Content

Scenario

Fotof provides photography services in the fields of family photography, personal event photography (e.g. weddings and party photography) and commercial photography (mainly corporate events photography, as well as photography for product catalogues, corporate newsletters, advertisements, etc.). With a portfolio of 52 photo studios, Fotof is one of the largest chains of photo studios in Northern and Eastern Europe. Fotof's 2022 turnover was 54 million euros. Out of this amount, 20% comes from product sales (Fotof sells photography products such as cameras and lenses, at its studioshops and online) while 80% comes from photographic services. Sales to corporate customers accounts for 25% of Fotof's photographic services revenue, while the rest comes from private customers.

One of core process of Fotof is its booking-to-cash process, which goes all the way from the moment a customer makes a booking for a photo shooting session, through the order placement, and up to the moment the customer pays and obtains the ordered pictures. In 2022, Fotof received around 20K orders from corporate customers, and 180K orders from private customers.

Booking-to-cash process

The process starts when a customer makes a booking for a shooting session. A booking can be done via phone or via e-mail addressed directly to a specific photo studio. The request is handled by a customer service representative at the photo studio designated by the customer. Each studio employs one customer service representative. The customer service representative enters the details of the booking into the photo studio information system. The entered data includes

- The photo studio that the customer wishes to use (typically the one closest to their location).
- Customer data (full name, phone number, e-mail, and if applicable company name, company address and company registration number for invoicing purposes)
- Booking data: start of the session, duration, type of shooting (family, personal event or corporate event) whether the shooting session is in-studio or "on location", special equipment required (e.g. lighting equipment)

The booking is assigned to one of the photographers of the studio (there are on average 4 photographers per studio). On average, an in-studio session lasts 40 minutes, while an on-location session lasts 3.5 hours (including transportation time). 20% of private customer shootings and 100% of corporate customer shootings are on-location.

After a photo shooting session, the pictures are automatically uploaded to a file server. Eventually, a technician (two technicians per studio on average) cleans up the pictures by deleting duplicates and failed shots. Later the technician edits the remaining shots and arranges them into a photo gallery using a dedicated photo studio software tool. Once the gallery is completed, the customer is notified by e-mail. The notification includes an URL where the customer can find the pictures. The clean-up and gallery preparation phase takes about 15 minutes from the technician per order.

Customers can view the gallery, select the pictures they wish to order in print (and how many copies) and those they wish to get in digital copy (full resolution). Customers can also annotate a selected picture in order to ask for additional editing (special requests). When placing their order, customers can specify whether they will pick-up the printed copies at the studio or have them delivered by post. In the latter case, a shipment fee is added to the order. Customers can also enter a “discount code” when placing their order. Fotof offers discounts of between -10% and -20%. Around 10% of orders are placed with a discount, and the average discount is 15%.

Once the customer has placed an order, a technician performs additional editing, if required by the customer. In the case of special requests, the technician may need to communicate with the customer by e-mails or phone to clarify the request and to determine how to fulfill it, and whether the special request will entail an additional fee and how much. This additional editing and special requests phase takes on average 30 minutes per order, but it is only required for 20% of orders.

The technician places the photos in a “QA ready” folder. Eventually, another technician (not the same one as the one who prepared the gallery) checks the pictures in “QA-Ready”, to detect any issues related to focus, exposure, or colour, for example. In 5% of cases, the technician who performs a QA is not satisfied with the results and

performs additional editing. After the QA check, the technicians who performs the QA places the pictures in the “Ready” folder. This QA steps take on average 10 minutes per order.

If printouts are required, the technician prints them out, puts them in an envelope and drops them in the studio's counter. Digital copies are placed on a dropbox folder with the order number (but the link is only shared with the customer after payment).

Once the pictures are ready, a customer service representative determines the amount to be invoiced (including additional fees for special requests, and discounts), produces the invoice and sends it to the customer.

The customer can pay their invoice by bank transfer or directly at the studio, for example when they come to pick up printed copies. When a customer service representative detects that payment has arrived by bank transfer, they mark the corresponding order as paid. If required they pack and send any printouts orders for postal delivery and if applicable they send the Dropbox link with digital copies to the customer.

