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UNDERSTANDING EMPLOYEE HOPES ABOUT WORKING WITH PHYSICAL ROBOTS

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ABSTRACT

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This master's thesis examines employees' hopes about working with physical robots. The study aims to gain a deep understanding of employee hopes and the meanings attached to them. In addition, its goal is to produce new information in the Information Systems (IS) field since the topic is still relatively unexamined. This research topic is relevant to study because understanding employees' hopes can help companies integrate physical robots better into use and can reduce employees' change resistance. The empirical part of the research is conducted with an existing data set, which has been collected by Makkonen, Pirkkalainen, and Salo (2022) in their research on employee emotions toward robots. The thesis utilizes the part of the research that focuses on employee hopes, which has not been previously analyzed. Based on the data, a qualitative content analysis is conducted, which identifies and categorizes the respondents' hopes into ten hope categories. The analysis reveals that the respondents had considered the topic from three different perspectives. Therefore, the hope categories have been divided into three main categories: employee-related, company-related, and robot-related. The employee-related hopes include the subcategories of assistance, time savings, physical relief, increased work safety, and not to replace humans. The company-related categories focus on increasing the company performance and reducing human error. The last main category, robot-related hopes, includes the subcategories of new features, reliability, and affordability. Additionally, the study analyzes the meanings employees attach to the hopes and draws conclusions about employee attitudes towards robots based on them. The findings of this master's thesis support prior studies focusing on employee attitudes and perceived benefits of robots and also create new insights about employee hopes. Since the findings are aligned with the prior research and are replicable, there is potential for future research to reach an even more extensive understanding of employee hopes. The results of the study can also be applied to practice by broadening the understanding of organizations about the employees' perspectives on using physical robots.

Keywords: physical robots, hopes towards robots, attitudes towards robots, robots at workplaces, robots as colleagues

TIIVISTELMÄ

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Tässä pro gradu -tutkielmassa tutkitaan, millaisia toiveita työntekijöillä on fyysisiä robotteja kohtaan heidän työtehtäviensä näkökulmasta. Tutkielman tavoitteena on saada syvällinen ymmärrys työntekijöiden toiveista sekä niiden taustalla olevista merkityksistä. Lisäksi sen pyrkimyksenä on tuottaa uutta tietoa tietojärjestelmätieteen tutkimuksen saralle, sillä aiempia tutkimuksia työntekijöiden robotteihin kohdistuvien toiveiden näkökulmasta ei juurikaan ole. Aihe on merkittävä tutkimuskohde, sillä työntekijöiden toiveiden ymmärtäminen auttaa yrityksiä integroimaan robotteja paremmin käyttöön ja voi vähentää työntekijöiden muutosvastarintaa niitä kohtaan. Tutkimuksen empiirinen osa toteutetaan olemassa olevan aineiston avulla, jonka Makkonen, Pirkkalainen ja Salo (2022) ovat keränneet tutkimuksessaan koskien työntekijöiden tuntemuksia fyysisiä robotteja kohtaan. Tämä tutkielma hyödyntää aineiston toiveisiin keskittyvää osaa, mitä ei ollut vielä aiemmin analysoitu lainkaan. Tutkielmassa toteutetaan aineistolle laadullinen sisällönanalyysi, jonka avulla tunnistetaan ja kategorisoidaan vastaajien toiveet kymmeneen toivekategoriaan. Tutkimuksessa havaitaan, että vastauksia kysymyksiin on toteutettu kolmesta eri perspektiivistä, jonka vuoksi toivekategoriat jaetaan kolmeen yläluokkaan; työntekijäkeskeisiin, yrityskeskeisiin sekä robottikeskeisiin. Työntekijäkeskeisiin toivekategorioihin lukeutuvat avustaminen, ajan säästäminen, fyysinen tuki, parempi työturvallisuus sekä ihmisten korvaamattomuus. Tämän lisäksi toivekategorioita muodostuu yrityskeskeisestä perspektiivistä. Näitä kategorioita ovat suorituksen parantaminen sekä inhimillisten virheiden vähentyminen. Robottiaiheisissa toiveissa puolestaan toivekategoita ovat uudet ominaisuudet, luotettavuus sekä edullisuus. Tämän lisäksi tutkimus keskittyy analysoimaan, millaisia merkityksiä toiveiden taustalta voidaan havaita ja mitä johtopäätöksiä niistä voidaan tehdä työntekijöiden suhtautumisesta robotteihin. Tutkimuksen keskeiset löydökset tukevat aiempia tutkimuksia, jotka ovat keskittyneet tutkimaan työntekijöiden asenteita ja käsityksiä fyysisiä robotteja kohtaan. Koska tulokset ovat linjassa aiempien tutkimuksien kanssa, luovat ne perusteen myös jatkotutkimukselle, jotta työntekijöiden toiveista robotteja kohtaan voitaisiin saavuttaa vielä laajempi ymmärrys. Tämän tutkielman tuloksia voidaan myös soveltaa käytäntöön ja hyödyntää lisäämään yritysten ymmärrystä työntekijöiden kokemuksista ja näkökulmista fyysisten robottien käyttöä kohtaan.

