

Master Thesis Interaction Technology

Requirements analysis and evaluation of a chat tool for frontline workers and their managers in healthcare and retail

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October 2021

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Foreword

I strongly believe Internal Communication (IC) is an exciting but challenging area to master, even more when it comes to involving frontline workers.

In my previous International Company I had the opportunity to work for, I discovered that as an employee, when communication goes right, you don't really notice it. Everything works smoothly and you can focus on your day-to-day responsibilities. When tools go wrong or wrong strategies are in place, everything feels chaotic and stressful. I have been on both sides throughout my career, both as an employee and as an Employee Services manager. The latter one helped me be more empathic with employees and understand their needs and struggles on a deeper level. I learned the lesson that only when you know your audience well you can call yourself a good communicator.

There are many books and podcasts about how to be a strategic communicator at work, with friends and family. Many other courses and resources relate to being a better manager or leader. All these resources are to be encouraged for consumption for the purpose of being more intentional in how we communicate in these roles.

But we haven't yet prioritized the people who are the actual leaders who help our businesses and hospitals exist - frontline workers.

It took a pandemic to make us rethink their importance and understand better in how many ways we don't thank them enough.

My thesis is a thank you note to all the ones who are doing their best in these times working on the frontline - keeping our families healthy and our tables full of food. I suggest all companies not only have them in mind when implementing strategies but actively involve them when shaping communication.

Abstract

This thesis, done in collaboration with an internal communications company, strives to shed light on two frontline industries - retail and healthcare - by understanding how different organizational layers (frontline and management) communicate, how they feel about it and whether Covid changed anything in their communication strategies and tools. As the research is quite limited on this topic during the pandemic, I started by searching what the literature says about internal communications for frontline and management in the present. In the second stage, I interviewed 56 employees from these layers and industries to better understand their user journeys, jobs to be done and personal opinions about the state of internal communication in their organization. I used the input from the interviews to collaborate with the UX Designer at the company that supports me to devise chat requirements and test a chat feature.

I tested this new chat with 15 frontline and management representatives. From the usability testing sessions conducted it turned out 14/15 would replace the current chat with the designed new chat tool, while some expressed the desire to have pinned messages and read receipts. More quantitative research is needed to validate the findings and the additional features of the chat, as well as the design framework.

Acknowledgements

I thank my main supervisor, Dr. Arjan, a lot for directing me towards the completion of my thesis on a biweekly basis, even taking from personal vacation time to make sure all my paperwork is done. I also thank Dr. Mariet for accepting my invitation to supervise my thesis on such short notice and giving me very relevant feedback. To my company supervisor, for giving me the opportunity to work on such an exciting project and all my colleagues from there for allowing me to grow professionally and personally.

Most importantly, I want to thank my partner Ignacio for being an amazing supporter and distressing me every day with his fun and cheerful personality and my family (parents) and friends (special thanks to Catalina) for giving me hope and motivation. I wouldn't have been able to go through some challenging times without your support! Your friendship and love keep me sane and focused at all times and I am very grateful for your presence in my life that makes it rich in so many ways.

I have grown and understood the importance of prioritization and choosing what is best for me in the long term, and not only in the short term, as well as keeping my mental health in check and taking breaks when needed.

1. Introduction

1.1 Problem

When done right, communication helps organizations to properly educate employees, implement strategies and fulfil their visions. Social media applauds and acknowledges the hard work some organizations do to properly set effective employee communication plans. As an example, Nationwide Building Society was praised for making a great effort to redefine the company vision by engaging all its 18,000 employees worldwide (Talkfreely, 2020). Another example is XPO Transport and Logistics, which, in an attempt to reduce costs and productivity, managed to get employees' ideas even from the hard-to-reach workforce: employees who do not have company phones nor other communication means for easy reach. They were rewarded for their efforts with £156,000 savings in one year (Talkfreely, 2020). Those are a few examples, and the cases continue, people worldwide being grateful for being listened to as employees.

However, when not done right, employee communications not only are not or less effective, but they can even bring negative implications to organizations. Choosing the wrong means of communication to employees leads to increasing their stress and annoyance levels towards their organization (Welch, 2011). For example, in Welch's qualitative study, employees are critical towards how their company spends their budget on paper communication rather than lean towards more economic digital means (e.g. "I think paper newsletters are wasteful (Ref. 6) the waste is actually shameful", or "Glossy brochures and newsletters that are produced for staff internally is a waste of paper (and money) when we can all access the information online (Ref. 61)"). The disagreement on the right approach between the leaders and employees side-track the latter's work motivations and ability to work in a healthy environment.

Frontline workers are particularly exposed to the ineffectiveness of communication since there is a large barrier between them and their organizations, even if frontline workers are the ones who execute the organizational strategy (Balogun et al, 2015). Their importance is emphasized even more during the Covid pandemic since frontline workers continued working on-site and maintaining business operations. Frontline workers are being recognized as the implementers or the ones who push organizations' strategies to completion. Balogun et al (2015) identify five elements that make frontline workers crucial in their roles, in relation to the clientele: (1) the situated physical context; (2) audience composition; (3) the moral order; (4) the talk, actions, and gestures; and (5) the corresponding talk, actions and gestures of the audience. Their skilful relationship-building with clients is the aspect that leads to them being the ones who actually realize a company's strategy. While the management can devise good plans, without the execution done by the frontline, nothing gets properly done.

Being so crucial to bringing strategies to life, their satisfaction should be considered as a component of organizational strategy in itself. Researchers realized that and thus several studies shed light on frontline satisfaction. Noelker et al (2009) study the relationship between frontline workers and their supervisors and how this affects the former's satisfaction level at work. It appears personal stressors

and job-related stressors (particularly finance and education) greatly affect them, to the point that company interventions need to be made to avoid employee turnover.

With the COVID-19 pandemic in 2020, the situation with frontline workers has derailed and highlighted exponentially existing inequalities and unfairness. "Stress", "fear", "anxiety" and "burnout" seem to be at the centre of frontline workers' sentiments. The pandemic has taken a toll on them, making them worried about loved ones, stressed due to isolation and fear of disease as well as anxious about lack of protective equipment and job security (Moitra et al, 2021). The topic thus deserves to be studied more deeply to understand how technology can play a role in releasing some of this stress and improving the professional lives of frontline workers.

Recent post-Covid studies have started to articulate how the COVID crisis hit several companies and countries, as well as their most successful strategies to cope with it. In Germany for example, over 900 employees praised their organizations, mentioning great communication at the beginning and during the pandemic, dissemination of important information, participative communication and transparency as being top factors of a great strategy (Ecklebe and Löffler, 2021). Other 490 employees from the United States also bring transparency into the discussion, since for them it is a coping mechanism for uncertainty, and fostering genuine working relationships (Li et al, 2021).

However, more research is needed to understand what tools are being used by different organizational layers and to capture the qualitative aspect of the needs of frontline workers, their managers and upper management.

With all this in mind, I hope to contribute to the existing research on frontline workers by interviewing communication experts, frontline workers, and their managers, as well as upper-management, to devise a more complete understanding of what tools and what design principles need to be used nowadays for efficient IC for frontline workers. I have worked as a User Researcher to support and advise them, in an agile way, what features are valuable for the frontline IC market and how these features can be designed and tested to improve the frontline workers and their managers' experience.

1.2 Company Context

For my thesis, I have collaborated with a company that operates in the advocacy space (whose name I cannot, unfortunately, mention due to this thesis being confidential). In the following two sections I will present what is their mission and their product functionalities. It is important to know these to understand the existent functionalities and specifically what is not yet available in the product. This will help later in the research to see what is most important for frontline workers and their managers that the current product does not have yet and prioritize it in development.

1.2.1 Mission

The mission of the company is to support businesses by allowing their employees to easily share information on their social media, acting as brand ambassadors. At the same time, the company desires to enter the IC market by helping every employee be up to date with the latest organizational communications.

While being a leader in advocacy, the company does not however fulfil the needs of the IC market according to their sales teams. With more than 70% of the IC market containing frontline workers, it became important to them to understand who frontline workers are, their responsibilities, their relation with other organizational layers and how to design new features for them.

1.2.2 Product

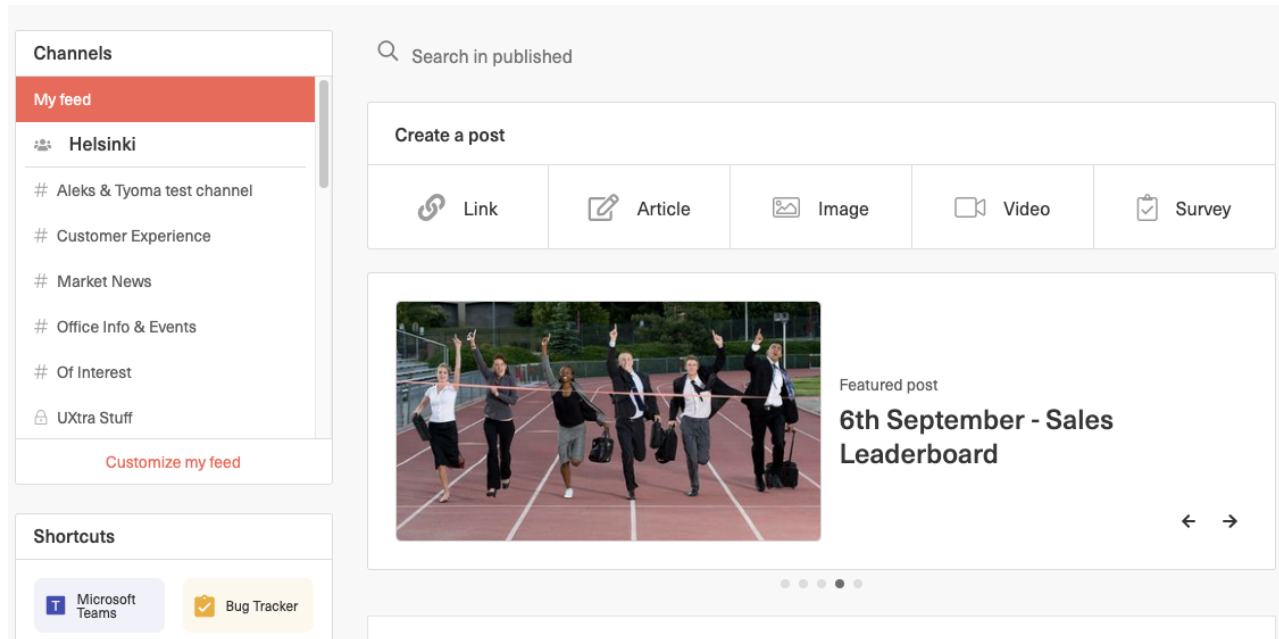


Figure 1. Product Main Page - Channels and Post Creation

My company's product has been built to suit the needs of the employee advocacy market. Employee advocacy is a term that refers to leveraging an organization's employees to promote the business brand, particularly through social media (Thelen et al, 2020).

The product's main objective is to allow its users to create content and share their own or other colleagues' content on their preferred social media channel (Figure 1). Therefore, the two core actions that the product can do are allowing employees to:


- create content (external link, article, image, video, survey)
- share the content on social media

Besides these two functionalities, the product offers the possibility to end-users to add files through the Resources section (Figure 2), particularly digital files have quick access to internal or external links through shortcuts (Figure 3) and compete in the number of external shares through the company leaderboard (Figure 4).


Resources: Helsinki ▾

Pages Files


[+ New resource](#)




24/7 Technical Emergency Support Process ...



Customer Success information ...



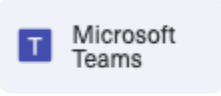

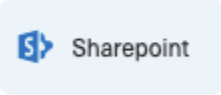
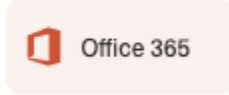
eBooks & Customer Stories ...



Gift & Reward forms ...

Figure 2. Product Resources Section

Shortcuts

 Microsoft Teams	 Bug Tracker
 Sharepoint	 Office 365

[Show all Shortcuts](#)

Figure 3. Product Shortcuts Section

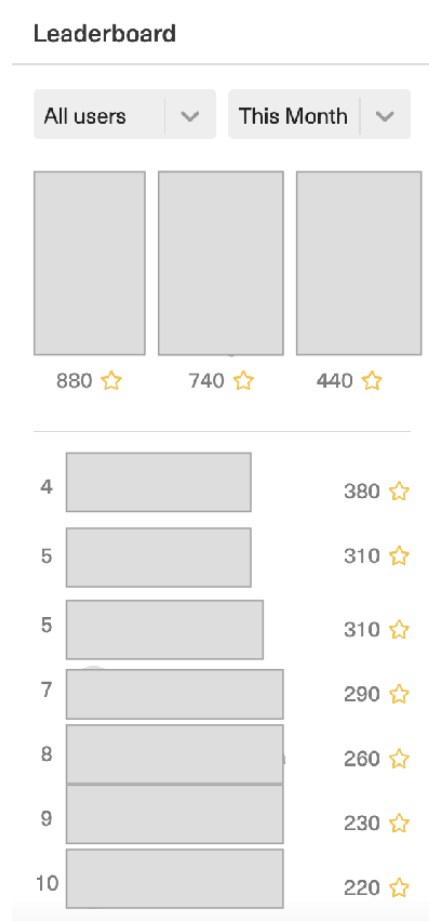


Figure 4. Product Leaderboard Section

On a high level, there are two types of users:

- Sharers - end-users who propose content and share existing approved content from the platform to social media
- Admins - users who approve and reject content and analyze how the organization is performing on the platform

For admins, additional functionality is available - analytics (Figure 5). With analytics, admins can see how users' posts are performing internally and on social media.

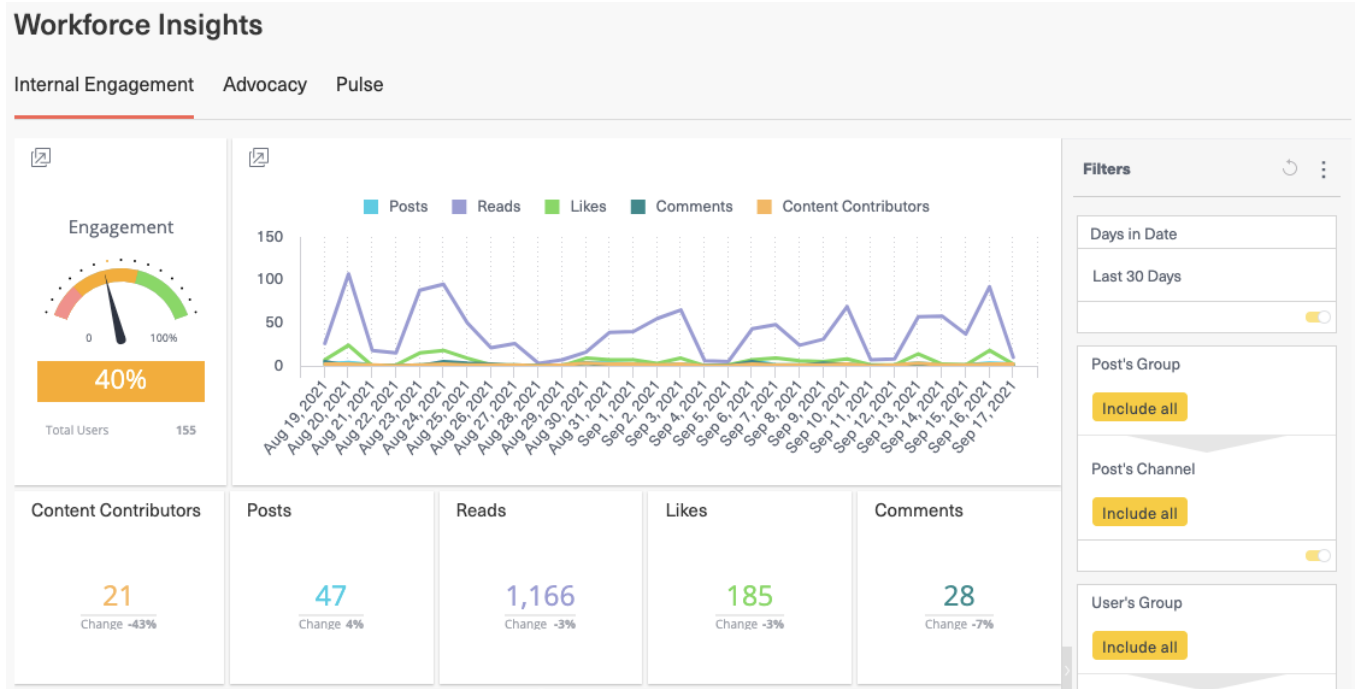


Figure 5. Product Analytics Section

1.3 Research Questions

Given the lack of a recent overview of digital IC tools used by frontline workers during the Covid crisis, the goal of this thesis consists of understanding the IC landscape of big frontline organizations in Europe and the U.S. This research draws on mapping the interactions, tools and feelings of the following groups of people:

- Frontline workers' needs and pains in information exchange with the employer and co-workers
- Communicators on the corporate level's needs and pains in information exchange with the frontline workers

Thus, the research questions posed are:

RQ: How could the ideal tool be designed to support frontline workers IC within these different layers of hierarchy during Covid times for the company product?

The sub-questions that accompany this main question are:

RQ 1.1. What are the user journeys and various channels each hierarchical level uses to keep every employee updated on recurrent changes currently?

This RQ questions can be broken down into several other subquestions:

RQ1.1.1. What are the frontline industries worth exploring in terms of communication?

RQ1.1.2. What are the job roles worth exploring in those industries?

RQ1.1.3. What are these roles' user journeys?

RQ1.1.3. What are these roles' IC channels?

RQ 1.2. How did the Covid pandemic change the tools of frontline workers?

RQ 1.3. What is the most relevant feature for each organizational layer that the current product does not have?

RQ 1.4 How can this selected feature be evaluated?

1.4 Thesis Outline

The following thesis outline in Figure 6 showcases the main chapters of this document and describes them, to be easier comprehended. All chapters have the sole purpose of investigating the research topic of the thesis - IC - in its current research state as well as add an updated view of IC to the research community. This chapter is meant to introduce the problem, research questions arising from it and company content to better understand the full picture of why this thesis is important and relevant. Then, a literature review is considered, outlining what the literature can teach about the problem and the research questions. A description of how the thesis questions is followed as well as revealing the findings from the interviews with the selected user groups. At the end, from these interviews, a feature is selected to be built by the company I collaborated with and evaluated it with a couple of representatives from the selected user groups.

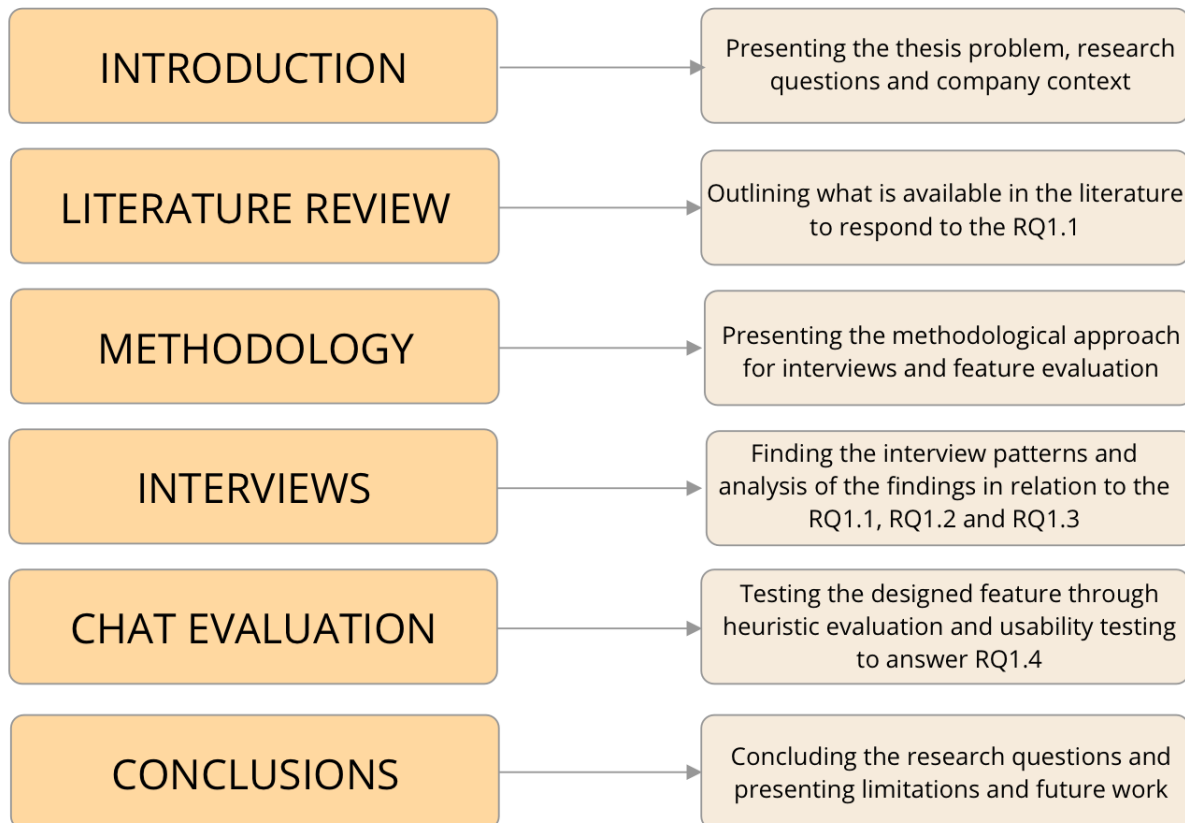


Figure 6. Visual Overview of the Thesis Structure

2. Literature Review

In the next chapters, I will introduce what internal communications (IC) is, what are the channels being used in IC, as well as zooming into the frontline industries and the roles that operate within them. This chapter seeks to answer RQ1.1 through secondary research, by understanding better what information is already available about IC and frontline workers in the literature and what needs more research.

