on customer location.

2. Calls unanswered during peak times
Why?

Insufficient operators and no overflow system to handle call volume.
Why?

There is no real-time adjustment for staffing based on peak demands.
Why?

Lack of workforce management or dynamic staffing tools.
Why?

Limited investment in call center infrastructure.

3. Errors in packaging (Delivery Orders)
Why?

Items are packed incorrectly, leading to complaints.
Why?

Lack of standardized packaging procedures.
Why?

No consistent training or packaging guidelines for staff.
Why?

No regular quality control process to identify and rectify mistakes early.

3. Errors in packaging (Delivery Orders)
Why?

Items are packed incorrectly, leading to complaints. Why? Lack of standardized packaging procedures.
Why?

No consistent training or packaging guidelines for staff.
Why?

No regular quality control process to identify and rectify mistakes early.

5. Repeated order corrections
Why?

Errors are discovered late in the process.
Why?

Orders are not validated thoroughly at the time of entry.
Why?

No verification system or real-time error detection during the ordering process.

6. Quantitative Analysis

6.1 Resource´s costs

Role	Salary (full time)	Cost per day	Cost per hour
Phone operatores	1425 €	47.50€/day	5.94€/hour
Kitchen Staff	1875 €	62.50€/day	7.81€/hour
Couriers	1350 €	45.00€/day	5.63€/hour
Reception	1500 €	50.00€/day	6.25€/hour
Website Staff	1500 €	50.00€/day	10€/hour
Packagers	1500 €	50.00€/day	6.25€/hour

$$\text{Cost per day} = \frac{\text{Salary}}{30\,\text{days}} \qquad \text{Cost per hour} = \frac{\text{Cost per day}}{\text{Working hours}}$$

The table describes daily and hourly personnel costs for different positions at Home Burger, calculated by simple division of the full-time annual salary by 30 days and further by the number of daily working hours, correspondingly. The lowest position in terms of cost is the phone operator: his daily cost is €47.50, which reflects their low annual salaries (€1425).

Mid-level costs are represented by the kitchen staff (€62.50/day) and the reception/packagers (€50.00/day). Interestingly, website staff also falls in this mid-range, considering the highest hourly cost of all, €10/hour, which means a short daily working schedule compared to others.

Couriers have similar daily costs as reception staff, €45.00, but with a lower hourly cost of €5.63/hour, which is likely to indicate a longer working schedule per day. These cost breakdowns are meaningful for budgeting, resource allocation decisions, and overall efficiency and effectiveness of every role in a restaurant setting. The more significant divergence in the hourly wage rate reveals variations in hours worked per week and possibly some differences in skill or level of responsibility.

6.2 Queuing Analysis

The Home Burger project uses queuing theory in an attempt to study the effectiveness of its order fulfillment process, with a focus on the Lisbon Center store. It requires the modeling of customer order arrivals at a given rate, and the processing of such orders by the store's resources (staff and equipment) at a given service rate.

Queuing theory will allow for the modeling of resulting waiting times, resource utilization, and potential bottlenecks under various operational conditions. Following general case definitions as stated within the project description, further analysis conducted in this part will be based on that without exploring alternative scenarios at this moment.

To carry out a complex and correct analysis it is necessary to understand the λ (lambda, or the mean arrival rate) that represents the number of customer calls arriving, on average, per some unit of time. In the context of Home Burger, for example, λ would be calculated for each order type (by phone, by web, in person) and also by store. A higher value of λ reflects higher service demand.

$$\lambda = \frac{\text{Total Orders per Day}}{\text{Total Time per Day}}$$

6.2.1 Orders registered by phone

Operating time	8 hours = 480 minutes = 28800 seconds
Process duration	6 minutes (by one phone call)
Average Orders per day	5250 / 30 = 175 orders/day
Average Orders per day by phone	(5,250 / 30) * 52% = 91 orders/day
Average Calls received per day	Average Orders per day * 100%) / 70% = = (91*100) / 70 = 130 calls/day
Mean Arrival Rate (Per hour)	91 / 8 ≈ 11.375 calls/hour
Mean Arrival Rate (Per Minute)	91 / 480 ≈ 0.19 calls/minute
Mean Arrival Rate (Per Second)	91 / 28800 ≈ 0.00316 calls/second
Mean Inter-Arrival Time = 1 / λ =	1 / 0.19 ≈ 5.26 minutes/call

The Lisbon Center of Home Burger works for eight hours every day. If the average duration of each phone call is six minutes, and considering that 70% of all the phone orders are answered, we estimate about 130 answered calls daily.

It receives on average 5,250 orders daily, 52% of which are by phone, amounting to 91 orders. That gives an average arrival rate of 11.375 calls/hour, 0.19 calls/minute, or 0.00316 calls/second. The average time between answered calls is 5.26 minute.The metrics allow for providing an overview of call center activities in quantitative terms that may be used to effect operational improvements and resource allocations.

Number of servers (c)	3 operators
p = occupation rate per time	λ / μ = 11.375 / 30 = 0.379
L = average number of instances	p / 1-p = 0.379 / 1-0.379 = 0.61
Lq = average number in queue	p^2 / 1-p = 0.379^2 / 1-0.379 = 0.231
W = average time spent in system	L / λ= 0.61 / 11.375 ≈ 0.0536 hours = = 3.216 minutes
Wq = average time in queue	Lq / λ = 0.231 / 11.375 ≈ 0.0203 hours = = 1.218 minutes

Three operators are used to handle calls, showing a system utilization rate of 0.379. To put it differently, the operators are busy approximately 37.9% of the time. This thus means that exists a relatively low level of utilization, suggesting that the system is not operating near its maximum capacity. On average, there are 0.61 orders in the system at any point in time (being served and waiting).

Only 0.231 orders would be on the queue, on average. This results in an average customer waiting time of 1.218 minutes and a total time in the system (waiting plus processing) of 3.216 minutes.

These performance metrics indicate a very efficient current system with low wait times, but the utilization rate shows that the system could accommodate a significant rise in calls before substantial waits would set in.

6.2.2 Orders registered by website

Operating time	5 hours = 300 minutes = 18000 seconds
Process Duration	6 minutes (by one client)
Average Orders per day	5250 / 30 = 175 orders/day
Average Orders per day in website	(5,250 / 30) * 25.5% ≈ 45 orders/day
Mean Arrival Rate (Per hour)	45 / 5 ≈ 9 orders/hour
Mean Arrival Rate (Per Minute)	45 / 300 ≈ 0.15 orders/minute
Mean Arrival Rate (Per Second)	45 / 18000 ≈ 0.0025 orders/second
Mean Inter-Arrival Time = 1 / λ =	1 / 0.15 ≈ 6.67 minutes/order

Website order processing for Home Burger operates for five hours daily with an average order processing time of six minutes. Of the 5,250 orders processed daily in this restaurant, 25.5% (or 45) orders arrive through its website.

This translates into an average arrival rate of 9 orders per hour, 0.15 orders per minute, or 0.0025 orders per second. The mean inter-arrival time, or average time between website orders is 6.67 minutes.

The relatively small arrival rate and long time between arrivals imply that there is a pretty good possibility that the existing website order processing system is capable of handling the existing order arrivals without significant delay.

Number of servers (c)	1 employee
p = occupation rate per time	λ / μ = 9 / 30 = 0.3
L = average number of instances	p / 1-p = 0.3 / 1-0.3 = 0.429
Lq = average number in queue	p^2 / 1-p = 0.3^2 / 1-0.3 = 0.129
W = average time spent in system	L / λ= 0.429 / 9 ≈ 0.0477 hours = = 2.862 minutes
Wq = average time in queue	Lq / λ = 0.129 / 9 ≈ 0.0143 hours = = 0.858 minutes = 51.48 seconds

This table applies queuing theory to a system with one employee handling website orders. The system utilization rate (p) is only 0.3, which means the employee is busy only 30% of the time. This low utilization suggests underutilization of resources.

On average, only 0.429 orders are in the system at any given time being processed or waiting, with a mere 0.129 orders waiting in the queue. Average time in the system is very small, amounting to just 2.862 minutes.

The average waiting time at this counter is only 0.858 minutes. These quantities strongly indicate that the staff needed for website order processing can be significantly overstaffed with respect to the orders actually coming in.

6.2.3 Orders registered in person at the stores

Operating time	8 hours = 480 minutes = 28800 seconds
Process Duration	6 minutes (by one client)
Average Orders per day	5250 / 30 = 175 orders/day
Average Orders per day in person	(5,250 / 30) * 22.5% ≈ 39 orders/day
Mean Arrival Rate (Per hour)	39 / 8 ≈ 4.88 orders/hour
Mean Arrival Rate (Per Minute)	39 / 480 ≈ 0.081 orders/minute
Mean Arrival Rate (Per Second)	39 / 28800 ≈ 0.0014 orders/second
Mean Inter-Arrival Time = 1 / λ =	1 / 0.081 ≈ 12.3 minutes/order

The table analyzes the arrival rate for in-person orders at Home Burger's Lisbon Center for its eight-hour workday. It takes an average of six minutes to process one in-person order. Of the 5,250 orders received daily, 22.5%, or 39 orders, are placed in person. This results in a mean arrival rate of 4.88 orders per hour, 0.081 orders per minute, or 0.0014 orders per second.

The average time between in-person orders, or mean inter-arrival time, is 12.3 minutes. Given the low arrival rate and the relatively long inter-arrival time, the current system would probably be adequately capacitated to handle the volume of in-person orders without significant customer wait times.

Number of servers (c)	1 employee
p = occupation rate per time	λ / μ = 4.88 / 30 = 0.163
L = average number of instances	p / 1-p = 0.163 / 1-0.163 = 0.195
Lq = average number in queue	p^2 / 1-p = 0.163^2 / 1-0.163 = 0.0317
W = average time spent in system	L / λ= 0.195 / 4.88 ≈ 0.04 hours = = 2.4 minutes
Wq = average time in queue	Lq / λ = 0.0317 / 4.88 ≈ 0.0065 hours = = 0.39 minutes

This analysis applies queering theory to the in-person ordering process at Home Burger, modeling a single employee to handle all orders. The resultant system utilization is an extremely low 16.3%, indicating the employee is busy only 16.3% of the time. This would indicate a severe overstaffing problem.

At any given moment, the average number of orders in the system-which includes orders being processed or waiting in a queue-is only 0.195. Even more remarkable is the average queue length, at only 0.0317 orders, resulting in minimal customer wait times.

For instance, the average time a customer spends in the system is a scant 2.4 minutes, with an average queue wait time of just 0.39 minutes. These figures clearly indicate that the present staffing for in-person orders is too high.

6.3 AS-IS Simulation

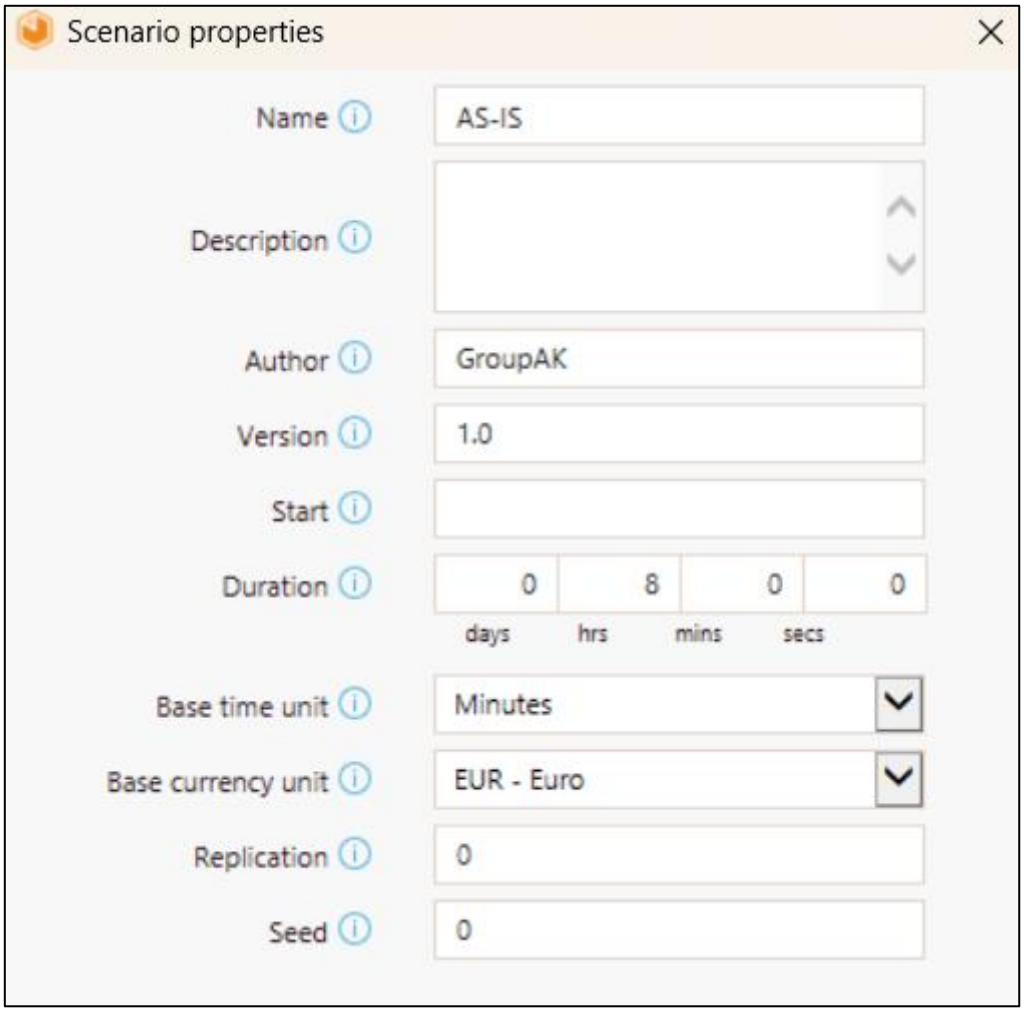
The AS-IS simulation is applied to improve performance. This becomes a tool for process improvement where the details of a process may be understood, starting from what stage it is at, including a detailed analysis of resources being spent and the time factor as well. It shows through clear visual how this particular process works and highlights spots that could be improved for optimized performance.

We use the General Process to conduct the simulation, with the appropriate adjustments given that the order only begins when contact is initiated by the client.