Asiasanat: fyysinen robotti, toiveet robotteja kohtaan, asenteet robotteja kohtaan, robotit työpaikoilla, robotit kollegoina

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1 INTRODUCTION

Robotics and artificial intelligence have been significantly growing fields in the past decade, but physical robots have been here with us much longer than that. Physical robots are machines or systems that perform tasks in a physical environment. They bring many new opportunities into various industries, leading companies to increase automation in the workplace. By utilizing physical robots, companies can improve their work safety because they can complete high-risk activities for humans, such as mining or handling hazardous chemicals. Additionally, physical robots can enhance the company's productivity, efficiency, and product quality while reducing unnecessary manual labor from employees. (Fernandez et al., 2012.)

In industrial fields, such as manufacturing, robots have provided support in different tasks since the 1950s (Bekey et al., 2005). Assistive service robots are not a relatively new innovation either, and they have been a part of frontline service operations in various industries, such as hospitality and retail, since the beginning of the millennium (Rindfleisch et al., 2022; Tuomi et al., 2021). However, the way we operate with robots has changed dramatically throughout the years. Previously, robots have been seen as tools or equipment that can enhance production functions. Since they have become more advanced and capable of more demanding tasks, they have now adopted entirely new roles in companies. This means that the traditional roles of employees are also inevitably changing, and in some fields, employees will even get non-human operators as their colleagues. (Bowen, 2016.)

Changes in the employees' roles and work tasks can cause many feelings toward the new robotic co-worker. Typically, employees may first experience negative emotions, such as mistrust or fear of losing their jobs, which can potentially lead to change resistance. Change resistance is a severe obstacle when implementing a robot in a company. If the employees are not on board with the change, the robot's full potential may never be fully utilized. (Meyer et al., 2020.)

Negative emotions towards robots, change resistance, and employee acceptance of robots are research topics that have been previously examined in the field of Information Systems (IS). However, another interesting perspective on the topic is the employees' positive emotions toward robots, which is yet a relatively unexamined research area. The prior research on the topic has mainly focused on employee attitudes toward robots or their perceived benefits of robots (Meissner et al., 2020; Turja et al., 2018; Van Looy, 2022). Nonetheless, previous studies do not seem to focus on the hopes of the employees for robots and how these thoughts or ideas may affect their adoption of robots.

As a concept, hope is a future-orientated cognition. For instance, expectations are individuals' probability-driven assessment of possible outcomes, while hopes are an assessment of the most desirable outcomes, which are not necessarily the most probable ones. (Leung et al., 2009.) Therefore, studying hopes can provide a more comprehensive view of the employees' mindset and true desires, which is not restricted by concrete aspects such as company norms or job demands.