2.1 IC Field

This section is partially based on Mihalache (2021), which explores the space of IC. The topic of IC has reached academia quite recently, researchers acknowledging the importance of it and placing it in the top 5 areas of public relations and communication management (Vercic, 2012). There is not much understanding in the literature of the exact current definition of IC. A reason for that can be that IC is different for each organization, even country, and culture, and therefore its definition is fluid over different cultures. Another reason can be that the evolution of the domain has been so drastic that its definition also developed dramatically. A trial of defining IC is done by Vercic et al (2012), who define IC as being "a management function in charge of intra-organizational communication, [...] integrating elements of human resources management, communication and marketing".

The preferred company channels in IC are dependent on the key goals communications managers want to achieve. In their market report, Ellwood Atfield and Comres (2017) have studied the changing facets of channels, and highlight that the main goal companies want to achieve through these channels is leveraging them as a tool to understand business goals and strategic decisions, goals predicted to increase in importance in the upcoming years. Building brand advocacy is a relatively new goal that organizations have realized could be a means to strengthen reputation, as well as employee engagement and retention. Men (2014) reveals the preferred means of communication for employees, which in 2014 were email for urgent communication and face-to-face means. Social media had not yet been successfully leveraged in IC, being quite new at that time. More recently, however, El-Bash (2020) examines the existent digital tools by interviewing experienced sales managers and social media appears more and more on the radar. What also came across is that while digitalization is a frequent term, almost ubiquitous today, people still struggle to find what they need. The problem currently is not deploying technologies, but rather having an abundance of technologies available and not knowing what should be used when. Social media comes into play, being currently used mostly "to get employees talking to each other and reduce silos" (Ellwood Atfield and Comres, 2017).

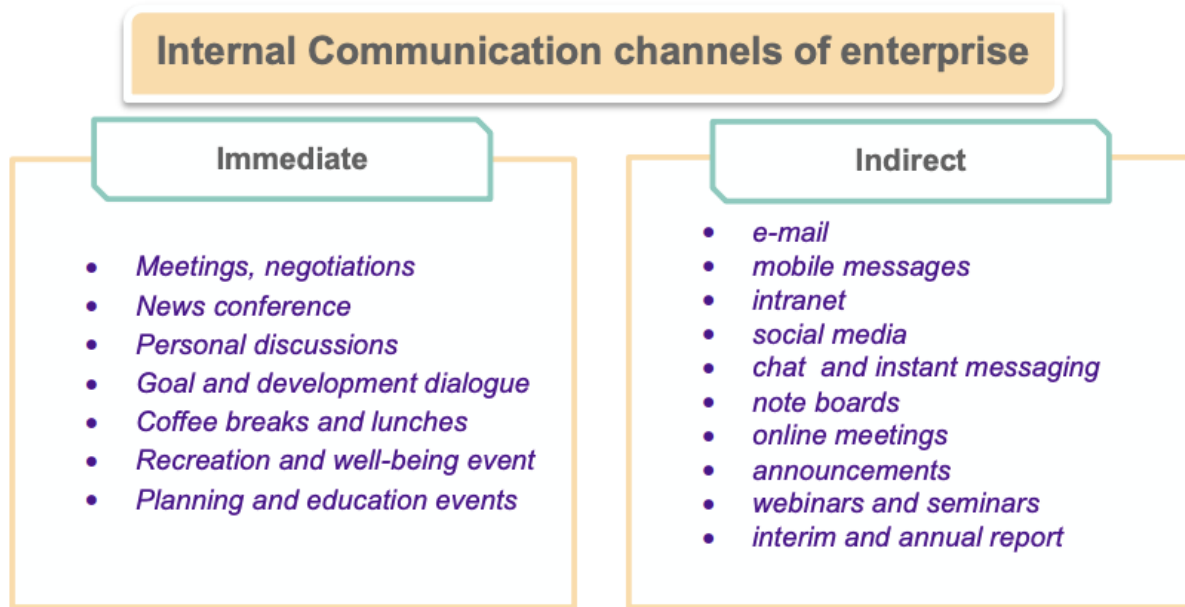


Figure 7. Immediate and Indirect Channels of Communication. Source: Honkala et al, 2017

I found the latest research on available communication channels to divide IC into two types of channels: immediate and indirect (Figure 7, Honkala et al. 2017). Immediate communication is mostly conducted face-to-face, while indirect communication leverages devices and digital tools. Due to its predominant digital nature, I find indirect communication of particular interest. To what extent the previous channels apply to frontline workers is not clear from this research.

The IC topic is of interest to all companies across the globe. For the purpose of this thesis, however, I will focus on Europe and the United States (US), due to being the two markets where my company operates and would like to expand.

Zooming into the organisations' space, the literature reveals that essential workers or frontline workers make up to 70% of all workers (Econofact, 2021). Due to this high percentage, it is therefore important to consider their role when entering this new market. An assumption that the sales team of my company has is that leaders consider them important and are interested in keeping frontline workers up to date with the latest information. 464 executives admit that their frontline employees are not yet equipped with the digital tools that would allow them to make good work decisions, especially when it comes to communication and collaboration tools (Harvard Business Review, 2020).

Having taken the decision to target frontline workers in Europe and the US, I looked at what research says are the most important industries that I could cover to narrow down the scope of the thesis. Looking at current studies, the industries which employ the largest number of frontline workers are healthcare, followed by retail, manufacturing, and construction (Blau et al, 2020). We decided then to proceed with healthcare and retail industries due to the previous attempts of those industries to reach out to our company representatives for demo purposes and also due to being essential industries, as food and healthcare are the most important services for meeting basic human needs.

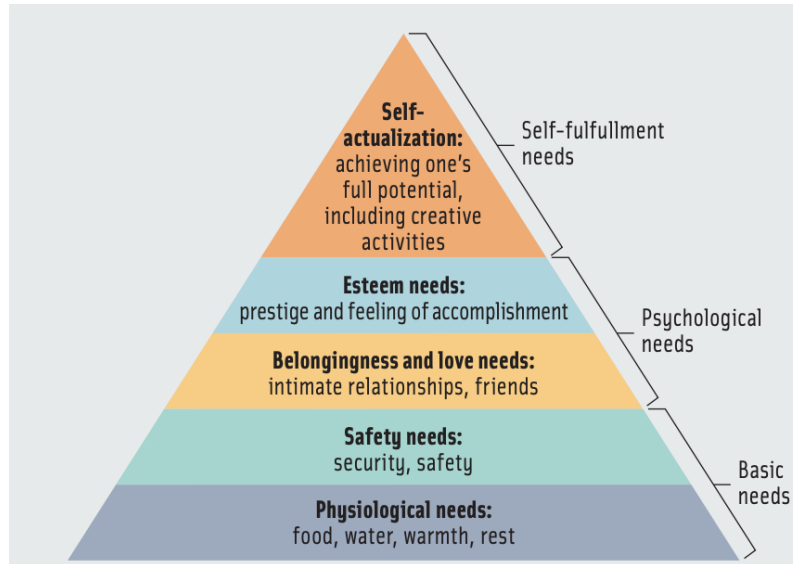


Figure 8. Maslow's Hierarchy of Needs, by Bob Poston, 2009

2.2 Retail

Retail, according to the official dictionary definition, is "the activity of selling goods to the public, usually in shops" (Cambridge Dictionary, 2021). The industry is interesting to study from a communication perspective due to its complicated setup called retail supply chain.

Figure 9 showcases how the retail chain is structured. In retail, the communication starts from the suppliers, who can be of multiple tiers. Then it passes through the OEM (Original Equipment Manufacturers) and through distributors as well before reaching retailers. There are therefore at least 3 external parties involved in the supply chain. How communication reaches out through the business leaders to the last frontier - frontline workers - is therefore interesting to study.

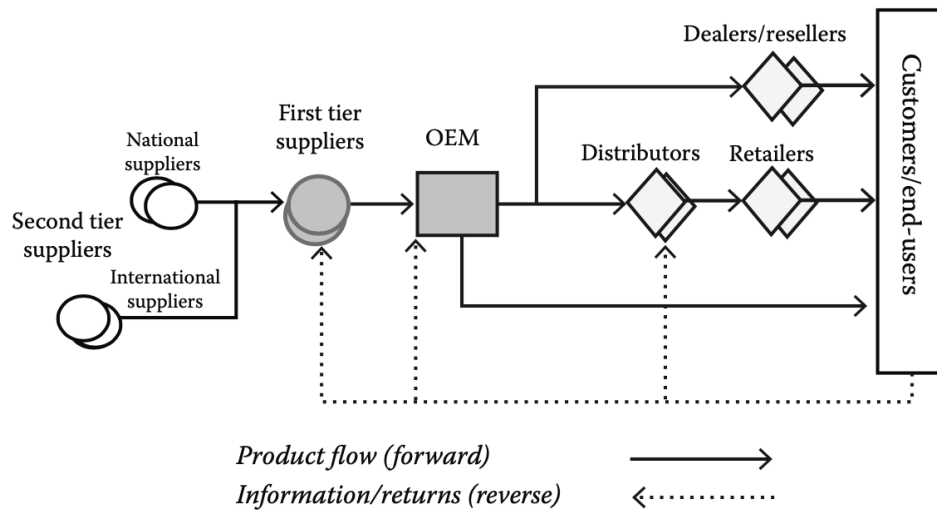


Figure 9. Retail Supply Chain. From Ayers & Odegaard, 2017.

The retail industry is quite complex and retails a variety of categories and specializations in their products and services. Showcased in Figure 10 are all the categories described by the North American Industry Classification System.

<i>Code</i>	<i>Descriptions of Product Category</i>	<i>Description</i>
441	Motor vehicles and parts	Retail motor vehicles and parts from fixed point-of-sale locations. Typically operate from showrooms or open lots.
442	Furniture and home furnishing stores	Sellers of new furniture and home furnishings from stores. Usually operate showrooms and have substantial areas for presentation of products. Many offer interior decorating.
443	Electronics and appliance stores	Electronics and appliances from point-of-sale locations. Use floor displays to demonstrate products. Staff is knowledgeable in features and warranties and may include trained repair persons.
444	Building material and garden equipment and supplies	New building material and garden equipment and supplies from fixed locations. Display equipment designed to handle lumber and related products and garden equipment and supplies. Staff knowledgeable in use of products for construction, repair, and maintenance of the home and associated grounds.
445	Food and beverage stores	Sell retail food and beverages from stores. Have equipment (e.g., freezers, refrigerated display cases, refrigerators) for displaying food and beverages. Staff trained in the processing of food products to guarantee the proper storage and sanitary conditions.
446	Health and personal care stores	Retail health and personal care merchandise from stores. Staff may include pharmacists, opticians, and other professionals advising customers, or fitting the product sold to the customer's needs.
447	Gasoline stations	Retail automotive fuels (e.g., gasoline, diesel fuel, and gasohol) and automotive oils with or without convenience stores. Have specialized equipment for the storage and dispensing of automotive fuels.

<i>Code</i>	<i>Descriptions of Product Category</i>	<i>Description</i>
448	Clothing and clothing accessories stores	New clothing and accessories. Establishments have display equipment and staff knowledgeable in fashion trends and the proper match of styles, colors, and combinations of clothing and accessories.
451	Sporting goods, hobby, book, and music stores	Provide expertise on use of sporting equipment or other leisure activities, such as needlework and musical instruments. Bookstores also included.
452	General merchandise stores	Unique establishments in that they have the equipment and staff capable of retailing a variety of goods. Include varied display equipment and staff trained to provide information.
453	Miscellaneous store retailers	Retail merchandise from stores that are different from those of other sectors. Many are unique. Examples include florists, used merchandise stores, pet and pet supply stores, and others.
454	Nonstore retailers	Nonstore examples that include broadcasting of infomercials, the broadcasting and publishing of direct-response advertising, the publishing of paper and electronic catalogs, door-to-door solicitation, in-home demonstration, selling from portable stalls, and distribution through vending machines. Establishments include mail-order houses, vending machine operators, home delivery sales, door-to-door sales, party plan sales, electronic shopping, and sales through portable stalls (e.g., street vendors, except food). Also includes direct sale of products, such as home heating oil dealers and newspaper delivery.

Figure 10. Business Categories in Retail. Source: North American Industry Classification System (NAICS).

As the target was to narrow the essential retail stores, I decided to primarily consider, for this topic, general merchandise stores, which contain food and beverages besides other items. The focus is primarily large grocery stores, such as supermarkets or hypermarkets, part of bigger store chains. The assumption behind choosing this type of retail store to study was that since they contain food and beverages they would need staff prepared to properly store those items. On top of that, since they will have additional items in the store, their level of awareness needs to be high enough to respond to different customers' queries.

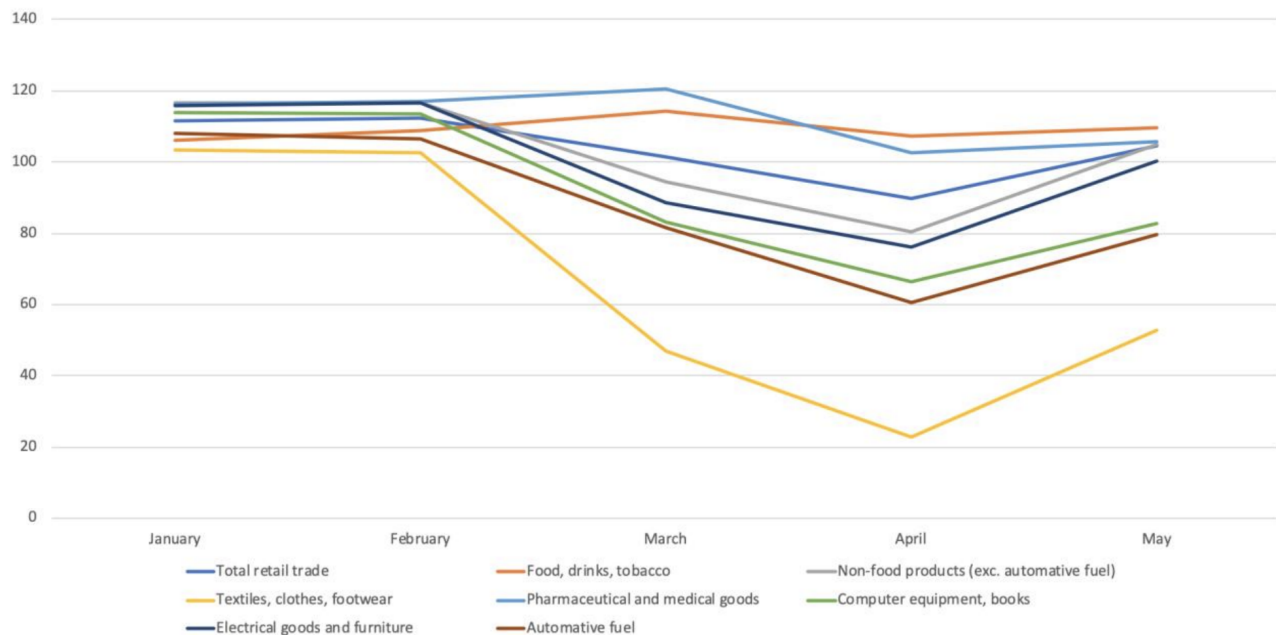


Figure 11. Development of retail trade volume according to product groups, January to May 2020.
Source: Eurostat (July 2020)

According to Figure 11, the assumption is correct, since in Europe the highest consumption in retail was driven by food, drinks and tobacco, followed by pharmaceutical and medical goods and non-food products.

During the 2019 Covid pandemic, the retail industry has been impacted, but not necessarily as abruptly as one would have expected. There were some speculations that due to the pandemic, the retail workers will be replaced by self-checkouts, but several studies reported that the frontline staff is still important, having a positive impact on store loyalty, store quality and customer satisfaction compared to self-checkout stores (Piyush et al, 2021).

Regarding the changes that did take place during Covid, in Germany for example, there has been an increase in e-grocery amongst the city population, but overall there doesn't seem to be a fundamental shift to online food retail as one would expect (Dannenberg et al, 2020).

There hasn't been a lot of research found on what communication channels the frontline workers in large grocery stores have used during the pandemic. In the existent literature, some of the communication channels that are frequently mentioned are:

- Face to face

The most mentioned channel still remains face-to-face even during the pandemic. Both top-down communication and also communication between employees are inherently face-to-face. This can potentially be the cause of frontline workers mentioning a friendly work atmosphere due to the social aspect. 93.5% of workers in one of the biggest Russian retailers note a great collegial relationship due to their frequent face-to-face interaction (Akhmetshin et al, 2020). Personal management meetings also have a great effect on employees, due to their possibility to receive an immediate reaction and

openly express ideas and feedback. However, only having face-to-face communication is not scalable, as managers cannot address their employees efficiently face-to-face.

- Surveys and polls

Gathering information through surveys and polls is a common practice in the retail industry. These are particularly used for assessing the internal perceptions of employees on the success or failure of the organization's communication strategy (Akhmetshin et al, 2020).

- Email

Even with the multitude of digital tools available nowadays, email still remains a highly used channel, particularly by retail managers. The reason for this usage is that it is a highly scalable tool: managers can create email communications in their own time and send them to hundreds of employees or even more at the same time.

- Chat

Digital messenger tools are also used in the retail industry, as a way to develop personal relationships between managers and employees and quickly communicate operational updates. Whatsapp for example is one of the most popular tools used in retail, allowing up to 256 people to chat at any time (Agrawal, 2020).

It is important to mention that frontline workers do not have access to corporate mobile phones, so when it comes to surveys and polls, email and chat, all the messages from those channels are distributed to their personal phones. One thing to pay attention to when it comes to methodology in chapter 3 is to see whether this has changed and managers decided to invest more in their employees' platforms or they continued to distribute messages on their personal phones.

2.2.1 Frontline Workers

When it comes to frontline workers in retail, let's first define who they are and what their characteristics are. A study conducted on frontline workers in retail sheds light on this. In the US the most recent data we have is from 2015 when approximately 12.6 million retail workers were employed. While the literature does not define concretely frontline jobs, what is generally meant by that is "retail jobs that require minimal or no prior experience" (Pamela & Kelly, 2019).

For this thesis, it was chosen to particularly focus on retail frontline workers who directly communicate with customers, since they need to be best prepared for sharing information with customers and supporting them in their sales process. From Figure 12 of existent retail jobs, I then chose to focus particularly on cashiers, customer service representatives and retail salespersons based on their job descriptions that require direct customer collaboration.

A **cashier's** job is to "receive and disburse money in establishments" (Figure 12) by handling scanners, cash registers and validating cash or card transactions. Their main job to be done is to make sure the payment of customers is done successfully through the relevant tools.

A **customer service representative** has to continuously interact with customers to answer their questions and fulfil their requests. Their main job-to-be-done is knowing all the information needed to inform any customer accordingly.

Finally, a **retail salesperson** is in charge of selling the product to customers, so knowing sales techniques and product information are core jobs-to-be-done by them.

Occupation	Description
Cashiers	Receive and disburse money in establishments other than financial institutions. May use electronic scanners, cash registers, or related equipment. May process credit or debit card transactions and validate checks.
Counter and rental clerks	Receive orders, generally in person, for repairs, rentals, and services. May describe available options, compute costs, and accept payment.
Customer service representatives ^a	Interact with customers to provide information in response to inquiries about products and services and to handle and resolve complaints.
Door-to-door sales workers, street vendors	Sell goods or services door to door or on the street.
Driver/sales workers	Drive truck or other vehicle over established routes or within an established territory and sell or deliver goods, such as food products, including restaurant take-out items, or pick up or deliver items such as commercial laundry. May also take orders, collect payment, or stock merchandise at point of delivery. Includes newspaper delivery drivers.
Laborers and freight, stock, and material movers, hand ^a	Manually move freight, stock, or other materials or perform other general labor. Jobs within retail industry.
Order clerks ^a	Receive and process incoming orders for materials, merchandise, classified ads, or services such as repairs, installations, or rental of facilities. Generally receive orders via mail, phone, fax, or other electronic means. Jobs within retail industry.
Packers and packagers, by hand	Pack or package by hand a wide variety of products and materials. Jobs within retail industry.
Parts salespersons	Sell spare and replacement parts and equipment in repair shop or parts store.
Receptionists and information clerks ^a	Answer inquiries and provide information to the general public, customers, visitors, and other interested parties regarding activities conducted at establishment and location of departments, offices, and employees within the organization. Jobs within retail industry.
Retail salespersons	Sell merchandise, such as furniture, motor vehicles, appliances, or apparel to consumers.
Sales and related workers, other	All sales and related workers not listed in other categories.
Services sales representatives, other	All services sales representatives not listed in other categories.
Shipping, receiving, and traffic clerks ^a	Verify and maintain records on incoming and outgoing shipments. Prepare items for shipment. Jobs within retail industry.
Stock clerks and order fillers	Receive, store, and issue sales floor merchandise. Stock shelves, racks, cases, bins, and tables with merchandise and arrange merchandise displays to attract customers. May periodically take physical count of stock or check and mark merchandise.
Telemarketers ^a	Solicit donations or orders for goods or services over the telephone. Jobs within retail industry.

Figure 12. Types of retail jobs. Source: US Department of Labor O*NET, <https://www.onetonline.org/>.

When looking in more detail at those selected roles, I searched articles that showcase how those roles look like. After cross-checking articles found on this topic (OwlGuru, 2021; Monster, 2021), the activities found that these roles accomplish are:

Cashiers

- Receive payment by cash, check, credit cards, vouchers, or automatic debits.
- Issue receipts, refunds, credits, or changes due to customers.
- Assist customers by providing information and resolving their complaints.
- Establish or identify prices of goods, services or admission, and tabulate bills using calculators, cash registers, or optical price scanners.
- Greet customers entering establishments

Customer service representative

- Serves customers by providing product and service information and resolving product and service problems.
- Attracts potential customers by answering product and service questions and suggesting information about other products and services.
- Opens customer accounts by recording account information.
- Maintains customer records by updating account information.
- Resolves product or service problems by clarifying the customer's complaint, determining the cause of the problem, selecting and explaining the best solution to solve the problem, expediting correction or adjustment, and following up to ensure resolution.
- Maintains financial accounts by processing customer adjustments.
- Recommends potential products or services to management by collecting customer information and analyzing customer needs.
- Prepares product or service reports by collecting and analyzing customer information.
- Contributes to team effort by accomplishing related results as needed.