6.3.1 Parameters

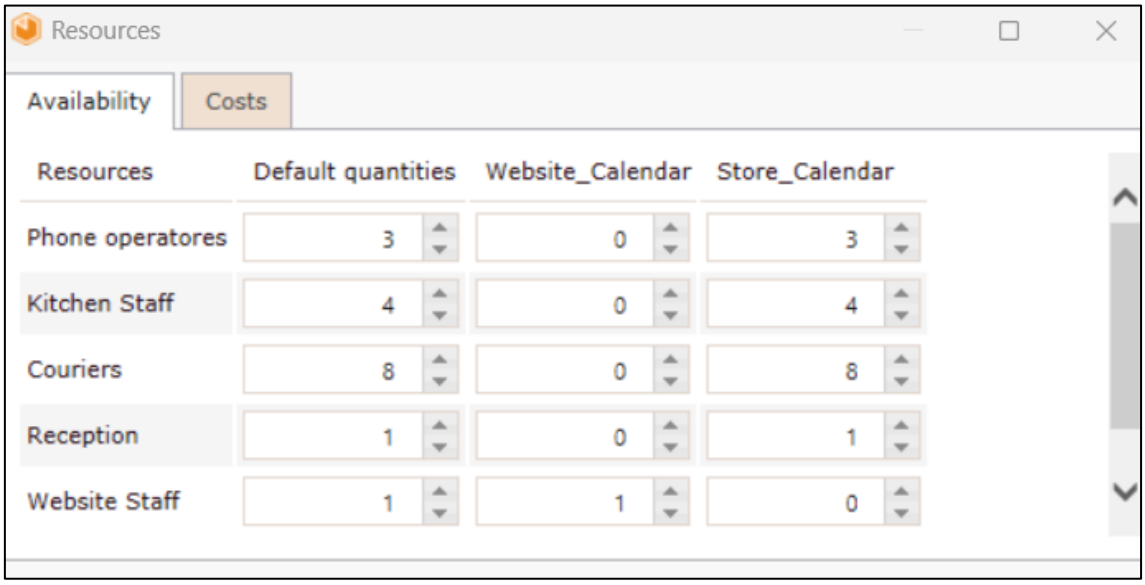
Properties

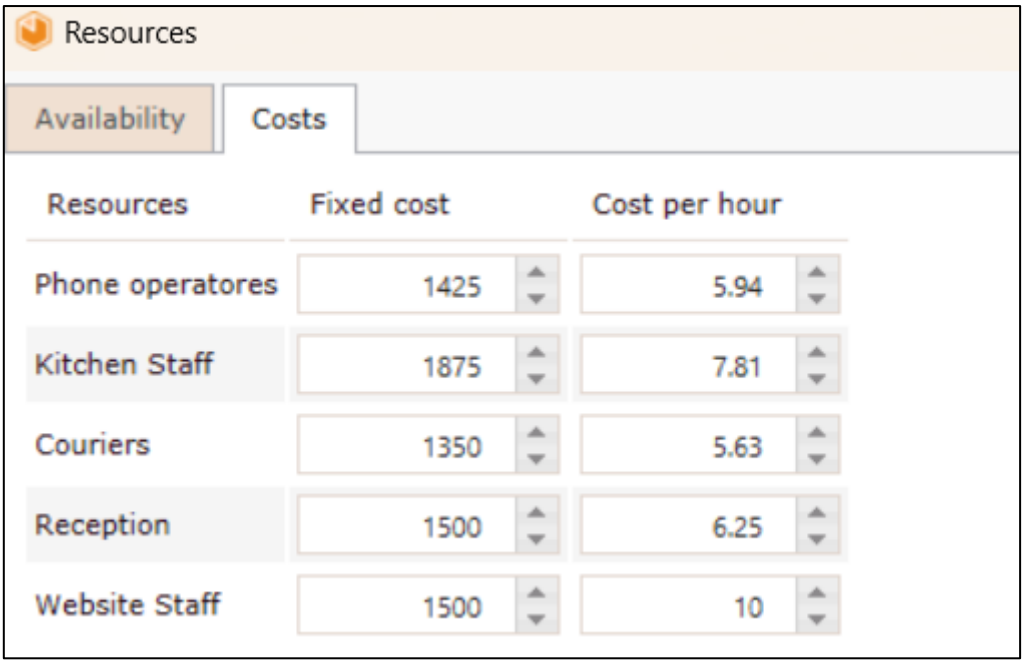
In the scenario properties, we assign the duration time as 8 hours, because Home Burger works from 12am to 3pm and from 7pm to 12pm every day. The base unit of currency is euro and the base time unit is in minutes.



Resourcers

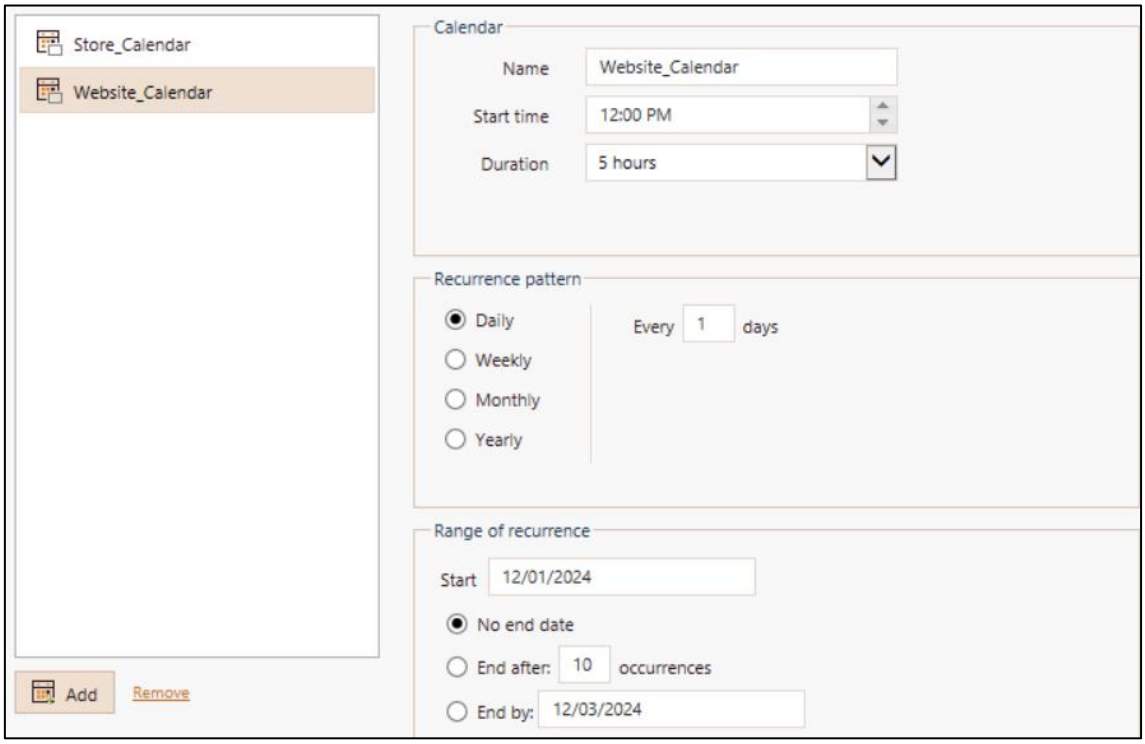
The following sections show the Resource Analysis configuration, divided, in turn, into "Availability" and "Costs." In the "Availability" section, the resources are allocated to two different calendars: "Website_Calendar" and "Store_Calendar." In the "Costs" section, for each employee type (such as Phone Operators, Kitchen Staff, Couriers, Reception, Website Staff, and Packagers), fixed salaries are specified in euros and hourly costs in euros per hour. This represents that the resources have been allocated to the different calendars, which again refers to the operational hours for the website versus store staff.

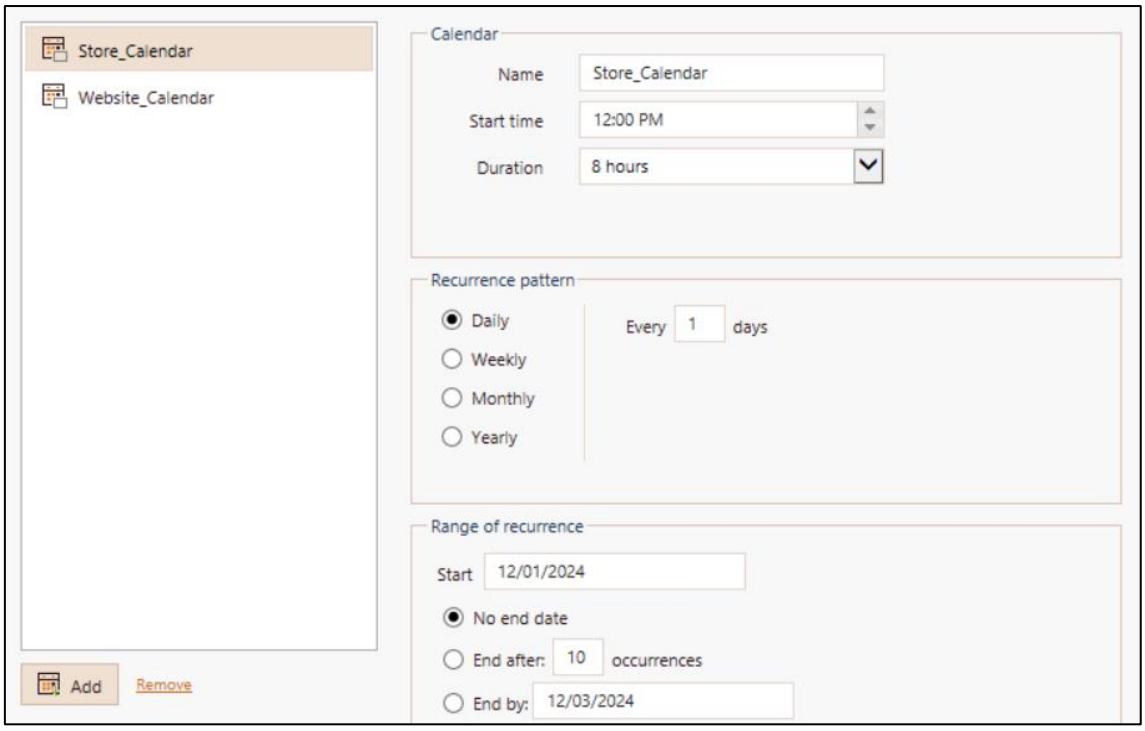




Calendars

Website_Calendar" defines a five-hour workday, reflecting the fact that this website staff works only in a limited time frame; the day will be from 12:00 PM to 5:00 PM. "Store_Calendar" sets an eight-hour workday, representing the normal operating hours of the Home Burger store, from 12:00 PM to 8:00 PM. It will be of importance to use two different calendars because the Bizagi simulation will be able to represent the difference in working hours between website staff and store staff, which is quite necessary in having a real and detailed analysis of resource utilization and fulfillment time of orders..



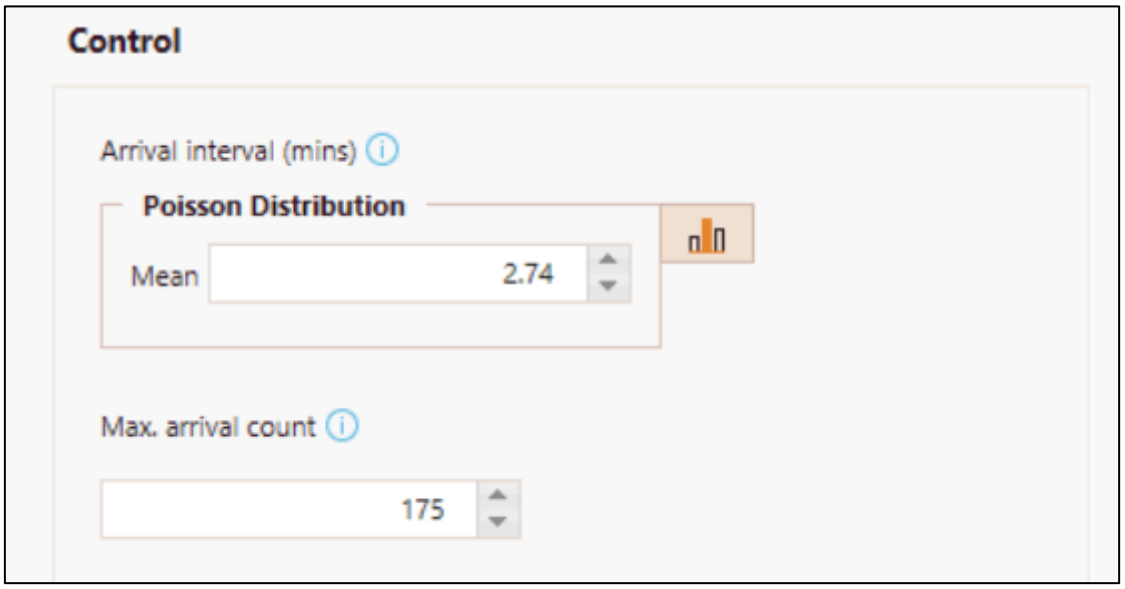


Distribution

Bizagi's "Parameter Type Selector" provides different options for the distribution of simulation parameters. For the Level 1 Order-to-Cash process of Home Burger, a Poisson distribution models the random arrival of customer contacts. Other activities in the process are based on a Truncated Normal distribution, reflecting processing times with minimum and maximum values. Distribution selection is a critical step for generating realistic simulation results that will represent the real-world process.

Contact initiated by client

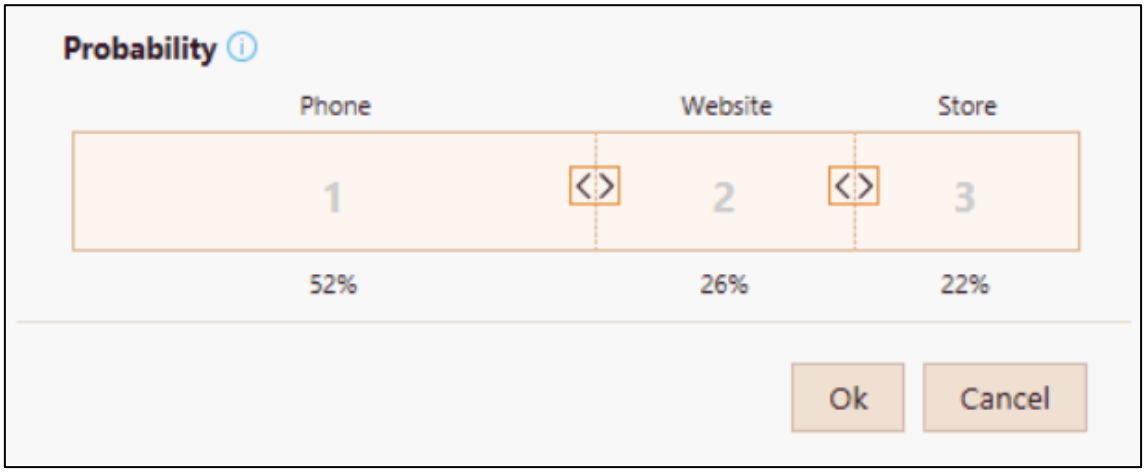
The figure shows the control parameters for the initiating of customer contact. The mean time between contacts is 2.74 minutes, which is calculated as 8 hours of work divided by the maximum of 175 daily contacts.