Employee hopes for robots is a crucial research area for three reasons. First, understanding employee hopes can help the company to manage expectations more efficiently. If the employees' hopes are unrealistic in some way, they might feel disappointed with the robot, which can lead to change resistance. By understanding these hopes, companies can better manage their employees' expectations to avoid this situation. Second, by examining the hopes, the company can better understand what employees are hoping to achieve with robots. That means that they are able to determine what kind of training or education could be helpful for the employees to work more efficiently with the robots (Tuomi et al., 2021). Third, examining and listening to employee' hopes can positively affect their acceptance of robots. By creating a positive environment around technology changes and giving employees the feeling that they have been heard, they will most likely experience fewer negative feelings since technology adoption and job satisfaction go hand in hand (Speier and Venkatesh 2002). In conclusion, understanding employee hopes can help to implement the robots better in the workplace, reduce possible change resistance, and improve job satisfaction.

Because of the mentioned benefits, this master's thesis aims to fill the research gap and provide a new perspective on the research of employees' emotions about working with physical robots. This study also aims to produce new information to support the integration of robots into workplaces. Based on these objectives, the following research questions have been chosen for this research:

- What kind of hopes do employees have about working with physical robots in their jobs for the future?
- What kind of meanings do employees attach to these hopes?

This master's thesis consists of a theoretical part and empirical research. The theoretical part introduces the relevant physical robots for this research and studies about employee attitudes and perceived benefits of physical robots. The empirical study employs a data set from a study by Makkonen, Pirkkalainen, and Salo (2022). The data set consists of 396 responses from a qualitative questionnaire with open-ended questions. It has been conducted on employees who are currently working or have previously worked with physical robots. The research questions in the questionnaire address the employees' hopes and fears toward robots. This master's thesis utilizes the part about employee hopes, which has not been previously examined or analyzed. The thesis takes a qualitative approach to the topic, as its mission is to analyze and categorize employees' hopes through a qualitative content analysis. The content analysis utilizes the content analysis processes by Berg (2001) and Roller and Lavrakas (2015) to carry out an extensive and thorough analysis of the data set.

The result of this empirical study is a categorization of the collected employee hopes and their meanings. The categorization process led to ten different hope categories, which were divided into three main categories based on their perspectives. Besides the hope categories that are the main finding of this study, the researcher analyzed the meanings attached to the hopes based on the responses.

The results of this study are significant because they bring new information to the field of Information Systems (IS). They also validate the prior studies because there were similarities in some of the results. Hence, the prior studies are replicable at some level and, therefore, more reliable. The results of this study can also be utilized for practical purposes. Companies can utilize the hope categories to gain a better understanding of employee hopes. This will allow them to get the full potential out of a physical robot and simultaneously improve employee satisfaction.

The structure of this thesis after the introduction is as follows. The second and third chapters will provide a framework for this study. The framework includes all the relevant types of robots for this research, their classifications, the employee perspective on working with robots, and what aspects might affect their acceptance of robots. The next part of the thesis focuses on the empirical study conducted for this master's thesis. The fourth chapter introduces the research methods and how the data collection and data analysis process has been conducted. The fifth chapter introduces the findings of the study, which is a categorization of the employee hopes and an analysis of the meanings attached to them. The sixth chapter of this master's thesis focuses on the theoretical contributions, implications for practice, and limitations of the study. Besides that, it introduces future research ideas for this research topic. The final chapter of this study provides a summary of the thesis.

2 PHYSICAL ROBOTS

This chapter focuses on physical robots, deeply describing their characteristics, classifications, and applications in various fields. The focus will be on three fundamental physical robot types: industrial, service, and medical. The chapter will also introduce the collaborative models for employees and each type of robot. The conclusion at the end of this chapter will summarize the differences between the examined robots.

2.1 Characteristics of Physical Robots

Physical robots have different physical features based on their use purpose. A typical feature for them is robotic manipulation, meaning that the robot can manipulate an object to perform a specific task. A common way for a robot to manipulate is a robotic arm manipulator, which allows it to work on the task it was designed for. (Holland et al., 2021.)