Sales Retail

- Greet customers and ascertain what each customer wants or needs.
- Describe merchandise and explain the use, operation, and care of merchandise to customers.
- Recommend, select, and help locate or obtain merchandise based on customer needs and desires.
- Compute sales prices, total purchases, and receive and process cash or credit payments.
- Answer questions regarding the store and its merchandise

2.2.2 Managers

Another user group that is necessary to consider in the context of this thesis, is frontline workers' superiors.

One specific role found extensively in the literature is the store manager, the role that supervises the entire store as well as all employees in the store (Kesavan, 2021). A fundamental job of this role found in the literature is the scheduling process, as store managers need to properly create and communicate a work schedule for all employees. They might also take care of operations, so knowing finances, operations and collaboration practices are essential skills this role needs to have to succeed.

In the recent decades, since retail has become a competitive environment due to the domination of multiple businesses in the market, as well as offering day but also evening or even overnight retail services, the retail managerial role has also changed a lot. Smith and Elliot (2012) bring to the reader the responsibilities and challenges of a store manager, Fiona, who handles a large store from the UK, part of a bigger store chain. Her responsibilities are running the store unit, from receiving a budget from the corporate store and spending it as she sees fit, to hiring employees and managing them. Communication wise, she mentions phoning her boss and employees whenever needed to quickly solve issues or discuss scheduling matters.

Another role is showcased through an interview script shared by students of Dr. Emily Satterwhite's HUM 2504 Introduction to American Studies class (Bryan, 2014), in which Bryan, a Shift Manager at Burger King, shares his typical day at the store. He usually arrives at the store at 8 or 9 pm, and referring to his employees, he "get along with them quite well. As long as they're respectful of me, and I treat them with respect as well, and we all work together, we get along pretty well. Every now and then you run into employees who are just plain lazy, or completely inept at their job, and then I have trouble getting along with them, naturally. But otherwise, I get along with them fairly well."

There is not much information about their communication tools or practices though, and therefore a more extensive study is needed to zoom into this area.

2.3 Healthcare

The healthcare industry is also divided into many categories and subcategories, having both a governmental aspect with public hospitals and pharmacies, but also private, with private businesses. The main industries in healthcare are pharmaceuticals, biotechnology, equipment, distribution, facilities and managed healthcare (Ledesma et al, n.d.).

A brief description of these industries is offered below:

- Pharmaceutical - this industry manufactures patient drugs using chemical processes
- Biotechnology - quite similar to pharmaceuticals, this industry manufactures patient drugs, but using biological processes. This industry is quite new and innovative.
- Equipment - industry in charge of manufacturing the equipment needed for the healthcare professionals to use in hospitals
- Distribution - industry representing all wholesalers and distributors of healthcare products

- Facilities - main industry of patient care, where healthcare professionals practice medicine and take care of patients
- Managed healthcare - industry managing healthcare insurances

From the list presented above, we considered pharmaceuticals and facilities core for the market and citizens. Considering the history of healthcare, one of the first medicine practices has been started by healthcare professionals working in minimalistic Healthcare Facilities, who produced pharmaceuticals themselves and distributed them to the closest population (Sheingold, 2014). Only later on proper technology and distribution channels were developed, and very recently more advanced facilities of Biotechnology. We therefore drew the conclusion that even if the other industries are highly important and lead to an efficient and scalable process of distributing healthcare services, Healthcare Facilities and Pharmaceuticals are core in the overall healthcare industry.

The Facilities industry is particularly interesting to study from a communication perspective, since there are multiple practitioners involved in maintaining an operational healthcare organization. Therefore, for the purpose of this thesis, the healthcare organizations considered are part of the Facilities industry: public and private hospitals.

Compared to other industries, studies show that the healthcare industry has not been deeply impacted by the pandemic. The lowest point was considered to be in April 2019, when indeed the industry suffered the biggest losses; however it is showcased in studies that the sector managed to "recover by 98% to pre-crisis levels" (de Vet et al, 2021).

When it comes to communication in hospitals, clinicians spend around 89% of the time avoiding communication overload. The first channel remains in healthcare still face-to-face, the same as in retail, similarly followed by email and chat. Additionally to the retail industry, healthcare workers also rely on paging and patient electronic records (EMR), with some also mentioning mobile devices called "Vocera" (voice communication system) and public boards (white boards, visual boards, flyers). It's no surprise then that the issue is there's too much information shared since there are a multitude of tools used by healthcare professionals (Barrett et al, 2020).

2.3.1 Frontline workers

Frontline workers in healthcare have a variety of roles, with the most common ones being doctors, nurses and pharmacists. Their common characteristic is that they provide care directly to patients or communities (Health Workers Coalition, 2021).

Informal articles draw a picture of how the day in the life of a doctor, nurse and pharmacist looks like. I started analyzing them by searching on Internet the "Day in the life of a healthcare professional"

After analyzing articles related to a day in the life of a healthcare professional (EasyUni, 2021; Bibhash Mitra, 2016; Doctor Nosa, 2019; Ameritech. 2017; Indeed, 2021; RegisteredNurseRN.com, 2021; Medacs Healthcare, 2019), I extracted the following tasks for the healthcare roles by cross-checking all relevant articles specific to a certain role:

Doctors:

1. Arrive at the hospital
2. Check the schedule for the day
3. Check patients' profile

4. Read healthcare knowledge, patient leaflets
5. Make phone calls
6. Check paperwork
7. Meet with staff to discuss patients and practice aspects
8. Break
9. Home Visits
10. Fill in paperwork
11. Discharge patients
12. Check final paperwork
13. Leave to home

Nurses:

1. Arrive at the hospital
2. Receive information from the previous shift nurse
3. Do morning rounds on patients and record their status
4. Performing physical examinations
5. Taking patient vital signs, measurements and medical histories
6. Asking about the patient's symptoms
7. Drawing blood samples
8. Requesting and conducting diagnostic tests
9. Recommending care options to physicians
10. Administering medication
11. Maintaining accurate and detailed record
12. Consulting with other health care providers
13. Educating patients on how to manage their conditions
14. Providing emotional support to patients and their families
15. Implementing and assessing care plans
16. Recommending sources of support for patients
17. Sharing relevant patient information at shift change such as admissions, discharges and changes in patient's conditions
18. Setting up treatment rooms
19. Sanitizing and assembling medical equipment
20. Checking and counting medication
21. Completing patient assessments
22. Administering wound care
23. Changing dressings
24. Consulting with other healthcare providers
25. Break
26. Do afternoon rounds, check patients and administer medications
27. Give information to the next nurse shift
28. Leave home

Pharmacists:

1. Filling prescriptions
2. Inspecting drug charts

3. Check patient's medicines
4. Stocking medicines
5. Discharge patient preparation
6. Informing patients about drugs
7. Maintaining patient records

2.3.2 Managers

The healthcare management role can be even broader than the frontline roles.

I found several responsibilities to be the most common in healthcare, inspired by the article from Healthcare Management Degree (2021):

- Nursing Home Administrators: manage staff, finances, admissions and operational activities of the home care building
- Clinical Managers: manage finances and operations of a specific department (which can be surgery, nursing, physical therapy, etc)
- Health Information Managers: manage patient private records and healthcare laws and regulations
- Assistant Administrators: support previously mentioned roles in handling daily operations and decisions

The commonality of those roles, compared to frontline workers, is that they usually manage operations, finances and other people. Due to this connection with people, no role will be disregarded from this list for the purpose of this thesis since all of them can shed light on how they collaborate and communicate with frontline workers.

Compared to frontline workers, their tasks are broad, not detailed, and can depend on the hospital centre. Therefore, more research is needed to dive into what exact tasks they have and how they accomplish their roles.

2.4. Differences Europe versus US

When designing a tool for several locations across the globe, it becomes important to also understand the differences in mentality between these regions, as these differences can influence whether certain functionalities are adopted or not.

A more informal source points to the fact that the culture influences IC a lot. Barfield (2018) shares from her experience of working in both environments that U.S. employees are used to making meaningful connections at work in a relatively short time frame. In Europe, it usually takes more time to build trust between peers. The type of communication is mixed within Europe, with British people being polite and indirect, Nordics being straightforward and colder, and Southern Europeans being casual and more friendly (Barfield, 2018). Another example shared by her is that being multilingual is a nice addition in the U.S., but many times mandatory in Europe: *For example, a business in Switzerland by default already needs to communicate in French and German, the country's two biggest languages. Additionally, they will likely need to have the international language of English, and Italian, the nation's next biggest official language. That's four languages just to operate in their own country. If they want to expand*

elsewhere in Europe, additional training will be required (Urban, n.d.). The language of the application should therefore be considered more in Europe, while in the US English only can be enough.

The existing literature examines the role of communication in these two continents. A study conducted by Swerling et al (2014), highlights the difference of adoption in digital tools which puts the USA 20 points higher in usage of digital tools compared to Europe. The authors attribute this to the fact that while Europe has tried over time to implement digital strategies such as social media, the cultural differences and multilingual environment have been obstacles against moving forward quicker with their practices. Another important difference between the two continents was that US-based communication practitioners are substantially more positive about their influence within organizations, mentioning that communication practices are taken seriously compared to Europe. This might be due to their extensive use of social media embedded in the infrastructure itself, as Americans use social media 20 points higher than Europeans (Swerling et al, 2014).

In an opposing view, it appears though that ultimately, US companies, as much prepared for communication as they are, don't prioritize IC as Europeans do (Bolden-Barrett, 2018). In many cases, IC is embedded in other departments, making it difficult to be prioritized and tracked consistently. Only 9% of companies in the US performed a communication audit in the past 3 years (Bolden-Barrett, 2018). Companies in Europe might therefore be more interested to promote IC aggressively than the US. Nevertheless, it is interesting to explore if things have changed since 2014 and if they differ

2.5 Conclusions

To conclude our literature review, I will respond with the existing information to the first research question:

RQ 1.1. What are the user journeys and various channels each hierarchical level in frontline industries uses to keep every employee updated on recurrent changes currently?

RQ1.1.1. What are the frontline industries worth exploring in terms of communication?

I selected for the purpose of this thesis the retail and healthcare industries to study due to their large numbers of frontline workers employed compared to other industries. From each industry, I have selected the sub-industries most relevant to study from a communications perspective: General Merchandise stores in retail and Facilities in Healthcare due to their complex communication setup.

RQ1.1.2. What are the job roles worth exploring in those industries?

In Healthcare Facilities and Pharmacies, the roles from the frontline I selected to study closely are nurses, pharmacists and doctors, while from mid-management I will dive deeper into Clinical Managers and Assistant Administrators.

In the Retail industry, I selected cashiers, customer service representatives and salespersons roles, while from the management I would need to dive deeper into shift manager and store manager roles.

RQ1.1.3. What are these roles' user journeys?

The user journeys of frontline workers are more defined than for the management roles. The known user journeys and responsibilities have been described in chapters 2.2 and 2.3, but there are some question marks remaining for them: for frontline the confusion still remains if those are updated or if they changed in any way because of the pandemic, while the user journeys for managers still need to be explored in more details. It is therefore important to gather more information from those roles and better understand the IC aspect of their work.

RQ1.1.3. What are these roles' IC channels?

The channels where retail frontline workers were found to communicate are face-to-face, email, chat. The channels where healthcare frontline workers were found to communicate are face-to-face, email, chat, paging and patient electronic records (EMR), with some also mentioning mobile devices called "Vocera" (voice communication system) and public boards (whiteboards, visual boards, flyers).

As chat, voice communication and emails are not functionalities that the product currently has, those could be potential features to be explored for retail and healthcare. Particular interest should be paid to those functionalities in this research.

3. Methodology

When it comes to the methodology of this thesis, I will first give a brief context of the types of research questions used in academics and the different techniques which can be used to answer them.

There are three types of research questions that can be used in a research study: descriptive, predictive, or causal (Kamper, 2020). Descriptive questions provide an overview of a situation and can be both collected at a single point in time (cross-sectional) or at multiple points (longitudinal). Predictive questions, as the name suggests, have the objective of forming expectations about the future. Lastly, causal questions seek to identify if a certain entity causes a particular outcome. Since our main research question seeks to understand “how” an ideal tool can be designed and seeks to explore the present available situation of frontline workers and their managers, the type of research question is descriptive.

Since my main research question seeks to answer "how" a tool can be "designed" to support a "user group", there are multiple perspectives to keep track of. First of all, if I am looking to design a tool for a user group under certain conditions (in this case the Covid pandemic), then I need an understanding of what is the journey of a user group, how do they use the current tools, and most importantly, what they lack from them, information that is not yet well researched. I am looking to contribute to this research with a descriptive qualitative study by engaging in semi-structured interviews with a small sample of the user groups targeted. This type of study describes poorly understood phenomena by relying on either direct observations or individual interviews (Kim et al, 2017). Then, this qualitative data was analyzed using thematic analysis, which I will shortly describe in the next sections. From the thematic analysis I devised user journeys to better understand in detail the life of frontline workers and user stories to better understand the managerial side. User journeys and user stories were used to collaborate with the UX Designers from my company for a design and prototype of selected features for frontline and their managers. To validate these features, a round of usability testing for each feature was employed, so that we could get feedback to further improve these features in next iterations.



Figure 13. Thesis Methodology Steps

3.1 Semi-structured interviews

A semi-structured interview, by its definition, is a "qualitative data collection strategy in which the researcher asks informants a series of predetermined but open-ended questions" (Given, 2008).

The advantage of semi-structured interviews is that while it can help the researcher get comparable data across subjects, it also allows getting into more details if needed (Carruthers, 1990). There is a low probability we can guess what is important for a user so that we can ask details about it during the session, and here is where the impromptu follow-up questions become relevant.

For this study, I have engaged in 30min - 1hour semi-structured interviews to reveal the main work challenges and differences of employees pre and during the Covid era. Additionally, I've interviewed 2 experts in IC, working for over 2 decades in the domain, to explore their views on how mature the domain is and where they see it going for frontline workers. The experts' interview questions can be found in Appendices, Section 2.3.

The interviews were addressed to different organizational layers, from frontline workers to managers, who were native or non-native English speakers. Participants were selected randomly, through several means, listed below:

- Friends & family

I messaged groups of friends and acquaintances to see whether they know someone who works in frontline or management in healthcare or retail

- Student and University NGOs

I posted messages on student and NGO groups to forward me to any relevant contacts they have

- Rocket Reach (<https://rocketreach.co/person>)

This is a tool used for prospecting and outreach service for businesses. I profiled people to contact by filtering based on role, region, and industry

- LinkedIn

I posted messages on my personal profile as well as filtered people based on role, region and industry

- Facebook groups

I posted messages on these groups

- Twitter

I posted messages on my personal profile

The selection criteria for the frontline participants was that their roles were from the list of roles established in sections 2.2.1 and 2.3.1. For managers, the only criteria for them was that they manage frontline employees in retail and healthcare.

To recruit and filter the participants, I asked the following list of questions before sending the ethical consent form and scheduling the sessions:

- What is your role?
- At what company do you work?
- Can you describe your work responsibilities?
- Do you have an office? If not, what is your work environment?

After each participant responded to the questions addressed, the consent form was sent to the participant to be filled in (Appendices, Section 2.1 and 2.2).

The questions of the interviews relate for each organizational layer to the following areas:

- For all: role, tools used to communicate, main responsibilities, how Covid changed their work-life and a usual day in the job
- For frontline workers: view of upper management
- For managers: relationship with frontline employees

The entire list of questions can be found in Appendices, Section 2.

The outcome of those interviews is to support the creation of the upcoming user journeys (RQ1.1), as well as answer RQ1.2 and RQ1.3.

3.2 Thematic Analysis

The second stage consists of an analysis of the semi-structured interviews through thematic analysis.

Thematic analysis is a method used to generate codes and themes, usually from interviews (Braun & Clarke, 2012). Codes capture relevant ideas from participants' quotes and observations, while themes are the patterns that codes showcase when analyzed.

The steps for conducting the thematic analysis are enumerated and explained below, and have been inspired by Maguire & Delahunt (2017):

1. Transcribing interviews or, if not recorded, adding all notes in one document

The first step was to transcribe the semi-structured interviews and collect all data in one place so that it is easier to read and always available. The transcription of the interviews was done with the help of two tools: Descript (<https://www.descript.com/>) and Otter.ai (<https://otter.ai/>).

2. Familiarising with data available

Going through the transcripts multiple times until the reader gets an understanding of the logic behind the answer was important to realize in-depth what the participant had in mind, as well as already coming up with potential patterns from the data.

3. Generate initial codes

The initial codes generated were formulated by reading through the transcribed interviews, noticing if something related to the research question is shared and then highlighting the interesting section.

4. Generate themes from the codes

At this stage I added all the codes in the same document and tried to look for patterns in the data.

5. Review themes

I then added the themes together and looked whether they make sense and are connected to the topic. The criteria was also that the themes should directly answer the RQ.

6. Define themes through mapping

Lastly I answered the RQ by mapping together all the themes into one diagram that is connected to the RQ1.

3.3 User Journey Mapping

To map frontline workers' day to day activities, their technological challenges in IC and respond to RQ1.1, I used user journey mapping. User Journey is a method that is highly used in agile development and seeks to learn about user processes by looking into all areas of their responsibilities and activities (Endmann & Keßner, 2016).

Inspired by the approach of Endmann & Keßner(2016), the steps I took to prepare a user journey mapping for each user group was:

1. Specify and select user groups

For frontline workers, the user groups selected are mentioned in sections 2.2.1 and 2.3.1. Since for managerial positions, there are no particular user groups selected yet, I will devise their user group from the semi-structured interviews based on their responsibilities.

2. Specify the user group's associated activities

For this step, I wrote all the activities of each user group based on the user interviews conducted, in a list, as a collection of all the activities they perform as part of their jobs.

3. Organize activities

When some activities seem to be related to each other, I clustered them to have a visual grouping of the similar responsibilities.

4. Identify and name tasks

When some activities fit into a pattern, I devised an overarching theme of this pattern and gave it a relevant name.

5. Assign pains and gains

Based on the comments given during the semi-structured interviews and literature review, for each overarching theme, I assigned their frontline's pains and gains for that particular theme.

3.4 Usability Testing

Usability Testing is another very common practice used in agile development, in which a moderator or observer watches a participant perform a specific task in a specified test environment (Lewis, 2006).

Usability testing is employed here to answer RQ 1.4 and support RQ 1.5 in finding more data about a relevant feature for the retail and healthcare industries. From the semi-structured interview, I will understand better the feature that can be most relevant to frontline and management, support the design and devise tasks to test this feature in a usability testing context.

4. Interviews

In total, 2 online interviews, of around 30 minutes to an hour, were conducted with communications experts and 52 semi-structured interviews with frontline workers and managerial roles in healthcare and retail (Figure 14). In the next sections, I am sharing the discoveries and analysis from the interviews.

	Europe		US	
	Frontline	Management	Frontline	Management
Retail	7	7	5	7
Healthcare	6	8	5	8
Total	13	15	10	15

Figure 14. Number of participants interviewed

4.1. Experts interviews

The series started by interviewing two IC experts. An expert in this context is considered a person who has been working in the IC field for at least a decade and in multiple environments and companies. The goal of this activity was to grasp the IC challenges from people who have been exposed to multiple working environments and have developed an understanding of patterns that exist. The two experts selected are based in both Europe and the US and have worked in these regions for more than two decades each, in roles such as Communications Consultant, Communications Lead and Company Advisor in IC, including retail and healthcare industries. The experts were Communications Advisors at the thesis company and were recruited by asking them for a 30-min call on the internal company chat. The thematic analysis of these two interviews can be seen on Figure 15 and further explained in the next paragraphs.

Theme: Frontline tools

The current frontline tools used are considered by them to be still "quite old-school". Whatsapp was mentioned several times by both interviewees as being highly used by frontline workers currently, but not very scalable and trustworthy due to its privacy issues. When it comes to tools, the perfect one in their views " [...] reduces the noise and friction in the organization". External parties have also become part of the company communication plan: "The dividing line between IC and external comms is a porous and fuzzy one, it used to be: you are an employee or you aren't. Let's say there is someone in the finance department who supports the IT team, shouldn't they be allowed to be in the IT distribution list to see that?"

Theme: Lacking functionalities

In terms of my company's product (section 1.2.2) ability to suit frontline workers, they believed it lacked this informal approach of frontline communication: "Again, you can post here, write articles, links, videos, but you are not able to communicate one on one. I'm tied to a group, so there is this pressure to create something professional. Frontline doesn't want that. Give me something easy, I could send one or two messages to whoever I want without the pressure of posting. I'm not an influencer, I'm someone who barely struggles to get the job done and now there's also Covid. So don't make an influencer out of me when I'm not paid enough sometimes even to do my job". Chat and email were mentioned as important functionalities missing from the current product.

Theme: Frontline future

When asked about the future of the frontline industry, the experts mentioned that the communication needed to be more clear and shorter in the future for frontline workers: "every company has its own agenda - that agenda is not equally relevant to all employees[...] Heard many complaining about the long messages they receive from their management. No one cares about the 2-hour long meeting with the executive team discussing investment. Tell me in a few lines how this affects me". They also predicted a higher increase in technology in retail and healthcare: "as new generations come upfront, retail and healthcare will probably be exponentially digitised. Today, the reason why they're still sticking with pagers is that there are still a lot of experienced doctors who think this is the best way because they grew up with them. The TikTok generation won't put up with that."