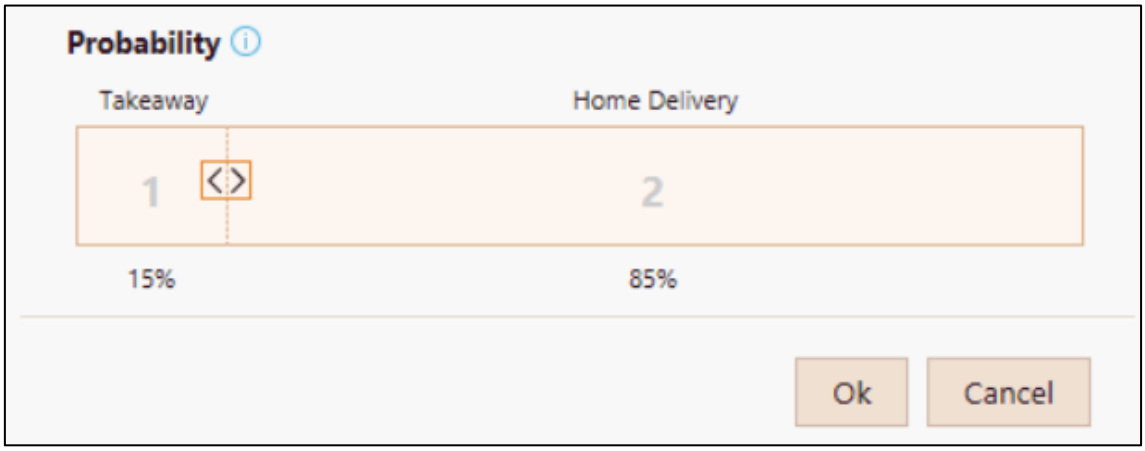


Gateways

The top image configures the gateway that determines the order channel. The probabilities are the share of orders received through each channel: 52% by phone, 26% by website (25.5%), 22% in store at the counter (22.5%).

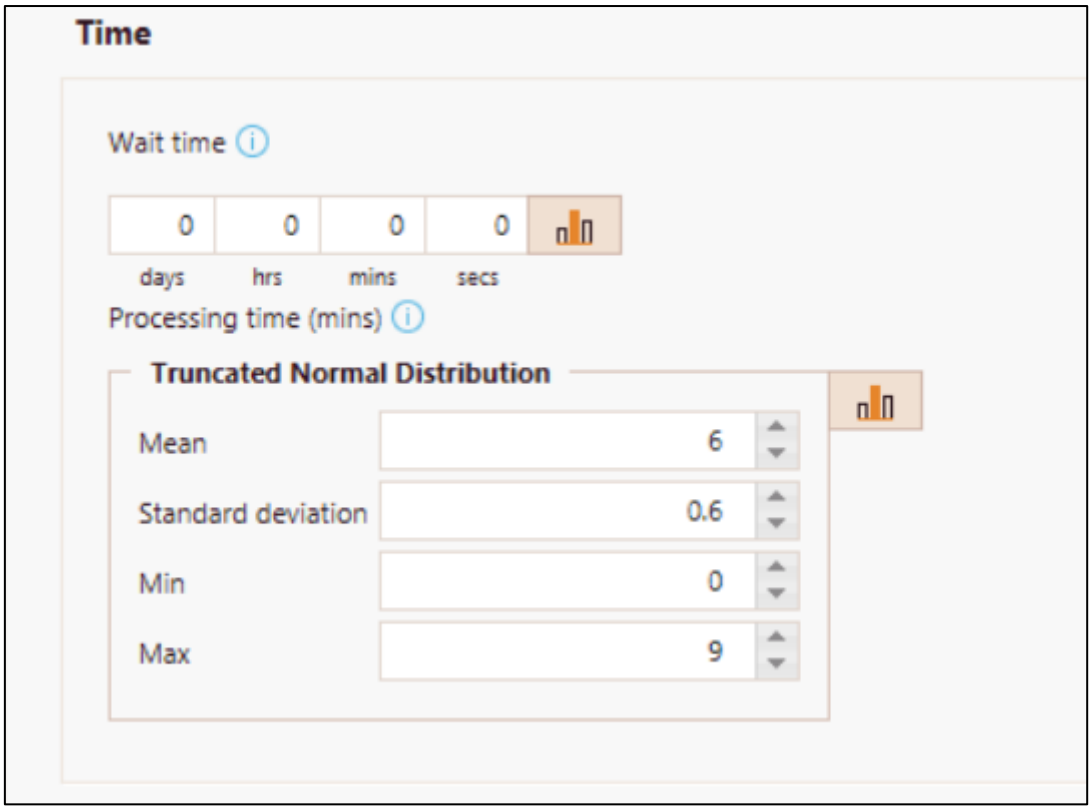
The bottom image configures the gateway that determines the delivery type. It indicates that 15% of orders are takeaway, while 85% is home delivery. These probabilities will help in correctly reflecting the amount of order received for each type in model.

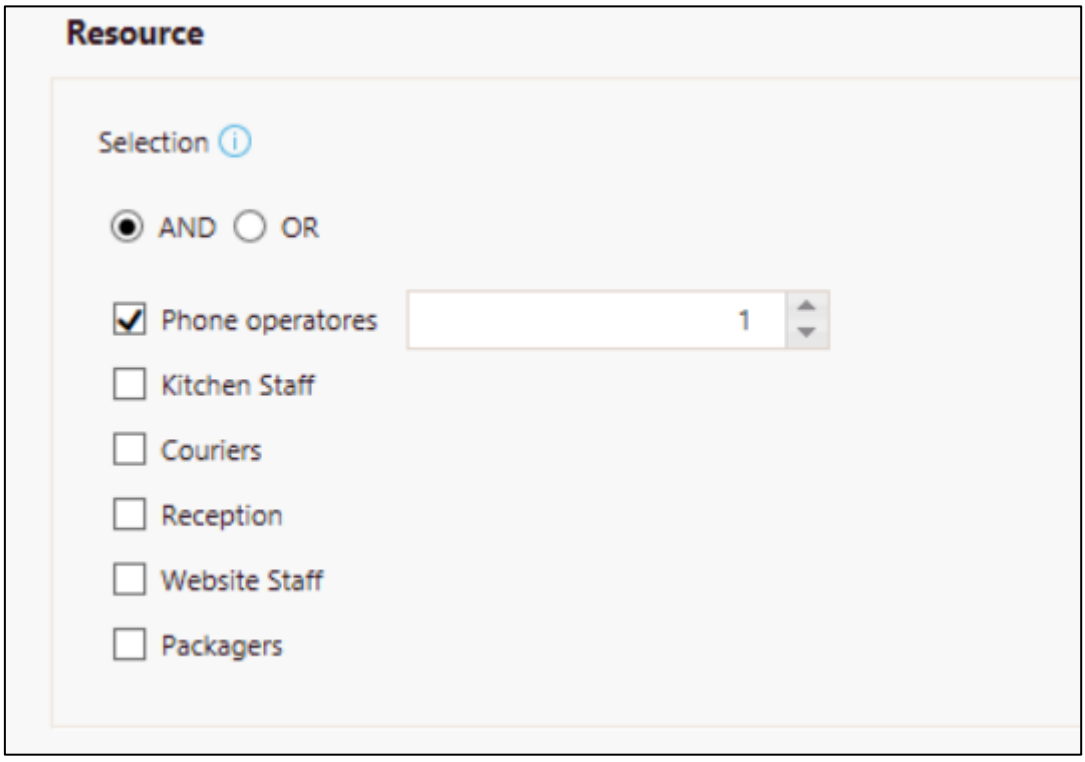




Orders registered by phone (Subprocess)

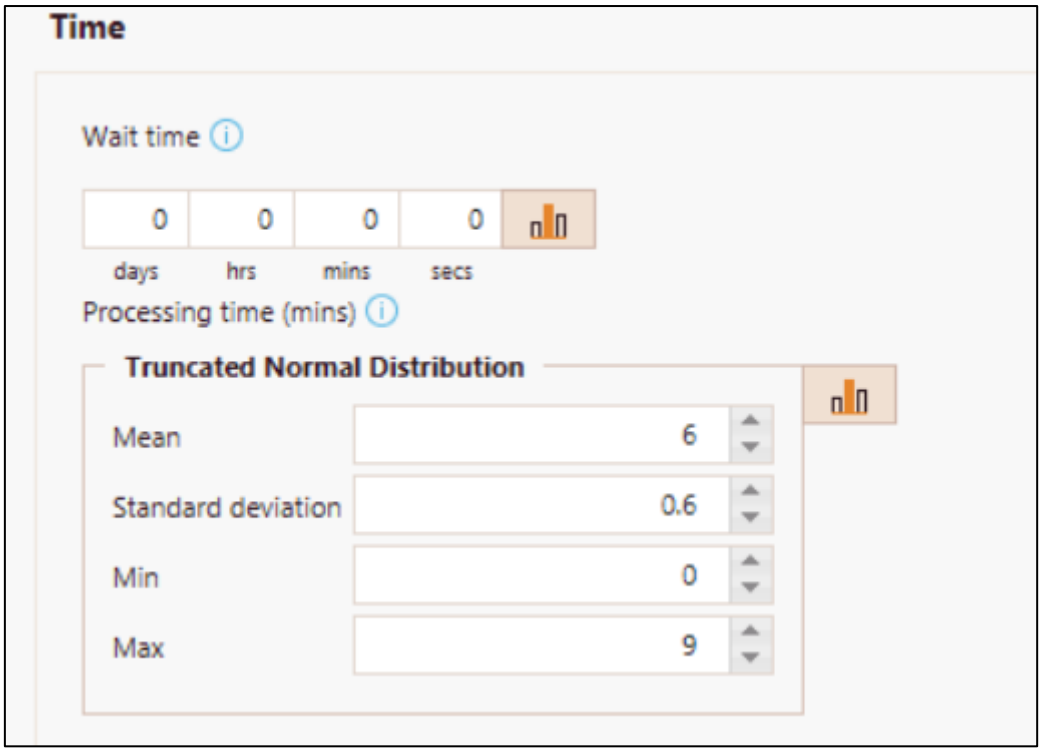
This Bizagi configuration screens sets parameters for the "Orders registered by phone" subprocess. The average processing time is set at 6 minutes, with an estimated variation of 0.6 minutes (10% of the average). The processing time is constrained between a minimum of 0 minutes and a maximum of 9 minutes. One phone operator is assigned to handle these orders.

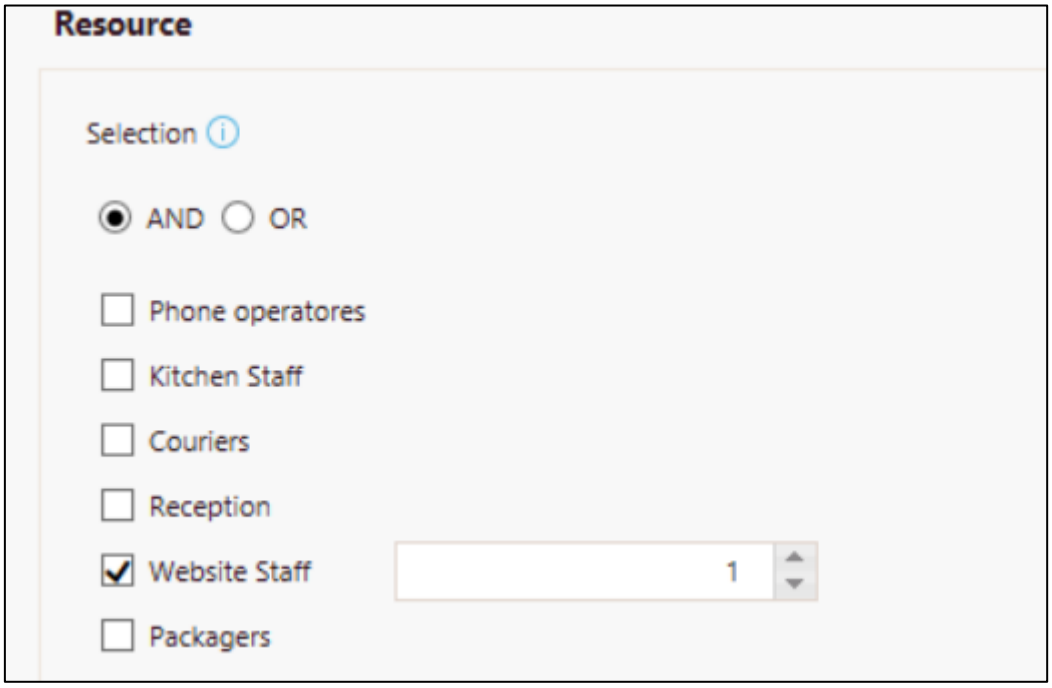




Orders registered by website

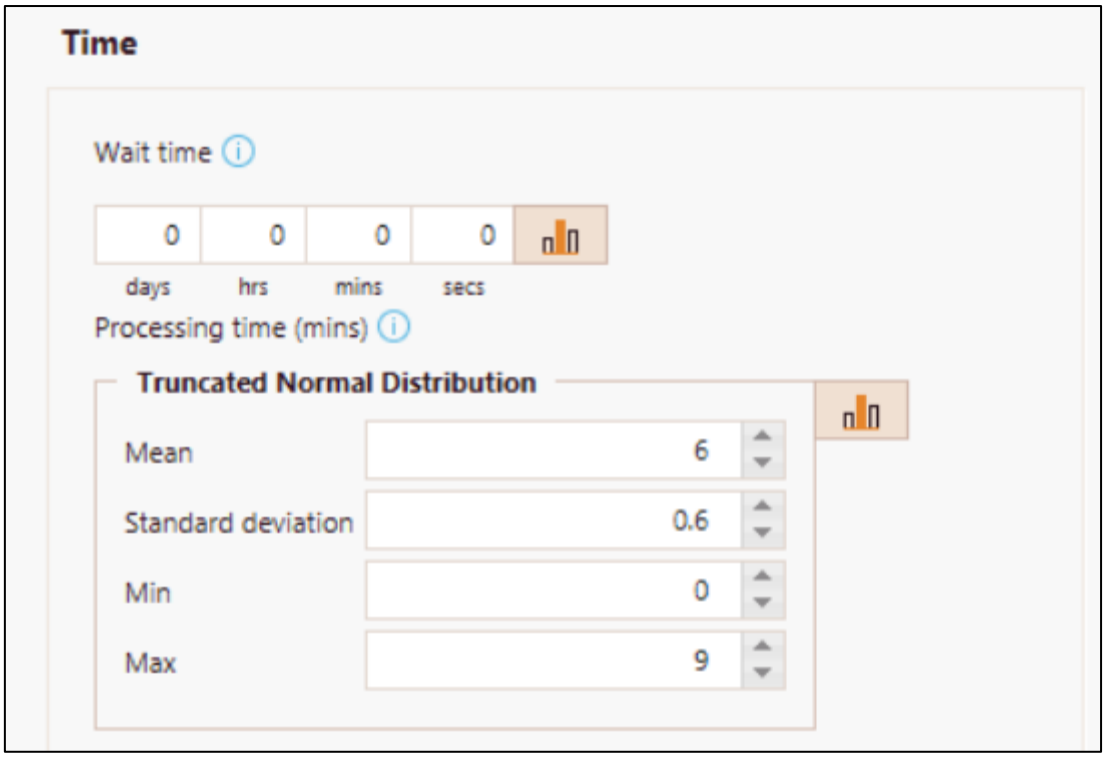
This Bizagi configuration screens sets parameters for the "Orders registered by website" subprocess. The average processing time is set at 6 minutes, with an estimated variation of 0.6 minutes (10% of the average). The processing time is constrained between a minimum of 0 minutes and a maximum of 9 minutes. One Website staff is assigned to handle these orders.