Another typical feature of a physical robot is mobility. Most mobile physical robots use wheels, legs, articulation, or tracks for movement. These robots are usually designed for health, medical, or service-related applications. (Holland et al., 2021.) Besides that, there are also robots designed for aerial mobility that can fly with the help of propellers or jet propulsion (Ijspeert, 2014). These robots can be used in surveillance or search and rescue applications. In addition to the ability to move, physical robots often have sensor equipment in them to enable the robot to observe its surroundings. The sensors can be touch, camera, ultrasonic, thermal, navigation, or medical sensors designed for the physical robot's application needs (Andreasson et al., 2023).

Physical robots often also have a certain level of autonomy. For instance, a known group of autonomous robots is service robots, which have a level of autonomy to accomplish their tasks without human interference. The autonomy varies from partial autonomy, which includes human-robot interaction, to full autonomy, where there is no need for human interference. (ISO 2018: 2012.)

Additionally, some robots are being steered for their task beforehand but still require human intervention. This is typical in the medical field, where the robot has been pre-programmed for a specific medical procedure to ensure the medical standards are fulfilled. However, the actual procedure also requires human intervention. (Lu et al., 2020.)

A physical robot's appearance varies a lot because its design is meant to match its initial task. For instance, industrial robots are usually machine-like, bulky robots with very simple features because they are designed for speed, precision, and durability in harsh manufacturing environments (Bekey et al., 2005). In contrast, service robots designed for consumers often have humanoid features such as a humanoid body shape, eyes, and a mouth (Li et al., 2010). Medical robots are usually smaller and more delicate than industrial robots, even though they are also machine-like and have a practical appearance. Their focus is on precise procedures; therefore, their design has prioritized safety and functional interaction with the medical professional using the robot. (Howe & Matsuoka, 1999.)

Different physical robots also have different expenses, and the amount of the purchase cost can vary greatly depending on the robot. Usually, industrial robots are a considerable purchase for a company, but they will provide profit in the long run, which means that they can be considered as a valuable investment. Service robots, however, are more affordable, especially those designed for consumers. Medical robots, such as surgical robots, can also be a notable expense when purchasing. However, they provide a cost-effective solution to traditional methods, potentially leading to lower costs in the long run (Lau et al., 2012).

2.2 Industrial Robots

According to the International Organization for Standardization, industrial robots are: "Automatically controlled, reprogrammable, multipurpose manipulator, programmable in three or more axes, which can be either fixed in place or fixed to a mobile platform for use in automation applications in an industrial environment." (ISO 8373:2021). Based on this definition, typical characteristics of industrial robots are their programmed functions that can easily be altered in various manufacturing tasks. Manufacturing and production industries utilize industrial robots the most. Because of their manipulation ability, industrial robots are suitable for tasks such as welding, assembling, product handling, and cutting materials. (Bekey et al., 2005.) To perform these actions, industrial robots use force-torque sensors, which enable them to react to an external influence and perform tasks that require touch (Loske & Biesenbach, 2014).

Even though the manufacturing and production fields have adopted industrial robots to use the most extensively, other fields have found them to be an excellent way to increase efficiency as well. For instance, the pharmacy industry uses industrial delivery robots that collect and dispatch medication to the pharmacist's workstation via a conveyor belt. This significantly saves time for the pharmacists who would otherwise need to get it themselves (Barrett et al., 2012).

Industrial robots also have different collaboration models to function well with employees. Some industrial robots interact directly with employees, either working together on an actual task or in close proximity to one another. These robots produce one part of a product, and the employee finishes it. (Bauer et al., 2016.) Table 1 describes the standard collaboration models between an industrial robot and an employee based on the model by Bauer et al. (2016).