Theme: Frontline management

On the theme of frontline management, interviewees mention a desire of management to get closer to the frontline: "I saw in the past many managers sitting at their desks while the frontlines are well, on the frontline. Everyone wants to see how the frontline is doing and how successful their messages to them are. So analytics are a big thing. Show me how many people are using what. Also, give me the option to choose what I want to see, don't throw all the data in my face."

Three models of IC have been mentioned in these interviews:

1. **Hierarchical communication:**
Top-down approach that has existed since the beginning of IC. There is a pyramidal structure that allows the upper function to communicate to their subordinates. There are quite a lot of mentions in papers pointing to more disadvantages than advantages of using this model, many of the time leading to conflict, ambiguity and distortion of communication (Friebel & Raith, 2004).
1. **Mixed communication:**
The information is shared with everybody, each person is exposed to the content of the others, not necessarily only superiors.
2. **Non-formal communication through networks:**
A new model that points to every organization having an informal network. This network is led by the people who are influencing and spreading information, without actually having the official role to do that. The information is shared organically.

Theme: Covid change

In regard to Covid, the two interviewees mention a probability for healthcare and retail companies to have moved to a lot more text messaging than before, less face-to-face and a desire to get rid of existing complex messages and very formal approaches. Additionally, they were unsure about whether Covid digitized or not their organisations: "It's most likely in some cases it did, but in others even stopped it. I can imagine some managers putting a higher priority on urgent, short-term stuff other than making things easier and simpler long-term. Which is understandable sometimes in these situations." Both experts agreed that in general, the frontline wants to be heard and is tired of top-down approaches, such as emails coming from managers.

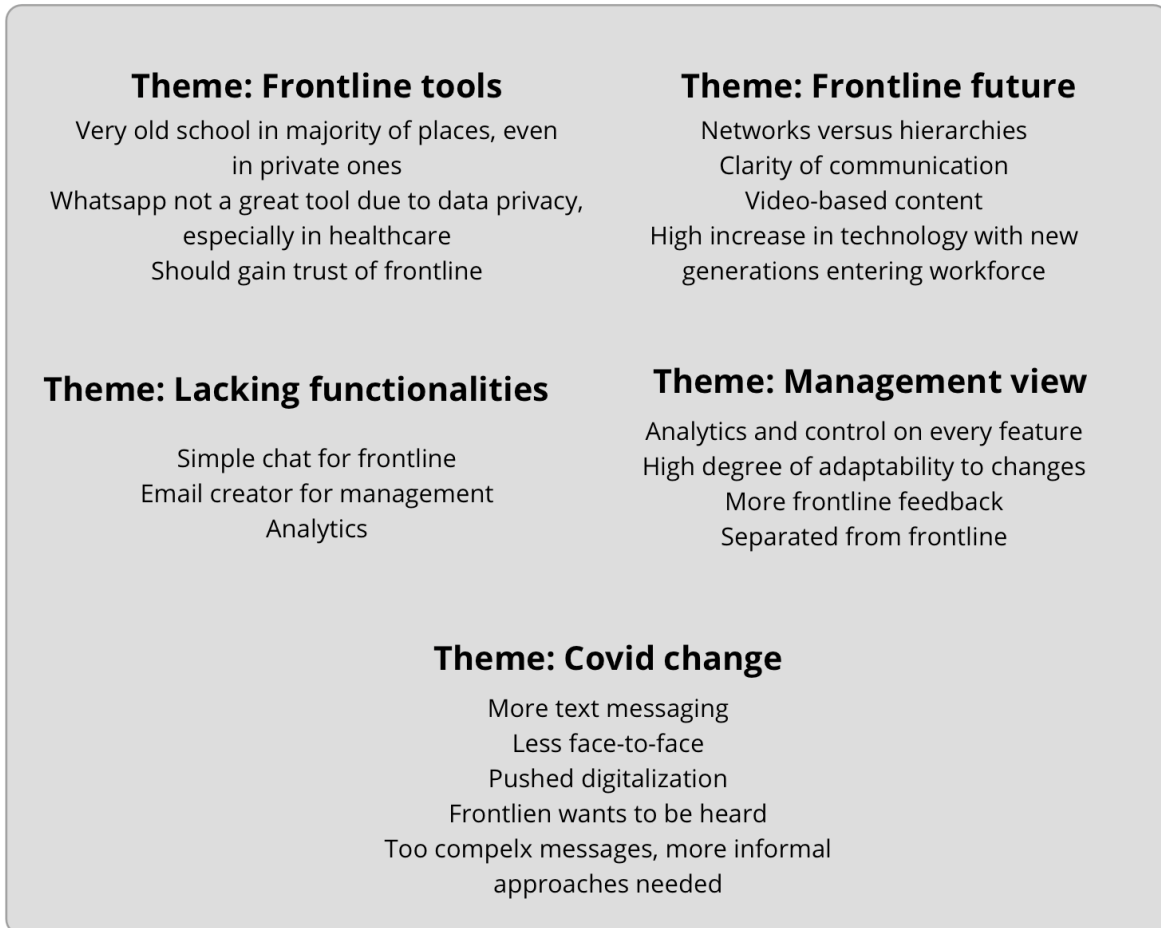


Figure 15. Themes IC experts

To conclude, the most important features not yet available in the platform, that from the experts' view would be beneficial to have in the product, are chat and email.

The experts' view on how Covid changed frontline lives is that while for some organizations it might have pushed their digital strategy to completion, for others it might have stopped it altogether. I relied therefore on the interviews with frontline and their management to validate whether chat and email are valuable features and in what way, if there are other valuable features for frontline workers and management, and how Covid pandemic actually changed the tool(s) they use.

4.2. Frontline workers interviews

I began the study of the frontline workers by interviewing 23 frontline workers, 12 from the retail industry and 11 from healthcare.

4.2.1 Retail

I have interviewed 7 frontline workers in Europe, coming from Romania, Finland, Spain, Sweden and Hungary. All the participants from Europe were non-native English speakers and worked in large stores, like supermarkets and hypermarkets. From the US I have interviewed 5 frontline workers, all native English speakers. All of them shared a common role that incorporated all the responsibilities shared in section 2.2.1: cashiers, customer service and sales. This role is "Sales Associate". I put together all their answers to the question "Tell me, how does a typical workday look like for you?" in the user journey in Figure 16.

The sales associate's responsibilities consist in welcoming the customers, accommodating their questions and requests, and making sure they pay successfully for their desired products. They usually work for a limited time, not having a full-time contract, company email, or a corporate phone. They mainly communicate with their direct managers but can receive messages from the store managers as well.

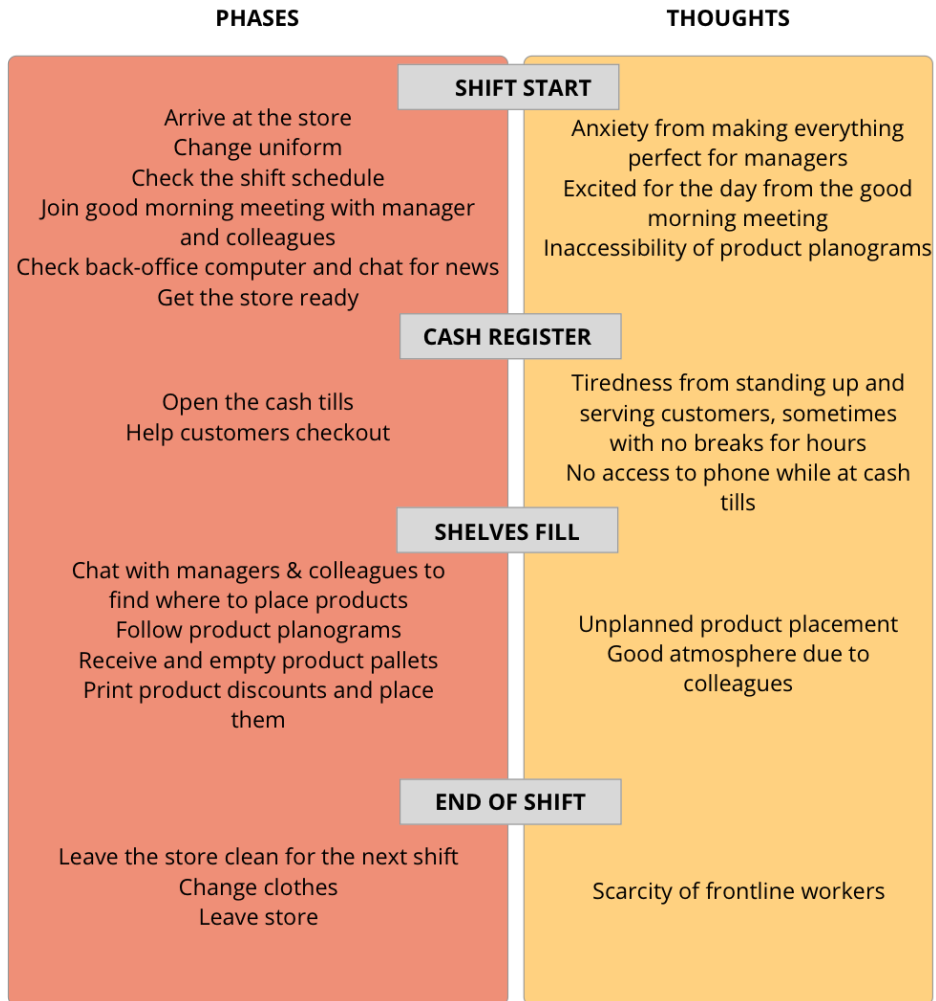


Figure 16. Retail Sales Associate Journey

A typical work day for them starts with arriving at the store very early in the morning, changing into work uniform and checking the shift schedule to see what colleagues they are going to work with or if there are any changes in the schedule for next days and weeks. After this, they join a good morning meeting led by their direct lead and their shift colleagues to plan ahead the day in matters of dividing the responsibilities, checking resources, making sure the store has the products as per the plan and taking care of the fresh products. Some of them check the back-office for any emails sent to the store or use Whatsapp to see product planograms on the bigger screen. In the morning they quickly prepare the store for upcoming customers and divide the next responsibilities.

Some of them then go to prepare the cash tills and stay there to support the customers coming to buy store products. Others fill the fresh and product shelves while others support customers from time to time with their requests.

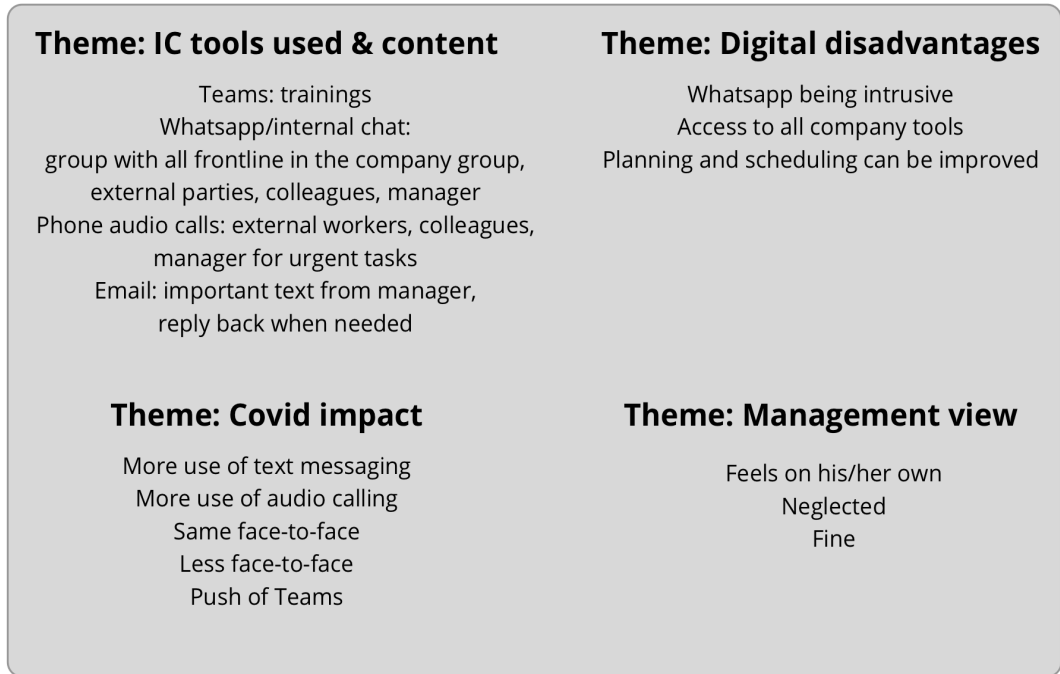


Figure 17. Thematic Analysis Frontline Europe

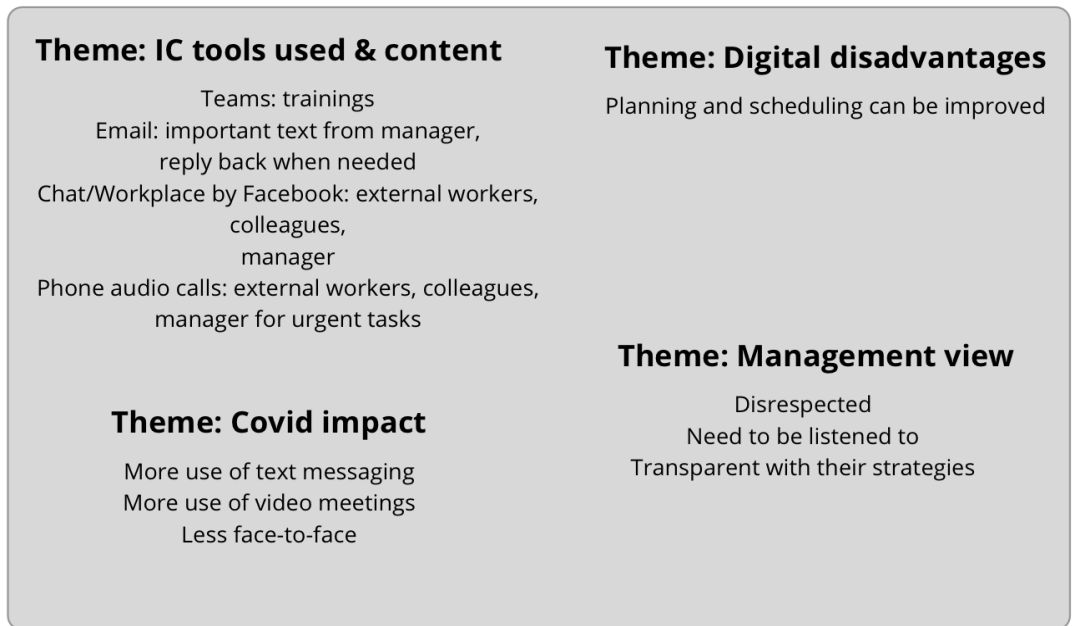


Figure 18. Thematic Analysis Frontline US

Figure 17 and Fig. 18 show the results of the thematic analysis for Europe and the US: IC tools and their content, digital disadvantages, Covid impact and Management View.

Theme: IC tools and content

In Europe, on the list of the tools used to communicate from the first theme, it is mentioned mainly WhatsApp as the main tool by six of the frontline workers, for messaging colleagues and managers and sending product photos, documents and external links, receiving company information in the common company WhatsApp group, and messaging external parties (such as distributors). The seventh frontline workers mentioned using a company built chat tool, brought in for security purposes. Phone calls are also common, used to reach out to colleagues and managers for important activities and external workers (distributors). Email was also used by 6 of them passively, to read organization information. One participant mentioned using email actively to reply to manager's inquiries. Teams was mentioned by two interviewees for training purposes.

On the theme of IC tools, compared to Europe, the frontline workers from the US did not mention using Whatsapp at all. The main channel used by all 5 interviewees is either an internally built company chat or Workplace by Facebook. All participants use email for receiving messages from management , while three of them use email quite actively with their direct manager in their communications.

Theme: Digital disadvantages

As for the challenges faced with the tools used for communication, three of them mentioned Whatsapp as being intrusive in their personal lives ("In my previous job I was using WhatsApp and I didn't like that because I always woke up to 100 messages and my day was already ruined before I came to work. Now I don't enter at all this chat until I'm on the bus to work and it just makes my mornings better"). Some mentioned they would like to have access to all the documents needed at once, since those are scattered across platforms and the ability to better plan and communicate their schedule in a digital way, since currently it is done via sharing a schedule paper in the back-room office.

In terms of digital disadvantages, the frontline workers from the US said their planning and scheduling can be improved, as it is currently done in a manual way.

Theme: Covid impact

The interviewed frontline workers in Europe mention an increase in text messaging usage and phone calls due to the Covid pandemic, which led in some cases to less face-to-face interactions. Two of the workers mentioned the adoption of Teams for training and important communications, while the other two said no digital change happened in the organization.

On the theme of Covid impact in the US, the pandemic led in their cases to more use of text messaging, video meetings and less face-to-face as safety measures from the pandemic.

Theme: Management view

When asked about their perspective on management and how they handled communications, especially during Covid, four of them mentioned they felt as if they were on their own during this time, with not much support from management. Two of them mentioned feeling neglected and left out, while one participant mentioned "they did all they could do at that time, it was fine."

When talking about management, two of the retail frontline workers in the US felt disrespected several times during their work time, other two mentioned they expected more honesty and transparency from management on what are the actions taken to help them during Covid and one of them would have liked to be more listened to her needs during the pandemic and felt "blocked out".

Conclusions

Concluding the digital tools used, the use of chat tools was predominantly mentioned in both Europe and US, Whatsapp being the main chat tool in Europe and Workplace by Facebook in the US. While email was still used, it was not actively used by frontline workers but rather passively to check organizations' important messages and news. The same was related to Teams, passively used across Europe and the US across frontlines interviewed.

Frontline workers Retail	
Europe	US
Face to face	Face to face
Whatsapp	Chat/Workplace by Facebook
Phone calls	Phone calls/messages

Table 1. Tools of frontline workers in retail

In terms of what they want, it seems planning and schedule is a common topic in both Europe and the US. European frontline workers did complain more about their technology, which might point to the US being more digitized (or simply US workers not complaining about the technology and being satisfied with the status quo). The tools used by the frontline are simple (phone calls, chat) and do not point to supermarkets being a highly digitized industry.

Frontline workers seem to be equally vocal when it comes to their relationship with management, feeling neglected or disrespected, or on the other side, taken into consideration and “fine”.

As expected and mentioned in the experts' interviews, Covid did bring either no change or slight change. The slight change mentioned on the technological front was a higher usage of their existing communication tools and, in isolated cases, implementation of a new communication tool (Teams).

4.2.2 Healthcare

I interviewed 6 participants working in healthcare in Europe and 5 in the US, of which 5 had the roles of nurses, 5 of doctors and one pharmacist. The participants from Europe came from diverse countries from Europe: Italy, Spain, Finland, Germany, Romania and Netherlands. Across Europe and the US I have noticed common user journeys when it comes to roles, presented in Figure 19, Figure 20 and Figure 21.

Nurses interviewed begin their days with a morning brief with night shift nurses and the other day nurses. They discuss and align patients' status and tasks for the day. Five of them reported checking emails on their personal phones or hearing the latest updates from their managers in the morning meetings. Afterwards, they start taking care of their patients by visiting each of them, preparing their

medications and updating a tool called Electronic Medical Record (EMR) on the hospital computer for every patient update. From time to time, their pagers beep when there are patient emergencies and they have to run to respond to them immediately. Towards the end of the shift, if they have written any note on paper regarding the patient during their shift, they have to update all remaining notes in the EMR and shred any paper files.

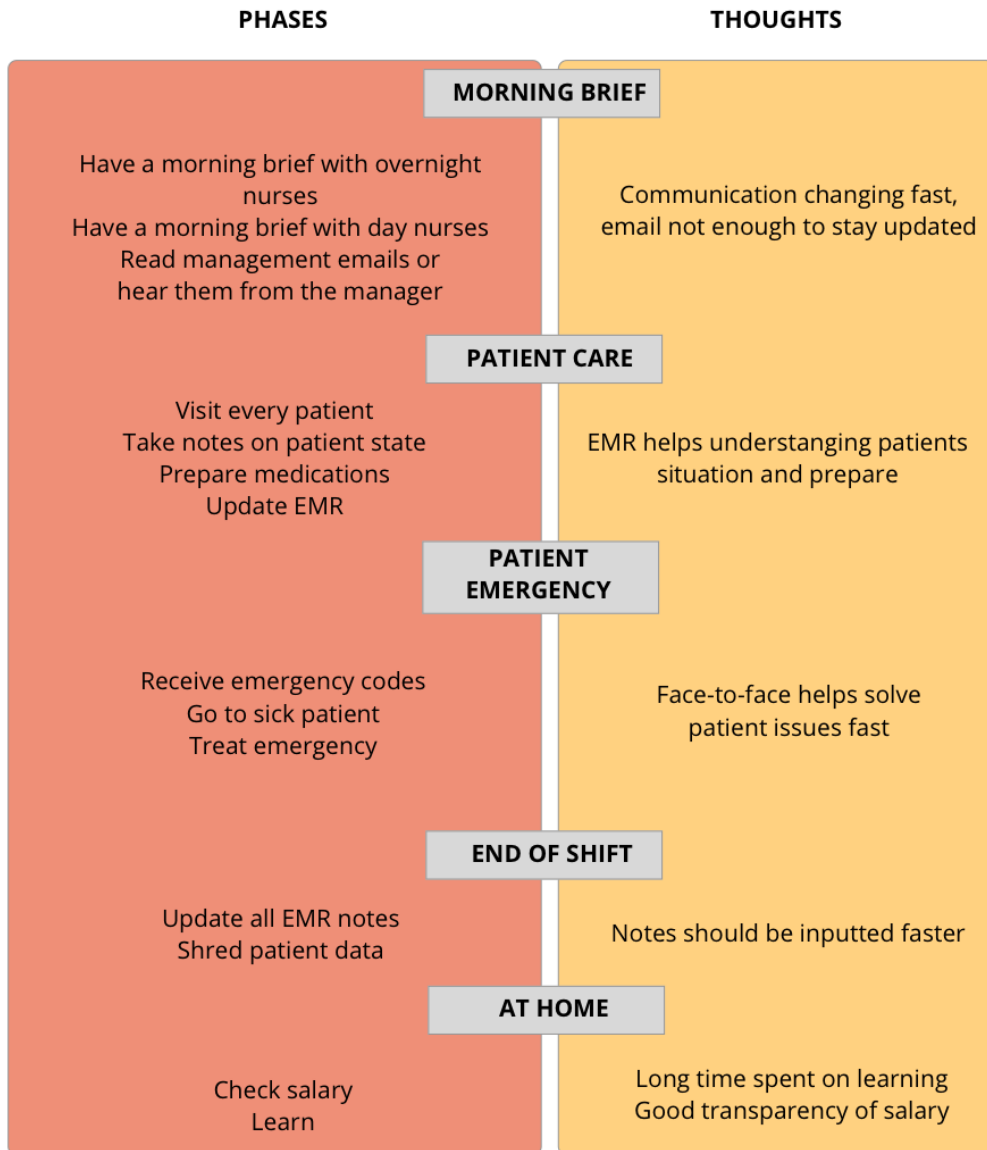


Figure 19. User Journey “Nurse”

Doctors have a similar journey, but a couple of activities are different. From time to time, they need to talk to consultants over the phone to get advice on a patient's state and receive and discharge patients as well as write prescriptions to patients.