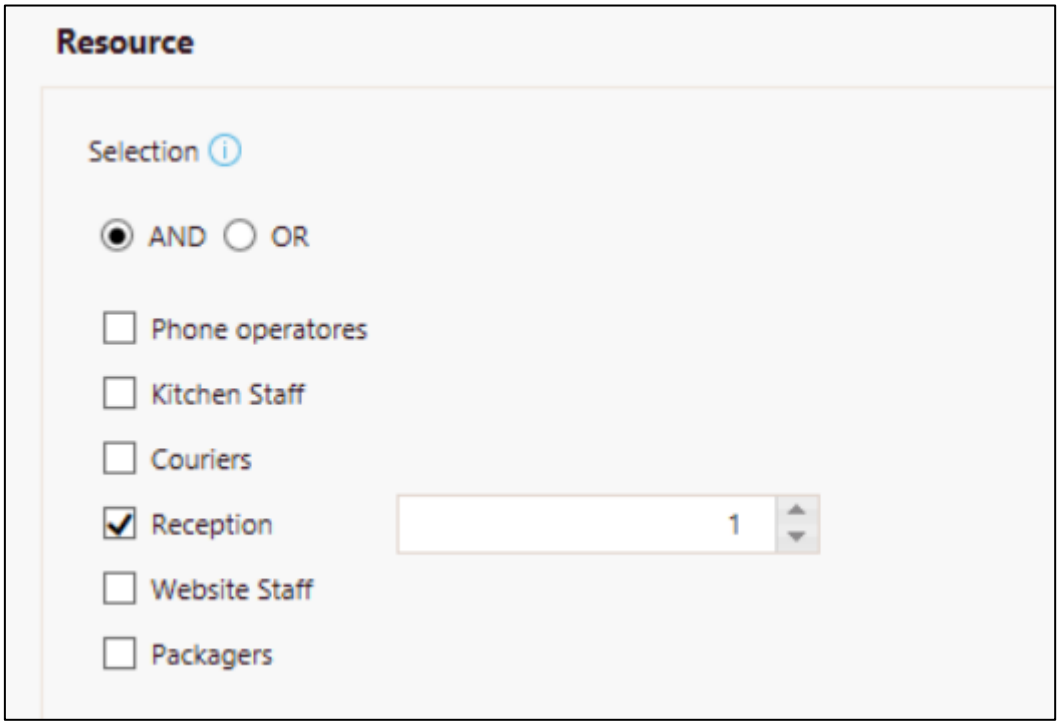




Orders registered in person at the store

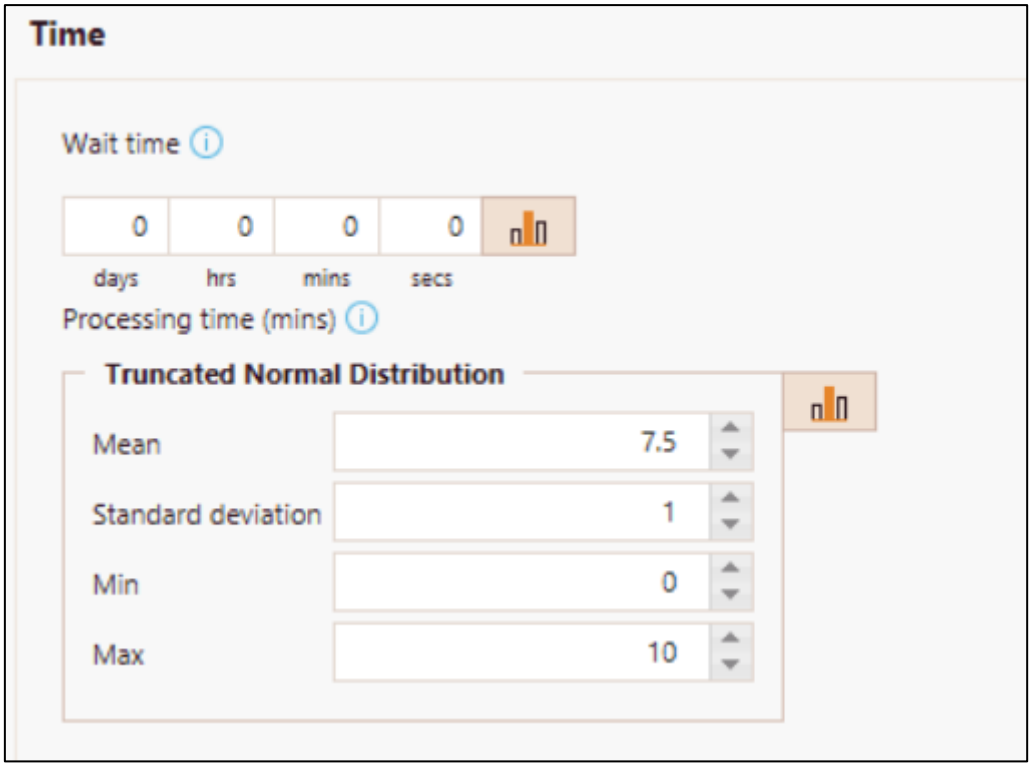
This Bizagi configuration screens sets parameters for the "Orders registered in persona t the store" subprocess. The average processing time is set at 6 minutes, with an estimated variation of 0.6 minutes (10% of the average). The processing time is constrained between a minimum of 0 minutes and a maximum of 9 minutes. One Reception employee is assigned to handle these orders.

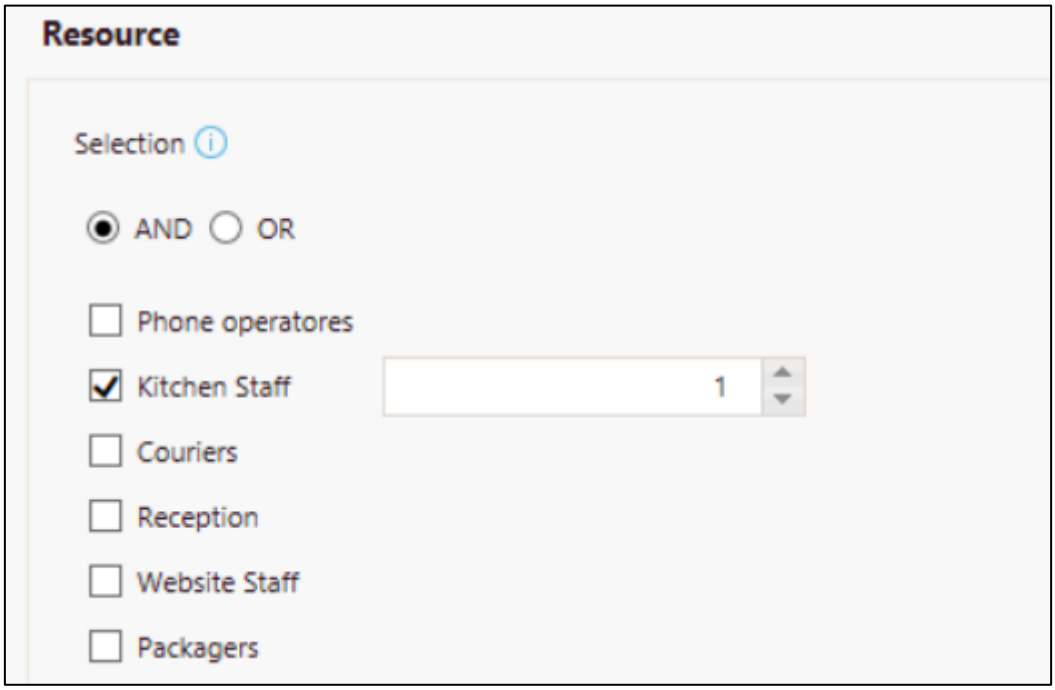




Prepare Order

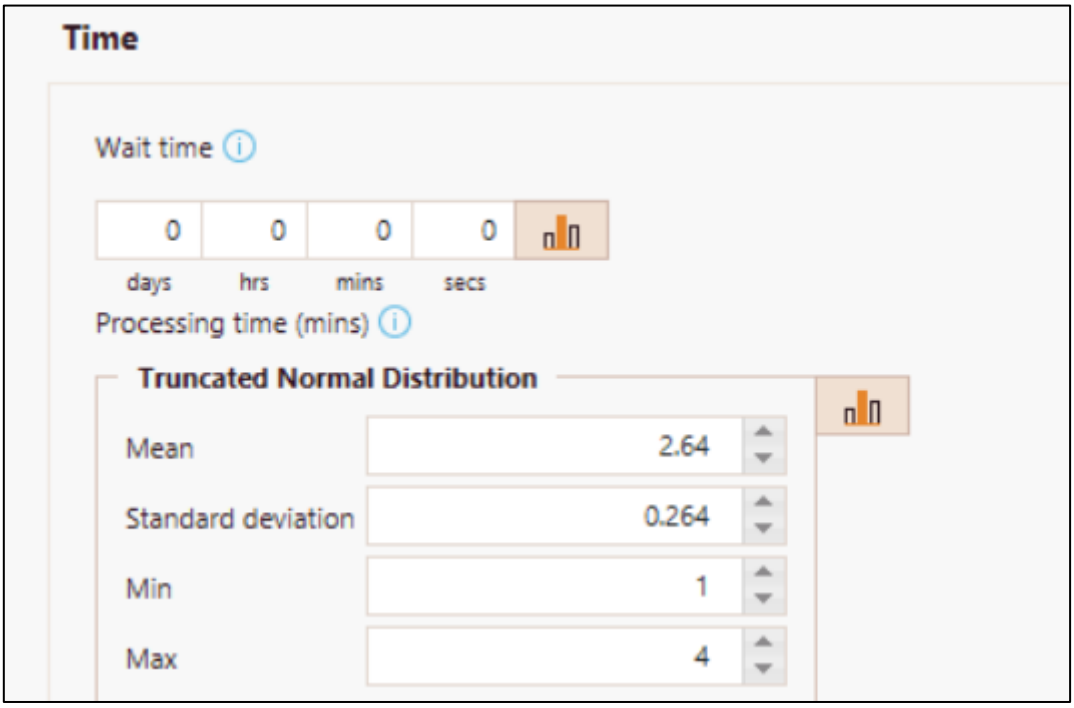
This Bizagi configuration screens sets parameters for the "Prepare Order" subprocess. The average processing time ("Mean") is set at 7.5 minutes, with an estimated variation ("Standard Deviation") of 1 minute (this is based on project description). The processing time is constrained between a minimum of 0 minutes and a maximum of 10 minutes. One kitchen staff member is assigned to handle this task.