TABLE 1 Collaboration Models with Industrial Robots (Bauer et al., 2016)

Type of collaboration	**Description**
Cell	Fenced robot, no genuine cooperation between the robot and the employee.
Co-existence	A cage-free robot and an employee work alongside each other but do not share a workspace.
Synchronized	A robot and an employee share a workspace, but only one of them is present at the same time.
Cooperation	A robot and an employee have tasks that they perform together but do not work simultaneously on the same product.
Collaboration	A robot and an employee work simultaneously on the same product.

As stated in Table 1, the level of collaboration between the robot and the employee varies depending on the task. The first level of collaboration is that the robot works in a cell, and the employee is outside of it due to safety reasons. This model is the least advanced type of collaboration; the employee and the robot are not genuinely working together on any task. The following model is co-existence, where the robot and the employee work together but not in the same space. In this model, the robot does not have to be in a cell because the tasks are smaller and less dangerous for the employee. Another type of collaboration is synchronized collaboration, where the robot and the employee can work in the same space but not at the same time. With minor adjustments, this model will become the cooperation model, where the employee and the robot share tasks but do not work on them simultaneously. The highest level for the employee and the robot to work together is the collaboration model, which means that the robot and the employee work together on the same product at the same time. (Bauer et al., 2016.)

2.3 Service Robots

Service robots are a physical form of artificial intelligence that accomplish non-manufacturing tasks for personal or professional use. These robots can offer humans exceptional changes in service and delivery experiences. (Kipnis et al., 2022.) Service robots fall into two groups based on their user group and purpose. A personal service robot is often used for non-commercial tasks by consumers, and a professional service robot is mainly operated by a trained professional (ISO 8373:2021).

Service robots designed for consumers are mainly made for domestic tasks. The most popular robot for non-commercial tasks is a robotic vacuum cleaner, a well-known physical robot in households worldwide. Robotic solutions can also provide assistance for disabled people who need help at home. One crucial assistive service robot is an automated walking aid that assists people with walking difficulties. Some companies also manufacture exoskeleton suits, which are wearable robots designed to enhance patients' strength and endurance. (Yan et al., 2020.) Other consumer service robots that can support in daily tasks are assistant robots that can carry items, open doors, or fetch items for people with limited mobility.

Commercial service robots, conversely, are service robots that help companies automate their functions. A typical commercial service robot is a humanoid social robot that companies use for entertainment or information purposes. With the assistance of artificial intelligence, these intellectual robots can recognize and respond to emotions, have conversations with humans, and personalize their interactions suitable for the situation. (Adams et al., 2000.) Social robots are excellent for customer service tasks, as they greet customers and provide guidance in hotels or public places (Heikkilä et al., 2019). Besides their usual work tasks, these robots can also be utilized in education, making learning more interactive for children. Commercial service robots are also helpful in professional cleaning, where they focus on cleaning and disinfecting public areas (Holland et al., 2021). Furthermore, commercial service robots are also a crucial help in the security and search and rescue industries, where they support professionals in firefighting, disaster relief, surveillance, or bomb search and disposal (IFR International Federation of Robotics, 2024).

Autonomous delivery robots are also commercial service robots used in various industries. An autonomous delivery robot can deliver services to customers without interacting with workers. Delivery robots are usually equipped with sensors and multiple cameras to be able to travel in traffic. They are battery-powered and will be recharged after deliveries. These robots can deliver food orders, groceries, online orders, and medical equipment. (Jennings & Figliozzi, 2019.)

2.3.1 Adoption of Service Robots

Adopting service robots into use is an opportunity to enhance the company's service delivery, customer experience, and operational efficiency. However, the utilization of robotics will inevitably also mean changes in employees' work tasks. There is some prior research on the potential new roles of service robots in the hospitality industry. According to the studies, service robots will either support or substitute employees in service encounters, which also means that traditional service roles of employees will change. Consequently, this means the employees will need different skill sets for future tasks. (Bowen, 2016.)