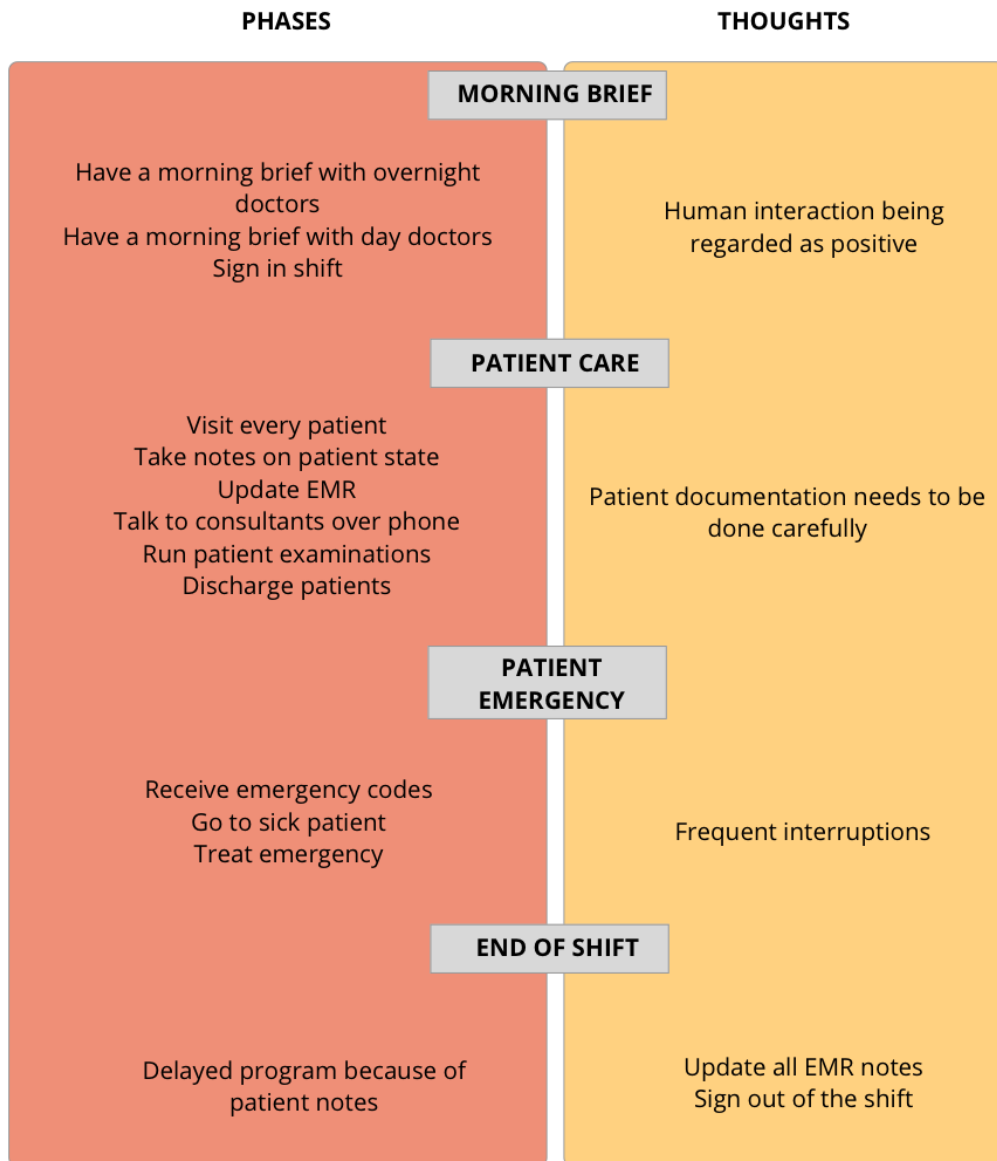


Figure 20. User Journey "Doctor"

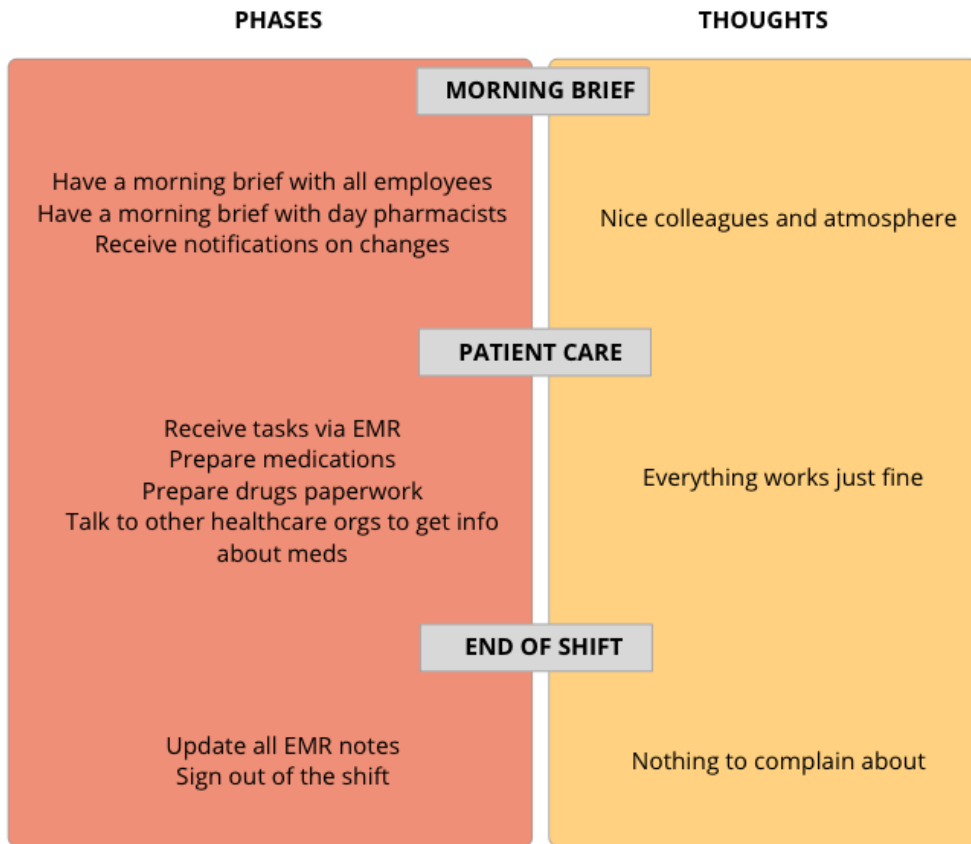


Figure 21. User Journey “Pharmacist”

Since only one pharmacist was interviewed, there is not enough data to detect patterns or draw conclusions over this role's journey. Still, based on the interview, the pharmacist also goes through the morning brief and updates the EMR system, and on top prepares patient medications and answers any questions related to them.

The thematic analysis summarized in Figures 22 and 23 shed light on the interviewees' usage of tools, perception of management and Covid impact on their roles in Europe and the US.

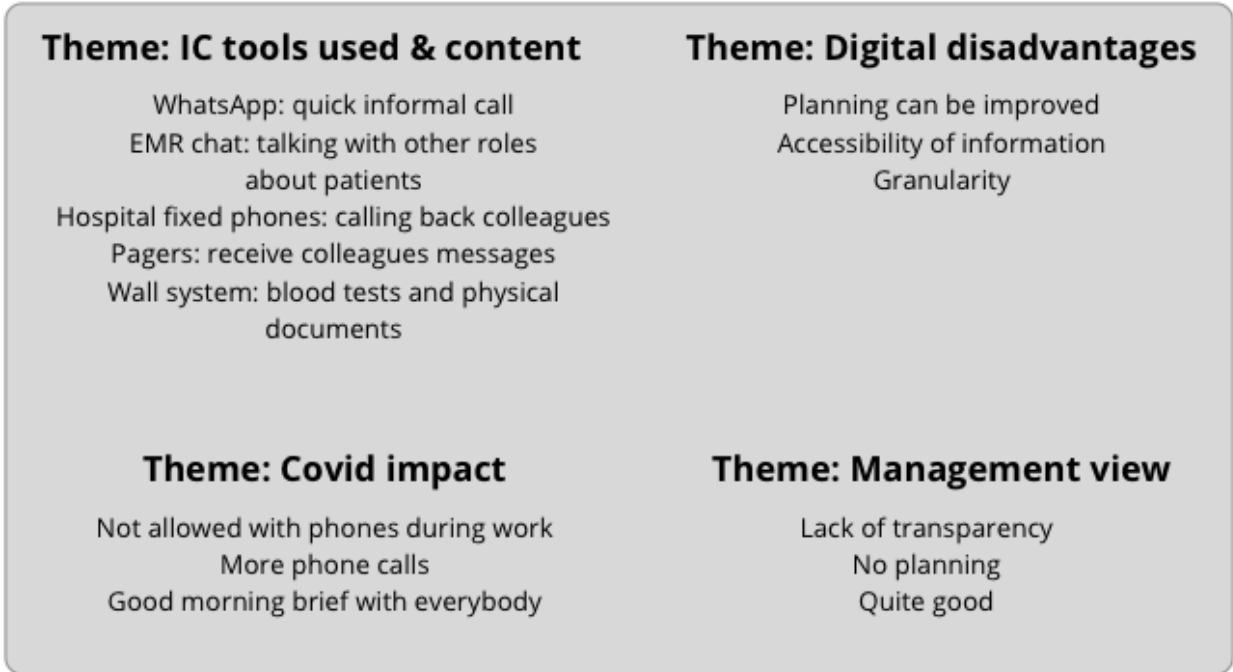


Figure 22. Thematic Analysis Healthcare Workers Europe

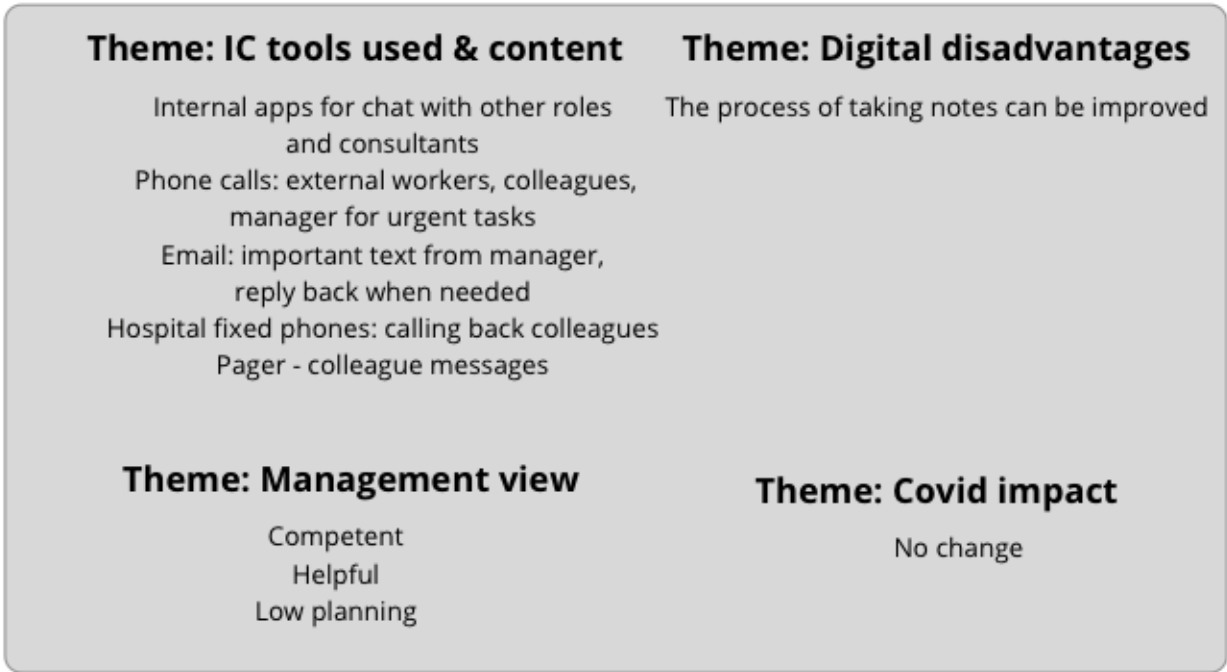


Figure 23. Thematic Analysis Healthcare Workers US

Theme: IC tools and content

The tools used to communicate in Europe are, as said before, mainly WhatsApp for informal messages, the EMR system chat to communicate with other roles on patient status, documents and patient photos if needed, pagers to receive messages without being disturbed and hospital fixed phones for getting back to people after they have been paged. An additional channel mentioned is a wall system for transferring paper files and physical objects through a pneumatic tube (e.g. blood tests) from room to room.

In terms of tools, US frontline workers mentioned more digital tools, such as internal apps specific for chatting with other roles and wards. They still rely frequently on phone calls with external consultants, colleagues and managers. They frequently read important organization communications and change of hospital policies and reply to managers whenever emailed. They also have pagers and hospital fixed phones for receiving messages and calling back to the senders.

Theme: Digital disadvantages

In terms of digital challenges in Europe, the planning schedule was mentioned as a potential improvement point, together with having easier access to all tools and being able to have more granularity when addressing different groups in communications (e.g. a certain ward).

Four of the frontline workers interviewed from the US hope the process of taking patient notes and reports can be improved, as it takes the most out of their time.

Theme: Covid impact

On the theme of the impact of Covid in Europe, two healthcare workers report not being allowed with their personal phones at work anymore to not spread the virus. The others actually mentioned an increase in phone calls, while one participant noticed the leadership decided to implement a morning meeting with all department roles to share latest organizational news face-to-face and address burning questions immediately.

In the US the main difference is that no change was being mentioned on how Covid changed any communication strategies at work.

Theme: Management view

Three healthcare workers from Europe perceived management as not being transparent at times, two mentioned not planning the communications well, sending many of them chaotically across departments, while one was satisfied and considered the management strategies good.

The view on management in the US is more positive, seeing them as competent, helpful, but also hope for better planning of communications and resources.

Conclusions

Concluding the digital tools used in the healthcare industry, the primary one is the EMR, mentioned in both Europe and the US. In Europe pagers are still highly used, followed by fixed hospital phones, WhatsApp and pneumatic tubes for sending physical objects and messages across rooms. In the US, after EMR frontline workers mentioned using phone calls, pagers and internally built hospital chat, followed by fixed phones and email.

Frontline Healthcare	
Europe	US
1. Face to face	1. Face to face
2. EMR	2. EMR
3. Pagers	3. Phone calls
4. Fixed phones	4. Pagers
5. Whatsapp	5. Hospital chat
6. Pneumatic tube	6. Fixed phones
	7. Email

Table 2. Tools of frontline workers in healthcare

4.3 Management interviews

4.3.1 Retail

I had the opportunity to interview 14 retail managers in total (7 from Europe and 7 from the US) all working in large groceries stores such as supermarkets and hypermarkets. When noting their responsibilities I discovered several user groups based on their roles.

The first role presented below (Figure 24) is the direct manager of the frontline employees, called Shift Manager. He/She is the one leading the good morning content, reinforcing daily tasks and supervising store readiness at the beginning of the shift. This role manages the team by recruiting employees, supervising how they perform their job at tills and verifying if everything is in place at the store. The role handles daily crises, such as unavailable products or missing employees. He/She also communicates with external parties, such as Key Account Managers, who are representatives from other companies who bring their products for sale at the store.

One Key Account Manager was interviewed additionally and mentioned to be coordinating a team of merchandisers who verify their own products are at the right place in the store. While there was no opportunity to interview merchandisers, from the Key Account Manager perspective, the merchandiser's role is to support the latter in making sure the products are placed accordingly in the store. At the end of the shift, the Shift Manager handles the finances of the day, prints schedules if any changes arise and updates the upcoming Shift Manager.

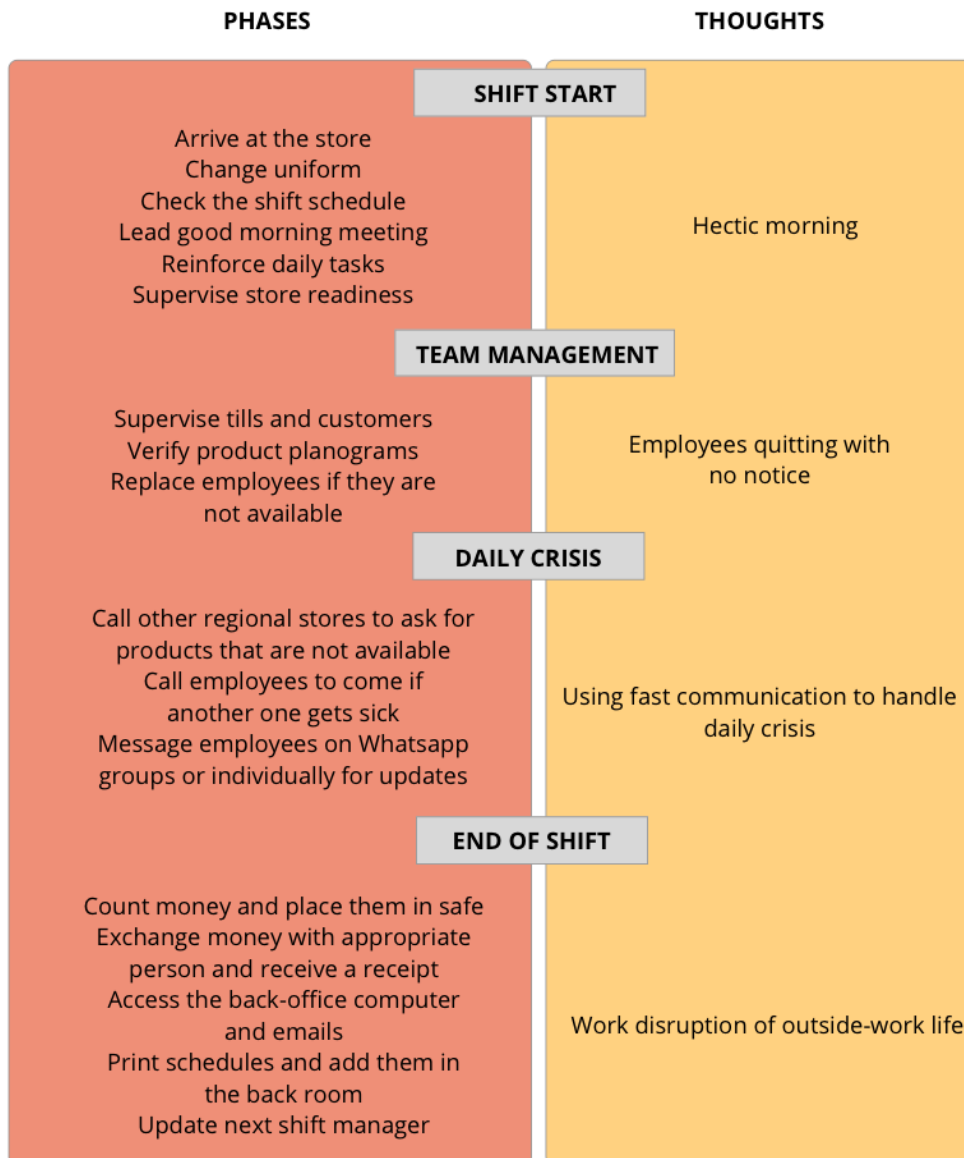


Figure 24. User Journey Shift Manager

The other role interviewed is the Store Manager, who has an overall view of the entire store performance. This “role” analyses which products bring profit and orders accordingly and gives an official signature for store orders. He/She is the one planning all the shifts with the Shift Manager and directly answering client complaints. The role hires and trains new employees and is the direct connection with the regional office, communicating overall strategy to them and giving feedback on any budget or resources needed.