Pictures from a shooting session are kept in the corresponding gallery for up to 30 days (a reminder is sent to the customer 5 days before the expiry date). If a customer has not placed an order past this period, an invoice is sent for the minimum billing amount (see below). Invoices are payable within 7 days of their issue. A customer service representative sends a reminder in case they detect an overdue invoice. Similarly, a customer service representative sends a reminder if they detect a customer has not collected printouts more than 7 days after these have been ready for pickup.

Booking or order cancellations can occur in three ways: (i) prior to the shooting session (booking cancellation); in case of no-show (the customer did not show up to the shooting session and did not re-schedule it); or (iii) after the shooting, if the customer does not order any pictures within 30 days. Cancellations prior to the photo shooting session do not incur a fee. Cancellations due to no-shows do not attract a fee if they are in-studio; they attract a fee of EUR 60 if they are "on location". In case of a no-show, the customer may re-schedule the booking to a later day but the no-show fee for onlocation shootings is

charged to the customer in any case. If a customer does not order any picture after a shooting session, the customer is invoiced a photo shooting fee of EUR 120 for in-studio sessions (EUR 160 for on-location one).

Stakeholder analysis

Customer viewpoint: In 2022, customer satisfaction stands at 82% (declining from 86% in 2021) and net promoter score at 7 (declining from 8 in 2021). Common customer complaints exist in regards to: (i) turnaround times between the photo shooting session and the availability of pictures for review, as well as the turnaround times for delivery of digital copies and printouts; (ii) turnaround times for resolving customer complaints particularly with regards to perceived defects in the delivered digital and printed copies; (iii) mishandled or "forgotten" orders or special requests. Customers often make changes to their orders or additional special requests via phone or e-mail and these changes/requests are sometimes not recorded (or recorded incorrectly) in the order management system. Changes to orders are currently handled manually.

Staff viewpoint: Staff satisfaction with the current process is low. Over 60% of customer service staff consider that their job is stressful. The staff turnover rate overall is at an all-times high: 20% of staff involved in the process as of 1 January 2022 had resigned by 31 December 2022. The average Cost- To-Company (CTC) of a photographer at a Fotof studio is 43K per year (36K for technicians and 38K for customer service staff). The CTC at Fotof is generally in line with industry averages. The company additionally employs 35 staff at the company headquarters at an average CTC of 48K. Interviews with staff have highlighted the following issues in the process: - Customer service staff perceive that appointment management is too time-consuming. Customers sometimes call or e-mail multiple times to find a suitable appointment time. Customers also call frequently to change their appointments for shooting sessions or to cancel their session. About 1% of corporate orders result in a cancellation prior to the shooting, while 5% of private orders are cancelled prior to the shooting. - There are numerous customer enquiries via phone and e-mail (on average 3 per order, in addition to booking-related calls or e-mails), be it to enquire

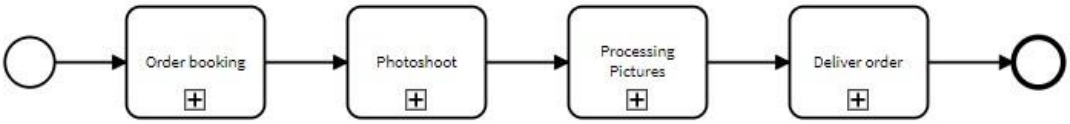
about the status of orders or deliveries, to make changes to the order, to discuss special requests, pricing questions, as well as to report complains with received pictures. There are also numerous inquiries regarding shipment and delivery (shipment via traditional postal service is a cumbersome process and the delays it causes are a visible source of inquiries and complaints). On average, a customer service staff spends 20 minutes per order, including creating and managing appointments, handling inquiries, and delivering orders. - The late-show and no-show rates for appointments are rather high: 10% late-shows for instudio sessions, 2% for on-location sessions; 4% of no-shows for on-studio sessions, and 2% for on-location. A late-show occurs when the customer arrives between 5 and 15 minutes late (the company has a policy of not waiting beyond 15 minutes, a delay of more than 15 minutes is normally treated as a no-show event).