2.3.2 New Roles of Service Robots in Service Encounters

According to prior studies, there are five identified technology-specific roles that service robots could adopt in service encounters. The first two roles that were identified were supportive automation and substitute automation. (Bowen, 2016; Larivière et al., 2017.) Based on these two studies, Tuomi et al. (2017) have introduced three other roles for service robots: automation for novelty, automation for better products, and automation for better jobs. Table 2 introduces the new roles for service robots based on the literature and the environment where the specific roles appear.

TABLE 2 New Roles of Service Robots (Bowen, 2016; Larivière et al., 2017; Tuomi et al., 2021)

Role of the Service Robot	**Description of the Role**	**Business Environment of the Role**
Supportive automation	Routine tasks, freeing up employees for more complex tasks	Internal / Operational
Substitute automation	Replaces the employee completely	Operational
Automation for novelty	Offering service businesses a chance to attract customers	External
Automation for better products	Increase efficiency, allowing businesses to focus on improving service offerings	External
Automation for better jobs	Changing employees' skillsets and transforming existing roles	Internal

The first role for the service robot is supportive automation, which means that the robot carries out mundane tasks and provides support for the employee, who can then focus on more complex and dynamic work situations. This role is based on research by Bowen (2016), and according to it, using technology with human capabilities can enormously enhance service encounters. The supportive automation is done in internal and operational environments, and the robots' tasks are usually straightforward, customer-facing tasks, such as hotel check-ins. In supportive automation, the robot and the employee work harmoniously, adding unique value to the service encounter. (Bowen, 2016; Tuomi et al., 2021.)

The second role of service robots in hospitality is substitute automation, which fundamentally means that the robot will replace the employee (Larivière et al., 2017). This was tested in operational situations where the robot was responsible for the whole service experience. One experiment of this role was in a coffee shop where the robot worked as a barista, serving the customer without human interference throughout the whole buying process (Larivière et al., 2017; Tuomi et al., 2021).

Service robots can also bring the potential to attract new customers with their novelty factor in an external environment. Therefore, the third role of the service robot is automation for novelty, which means utilizing robots in order to bring new business into the company. This was executed in a restaurant by having a personal assistant robot serve the customers at every table. (Tuomi et al., 2021).

The fourth identified role for the robot was automation for better products, which was also conducted in an external environment. This means that service robots are utilized to create better service offerings, for example, by delegating tasks to the robots. This will give the employees more time to create value for the customers. (Tuomi et al., 2021).

The last new role for the service robot is also in an external environment, and it is automation for better jobs. This role focuses more on the changing roles of employees. According to the study of Tuomi et al. (2021), the efficiency of increased automation has allowed companies to focus more resources on improving employee competencies. This can mean that the company provides competence training, career development, or promotions for the employee.

2.4 Medical Robots

Physical robots in the healthcare industry can be described as hypernym medical robots, which refers to both health robots and surgical robots. Health robots are all nonsurgical robots that can support healthcare workers in their tasks. Surgical robots, in turn, help surgeons perform less invasive surgeries on patients. (Kyrarini et al., 2021.)

2.4.1 Surgical Robots

Surgical robots help surgeons perform more precise and less invasive surgeries, potentially leading to faster recovery, less scarring, and fewer patient complications (Kumar et al., 2016). Especially in general surgery, robot-assisted surgery has been increasing significantly in recent years. Surgical robots are mainly used for minimally invasive procedures, such as cardiac, thoracic, neck, and head surgery procedures (Peters et al., 2018).

From the surgeons' perspective, surgical robots will most likely improve their work ergonomics because they can sit while operating when using the surgical robot's consoles. Surgeons may often feel fatigued during long surgeries, but with the help of surgical robots, they can maintain the needed level of concentration and precision throughout the surgery. Besides, surgical robots increase the surgeon's capabilities by removing potential human errors from the operation, such as a slightly trembling hand. (Peters et al., 2018.) Surgical robots also offer an opportunity for surgeons to learn new skills in surgery simulation in a risk-free environment (Howe & Matsuoka, 1999).