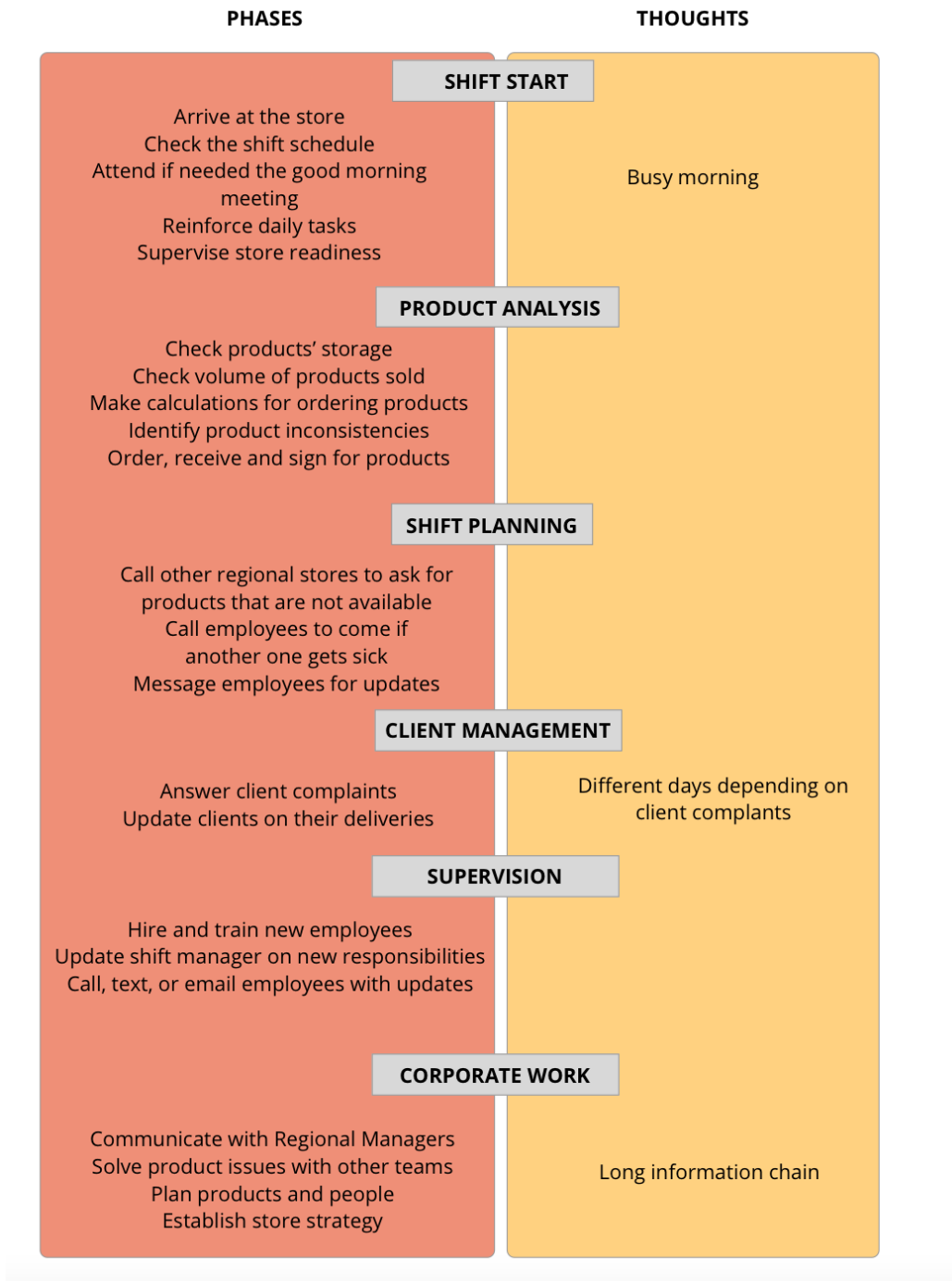


Figure 25. User Journey Store Manager

From the thematic analysis in Figure 24, the theme of IC tools used highlights Whatsapp or internally built chat for managers in Europe. Otherwise, they communicate via audio calls and email, as frontline workers also mentioned previously in chapter 4.2.2.

On the theme of digital challenges, the managers said "updating employees on tools is cumbersome, and scheduling employees is still done the old way". They wished that in terms of digital solutions they

would have a more secure way to chat, the ability to measure how well they are communicating with their employees and since the information is scattered around multiple platforms, having everything in one place would make things way easier.

On the pandemic theme, the change in digital tools mentioned is the introduction of the texting and conferencing tool [Teams](#) on a regional level. The management teams mentioned working to introduce the Teams tool to frontline workers as well, so one of them was mentioning a pilot being run to test Teams with frontline workers.

Managers in Europe would like that frontline workers are more proactive and manage themselves and their tasks since interviewees report they do not have much time onboarding every employee on what they need. Their most cumbersome task is always making sure employees are updated on chat and that Whatsapp is not secure. Scheduling is still happening on paper, so this is bothersome for them, as well as not being able to measure how communication is going on in the organization ("Are my messages reaching my employees? How can I know that?").



Figure 26. Thematic Analysis retail managers Europe

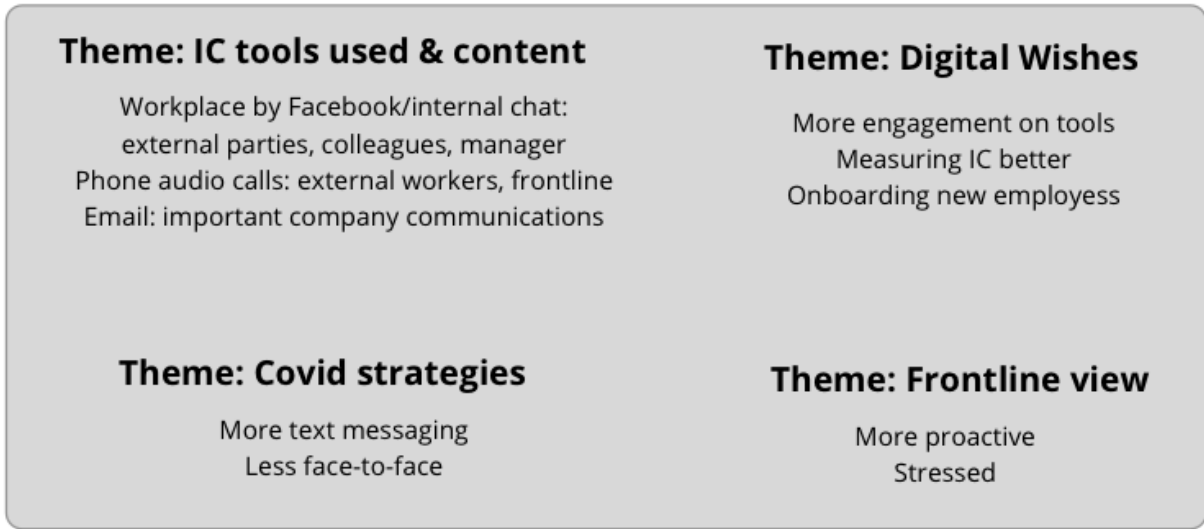


Figure 27. Thematic Analysis retail managers US

In the US, in terms of tools, the same tools remain available as in chapter 4.2.2, meaning managers mentioned using Frontline workers Workplace by Facebook or an internally built chat tool, phone calls and email.

They want to have more engagement on the tools already used for IC, to be able to measure it better and improve the process of onboarding new employees that is currently done in a chaotic manner.

The digital changes that appeared due to Covid were more text messaging used and less face-to-face communication.

Managers in the US regard the frontline even more as being not as proactive as expected, expecting them to be more assertive with their needs and solving the day to day challenges. Some of them are aware that a lot of pressure is put on them, and they try to be understanding, even if “the job still needs to be done in one way or another”.

4.3.2 Conclusions

Table 3 showcases the main communication tools used by retail management, with messaging tools being used most frequently, followed by phone calls. Teams makes its appearance in Europe mainly, followed by email in both Europe and the US. The tools are the same as for frontline workers in section 4.2.1, with the only difference that face-to-face communication was not mentioned as a communication tool from management, but rather as an implied communication mean used everywhere in retail.

Management Retail	
Europe	US

1. WhatsApp	1. Workplace by Facebook
2. Phone calls	2. Phone calls
3. Teams	3. Email
4. Email	

Table 3. Tools of frontline workers in healthcare

In Europe the continuous management of tools and employees' schedules seem to be a challenge the management faces, challenges that are not shared by the US retail managers. The European retail management also desires for having everything in one tool, to be able to measure communications and a more secure way to chat rather than WhatsApp. This could point out again that Europeans either have more issues when it comes to technology or are used to being more vocal about their challenges at work. The US retail managers also mentioned being able to measure communications as an important aspect, followed by more onboarding and overall more engagement on the currently used communication tools.

Similarly to frontline workers, the retail management in Europe mentioned Teams as being "pushed" to usage to all the organization, while no change in tools was mentioned in the US.

4.3.3 Healthcare

I interviewed 8 management participants in healthcare from Europe and 8 from the US, with the roles of Hospital Administrator and Senior Doctor.

The Hospital Administrators (Figure 28) are in charge of the hospital operations, being involved in many meetings related to tools, patient complaints, how teams perform and hospital reports. In general they do casual hospital rounds to ensure the hospital is running well and healthcare workers' state is positive. They check hospital machinery from time to time and order new ones if necessary.

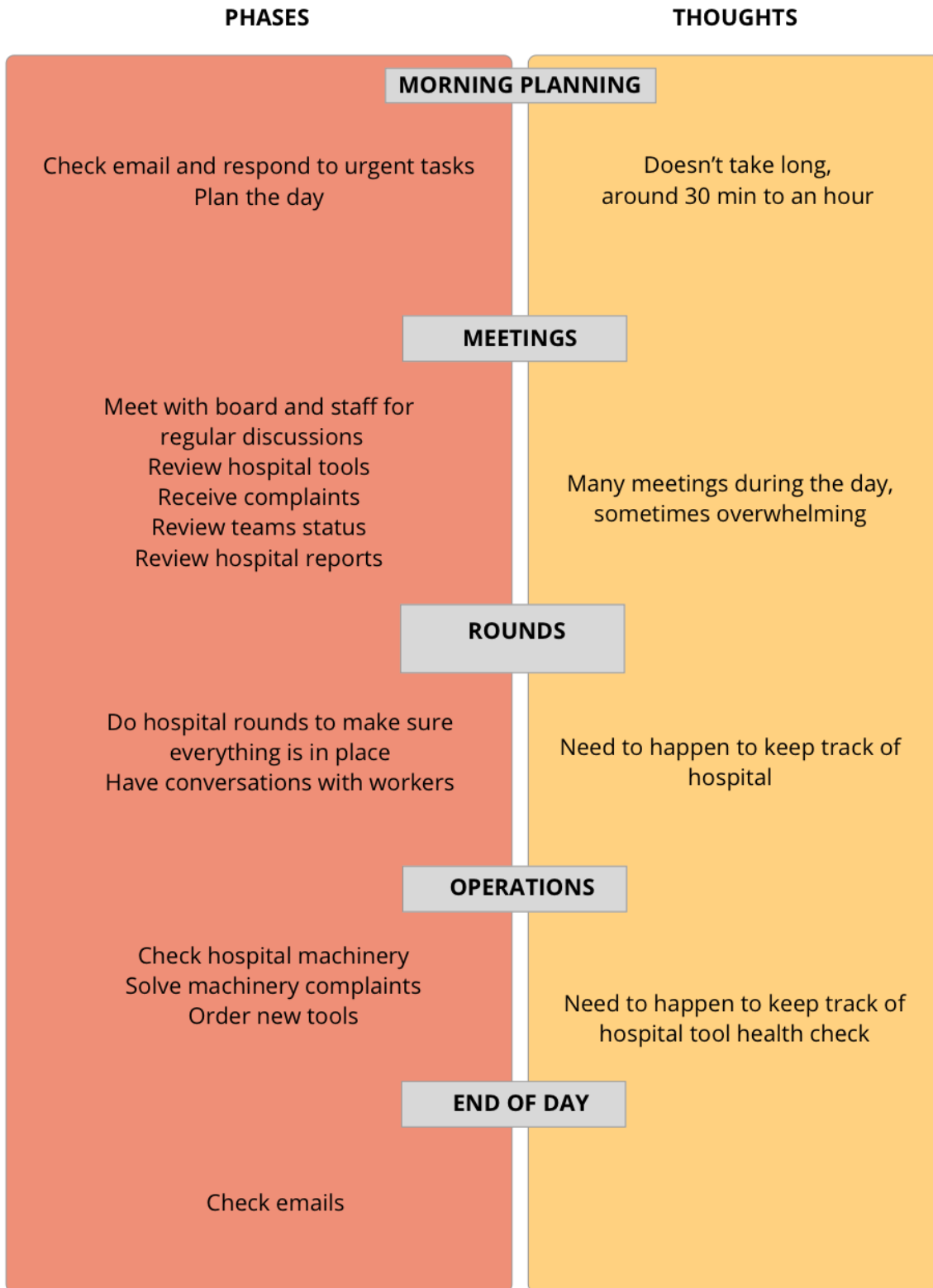


Figure 28. User Journey Hospital Administrator

The Senior or Lead Doctor (Figure 29) is performing similar tasks as the frontline doctor. On top of those, he/she is in charge of mentoring interns, offering consulting advice for difficult patient cases and scheduling doctors' shifts.

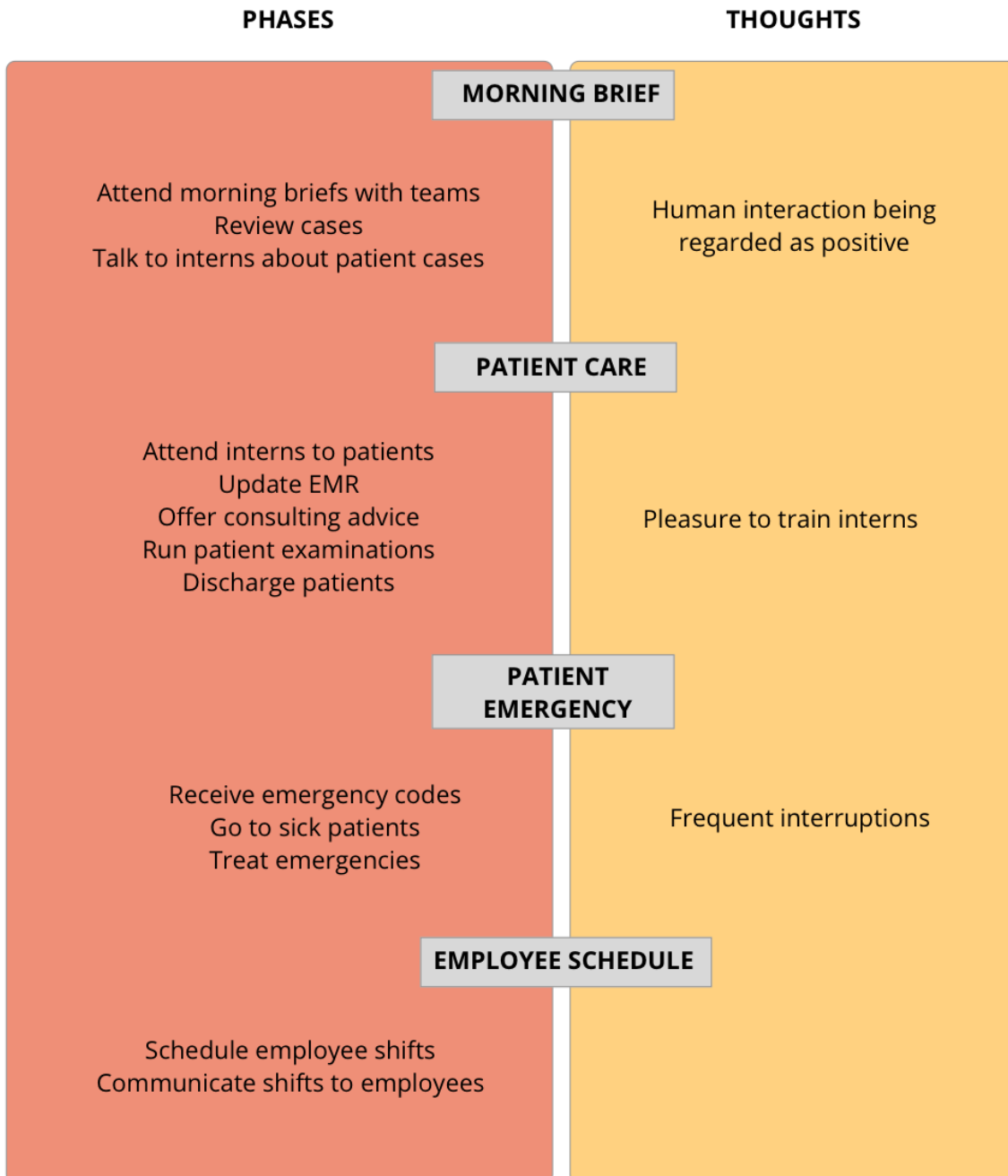


Figure 29. User Journey Senior Doctor

The theme of IC tools used by healthcare managers in Europe (Figure 30) reveals that they sometimes use Whatsapp to chat with their employees, the EMR chat, hospital fixed phones and pagers.

They wished that in terms of digital they could get feedback from their employees more easily, measure how they are doing in terms of communications and access to multiple tools in one platform.

In Europe healthcare management mentioned about implementing less face-to-face meetings and more phone calls due to Covid.

They believe that overall their frontline workers are "great people" they enjoy serving, hard workers and optimistic about the pandemic. What they want to improve in the future is seeking more feedback from the frontline, measuring how engaged they are and access to all their info needed in one platform.



Figure 30. Thematic Analysis healthcare managers Europe

In the US, on the theme of IC tools (Figure 31), healthcare managers said the usage of internal apps to chat with their employees and consultants is quite high, while also mentioning phone calls, email, hospital fixed phone and pagers.

They wished to have better tools for taking notes, since this activity it's taking most of the time, a faster way to reach consultants since they do not always have access to the chat tools used, a platform with everything they need in one place and being able to chat with groups as they need.

In the US no specific change is mentioned in the way communications are affected by the pandemic other than reinforcing frontline workers to wear masks and avoid face-to-face interaction as much as possible. Same communication tools are used as healthcare frontline workers mentioned. The managers consider them competent and helpful and would like more tools for note-taking, a faster way

to reach the consultants, one platform for everything communications related and the ability to make a granular selection of their audience at any time.

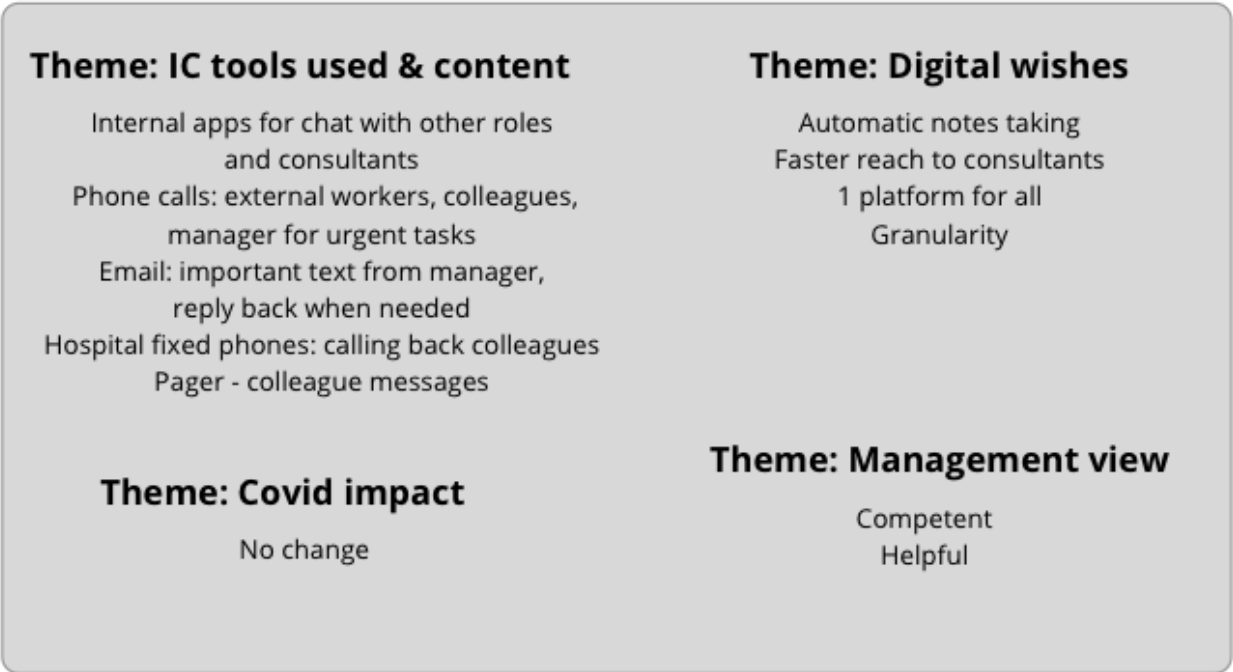


Figure 31. Thematic Analysis healthcare managers US

4.3.4 Conclusions

The management in healthcare uses particularly the EMR chat, hospital fixed phones, pagers, email and Whatsapp to communicate internally, why the US mentions internally built chat apps, followed by phone calls, emails and pagers. There is a slightly higher variety of tools used in healthcare management compared to retail.

Management Retail	
Europe	US
1. EMR chat	1. Internal chat app
2. Hospital fixed phones	2. Phone calls
3. Pagers	3. Email
4. Email	4. Pagers
5. WhatsApp	

Table 4. Tools of frontline workers in healthcare

The healthcare management in Europe wishes for being closer and receiving more feedback from the frontline, and similarly to retail, one platform for all communications and a way to measure them. In the US it is also clear having one platform for all communications topics is preferable, adding to that a faster way to take notes, to reach consultants, and being able to measure how targeting both individuals and groups works (granularity).

No tool was implemented during Covid, the only changes mentioned being in Europe, with more phone calls and less face-to-face communication.

Healthcare management in both Europe and the US view frontline workers in a positive light, compared to retail, Europe seeing them as “great people”, “hard-workers” and “optimistic give the circumstances”, while in US “competent” and “always helpful”.

4.4 Interviews Conclusions

To conclude, in this chapter I analyzed the interviews from frontline workers in Europe and the US, working in the retail and healthcare industries and discovered the main channels that they use to communicate internally. I additionally mapped their interactions in Figure 32 for retail and Figure 33 for healthcare.