Management viewpoint: The company strategy of Fotof for the years 2023-2025 is focused on revenue growth. The company seeks to achieve a revenue increase of 50% by end of 2025 relative to end of 2022. This growth should be achieved organically, meaning via growth of the existing business, without company acquisitions and without opening additional retail outlets. To achieve this goal, Fotof's management is receptive to ideas to improve customer service and to expand the range of added-value services, such as offering "slideshows" to customers of personal events, creating customized artistic galleries, allowing customers to easily order reprints of photos, etc. Fotof's management perceives that additional revenue could come in great part from wedding photos, parties and ceremonies and targeting school events. At present only the customer who initiates the booking can place orders. But in the case of personal events and if the customer consents, there is an opportunity to sell to other event participants. Fotof's management also perceives that faster cycle times could also help to enhance sales. Sending more frequent reminders to customers to place their order, or re-organizing work to reduce cycle time are options that could be considered. In any case, the management is very sensitive to ideas on how to create spare capacity (e.g. via productivity gains), so that the existing workforce can handle more orders and more product lines without this causing additional stress on the workforce. The

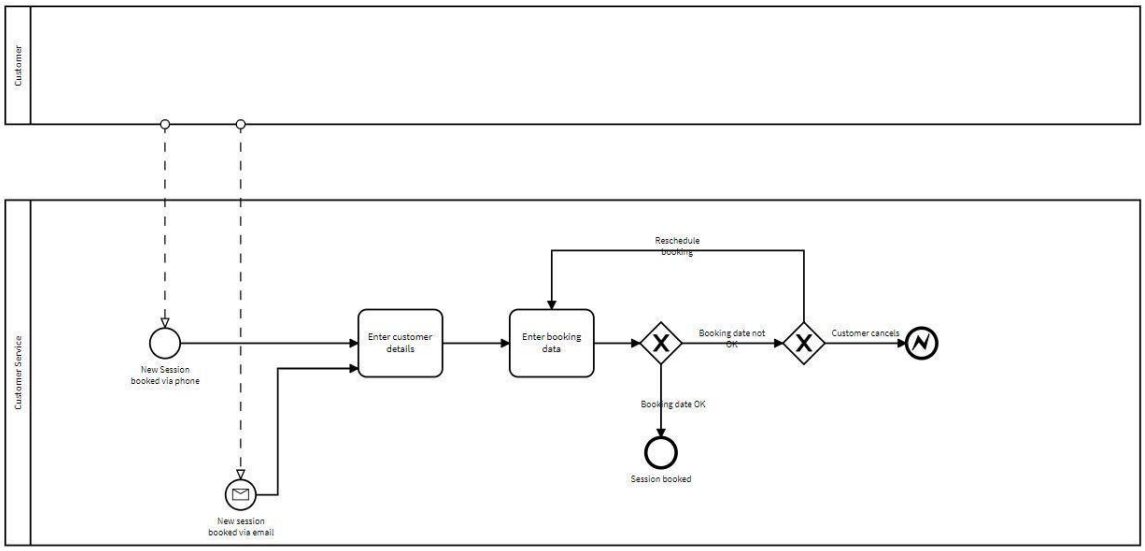
management is also keen to avoid customer churn, given that the Cost Acquisition Cost (CAC) is in the order of 75 euros, versus a customer lifetime value (CLV) of 350 euros. For corporate customers, the CAC is 300 and CLV is 2500. Improving retention rate, increasing LTV and reducing CAC are key strategic drivers. Fotof's management believes that cross-selling and up-selling are crucial to achieving the company's goals.