2.4.2 Care Robots

Care robots are robotic assistants that help individuals who have difficulties with everyday tasks. Care robots cannot be characterized with certain features because the name "care robot" only refers to their use purpose (van Wynsberghe, 2020). Care robots can be utilized to take care of adult patients and children. With elderly adults, care robots can monitor and assist the patient mentally and physically with telepresence. This is especially convenient from the perspective of medical professionals because it allows them to monitor the patient remotely through telepresence and perform other crucial tasks simultaneously. Moreover, the care robot can remind patients about essential things and provide mental support. The care robot can also support the patient physically by handing over objects or assisting in eating (Johansson-Pajala et al., 2020).

Even though the care robots were initially designed to assist the elderly, studies show they could also be suitable for assisting children with mental disorders and children in hospital care. When facing illness, children lack the elements of their everyday lifestyle, which might be challenging to cope with. Care robots can help pediatric patients with chronic illnesses by encouraging and educating them about healthy behaviors, distracting them when the personnel is performing medical procedures, or by providing comfort. (Dawe et al., 2019.)

2.4.3 Hospital Robots

Hospital robots assist nurses in their work tasks but under their direct control. A robotic nursing assistant can perform non-critical tasks as the nurse's teammate, which allows the nurse to focus more on actual patient care. Another good quality of a nursing assistant robot is that it is not as vulnerable to diseases as humans. (Kyrarini et al., 2021). Hospital robots are often fully autonomous robots with manipulation abilities. They are also capable of human-robot interaction. Therefore, they can help hospital staff by running patient supplies, delivering lab samples, distributing personal protective items for the personnel, and delivering medication. When the robot is deployed into a particular hospital, it will learn crucial locations where it needs to go and thereby can navigate autonomously and safely around the hospital. (Ljungblad et al., 2012.)

2.4.4 Assistive Robots and Rehabilitation Robots

Assistive and rehabilitation robots work similarly to each other, physically assisting disabled people to perform daily activities. The difference between them is that assistive robots help disabled people with permanent conditions, and rehabilitation robots help people rehabilitate their injuries.

An assistive robot is often a wheelchair-mounted manipulator which helps the patient eat or drink. The most advanced assistive robots can assist people with quadriplegia by moving the patients around in their homes so they can do everyday tasks by themselves (Kyrarini et al., 2021). Rehabilitation robots, on the other hand, can help in situations where the patient has compromised motor skills. For instance, diseases such as a stroke or injuries in the head or the back can cause conditions that require rehabilitation. Rehabilitation robots can help the patient perform physical therapy tasks, and they also collect data about the rehabilitation process, which allows the physical therapist to alter the rehabilitation to be more suitable for the patient. (Kyrarini et al., 2021.)

2.4.5 Benefits of Medical Robots for the Healthcare Industry

Medical robots bring relief to the healthcare industry, which is strongly affected by resource problems, straining work tasks, and high employer turnover (Kyrarini et al., 2021). Table 3 introduces the collaboration models for each medical robot and the perceived benefits they bring to healthcare professionals based on the previous literature of this chapter.

TABLE 3 Collaboration Models for Medical Robots and Healthcare Professionals Based on the Previous Literature

	Care Robots	**Hospital Robots**	**Assistive & Rehabilitation Robots**	**Surgical Robots**
Collaboration Model	The robot helps medical professionals by taking over some tasks.	The robot performs tasks individually but under the direct control of the personnel.	The robot performs the heavy work, and employees monitor it.	The robot does the procedure, and the employee monitors it.
The Perceived Benefits of Robots	Save time from the employee for other tasks, which helps with resource problems.	To work as a teammate to ease the burden. Is not vulnerable to diseases.	Take away physically straining tasks from the employees.	To add precision, stability, and safety to the procedures. To remove human errors.