For grocery stores (Figure 32), there are five user groups represented or mentioned by the interviewees: Sales Associate, Shift Manager, Store Manager, Key Account Manager and Merchandiser. The Sales Associates mainly communicate with their Shift Manager and very few times also with the Store Manager, who reinforces them the messages related to the daily shifts. You can find them in the Back Room Office that contains printers, where they frequently eat and have access to a store computer with Internet, at the tills when they serve customers, unloading the product palletted and placing them accordingly in the store according to the product planograms.

Their direct manager, the Shift Manager, communicated mostly with the Sales Associates and the Store Manager, from whom receives directions for the employees and the store. You can find the Shift Manager always on the go, from making sure the product palettes have arrived safely, to coordinating

product placements, to coordinating who is at the tills and in the Back Room Office for posting schedule changes or browsing the computer for information.

The Store Manager, besides keeping contact with the Shift Managers and Sales Associates, is the connection between other stores, asking for products and information, as well as with the corporate office, from which he/she receives directives for the store performance. The Store Managers are also communicating with external parties, such as Key Account Managers, who are representatives from other businesses that collaborate with the store to display and sell their products. The Key Account Managers have a team of merchandisers that make sure their products are correctly placed in the store.

The majority of the roles also carry their own or company mobile phone with Whatsapp or installed company apps for chatting with others.

THE ECOSYSTEM OF A GROCERY STORE

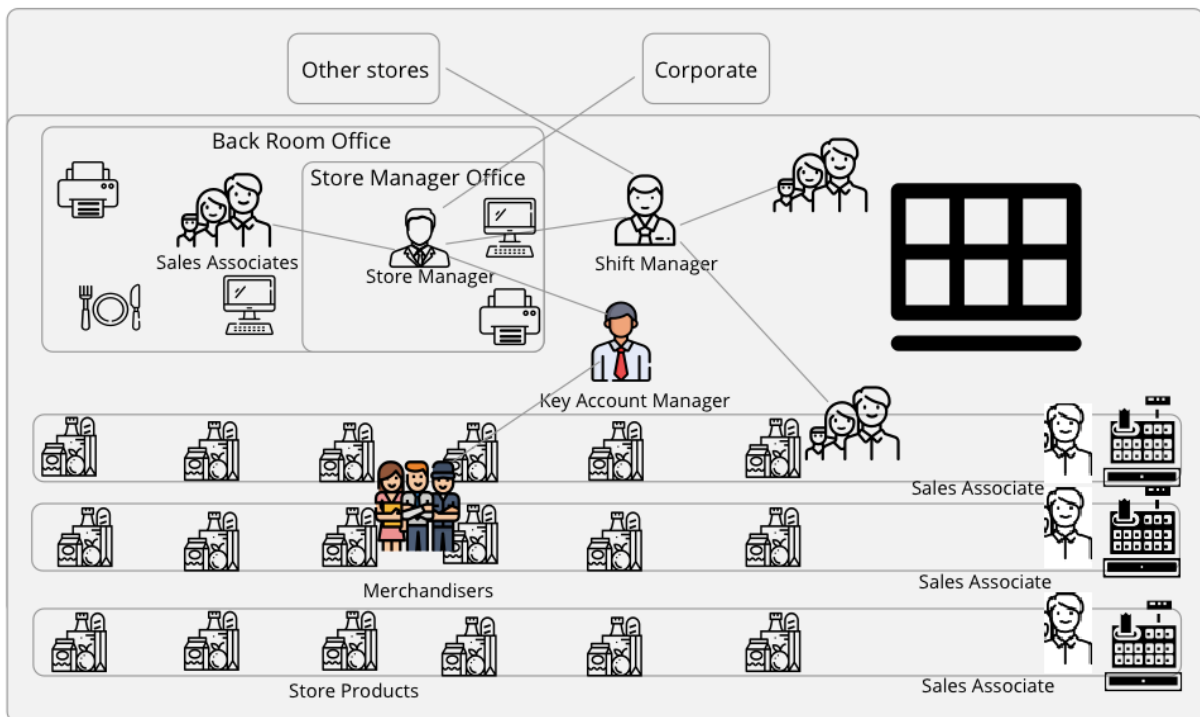


Figure 32. The roles and communication mapping between roles in a supermarket

In the hospital ecosystem (Figure 33), I interviewed five user groups: Doctor, Senior Doctor, Nurse, Pharmacist and Hospital Administrator. They all seem to communicate with each other: the Doctor being supervised by the Senior Doctor, the Nurse collaborating with the Doctor to treat patients, all these roles asking drug-related information from the Pharmacist and the Hospital Administrator interviewing everyone on the needs they have in terms of machinery and tools. The Doctor can be found mostly in his own Staff Room or New Patients Room, discharging patients and admitting new patients to the hospital. In this room, he/she has access to computers, fixed phones or even a wall pipeline for sending information to other Staff Rooms.

In the patients' rooms, Nurses are making rounds, visiting them frequently and making sure their vital signs are in check. The Senior Doctor sometimes also does these rounds, particularly in more difficult patient cases. The Pharmacist is mostly in the Hospital Pharmacy, answering drug-related inquiries and prescribing them to patients.

There are fixed phones and printers all around the hospital, everybody being able to use them as they wish. The majority of the roles also carry their own mobile phone with installed hospital apps or WhatsApp for chatting.

THE ECOSYSTEM OF A HOSPITAL

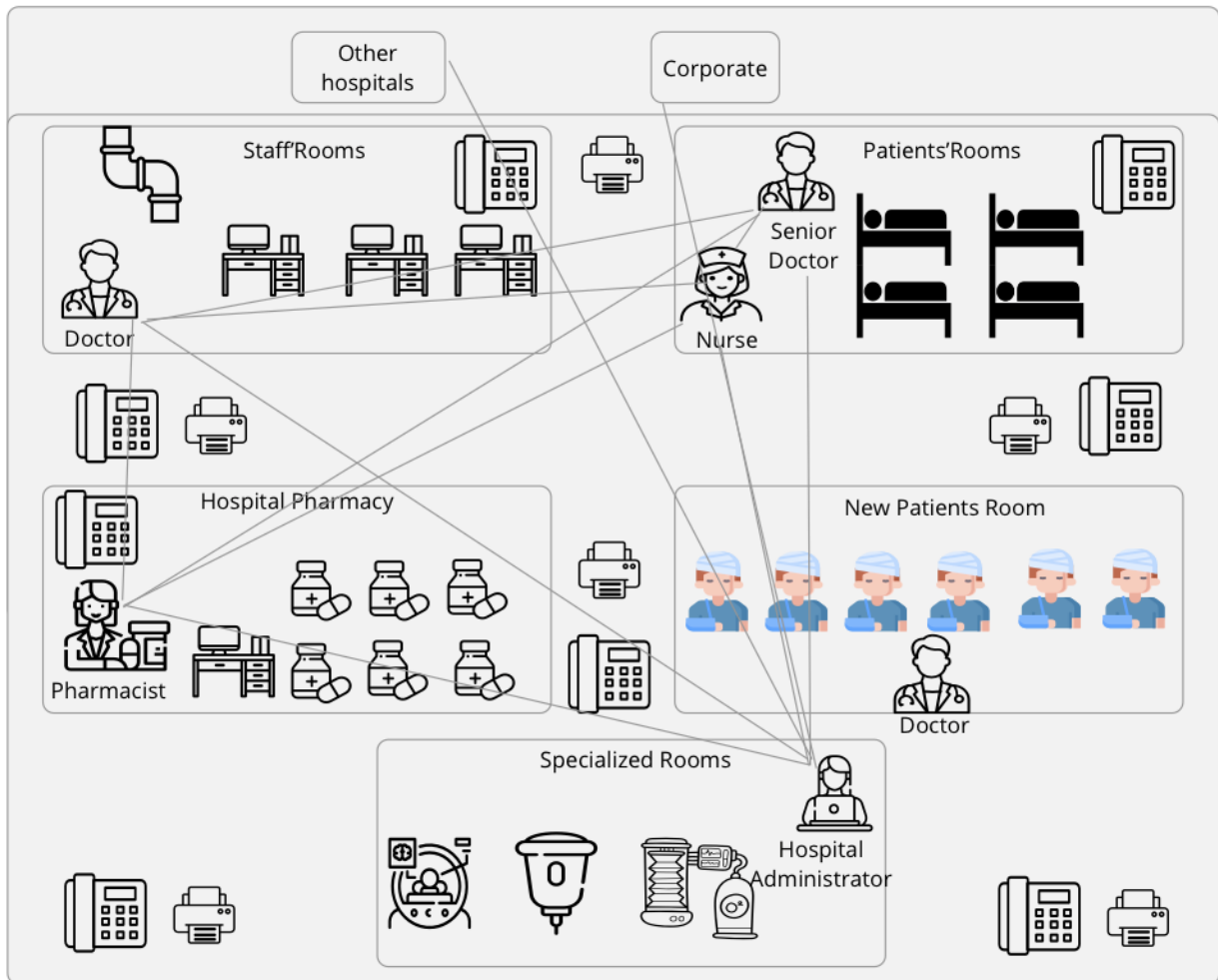


Figure 33. The roles and communication mapping between roles in a hospital

Based on data available until now, I selected chat as being the most used feature across healthcare and retail. This choice was taken given the fact that while email has been mentioned across healthcare and retail, frontline and management, it was not actively used by the frontline workers, who used it passively to read important communications.

For the design of the chat (chapter 5), I derived the following requirements from the interviews in chapter 4:

- The tool should be similar to WhatsApp, in ways that you can:

- Create groups
 - Closed groups: Have one group admin to manage the group

Due to the fact that managers currently create and supervise chat groups with frontline workers, I decided to give the power to the shift manager to create groups with his shifts or the store manager to create groups with everybody in the store. These groups can be optionally closed, not allowing anyone else to enter to see confidential information related to products or shifts.
 - Open groups

I also added the option to create open groups in the chat so that frontline workers can create groups with external consultants and colleagues that work on a specific task such as carrying products and arranging them in the store
 - Add contacts to an existing group

Frontline workers and their managers should have the ability to add or remove employees from groups, since many employees quit their jobs after a short time.
 - Name and rename the group

This capability was added to distinguish from several chats, inspired by other chat tools currently used (e.g. WhatsApp, Workplace by Facebook).

 - Have 1-1 conversations

Besides groups, frontline workers might also want to reach their managers for personal questions, so having the ability to send a 1-1 message on the chat is needed.
 - Search in messages

Same as WhatsApp and Workplace by Facebook, it is good to keep the functionality consistent and allow employees to search in the conversations:

 - By person
 - By content of the message
 - Set and display employee picture

For the employees to be found easier and match the real world better, an employee picture should be available for display on the chat.
 - Push notifications
 - Offer option to set them for later
 - Especially for healthcare workers (but also for retail) it is very important to not be disturbed during peak work (for healthcare workers in patient meetings and for retail workers while serving customers at the counters). Therefore, frontline workers should be offered the option to not be disturbed during certain intervals.
 - Ability to take photos from the app and send them

Since both retail and frontline workers take photos and send them on chat currently, this ability should be offered in this chat as well
 - Ability to send documents and links

Frontline workers currently share documents and external links on chat.
 - Ability to reach people outside the organization

Frontline workers collaborate with external workers (retail workers with Key Account Managers, healthcare workers with consultants), so being able to reach out to them is needed.
 - The personal number should not be displayed

Frontline workers interviewed did not like to be reached outside work or their personal number to be known by the manager, so the chat should make sure to not display personal phone numbers.

5. Chat Evaluation

In this section, I evaluated the chat designs that the UX Designer built based on my previous requirements.

5.1 Design

The requirements from section 4.3 were passed to the UX Design team of my company.

Some of the designs created by the company UX Design team are shared below (Figures 34, 35 and 36). Other flows are unfortunately confidential.

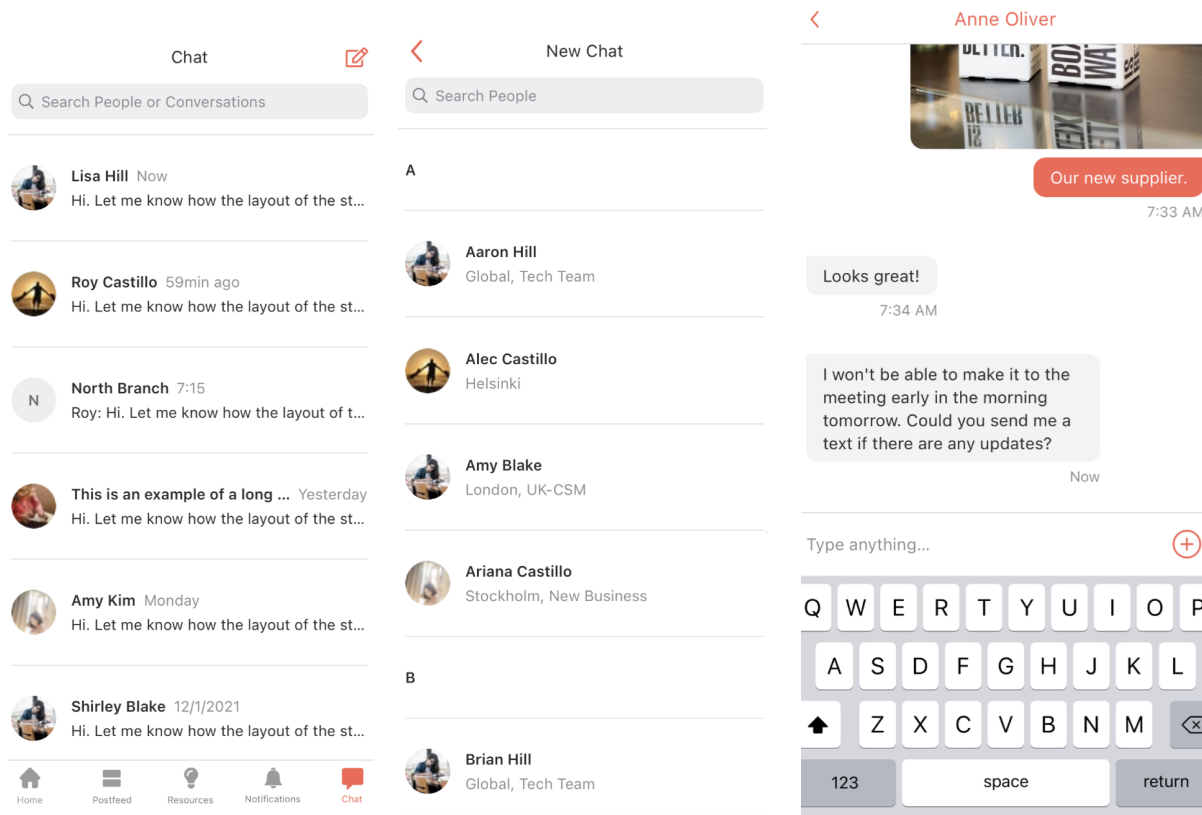


Figure 34. Creating a new 1-1 chat

From Figure 34 we can see that any user is able to search in the existent chat either by the content of the conversation or by people. We can also see how a person can create a 1-1 chat or group chat. For the 1-1 group, if the member is already on the company platform and there is no previous chat available with them, the user can find a new contact by searching in the company list of contacts. If the member is external and not on the company platform, the user should be able to first save the contact on their phone, and then the user will be displayed on the contact list, similarly to the ones already available in the platform. To simplify the process, the same flow is available to users for creating a group chat, with the only difference being that the user can select multiple contacts (Figure 35).

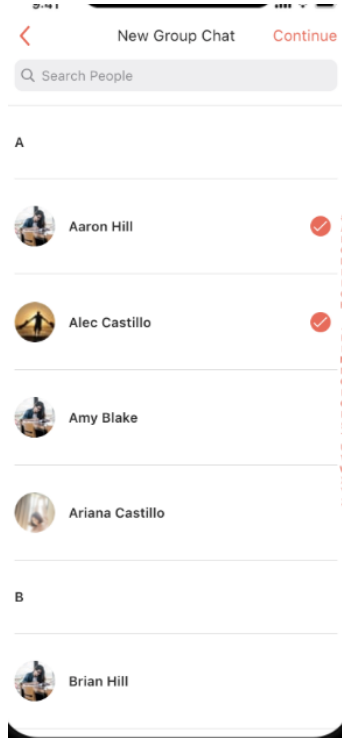


Figure 35. Selecting members for the group chat

From the chat settings, the user is able to rename the group, add a group picture or set the chat to be open or closed. The closed chat is signified with a small lock in the main chat room to differentiate them from the others. The admin of the chat is the only one able to add contacts to the closed group, while in an open group anyone can add additional members in the chat.

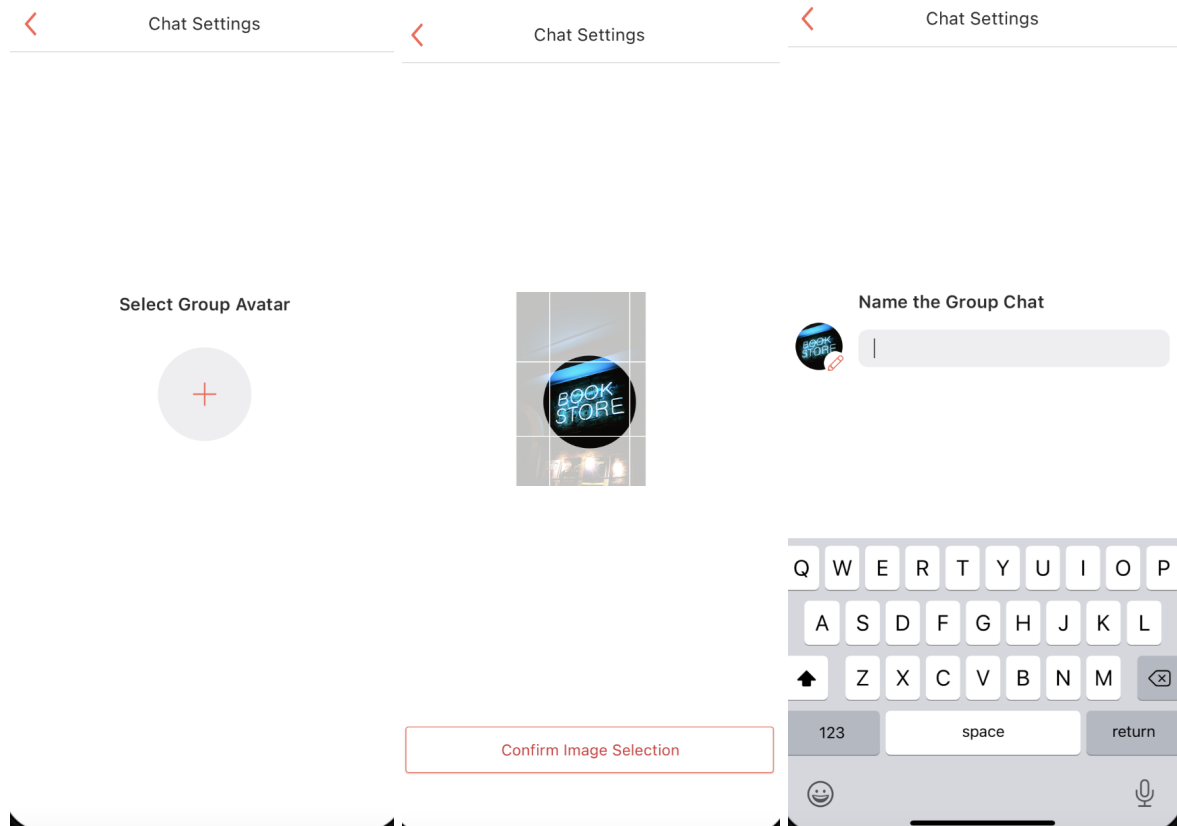


Figure 36. Naming the group chat

Users can either take instant photos or share existent photos or documents from one place (Figure 37). They can also add links in the chat, which will lead to them being redirected to that particular link in their phone browser.

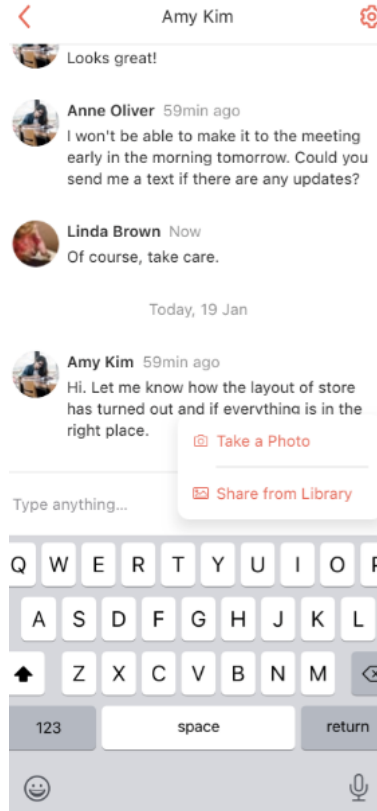


Figure 37. Sharing photos or documents from the chat

Neither the personal nor the company phone number of the user is displayed in any of these flows.

5.2. Heuristics Evaluation

I conducted a heuristic evaluation to check if the new designs from section 5.1 respect Nielsen's Heuristics (Nielsen, 1992).

- Visibility of system status

Description: This heuristic refers to the design being descriptive enough for users to inform them at all times what is going on and where they are in the application.

Feedback: The system expressed whenever the user was in the chat, at what stage and what is the next step that can be taken. For example, it always displays that you are in the chat, and have a clear idea that you can search by people or conversations (Figure 32). It shows also when you are in the process of creating a new chat and shows what type of chat it is, whether it is group (Figure 34) or simple chat. You are not shown however how many steps are ahead of you, which violates the heuristic since you are not aware of an user how long it is going to take you to finalize the step (e.g. for creating a new group you don't know beforehand you will have to select an image)

- Match between system and the real world

Description: Designs who respect this heuristic use words, phrases and concepts that are understandable for users and follow real world conversations and conventions.

Feedback: By using user profile pictures that are displayed on the chat, the system matches the real world environment. One potential improvement is adding the job role in the profile, so that the users can better identify who they are addressing when they chat with a new person.