1. Business Process Model:

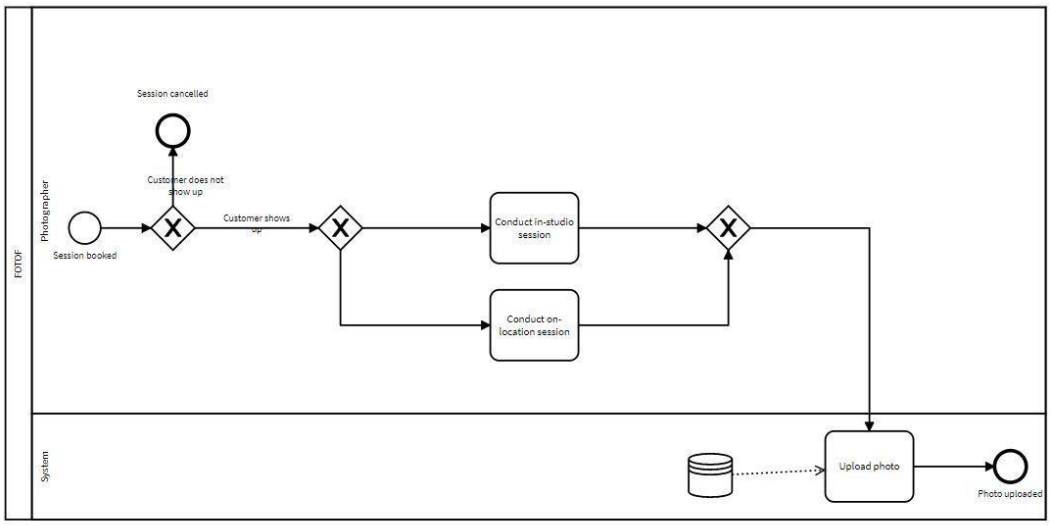
1. Main process



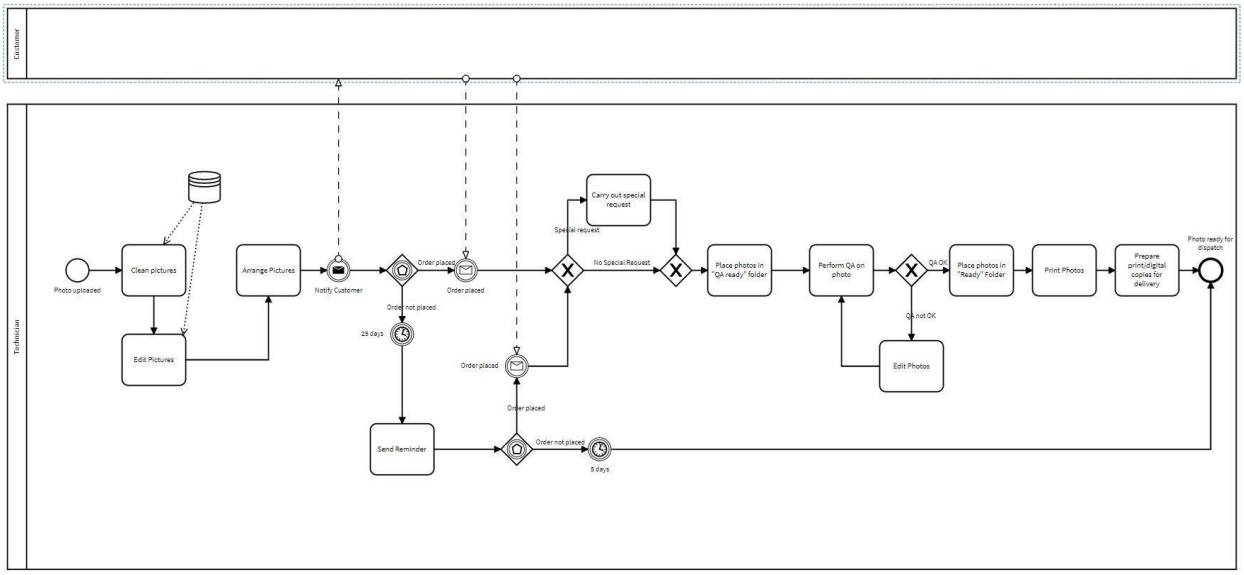
2. Order booking sub-process



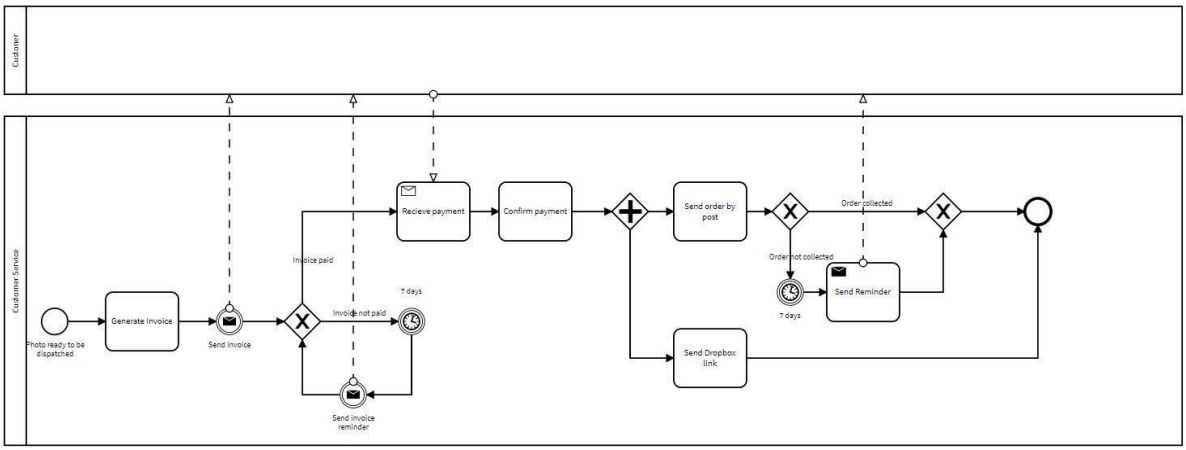
3. Photoshoot sub-process



4. Processing Pictures sub-process



5. Deliver Order sub-process



2. Waste Analysis for Fotof's Booking-to-Cash Process:

Type of waste	Name	Waste Description
➔ **Transportation**	Printouts and physical copy delivery	Printouts and physical copies are transported to consumers or for postal delivery, which can waste time, money, and possibly lead to damage. The transportation procedure can be made more efficient by looking into alternate delivery options or working with reputable logistics companies.
➔ **Motion**	Excessive motion in managing appointments	In the process, particularly while managing appointments, there is a chance for excessive motion waste. To identify suitable appointment dates, handle modifications, and handle cancellations, customer support staff spends time on phone calls and emails. The efficiency of the employees can be increased by implementing a centralized, automated system for managing appointments.
➔ **Inventory**	Unclaimed printed copies	If printed copies are not picked up by clients within a reasonable amount of time, there is a danger of inventory waste. Printouts may occasionally go uncollected for more than seven days. inventory waste can be decreased by putting in place a system to monitor and control printing inventories as well as by reminding customers when necessary.
➔ **Waiting**	Waiting between photo shoot and viewing	Throughout the procedure, there are times when you have to wait. Customers may experience waiting periods between their photo shoot and the availability of their images for viewing. Furthermore, delays in delivering printed copies and digital copies can lead to customer dissatisfaction. To enhance the efficiency of the process, it is crucial to identify areas causing delays and implement measures to minimize waiting times.