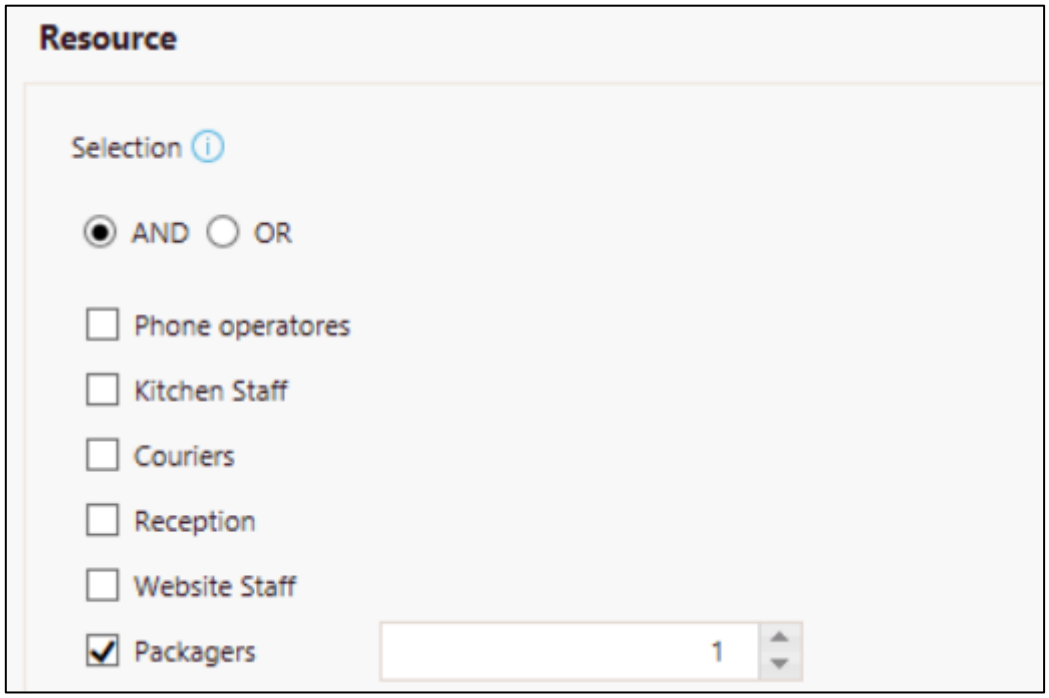




Package Order

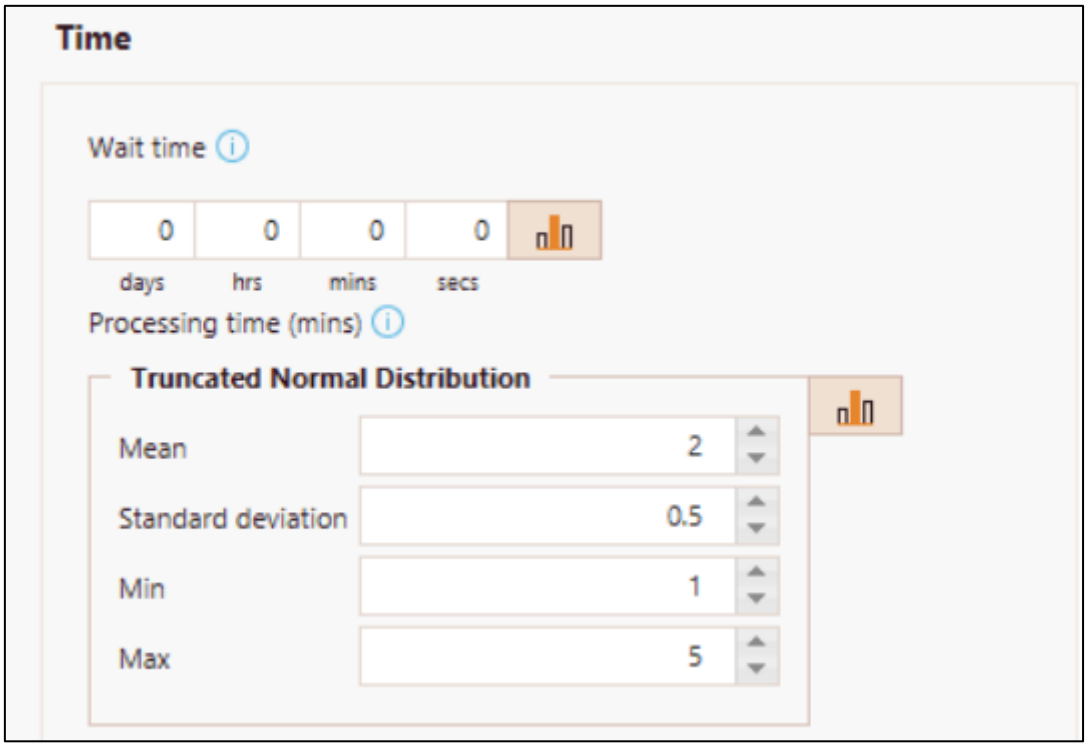
This is a Bizagi configuration screens with the parameters that were adopted for the "Package Order" subprocess. The "Mean" of processing time is 2.64 minutes with a Standard deviation of 0.264 minutes. Minimum and maximum are 1 and 4 minutes, respectively. A resource of one "Packagers" has been assigned to this task. The "Mean" and "Standard Deviation" values refined iteratively from simulation results targeted an average arrival time of about 55 minutes as specified in the project description. This was an iterative process in order to make sure that this simulation reflects real-world order packaging times and also contributes to the overall simulation goal.

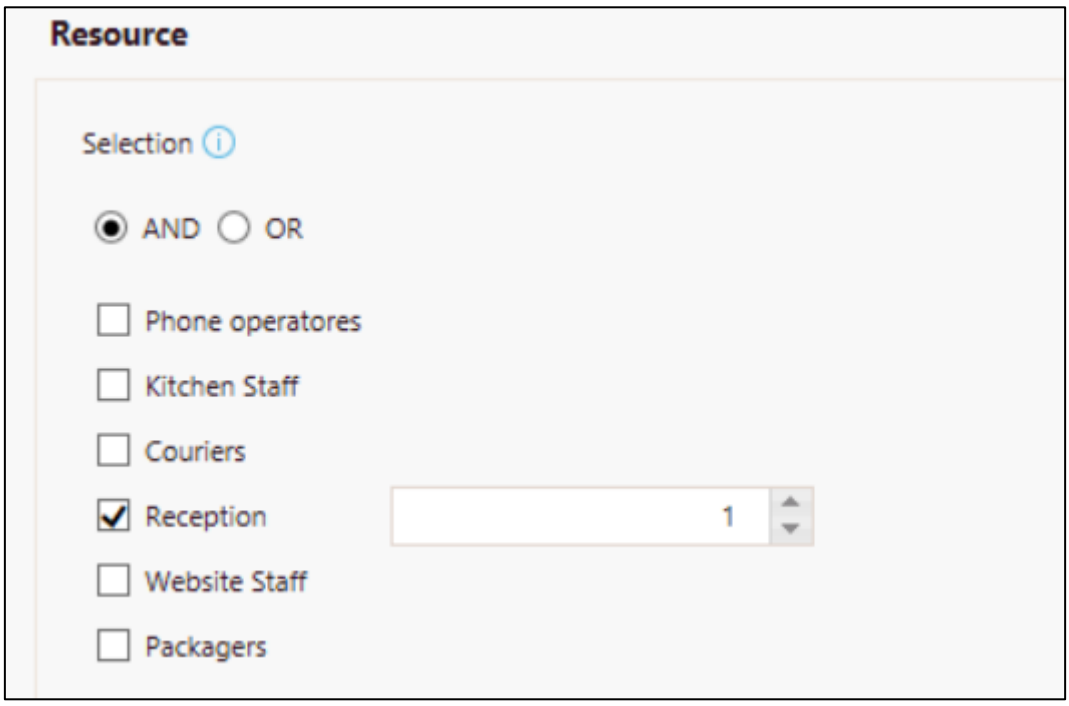




Takeaway

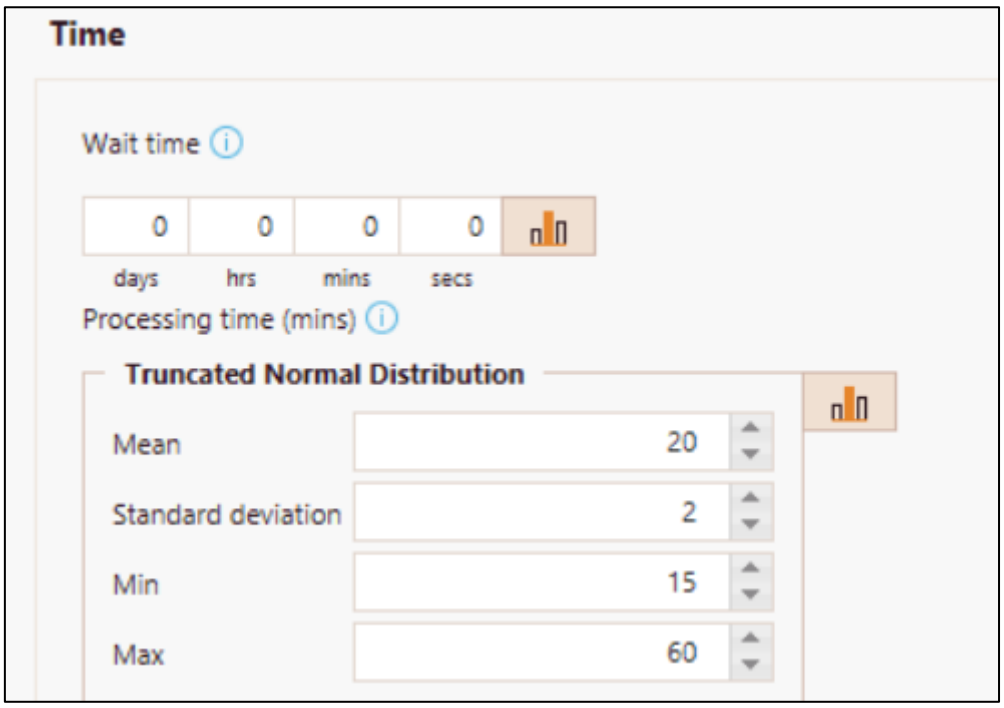
These values have been iteratively refined from simulation results to represent the takeaway process realistically in the context of an average arrival time target of about 55 minutes. There is one reception employee available to take care of takeaway orders. These values have been iteratively refined from simulation results to represent the takeaway process realistically. There is one reception employee available to take care of takeaway orders.

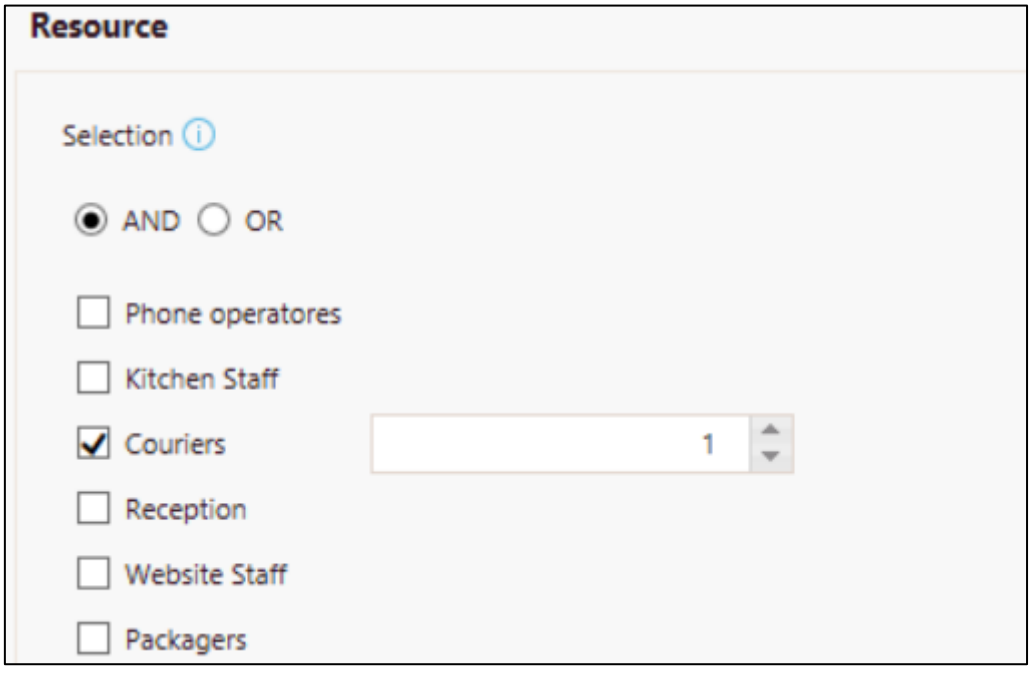




Delivery by courier

This screen from Bizagi shows the configuration to create the "Delivery by Courier" subprocess. The delivery "Mean" is set to 20 minutes with a "Standard Deviation" of 2, accounting for estimated variation in delivery time. The minimum amount is set to 15 and the maximum amount is 60 minutes. The resource shown means one courier is put into service for deliveries. The "Mean" and "Standard Deviation" values were changed iteratively based on the results of simulations, aiming at an average arrival time target in order for the simulation to reflect real life in delivery times and, by extension, contribute to the overall objective.





Activity Cost

The "Activity cost" field is set to 0. This setting was made for all subprocesses in the model to avoid possible distortions in the results of the simulation, focusing the analysis on the main objective of reaching a target average arrival time and the best results in time and cost.

6.3.2 Results

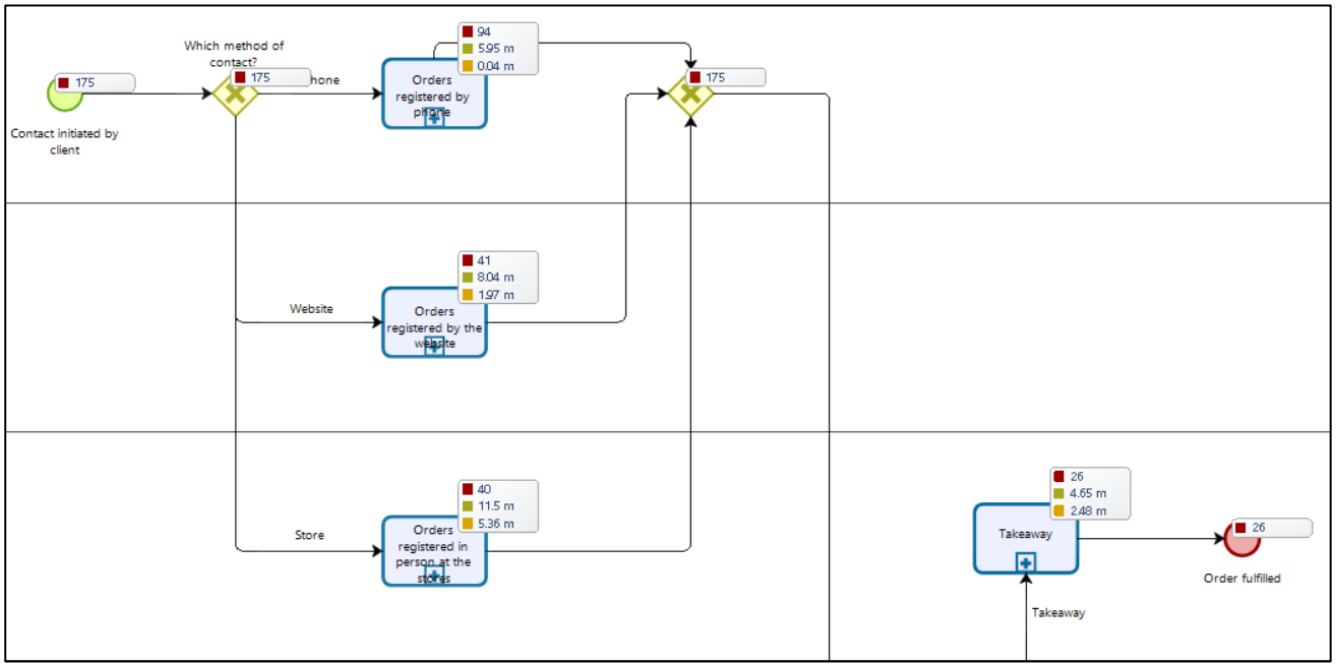
The total fixed cost estimate seems reasonable for a company of the size of Home Burger, but the unit cost seems a bit high. The very high utilization of packagers at 96.67% and couriers at 76.71% indicates large bottlenecks in these areas and requires a detailed investigation with possible process optimization strategies.