- User Control and freedom

Description: This heuristic refers to being able to offer an exit to leave any unwanted actions in a simple and timely manner.

Feedback: The user can go back from a step or exit any process. The user can for example create a group, add users and a picture and use the back button to navigate to previous steps if needed.

- Consistency and standards

Description: With this heuristic respected, users are clear whether the wording used or actions in the application mean the same thing and follow industry conventions.

Feedback: The chat is consistent with the current branding by using the same colors as the company. Also, the design is similar to a tool majority of them frequently uses and is aware of, which is WhatsApp. By having a similar design with an already existing application used, this makes it easier for the user to understand and learn how to navigate a new application.

- Error Prevention

Description: This heuristic encourages designers to prevent problems from occurring in the first place in a flow or at least, help users confirm before they commit to an action.

Feedback: This aspect is not yet addressed with the current design. For example, if a person couldn't be added for some reason to the current chat, the design should make the error clear.

- Recognition rather than recall

Description: This heuristic is about making the design easy to recall in a way that reminds users in a visible way of all the needed information. Users should not have to go back to remind themselves of certain information in the flow.

Feedback: The design of the chat is very similar to a tool already used for the majority of frontline workers, WhatsApp, therefore I believe it can be easy to recall the basic principles of a chat. One recommendation is to have the roles of the people displayed in the chat, so that users can also search based on it. This would speed up their ability to recognize people from the list.

- Flexibility and efficiency of use

Description: A good minimalist design is one that speeds up interaction for both experienced and inexperienced users and allows them to tailor frequent actions.

Feedback: One improvement that can be added here would be to help users add new contacts in the chat by offering them frequently contacted users. In this way, the users would not have to search through a list, but rather have the option available for them to immediately pick.

- Aesthetic and minimalist design

Description: The design of a flow should only contain the information that is relevant and needed for users to take a decision inside the application.

Feedback: The design is simple and does display the minimum amount of information it can.

- Help users recognize, diagnose and recover from errors

Description: Any error message in the design should indicate the problem and a solution to it.

Feedback: This heuristic is violated since no error is currently added in the design.

- Help and documentation

Description: While the best case is when a design doesn't need any further explanation, this is not always the case. It is at least necessary to provide additional documentation to help users with their goals in the applications.

Feedback: This heuristic cannot be evaluated since there is no help and documentation offered in the application. Users could benefit from having a tutorial in the beginning of their experience of what they could do in the chat and what are the different groups and roles that they can take.

5.3 Usability Testing

I have tested a chat prototype that could be used by frontline workers in 15 usability testing sessions. The UX Designer from the company I collaborated with created a chat prototype in Invision to test with 5 retail frontline workers and 5 healthcare frontline workers. In addition to those, 3 retail managers and 2 healthcare managers agreed to also test it. All were part of the previously interviewed participants list. I hoped from these sessions to understand their reactions and how well they think the tool could suit them.

5.3.1 Procedure

The prototype was created for mobile and the scenarios included in the prototype were:

- You received a text from your co-worker and she's waiting for your answer
- You want to update your co-workers by taking a new photo of the hospital room/store layout.
- Aaron and Alec are working together with you so you decided to create a new chat room for the three of you.

During the session, I shared my role as a moderator, the objective of the call, and the procedure of it. The participant was encouraged to think aloud and share their thoughts in each of the tasks. After sharing this information, I proceeded to start recording the session, share the link to the Invision prototype and encourage the participant to start talking aloud during the task.

After the sessions, the following questions were addressed to the participants:

- What is your opinion about this chat?
- Are there other functionalities you expect to have in this chat?
- Could this app replace the chat tool you are currently using?
- What criteria do you have in mind for a great chat tool?

What I sought to measure in the usability testing sessions were task success and qualitative feedback received at post-usability questions. Due to the talking aloud procedure applied, I did not measure task timing, as the participant comments interfered with the real time of the task.

The entire procedure of the usability testing session can be found in Appendices, Section 3.

5.4 Results

On the frontline side, 10/10 participants completed the first task and second tasks, and 9/10 completed the third task. One participant was not able to complete the third task due to not knowing how to select multiple contacts.

Their feedback to the addressed post-usability questions was that it is "easy to use" and "similar to the chats I know". When asked if there are other functionalities expected, 2 of them mentioned the ability to leave audio messages if in a hurry and another to be able to pin important messages on the chat, so that they are not left out in the chat. All 10 frontline workers mentioned the chat could replace their current messaging tools due to the security of information, not invading their personal life.

On the manager's side, all 5 participants successfully completed the tasks.

Three of them mentioned that they would need "to know if they read my message",

When asked if the chat could replace their frontline worker's tools, one of them mentioned no because of the "read" functionality that is expected from it. The ones who mentioned the new tool could replace their currently used chat is again the security of information and designated place for IC.

Additionally, they mentioned they would like the following criteria to be respected in a chat tool:

- Accessible

Frontline workers desire accessibility, meaning fast access to their needed tools, which can be documents, platforms, chat, etc.

- Limited waiting times

The time needed to send a message or to wait for the contacts to load shouldn't be long, it should be as close to instantaneous as possible.

- Design for relaxation

All frontline workers in retail and healthcare mentioned having a higher level of stress than before Covid, caused by the uncertainty of job and fear of disease. This should also be considered when designing features and products. To design for stress, I have looked at existing design models. Based on Stoop & Dirk (2017) I have devised the following design principles:

- No error states or at least, include useful error states
Tools not working as they are supposed to make frontline workers even more prone to stress.
- Design with rounded shapes instead of sharp corners
Round shapes were preferred against more sharp shapes.

- Soothing and transparent copywriting

The product messaging should be kind and communicate exactly the intention that the product expects from the user.

- Limited choices

Users should not have to make too many choices in the feature flow (participant quote: "I like the simplicity. We have an internally built messenger now, which makes the process such a pain. I shouldn't be asked who should be the admin of the chat or who is allowed to be in, too complicated").

6. Conclusions

I conclude below the findings from my research by directly answering the research questions posed in the beginning of the thesis and additionally offer a framework and advice for different organizational layers.

6.1 Research Questions

RQ 1.1. What are the user journeys and various channels each hierarchical level uses to keep every employee updated on recurrent changes currently?

RQ1.1.1. What are the frontline industries worth exploring in terms of communication?

RQ1.1.2. What are the job roles worth exploring in those industries?

I started by reviewing the literature in healthcare and retail and found several roles that are interesting to study from a Communications perspective: in retail Customer Service Representatives, Cashiers and Sales and in healthcare doctors, nurses and pharmacists. To validate their responsibilities and find roles in management as well, I relied on semi-structured interviews to interview 52 healthcare and retail workers and managers.

RQ1.1.3. What are these roles' user journeys?

I discovered the journey of Sales Associates, Shift Manager and Store Manager in retail, and Doctor, Nurse, Pharmacists, Hospital Administrator and Senior Doctor in Healthcare. Their journeys and channels are explained and can be seen in chapters 4.2.1, 4.2.2, 4.3.1 and 4.3.2.

RQ1.1.3. What are these roles' IC channels?

The channels that retail workers use currently to communicate internally in Europe are face-to-face, WhatsApp and phone calls, while in the US face-to-face, chat (internally built or Workplace by Facebook) and phone calls and messages.

In healthcare, frontline workers still use face-to-face communication the most, followed by chatting in the EMR system, pagers, fixed phones, WhatsApp and pneumatic tubes. In the US, the channels are face-to-face, EMR, phone calls, pagers, the hospital internally built chat, fixed phones and email.

On the retail management side, in Europe managers still talked about using Whatsapp, Teams, phone calls and email as the main tools to communicate with their frontline workers, while in the US it is again mentioned Workplace by Facebook, phone calls and email.

In healthcare management, the interviewees mentioned internally built chat tools, phone calls, email, hospital fixed phones and pagers to reach their frontline workers.

RQ 1.2. How did the Covid pandemic change the tools of frontline workers?

From the thematic analysis of the interviews I draw the conclusion that in general, no major impact in the way frontline workers operate and the tools they use has happened during Covid for the interviewees. In retail they mentioned the push of Teams, a communication tool, to receive training on potential operational changes and Covid conduct. In healthcare no change in tools happened, although some mention not allowing them to use personal mobile phones anymore, while some report an even greater use of mobile due to the increase in messaging communication.

Some of the frontline workers in Europe in both retail and healthcare feel their communication tool is intrusive during the pandemic, while in the US they would like to better communicate the shift planning arrangements that became more chaotic. Across industries, frontline workers prefer a tool that would include all their communication needs and accessibility to the information needed.

Managers agree with tools not being secure enough, the planning and scheduling processes that can be improved and mention also that they would like to have the ability to measure how their communications are performing in the organisation.

An aspect that is not directly related to the tools frontline workers and their management use, is how their relationships changed due to the pandemic. Retail frontline workers predominantly mention a degradation of their relationship with management, in both Europe and the US, while on the other side, both healthcare frontline workers and the management see each other as competent and doing the best they can in this situation. While not directly related to any tools, this is important, since it will help an organization leverage a feature to a potential customer and frame the interest point, either as a tool that can strengthen the relationship between supervisor and employee through more transparency or as a tool that allows each employee to be more secure without revealing personal information to the employer.

RQ 1.3. What is the most relevant feature for each organizational layer?

Chat was mentioned as being the most relevant feature for both frontline workers and management, as it appeared during all interviews. One aspect to be noted is that even though other functionalities were mentioned (e.g. planning, scheduling), the goal of this research was to choose a feature that could strengthen the current functionalities already offered by the current product.

One exception was a nurse that reported that since Covid the management is not allowing mobile phones in the hospital anymore, but even in that case, she was using chat to ask questions to co-workers in breaks or outside work. The email was also used across all roles, but since the objective of this thesis was to select a tool actively used by frontline, I did not select email as in the majority of cases it was passively used by them to read the latest news and announcements.

Besides validating chat as being used across multiple user groups, I also contributed by analyzing the participants' interviews and coming up with requirements on how to build a usable chat feature. The most important requirements discovered were:

- Create groups
 - Closed groups
 - Open groups
 - Add contacts to an existing group
 - Name and rename the group
- Have 1-1 conversations
- Search in messages
 - By person
 - By the content of the message
- Set and display employee picture
- Push notifications

- Offer option to set them for later
- Ability to take photos from the app and send them
- Ability to send documents and links
- Ability to reach people outside the organization
- The personal number should not be displayed

RQ 1.4 How can this selected feature be evaluated?

Firstly, I evaluated the chat through a heuristics analysis, which revealed the design should incorporate error states, ability to search by role and for frequently contacted users and offering a tutorial on how the main actions can be performed in the chat.

I evaluated the chat design built by the UX Design team of my company with 15 retail and healthcare employees, from which 10 had frontline roles and 5 management roles. 15/15 participants completed the first task and second tasks, and 14/15 completed the third task.

The participants evaluated it as being "easy to use" and "similar to the chats I know". They mentioned the ability to leave audio messages if in a hurry, the ability to pin important messages on the chat and know when a message was read. 14/15 participants mentioned the chat could replace their current messaging tools.

Finally, I came up with the following checklist that can be considered in the future when designing a chat for healthcare and frontline:

- Accessible - fast access to any content
- Limited waiting times
- Design for relaxation
 - No error states or at least, include useful error states
 - Design with rounded shapes instead of sharp corners
 - Soothing and transparent copywriting
 - Limited choices to make in the tool

6.2 Limitations

The following limitations can be mentioned to influence the final results:

- While frontline workers and their managers were reached for both Europe and the US, the sample is not enough to draw conclusions for entire industries. Quantitative research is needed to better understand the scale of the findings.
- Not all roles in those industries were covered. Participants in the thesis mentioned many other multiple roles in the industry (Key Account Manager, Merchandisers, different types of nurses and doctors and other healthcare specializations), which when potentially aggregating their numbers can make a big percentage out of those industries.
- The majority of the interviewees were recruited via social media, which can

- The majority of the participants interviewed were non-English speakers, two of them having difficulties with the English language. Given this, the language might be limited, especially when asked to describe a situation or a feeling.
- The duration of the interviews was limited, in few cases 30 minutes not being enough to dive into all aspects of the IC life. While all prepared questions were addressed as expected, when diving deeper into some aspects of the participants' work life, the timing did not permit fully uncovering all the details of communication.
- Only one person, the author, analysed the entire data, which can make the study biased. More stakeholders should be involved in the future to both conduct the interviews and analyze the data from different angles.

6.3 Future Work

As previously mentioned, more quantitative research is needed on retail and frontline to validate the findings related to the user groups found, their responsibilities and most used features in IC.

Testing also the prototype with a bigger sample might reveal additional features that workers would consider as necessary to conduct their work.

I also recommend testing with a bigger population the following recommendations, to see how valid they are per industry and potentially have an in-between subjects design study to test how important each additional functionality is:

- The new chat feature designed by my company
- The new chat feature designed by my company + Adding the possibility to pin messages
- The new chat feature designed by my company + Adding the possibility to read messages
- The new chat feature designed by my company + Adding the possibility to pin messages + Adding the possibility to read messages

This type of study is recommended so that each feature's impact on the product is compared to the base chat.

Some other interesting insights were also mentioned as potential opportunities to be looked into that are not solved by chat, and more specific to the industry, such as scheduling for retail or note-taking for healthcare.

Additionally, by reviewing the interviews and how much each layer knows about each other, I can give the following recommendations to each organizational layer:

- For frontline workers
 - All of the frontline workers interviewed seem to not be vocal when it comes to their communication needs. Do not hesitate to give feedback to managers - even if inexperienced, a fresh perspective always brings new insights to the organization and its leaders
- For mid-managers
 - Create a culture of openness and talk openly about stress
 - Talk to the superiors about tools your employees need to become more efficient - do not rely on the organization to know that
 - Find ways to be more transparent on the roles your employees have
- For upper-management

- Create a culture of top-down, as well as bottom-up communications and use tools to promote that
- Walk the floor and find out who your ambassadors are
- Walk the floor and find out who your frontline workers are and what they need

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Appendices

Section 1. Consent Form

Link to the consent form can be found here: <https://forms.gle/T6nVydZuw6D21k1N6>

Text of the consent form:

Dear participant,

Thank you for joining my research study!

This thesis is conducted in collaboration with the University of Aalto, Finland, the University of Twente, Netherlands and an internal communications company based in Finland.

The purpose of this study is to understand how different organizational layers (frontline, mid and upper management) from Europe and the U.S. communicate in their day-to-day work activities. The study consists in a 30min interview conducted via Google Meets, meeting link becoming available in the calendar invitation sent once this form is filled in.

It is my responsibility to inform you how I plan to share and use the information that will become available in the course of our discussions. Your personal information (name, email), as well as audio recording of the session(s) are protected and will not be shared nor stored after my analysis. During the analysis of the information, your data will be stored in my personal company drive, after which your data will be deleted.

I will discuss insights and findings from our discussion(s) with the aforementioned stakeholders in a manner that does not reveal in any way a possibility to identify you. The results of your interview might be used in form of interview quotes in the final thesis and stakeholders' presentations.

The only exception to this is if you directly state you agree to be contacted for further research, in which case your personal information and your audio recording will become available only to my company. But, in any case, personal information will not be mentioned in the thesis nor shared with any University. My thesis findings will become immediately available to University of Twente and my company, and after 2 years, will become publicly available.

You may retract from this research at any point of time. Even if you do not agree to record the audio session you are still eligible to participate in this research.

By submitting this form you agree with these conditions and with your selected choices in this form. By presenting you this form I also agree to respect my obligations stated here.

You may contact Magdalena Mihalache (mihalache.magdalena@gmail.com) for any questions concerning your confidentiality or overall research inquiries. If you have any complaints about this research, please direct them to the secretary of the Ethics Committee of the Faculty of Electrical Engineering, Mathematics and Computer Science at the University of Twente, P.O. Box 217, 7500 AE Enschede (NL), email: ethicscommittee-cis@utwente.nl.

Section 2. Semi-structured interviews text

1. For frontline workers

First of all, thanks a lot for your time!

I would like first to introduce myself.

My name is Magda and I am a student at Twente University, Netherlands. For my thesis topic I am collaborating with an internal communications platform, to understand how frontline workers communicate information in their day to day work activities. Your information will be used for analysis and understanding how frontline workers find internal information and communicate. Your name will not be asked nor associated with your data.

Answer given. Interview starts. If permission was granted, recording starts.

Let's first talk about yourself and your role.

- Can you tell me more about your role? What are the main responsibilities you have?
- Tell me how a typical work day looks like for you. (*dive deeper into activities to understand with whom does he/she interact with and how*)

I am curious to know more about your needs in internal communications.

- With whom do you interact during the work day?
- How do you interact with them?
- What tools do you use for communicating? Are these tools recommended by the employer?
- How often do you use each of them?
- What type of messages or content do you share on these tools?
- What is your opinion about each of these tools? What are the advantages and disadvantages of using them?
- How did Covid change the way you communicate with your colleagues? How about with the management?
- What do you think about the management strategies taken during Covid?

What haven't I asked you today that you think would be valuable for me to know?

May I contact you if we have any other questions or for possible further research for this project?

2. For managers

First of all, thanks a lot for your time!

I would like first to introduce myself.

My name is Magda and I am a student at Twente University, Netherlands. For my thesis topic I am collaborating with an internal communications platform, to understand how managers communicate information to their frontline workers. Your information will be used for analysis and understanding

your communication strategies towards frontline workers. Your name will not be asked nor associated with your data.

Answer given. Interview starts. If permission was granted, recording starts.

Let's first talk about yourself and your role.

- Can you tell me more about your role? What are the main responsibilities you have?
- Tell me how a typical work day looks like for you. (*dive deeper into activities to understand with whom does he/she interact with and how*)

I am curious to know more about your needs in internal communications.

- What are the strategies that you use for communicating with frontline workers?
- What are the tools that you use for communicating with frontline workers?
- How often do you use each of them?
- What type of messages or content do you share on these tools?
- What is your opinion about each of these tools? What are the advantages and disadvantages of using them?
- How did Covid change the way you communicate with frontline workers?
- How do you think frontline workers have been affected during Covid?

What haven't I asked you today that you think would be valuable for me to know?

May I contact you if we have any other questions or for possible further research for this project?

3. For Communications Experts

Hi,

We are currently exploring the topic of internal communications for frontline workers and their managers. Your experience in the internal comms space is very valuable for us to better understand this topic and its importance.

- Where is the IC industry going in the future for frontline workers? What is the current state of the IC industry for frontline (is it at the beginning or is it matured?)
- From your experience, what have you noticed are the most important aspects of great IC products for frontline workers?
- What do you think about the current state of tools when it comes to frontline workers?
- How well do you think the current product capabilities cater the needs of IC customers with frontline workers? Any particular insight that you want to share towards what currently works and what not?
- What do you think higher levels of management want to have in terms of frontline communication tools and features?

Section 3. Usability Testing Consent Form and Procedure

Consent Form

Dear participant,

Thank you for joining my research study!

This thesis is conducted in collaboration with the University of Aalto, Finland, the University of Twente, Netherlands and an internal communications company based in Finland.

The purpose of this study is to understand how different organizational layers (frontline, mid and upper management) from Europe and the U.S. communicate in their day-to-day work activities. This study consists in a 30min usability testing session of a chat functionality conducted via Google Meets, meeting link becoming available in the calendar invitation sent once this form is filled in.

It is my responsibility to inform you how I plan to share and use the information that will become available in the course of our discussions. Your personal information (name, email), as well as audio recording of the session(s) are protected and will not be shared nor stored after my analysis. During the analysis of the information, your data will be stored in my personal company drive, after which your data will be deleted.

I will discuss insights and findings from our discussion(s) with the aforementioned stakeholders in a manner that does not reveal in any way a possibility to identify you. The results of your comments might be used in form of quotes in the final thesis and stakeholders' presentations.

The only exception to this is if you directly state you agree to be contacted for further research, in which case your personal information and your audio recording will become available only to my company. But, in any case, personal information will not be mentioned in the thesis nor shared with any University. My thesis findings will become immediately available to the University of Twente and my company, and after 2 years, will become publicly available.

You may retract from this research at any point of time. Even if you do not agree to record the audio session you are still eligible to participate in this research.

By submitting this form you agree with these conditions and with your selected choices in this form. By presenting you this form I also agree to respect my obligations stated here.

You may contact Magdalena Mihalache (mihalache.magdalena@gmail.com) for any questions concerning your confidentiality or overall research inquiries. If you have any complaints about this research, please direct them to the secretary of the Ethics Committee of the Faculty of Electrical Engineering, Mathematics and Computer Science at the University of Twente, P.O. Box 217, 7500 AE Enschede (NL), email: ethicscommittee-cis@utwente.nl).

Procedure

Hi, my name is Magda, and as we talked previously, I am working on my thesis to better understand how a tool can be designed for frontline workers and their managers in retail and healthcare.

- Goal

The goal of this session is to test a chat functionality my company designed..

The session will go as follows: I will share a prototype with you, that can be opened in your browser. I kindly ask you to share your screen, so that I can also see what you are going through in the prototype. If it is ok for you, I will start the recording, that has the purpose of backup in case I want to recall something.

- Rules

I want to mention that by no means we are testing you, but the prototype, and I'm eager to know your feedback about it.

Before actually starting the session, a couple of rules to be mentioned:

- I kindly ask you to think aloud, meaning that at each step of the process you are invited to say what you think and feel about your interaction with the prototype
Mention the tasks aloud. You have 4 scenarios to go through, read them aloud so that you remember them better throughout the task
- For the sake of accuracy of this testing session, I will not intervene in your process (unless the prototype poses difficulties and you cannot continue with the task).
- Send Invision prototype
- Questions after the tasks:

What is your opinion about this chat?

Are there other functionalities you expect to have in this chat?

Could this app replace the chat tool you are currently using? Why yes, Why not?

What criteria do you have in mind for a great chat tool?