➔ **Defects:**	Quality issues in digital and printed copies	The occurrence of customer complaints related to flaws in the delivered digital and printed copies points to process defects. These defects could involve problems with photo quality, such as focus, exposure, color accuracy, or other technical aspects. To address this issue, implementing quality control measures is essential. This can be achieved through enhanced technician training and implementing a more rigorous quality assurance (QA) process. By doing so, the occurrence of defects and subsequent customer complaints can be reduced.
➔ **Overprocessing**	Editing Pictures	The method involves numerous manual procedures and tasks that can be seen as overprocessing. For each purchase, the technician spends, as an illustration, 15 minutes cleaning up and setting up the gallery, which may include getting rid of duplicates and unsuccessful images. These processes can be made more efficient and automated to cut down on needless processing time.
➔ **Overproduction**	Excessive creation of printouts and copies	If the amount of printouts or digital copies created exceeds client demand or if they are not ordered within 30 days, overproduction waste may result. Customers are invoiced a minimum billing amount in these circumstances, which could lead to waste and unforeseen costs. Waste from overproduction can be reduced by using demand-driven production and improving customer communication.

Issue priority number	**Issue name**	**Short Description**	**Data assumption**	**Qualitative Impact**	**Quantitative Impact**
1	High staff turnover	High staff turnover leads to loss of expertise and increased recruitment cost	Staff turnover rate: 20%; Avg. CTC for photographer: €43K; technician: €36K; customer service staff: €38K; Total number of studio employees: (52 studios * (1 CSR + 4 photographers + 2 technicians)) = 364	Lower productivity and service quality, increased workload for remaining staff. Additional revenue lost.	Turnover cost = 0.20 * (€43K * 208 + €36K * 104 + €38K * 52) = **€1.89M per year**