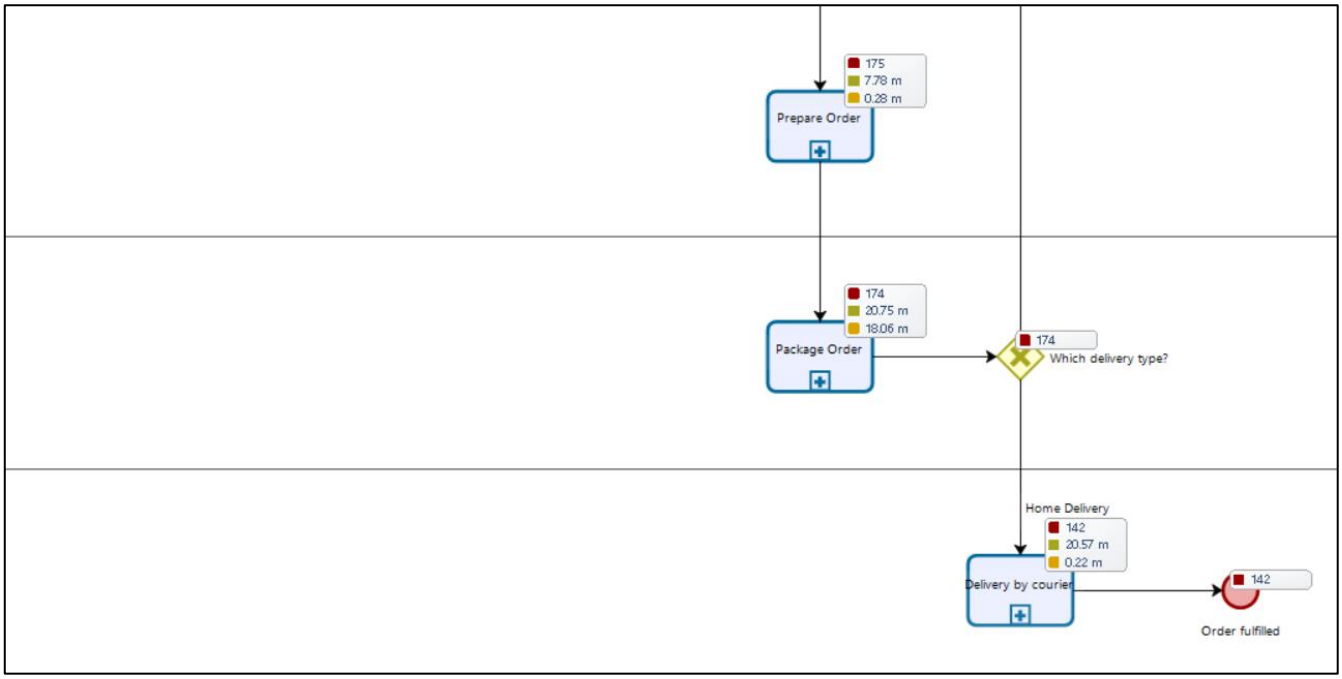
Resource	Scenario	Utilization	Total fixed cost	Total unit cost
Phone operatores	AS-IS	38.59%	133,950	55.01
Kitchen Staff	AS-IS	68.41%	328,125	170.96
Couriers	AS-IS	76.71%	198,450	276.42
Reception	AS-IS	62.64%	100,500	31.32
Website Staff	AS-IS	51.86%	61,500	41.49
Packagers	AS-IS	96.67%	262,500	48.33

The simulation processed 175 instances, resulting in an average processing time of 54 minutes and 59 seconds (≈55 minutes). Task durations varied significantly. For example, "Orders registered by phone" averaged 5 minutes 56 seconds, "Prepare Order" averaged 7 minutes 46 seconds, and "Delivery by courier" averaged 20 minutes 33 seconds.

While most tasks experienced minimal resource waiting time, the total resource waiting time across all tasks amounted to 2 days, 13 hours, and 11 minutes. The extended total simulation runtime suggests potential areas for process optimization to better reflect the typical operational flow of Home Burger on a normal workday.

Name	Scenario	Type	Instances completed	Instances started	Min. time	Max. time	Avg. time
Home Burger	AS-IS	Process	168	175	24m 49s	1h 22m 3s	54m 59s
Contact initiated by client	AS-IS	Start event	175				
Which method of contact?	AS-IS	Gateway	175	175			
ExclusiveGateway	AS-IS	Gateway	175	175			
Which delivery type?	AS-IS	Gateway	174	174			
Order fulfilled	AS-IS	End event	142				
Order fulfilled	AS-IS	End event	26				
Orders registered by phone	AS-IS	Task	94	94	4m 16s	7m 17s	5m 56s
Orders registered by the website	AS-IS	Task	41	41	5m 28s	15m 2s	8m 2s
Orders registered in person at the stores	AS-IS	Task	40	40	5m 13s	27m 51s	11m 31s
Prepare Order	AS-IS	Task	175	175	3m 2s	12m 23s	7m 46s
Package Order	AS-IS	Task	174	175	2m 19s	34m 25s	21m 5s
Takeaway	AS-IS	Task	26	27	1m 24s	17m	4m 49s
Delivery by courier	AS-IS	Task	142	147	15m 51s	27m 42s	20m 33s





6.4 What-if analysis

Scenario 1 – "More 2 Kitchen staff"

Scenario 1 examines the effect of adding two kitchen staff. Focus is placed on resource utilization and average processing time. The pre-change AS-IS for Kitchen Staff was 68.41%. Scenario 1 decreased this to 45.60%. While this huge jump in cost must be balanced against the possibility of future gains in profit due to shorter processing time per order, it could result in serving more customers and thereby increasing revenues to offset the increased labor costs.

Resource	Scenario	Utilization
Phone operatores	What if - Scenario 1	38.59 %
Kitchen Staff	What if - Scenario 1	45.60 %
Couriers	What if - Scenario 1	76.71 %
Reception	What if - Scenario 1	62.64 %
Website Staff	What if - Scenario 1	51.86 %
Packagers	What if - Scenario 1	96.67 %

Scenario 2 - "Kitchen staff carrying out the Package process"

Scenario 2 attempted to achieve savings by eliminating the Packager position and allocating the role of packaging to the Kitchen. This successfully eliminated fixed and unit costs associated with the Packagers. No doubt this was more smoothly taken on as a result of previously increasing the number of kitchen staff in Scenario 1 since, for this scenario, utilization in the Kitchen Staff to 61.34%. The most important result is the significant reduction of the average processing time to 38 minutes and 30 seconds. This significant reduction in average time, along with the cost savings from the lack of a dedicated packaging team, shows that this reorganization of tasks might have created a more efficient workflow for Home Burger.

Resource	Scenario	Utilization
Phone operatores	What if - Scenario 2	33.65 %
Kitchen Staff	What if - Scenario 2	61.34 %
Couriers	What if - Scenario 2	77.83 %
Reception	What if - Scenario 2	61.65 %
Website Staff	What if - Scenario 2	61.61 %

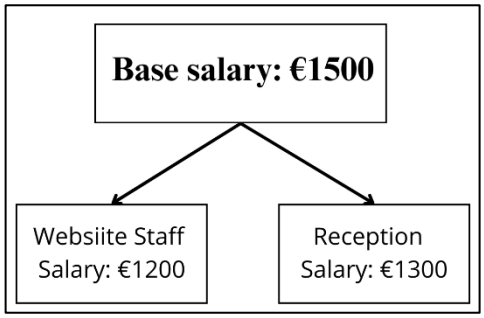
Avg. time
38m 30s

Total time waiting resource
12h 48m 43s

Scenario 3 e 4– "Reduce salary Website Staff and Reception employee"

This Scenarios was another objective to reduce operational costs. In this strategy, the focus has been on the reduction of salary for website staff and reception employees. Since website staff spend less hours and have fewer direct public interactions, it was felt, their salaries need not be as high as other group members. Similarly, being less effective in their roles compared to the others, reception employees' pay could be reduced.

Resource	Scenario	Utilization
Phone operatores	What if - Scenario 3	33.65 %
Kitchen Staff	What if - Scenario 3	61.34 %
Couriers	What if - Scenario 3	77.83 %
Reception	What if - Scenario 3	61.65 %
Website Staff	What if - Scenario 3	61.61 %



7. Proccess Redesign

7.1 Heuristics

Task Elimination

This is a heuristic that deals with the removal of non-value-added activities from the process. In the TO-BE model for Home Burger, several tasks were eliminated:

- The "Packager" role is removed; packaging is integrated into the workflow of the kitchen staff. This effectively removes a redundant task and decreases labor costs.
- In the "Delivery by Courier" process, it is not necessary to return the orders to the store for discounting or to manually send confirmation messages. This is because the courier confirms the details of the order prior to delivery and sends automatic updates to the system. This eliminates any error correction and thus smoothes the process.

Task Composition/Decomposition

This involves either bringing several activities into a single and better activity or converting one big problem into series of simpler problems, smaller sub-problems, decomposition. In this "Home Burger " TO-BE model, most of the ideas have focused on task composition:

- "Prepare Order" combines with packaging. Because of that, it reduces work from having another process and therefore reduces overall processing.

Triage

This heuristic means performing tasks either in order of urgency or importance. Although, triage can be implicitly applied in Home Burger's TO-BE processes:

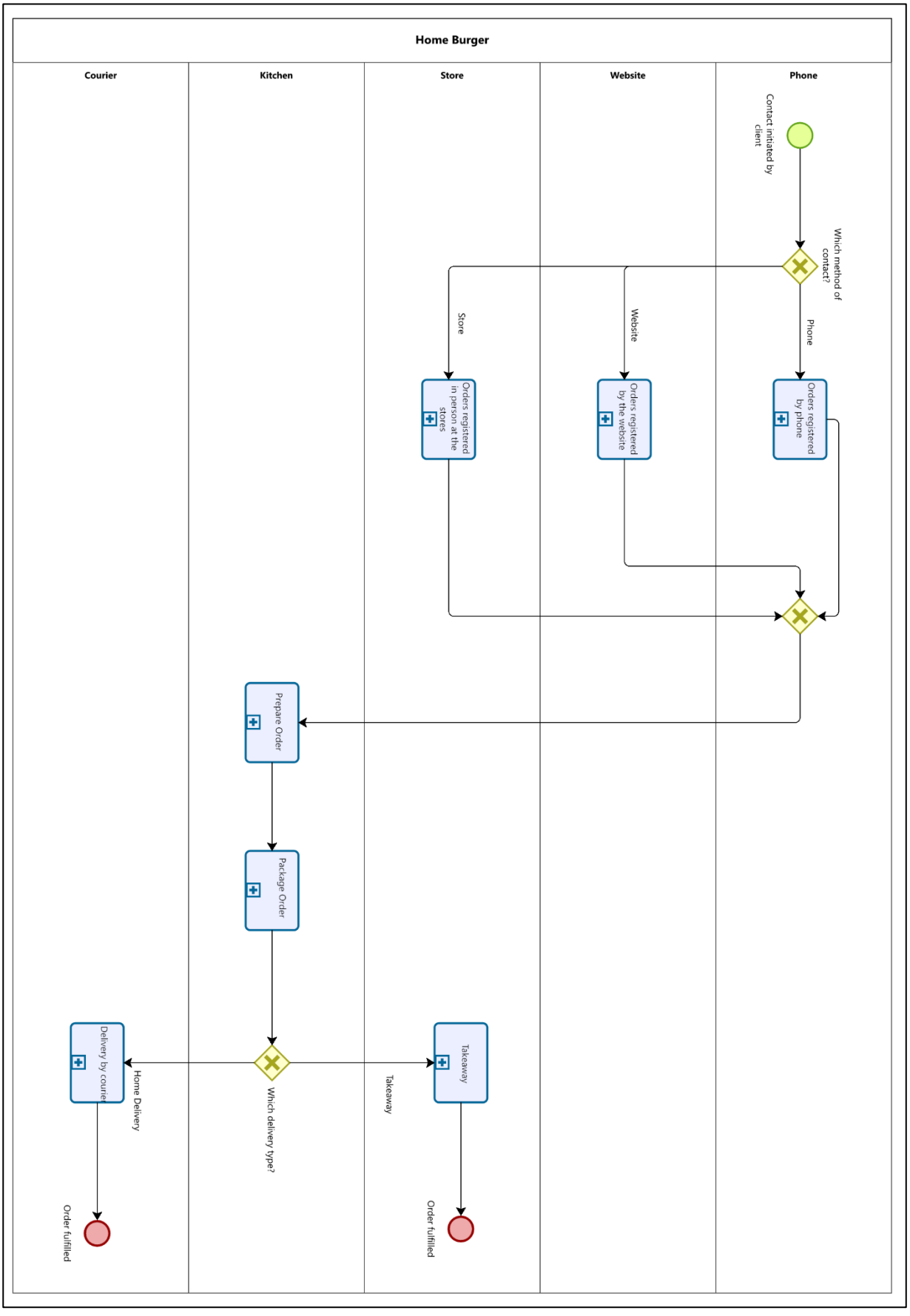
- Error handling is treated at different stages. The system prioritizes the steps to solve the issue. The systems prioritize steps for error resolution, thereby ensuring efficient handling of any disruptions.

7.2 TO-BE Process Model

Order-to-cash (O2C)

The proposed TO-BE model introduces one key modification in order to optimize the order fulfillment process of Home Burger and reduce operational costs. First, to eliminate redundancy and lower labor costs, the dedicated "Packager" role is removed. This puts the responsibility for packaging orders directly into the workflow of the kitchen staff.

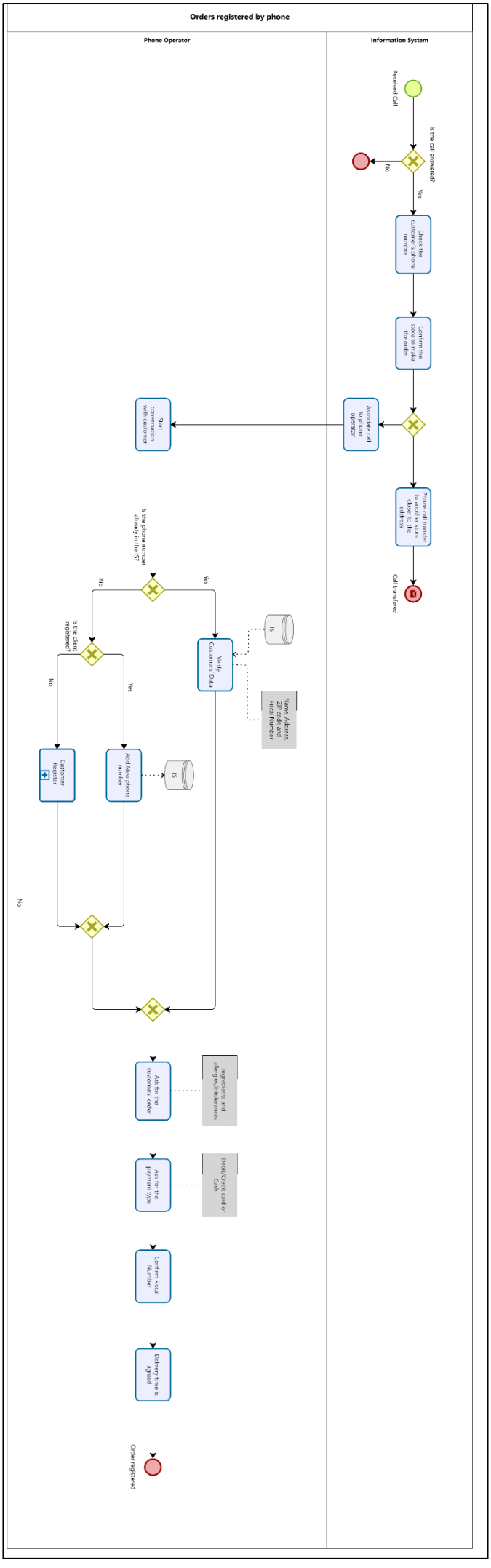
To enhance the process flow and remove the intermediate packaging stage, kitchen staff will now package orders right after preparation. This streamlined process eliminates packaging and reduces processing time, which in turn means increased efficiency. This will not only minimize labor costs but will also further contribute to streamlining the process flow for faster order fulfillment. Eliminating one more packaging step minimizes handling time and potential bottlenecks, thereby enhancing the efficiency and economy of the order fulfillment process.