2	Late-shows and no-shows	High rate of late-shows and no-shows leading to loss of revenue and potential penalties for on-location no-shows	Late-show rates: 10% (in-studio), 2% (on-location); No-show rates: 4% (in-studio), 2% (on-location); No-show fee for on-location: €60; Number of orders: 20K corporate, 180K private; 20% private & 100%	Disruption in scheduling and planning, decreased customer satisfaction. Additional revenue lost	Lost revenue due to no-shows = No-show rates * No-show fee + No-show rates * Avg. shooting fee; for on-location: (0.02 * 20K + 0.02 * 0.20 * 180K) * €60 = €96K; for in-studio: (0.04 * 0.80 * 180K) * €120 = **€3.456M per year**

3. Issue Register:

			corporate are on-location		
3	Mishandled or “forgotten” orders	Orders or special requests are sometimes mishandled or forgotten	Assumption: 5% of orders mishandled; Avg. order value: €54M * 80% / 200K orders = €216	Lower customer satisfaction, increased customer complaints. Additional revenue lost	Lost revenue = 0.05 * 200K * €216 = **€2.16M per year**
4	High booking cancellations	High rate of booking cancellations, particularly for private orders	Cancellation rates: 1% (corporate), 5% (private); Avg. shooting fee: (€160+€120)/2=€140	Lower revenue, wasted resources	Lost revenue = Cancellation rates * Avg. shooting fee; for corporate: 0.01 * 20K * €140 = €28K; for private: 0.05 * 180K * €140 = **€1.26M per year**
5.	High customer inquiries	High number of customer inquiries per order leading to increased workload for staff	Average inquiries per order: 3; Average time spent by customer service staff per order: 20 minutes; CSR cost per hour: €38K/ (52 weeks * 40 hours) = €18.27	Increased workload for staff, lower productivity. Additional revenue lost	Additional cost = 3 * 20/60 * 200K * €18.27 = **€3.65M per year**

4. Quantitative Analysis:

Fotof receives a total of 20,000 orders from business clients and 180,000 orders from private clients. To determine the average order rate per hour, we divide the total number of orders by the total hours in the given timeframe. Assuming the timeframe is 260 business days, each consisting of 8 working hours, the calculation would be as follows: Total orders = 20,000 (business) + 180,000 (private) = 200,000 orders Total hours = 260 days * 8 hours = 2080 hrs/year

Average order rate per hour = Total orders / Total hours = 200,000 / (2080*52 studios) ≈ **1.846 orders** per hour

Photographer queuing Analysis

The typical duration of an in-studio session is approximately 40 minutes(0.667hrs) , while an on-site session lasts an average of 3.5 hours. In 2022, Fotof received a total of 200,000 orders. Among these, corporate clients constituted 10% of the orders, while private consumers accounted for the remaining 90%. Based on the available data, on-location shots were required for 20% of individual client orders, whereas 100% of corporate customer purchases necessitated on-location photography. Moreover, approximately 80% of private customers expressed a preference for studio shoots. Since both types of shoots occur simultaneously, we need to determine the average shooting time for each scenario.

Average time per order = (28% of orders * 3.5 hours) + (72% of orders * 0.667 hours) = 1.4684

Service rate for a photographer = 1/1.4684 = 0.68 orders/hr

M/M/s	
Arrival rate (λ)	1.846
Service rate (μ)	0.68
Traffic intensity (ρ)	0.6787
Number of the servers (s)	4
Seriver utilization (α)	2.7147
Average number of customers (L)	3.5515
Number of customers in the queue (LQ)	0.8368
Average time spent in the system (W)	1.924
Time spent in the queue (WQ)	0.4533
Probability of no customers in the queue (p0)	5.625 %
The probability of a queue with	customers...
is pn	%

Typically, there are 0.83 customers waiting in line at Fotof and the resource utilization is 67.87 %

Technician Queuing Analysis

For technicians:

The total number of technicians in all studios: 2 technicians/studio
Time spent on each order:
Clean-up and gallery preparation: 15 minutes/order
Additional editing for special requests: 30 minutes/order, but this is only required for 20%
of orders, so the average additional editing time per order is 0.2 * 30 = 6 minutes/order
QA step: 10 minutes/order
Total time per order = 15 minutes/order + 6 minutes/order + 10 minutes/order = 31 minutes/order or approximately 0.5167 hours/order.
Service rate for a single technician: 1 / 0.5167 hours/order ≈ 1.935 orders/hour

On average, there are approximately 0.283 clients waiting in line at Fotof. And resource utilization is 47.82%.