Home Burger
Courier
Kitchen
Store
Website
Phone
Contact initiated by client
Which method of contact?
Store
Website
Phone
Orders registered in person at the stores
Orders registered by the website
Orders registered by phone
Prepare Order
Package Order
Which delivery type?
Home Delivery
Takeaway
Delivery by courier
Takeaway
Order fulfilled
Order fulfilled

Orders registered by phone

Home Burger's redesigned "Orders registered by phone" process (TO-BE model) improves upon the existing AS-IS by integrating an automated information system (IS) to handle many previously manual tasks. This frees the phone operator to concentrate solely on order taking and customer service.

The IS now automatically verifies customer data (name, address, fiscal number) from the entered phone number, eliminating manual data entry and significantly reducing errors. The system also automatically identifies the correct Home Burger store based on the customer's address, removing the need for manual call transfers. The phone operator's role is now exclusively focused on order taking, addressing customer queries, and confirming order details.


Orders registered by phone
Phone Operator
Information System
Received Call
Is the call answered?
No
Yes
Check the customer's phone number
Confirm the store to make the order
Associate call to phone operator
Phone call transfer to another store close to the address
Call transfered
Start conversation with customer
Is the phone number already in the DB?
No
Yes
Is the client registered?
No
Yes
Verify Customer's Data
IS
Name, address, ZIP code and Fiscal Number
Customer Register
Add New phone number
IS
No
Ask for the customer's order
Ingredients and allergies/intolerances
Ask for the payment type
Debit/Credit card or Cash
Confirm Fiscal Number
Delivery time is agreed
Order registered

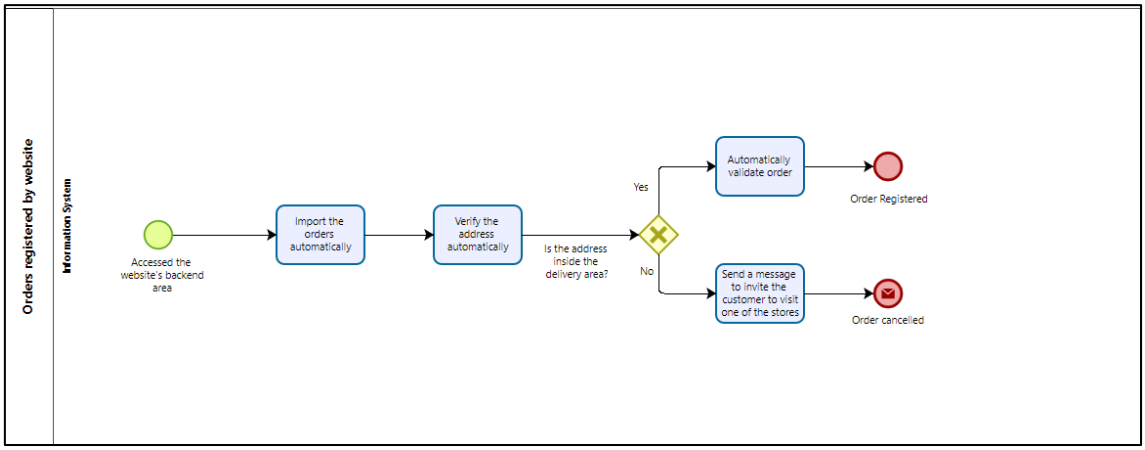
Orders registered by website

Home Burger's TO-BE process for website orders is far different from the company's AS-IS model, with a greater focus on automation and efficiency. The centerpiece of this changeover is the replacement of manual order processing by a dedicated employee with a completely automated system. This negates the need for a dedicated "Website Staff" member, reducing labor costs and greatly decreasing the processing time for each order.

The automated system now directly imports order data from the website, thereby bypassing the manual steps of downloading and data entry from spreadsheets. This automated import of data is followed by an automated verification of addresses. By using a centralized database, the system immediately identifies if the delivery address falls within the service area.

If the address is valid, the system automatically confirms the order, registering it for fulfillment. If the address is outside the delivery area, the system automatically generates a message to the customer, suggesting a visit to one of the physical stores or to contact a different branch to place their order.

This avoids the need for manual cancellation of orders and the time-consuming process of manual confirmation of the store location**.**



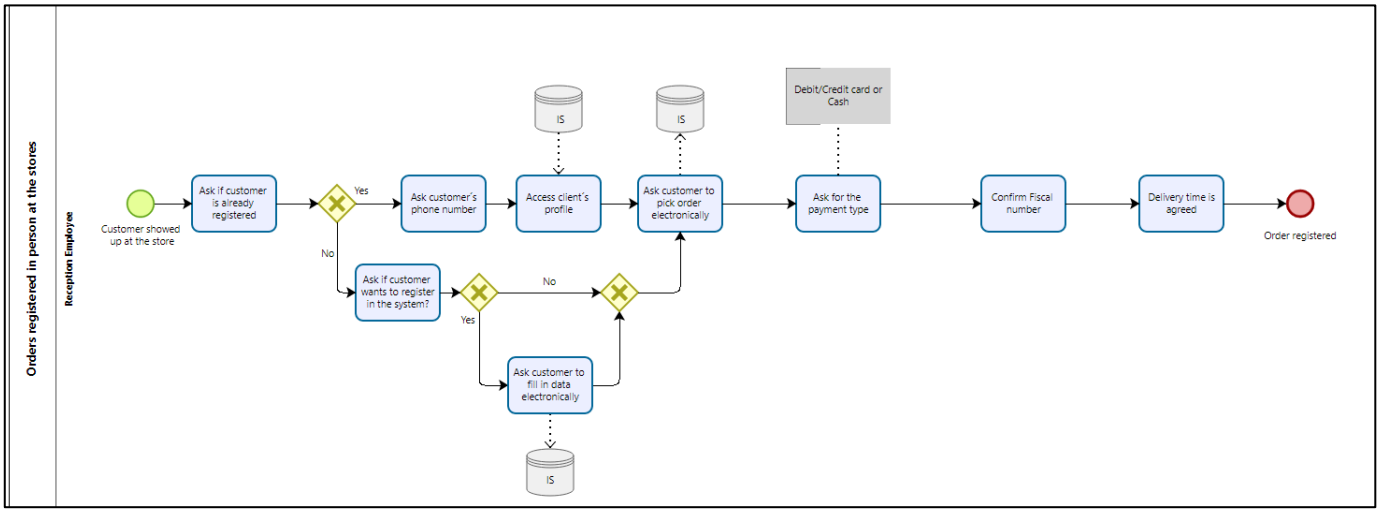
Orders registered in person at the store

Home Burger's redesigned in-person ordering process TO-BE model significantly smoothed operations by adding at the reception area a self-service digital kiosk, such as a tablet.

The technical enhancement alleviates reception employees from data entry and placing orders, hence focusing on the processing of payment and customer queries. The customer can now self-register by directly feeding their personal information, such as name, address, and fiscal number, into the system through the kiosk. This automated data entry process greatly reduces the likelihood of human error that can be associated with manual collection.

The digital kiosk navigates customers through the selection process, displaying all the ingredients and potential allergens in the orders. The customers themselves choose their meal and order through the interface.

The self-service feature saves the customer time and also saves the receptionist from the headache of tedious data entry, freeing them up to focus on more important tasks, such as managing payments and addressing customer queries. This technological integration, therefore, leads to a more effective, efficient, and customer-friendly process of in-store ordering**.**

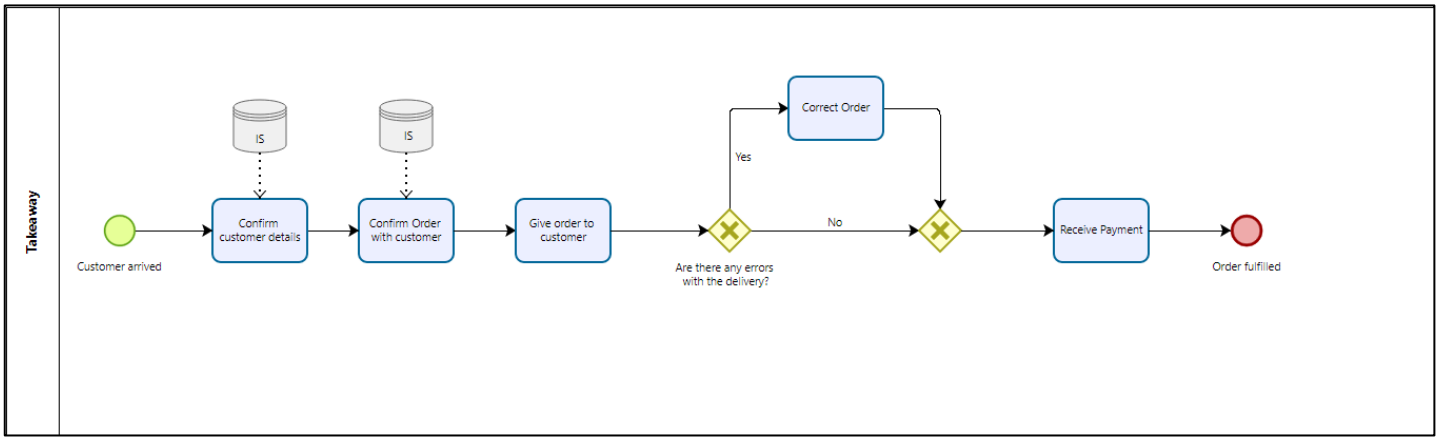


Takeaway

Home Burger's optimized takeaway process, the TO-BE model, improves on the existing system by adding the important customer confirmation step before the processing of the payment. This minor addition creates much efficiency and reduces costs of operation. Reception staff now confirm all the order details with the customer, minimizing chances of errors such as missing items or incorrect orders.

This proactive error reduction step eliminates the need for the former AS-IS process step of offering discounts or other concessions to make up for the errors. While this new step does increase the workload of the reception employee slightly, the cost savings from avoided discounts are far greater than this slight increase.

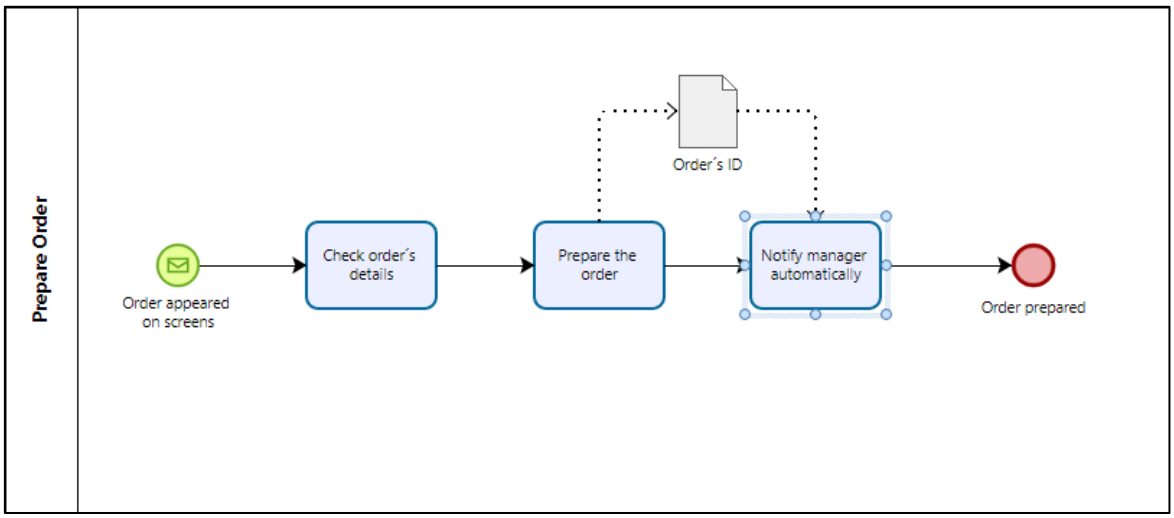
Additionally, this discount/offer step has been removed from the process, which makes it considerably more efficient and easier to manage. The improved accuracy arising from confirmation of customer orders means a reduction in the need for error correction, thus more efficient and cost-effective.



Prepare Order

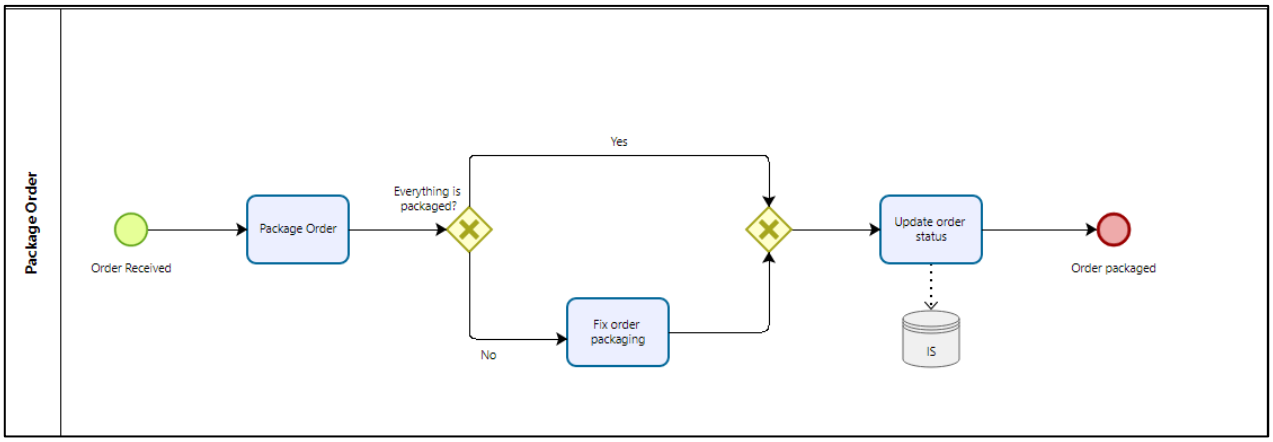
Home Burger's "Prepare Order" process TO-BE maintains the core functionality of the existing system AS-IS model realizing the effectiveness of it.

In order to optimize efficiency and minimize interruptions for the kitchen staff, the method of notifying the manager about order completion has been changed. Instead of manually informing the manager by the kitchen staff, an automated notification system is implemented. This could be in the form of an on-screen order completion alert that automatically updates order status and sends a notification to the manager.



Package Order

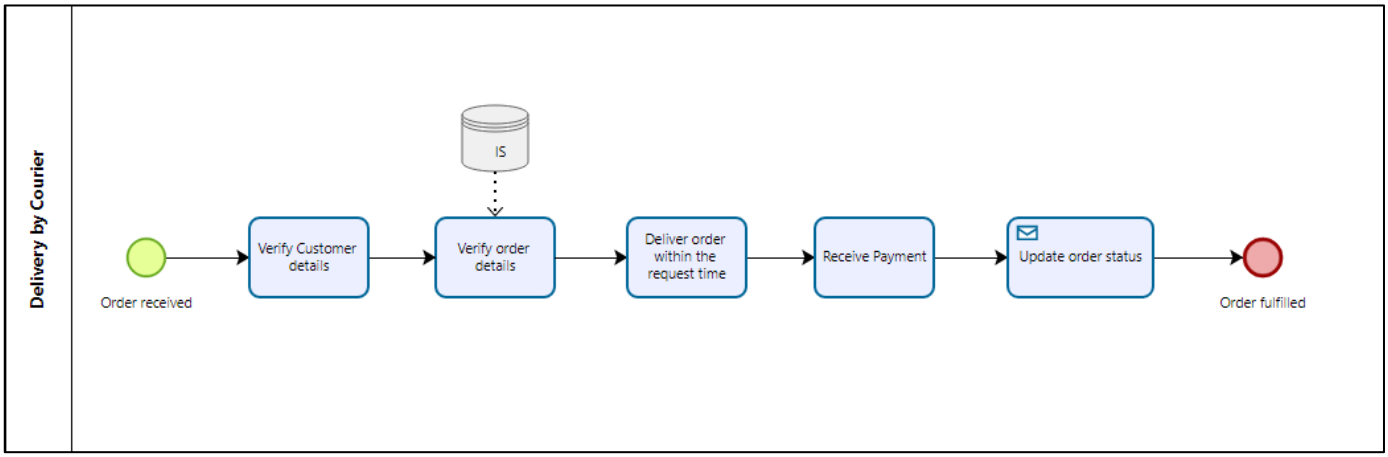
Home Burger's "Package Order" process TO-BE model maintains the efficient structure of the AS-IS model. However, a key enhancement has been added to improve logistical organization and real-time tracking. After the order is packaged and everything is verified, the packager now automatically updates the order status. This automated update provides both the manager and other staff with real-time visibility into the packaging status of orders, enhancing logistical coordination.



Delivery by courier

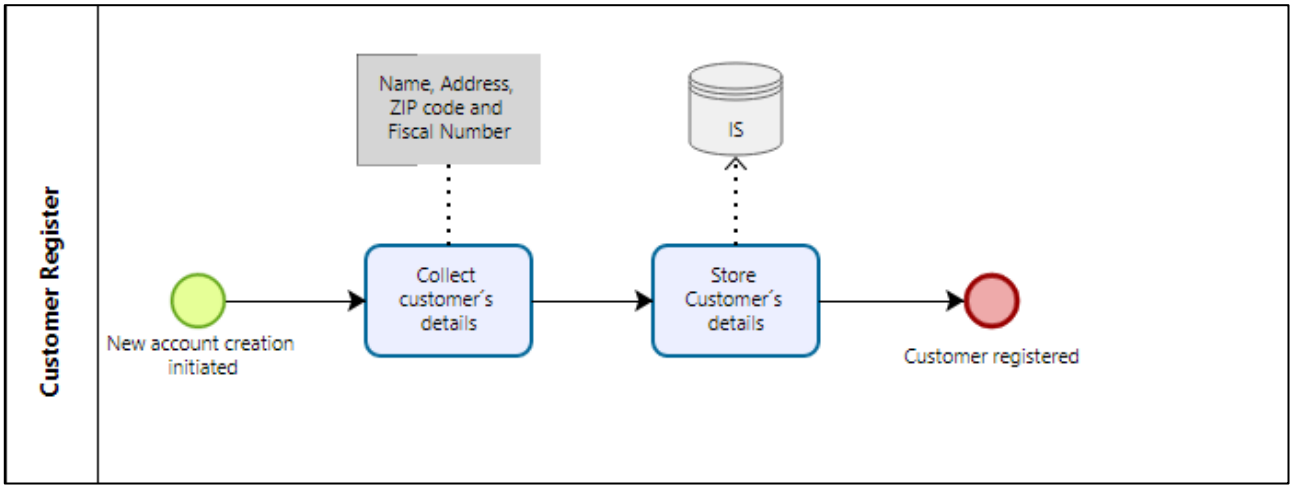
Home Burger's enhanced "Delivery by Courier" process TO-BE model streamlines operations and reduces costs compared to the existing system AS-IS. The most significant change is that the courier now verifies order details before attempting delivery.

By verifying details beforehand, the need for couriers to return to the store, incur additional transport costs, or offer discounts to compensate for errors is virtually eliminated. This results in significant cost savings, both in terms of reduced fuel expenses and avoided discounts. The streamlined process also enhances the courier's workflow, allowing them to complete deliveries more efficiently.



Customer Register

The TO-BE model of Home Burger's "Customer Register" process maintains the same structure as the AS-IS model since the process is considered efficient and effective in reaching its objective: register new customer accounts. In this process, no changes have been implemented. This simplicity ensures that data management is efficient and data integrity is maintained across all ordering channels.



7. 3 Financial Analysis

This section provides a detailed financial evaluation of the proposed process improvements for Home Burger. We analyze both the initial investment and ongoing operational costs associated with the recommended changes, comparing these expenses to the projected benefits, such as increased efficiency and revenue.

The projected annual revenue is based on the TO-BE model's 168 completed orders daily at an average price of 20. Recurring annual operational costs include salaries (28 825€):

Role	Fixed Cost	Nº of employers	Total Cost
Phone operatores	1425 €	3	4275 €
Kitchen Staff	1875 €	6	11 250€
Couriers	1350 €	8	10 800€
Reception	1300 €	1	1300€
Website Staff	1200€	1	1200€
Total Cost			28 825€

This analysis demonstrates the overall financial viability and long-term sustainability of the proposed solution:

- Implementation of a new integrated management software system for inventory, ordering, payments, and financial reporting:

- Average monthly fee – 100€;
- Annual cost - 1200€

- Additional order costs is 28 371€/month:

- Ingredients and Supplies – 16 632€
- Utilities- 500€
- Equipment -309€
- Licenses and Insurance -250€
- Marketing – 250€
- Delivery and Logistics – 10 280€
- Cleaning and Maintenance- 150€

- Total One-Time Costs is 113 900€:

- Solar energy system – 40 000€;
- 3 TPA terminals – 900€ (300€ per unit);
- 13 POS terminals – 5 000€ (300€ per unit).

- Kitchen Automation Equipment: 20 000€ (automatic grills and ingredient dispensers).
- Installation of Air Conditioning and Ventilation System: €10 000
- Delivery Vehicles (8 electric scooters): €28 000 (€3,500/unit)
- Digital Kiosks for Self-Service (2 units): €10,000 (€5,000/unit)

- Total Annual Ongoing Costs is 86 100€:

- POS software for 13 employees – 20 000€
- Recyclable packaging for delivery – 50 000€/year
- TPA rental – 2 000€/year
- Transation fees (1.5%) – 10 000€/year
- Solar energy maintenance – 1 100€/year
- Vehicles maintenance – 3 000€/year

Final Analysis

Annually, the salary expenses will amount to 28 825€ * 14 = 403 550€

Cost = 28 825€ * 14 + 28 371€ *12 = 403 550€ + 340 452€ = 744 002€

Revenue = 168*365*20 = 1 226 400€

Total investment (Fist year) = One-Time cost+ Annual Ongoing Costs = 200 000€

Profit = Revenue - Costs - Investment = 282 398€

ROI = (Profit/Investment) * 100 = (282 398/200 000) * 100 = 141.199%

8. Possible Investements

1º- UberEats Afiliation

This analysis explores the long-term viability of affiliating a restaurant with Uber Eats, focusing on a scenario where the restaurant avoids the costs associated with employing its own couriers. The model considers a worst-case scenario, assuming a relatively low daily revenue of €10, to demonstrate the potential for profitability even under challenging circumstances.

The initial investment includes a one-time activation fee of €500. This covers the provision of a tablet, software configuration, and professional photography. Additionally, a monthly budget of €50 is allocated to account for potential unforeseen expenses or equipment rentals.

Uber Eats can takes a 35%(maximum) commission on each order. Based on a €10 daily order value, the monthly commission is (€10 * 0.35 * 30 days) = €105. Therefore, the total monthly losses are calculated as the initial €500 investment plus the recurring monthly costs (€50 + €105 = €155). The initial loss is €655 (activation fee + first month's expenses), and subsequent losses gradually increase based on the €155 monthly overhead.

After deducting the 35% Uber Eats commission, the restaurant retains 65% of each order's value. With a €10 daily order, the daily profit is (€10 * 0.65) = €6.50. This translates to a monthly profit of (€6.50 * 30 days) = €195. This figure is added incrementally to the monthly winnings over time

The cumulative column reflects the net difference between the monthly losses and winnings. While the cumulative total becomes positive in month 13, it doesn't represent a full return on the initial investment until month 25. Month 13 marks the point where monthly winnings exceed monthly losses, but the accumulated losses from the initial investment and the first year still need to be recovered. Therefore, while profitability begins in month 13, a complete return on investment is only achieved by month 25.

Months	1	2	3	4	5	6	7	8	9	10	11	12
Losses (€)	655	810	965	1120	1275	1430	1585	1740	1895	2050	2205	2360
Winnings (€)	195	390	585	780	975	1170	1365	1560	1755	1950	2145	2340
Total Cumulative (€)	-460	-880	-1260	-1600	-1900	-2160	-2380	-2740	-2880	-2980	-3040	-3060

Months	13	14	15	16	17	18	19	20	21	22	23	24	25
Losses (€)	2515	2670	2825	2980	3135	3290	3445	3600	3755	3910	4065	4220	4375
Winnings (€)	2535	2730	2925	3120	3315	3510	3705	3900	4095	4290	4485	4680	4875
Total Cumulative (€)	20	80	180	320	500	720	980	1280	1620	2000	2420	2880	3380

The analysis suggests that affiliating with Uber Eats is a viable long-term strategy. Even under the pessimistic assumption of only a €10 daily order value, the restaurant achieves profitability within two years. Once profitability is established, a portion of the profits could be strategically reinvested in marketing and enhanced visibility within the Uber Eats platform to further attract customers and increase revenue.

2º - Touchscreen kiosk

This business plan outlines a single kiosk with a €5,000 initial investment. Annual maintenance costs are estimated at €1,000, representing a conservative, worst-case scenario for expenses. Operating 8 hours daily (12pm-3pm and 7pm-12am), seven days a week, the kiosk anticipates a daily revenue of €100, based on 10 orders per day with an average order value of €10. This projection represents a worst-case scenario for revenue. The kiosk replaces the need for one attendant, resulting in monthly savings of €1,500 (€18,000 annually).

- Daily Revenue**:**
  10 orders/day × 10€/order = 100€/day.
- Annual Revenue**:**
  100€/day × 365 days = 36,500€/year.
- Revenue Generated by the Kiosk + Savings on Employee Costs**:**
  36,500€ + 18,000€ = 54,500€.
- Subtract Maintenance Costs**:**
  54,500€ − 1,000€ = 53,500€.

This is an example of how the kiosk increases revenue while reducing fixed operating costs, a positive effect on net profit. With 8 hours of operation per day, the kiosk can meet demand quite well without the need for significant interruptions. It also offers flexibility to serve more customers, providing an interactive and technologically advanced customer experience.

3º- Ordering application (Phone and website)

The core functionality revolves around a user-friendly app and website, enabling customers to place orders for home delivery, pickup, or on-site consumption. A built-in restaurant locator utilizes user location to display nearby "Home Burger" establishments, ensuring convenience and accessibility. The app also features a robust user profile system, storing order history, favorite orders for quick reordering, payment and address information for efficient transactions, and a review system.

While the initial investment will include the costs of a UX designer and a software developer, as well as ongoing app maintenance, this technological commitment promises long-term benefits and a significant competitive advantage, establishing a highly innovative

9. Limitations

First, many of the factors that drove the processes of Home Burger were not well documented in the project description. This necessitated that we make some assumptions to arrive at results that would be consistent with expectations. While the values and probabilities we used were reasonable, they were assumptions nonetheless, based on limited data, and may weaken the accuracy of our analyses.

One of the most important challenges during the modeling phase was the limitation of the used software. For example, Bizagi allows only one user at a time to edit the model; this means that the team members cannot collaborate all at once, which introduces inefficiencies during the design process. Additionally, the project description was not supported by detailed data on operations, which limited how we could simulate the AS-IS model and make it as close as possible to real life.

Finally, since our simulations were based on probabilistic methods, the results were not fully consistent. Running the same simulation gave different outputs, as probabilities are always variable. While such a variation falls within acceptable ranges, it does suggest that the probabilistic nature of the results could allow minor variations in outcomes.

These limitations highlight that even more refinement is needed regarding data collection and analysis tools, and even better project descriptions are needed for more valid and comprehensive process improvements in the future.

10. Conclusions

The project developed for Home Burger brought important insights to optimize the restaurant, with a focus on increasing efficiency, reducing costs and improving the customer experience. Through detailed analyzes and simulations, significant process improvements were identified, such as the simplification of operational flows and the integration of technologies that reduce errors and speed up service.

The proposed changes demonstrated financial viability and potential for significant return, strengthening the company's sustainability and competitiveness. Despite the limitations faced, the work provided a solid basis for implementing improvements and for continuous monitoring of performance.

By applying the recommendations, Home Burger will be prepared to better service its customers, reduce bottlenecks and consolidate its position as a reference in the delivery market, combining operational efficiency with innovation and sustainability.