M/M/s	
Arrival rate (λ)	1.846
Service rate (μ)	1.93
Traffic intensity (ρ)	0.4782
Number of the servers (s)	2
Seriver utilization (α)	0.9565
Average number of customers (L)	1.24
Number of customers in the queue (LQ)	0.2836
Average time spent in the system (W)	0.6718
Time spent in the queue (WQ)	0.15364
Probability of no customers in the queue (p0)	35.296 %
The probability of a queue with	customers...
is pn	%

Customer Service Queuing Analysis

For CSR:

Time spent on each order by a CSR is given as 20 minutes/order, which is equal to approximately 0.3333 hours/order.

Service rate for a single CSR: 1 / 0.3333 hours/order ≈ 3 orders/hour

M/M/s	
Arrival rate (λ)	1.846
Service rate (μ)	3
Traffic intensity (ρ)	0.6153
Number of the servers (s)	1
Seriver utilization (α)	0.6153
Average number of customers (L)	1.5997
Number of customers in the queue (LQ)	0.9843
Average time spent in the system (W)	0.8666
Time spent in the queue (WQ)	0.5332
Probability of no customers in the queue (p0)	38.47 %
The probability of a queue with	customers...
is pn	%

Waiting time for the Customer Service Representative is 51 minutes with a 61.5%utilization.

5. Redesign:

To redesign the booking-to-cash process for Fotof, We focused on addressing the key pain points and opportunities mentioned in the scenario. Here's a proposed redesign:

Online booking system

Redesign: Implement an online booking system on Fotof's website, allowing customers to easily enter their details and schedule their shooting sessions. The system should provide real-time availability for each studio, reducing the need for phone or email bookings. This is to try to capture all the needed information at once and at the source.

Reason: The problem of many late-shows and No-shows appointments is a significant concern as it results in the wastage of valuable time and resources. To tackle this issue, implementing an online reservation system would be beneficial. This system would automate reminders and provide convenient rescheduling options, resulting in a considerable decrease in the frequency of late-shows and no-shows.

Feasibility: While there is a significant upfront investment required to establish the system, the reduction in no-shows and the enhanced efficiency in managing bookings can help mitigate these initial costs

Centralized Information Systems

Redesign: Implement centralized information systems such as cloud-based document repositories, knowledge bases, or enterprise resource planning (ERP) systems. These systems provide a single source of truth and enable geographically dispersed resources to access and share information seamlessly. For instance, the technician pool can be treated as if they were in central location further increasing efficiency and reducing wait time.

Reason: The problem of turnaround times between the photo shooting session and the availability of pictures for review is a leading customer complaint. To tackle this issue, implementing a consolidated pool of resources would be beneficial.

Feasibility: Medium to High. This requires an initial investment in developing the information system, but the decrease in customer complaints and increased customer satisfaction could offset this over time.

Up-Selling Through Tagging Potential Customers

Redesign: Implement a tagging system on the photo gallery so customers can tag other people included in the photo. A link including the photo can be sent to the potential customer requesting if they would like to get a printed copy or if they would like a special order.

Reason: Management has expressed its desire to increase revenue, and this will be an avenue to prospect potential clients with a sneak peek of the services offered by Fotof..

Feasibility: Medium to High. This requires an initial investment in developing capability, but the increase in customer base would more than offset the cost.

Customer portal

Redesign: Creating a customer portal that enables clients to track their order status, make payments, communicate specific requests, and access their digital photographs..
Reason: By implementing this solution, the company could experience a decline in customer inquiries and achieve a more efficient and streamlined communication process between the company and its customers.
Feasibility: Although there is an upfront cost involved in developing the portal, the long-term benefits of reduced customer service inquiries and increased customer satisfaction could eventually outweigh this initial investment.

Automated Notifications and Reminders

Redesign: Developing an automated system that sends notifications and reminders to customers regarding their appointments, order statuses, and delivery updates.
Reason: Implementing this solution would result in a decrease in the volume of inquiries received by customer service and enhance the overall customer experience.
Feasibility: The expenses associated with implementing an automated system could be balanced out by the decrease in lost revenue caused by no-shows and late-shows

TO- BE MODEL (Executable Model)