As stated in Table 3, medical robots can support medical professionals in many ways. The most crucial help for medical professionals comes from health robots, which include care robots, hospital robots, assistive robots, and rehabilitation robots. They care for the elderly, children, and disabled people in places such as hospitals and rehabilitation centers. Since the population is aging rapidly, the need for caregivers will only increase in the future. This means there will be a greater need for employees in hospitals, rehabilitation centers, and assisted living communities. At the same time, healthcare personnel face much emotional exhaustion at work, and many people switch careers and do not want to stay in the field. Therefore, health robots could be a potential solution for this demand and supply imbalance. (Kyrarini et al., 2021.)

Health robots also have the potential to improve the working conditions of employees. When they take over physical tasks such as lifting patients, the job does not feel as straining for the employee. Also, when they take over menial tasks from the employees, they have more time to focus on more important tasks or even take more breaks, which could increase their work satisfaction. Health robots can also be helpful in tasks that could be harmful to the employee's health. Especially during epidemics or pandemics, health robots can deliver supplies to infected patients and minimize the time the employees have to spend with patients that could infect them. (Kyrarini et al., 2021.)

2.5 Conclusion of the Chapter

This chapter has now introduced industrial, service, and medical robots and their variations. It has focused on introducing their characteristics, typical applications for them, and how the employee can operate with each type of robot. As a conclusion for this chapter, Table 4 provides a comprehensive summary of all the relevant information from this chapter for the reader. It summarizes the functionalities, characteristics, and use environments of each robot type and highlights the differences between the examined robots based on the previous literature from the chapter.

TABLE 4 Summary: Characteristics of Physical Robots Based on Previous Literature

Characteristics	**Industrial Robots** (Manufacturing, assembling, welding)	**Service Robots** (Cleaning, customer service)	**Medical Robots** (Medical procedures, medical assistance, patient care)
Mobility	Little or no mobility	Moves with wheels or legs	Moves with wheels or with articulation
Sensors	Force-torque, vision, thermal, and tactile sensors	Visual sensors, sensors for communication, environmental sensors	Medical sensors
Steering / Autonomy	The steering is done beforehand for the specific task, and the robot functions autonomously.	Autonomous robots that can function by themselves or in collaboration with employees.	The steering is done beforehand for the specific medical procedure. Requires human intervention to function.
Use Environment	Industrial environments	Offices, hotels, stores, personal use	Hospitals, care facilities, assisted living
Safety	Requires security actions, such as security fences and emergency buttons	Safe to use around humans, uses sensors to detect obstacles	Must follow medical standards on safety issues
Costs	Considerable purchase costs, but will make a profit in the long run	Reasonable costs, especially with the consumer robots	Considerable purchase costs, but can make significant savings in healthcare
Appearance	Machine-like, bulky robots with a very simple appearance.	Humanoid features, designed to persuade consumers.	Smaller and more delicate robots, the design focus is on sterility and precision.

3 EMPLOYEE PERSPECTIVES ON USING PHYSICAL ROBOTS

This chapter focuses on the employees' perspectives on using robots at work. Before delving into the topic of employees' hopes for robots, the reasons behind the hopes must be clarified first. Therefore, the chapter starts with an overview of the social acceptance of robots and then narrows it down to examine the employee acceptance of robots. The chapter also identifies how employee acceptance can vary across different occupational fields.

After defining the acceptance of robots, the focus moves on to employees' perceived benefits towards robots. Since employee hopes is such a new research area, this study utilizes prior research on the employee willingness to use robots and the perceived benefits of robots to form a theoretic foundation for this research. Lastly, the chapter introduces four studies regarding the perceived benefits of employees and compares the perceived benefits between professionals from varying professions.

3.1 Acceptance of Robots

The social acceptance of robots is affected by many different factors. According to prior research, demographic factors have played a significant role in acceptance, and it has been discovered that younger generations, males, and well-educated individuals are more likely to accept robots. Additionally, the individual's role at their workplace may increase their acceptance. It has been studied that employees on a higher level are more open to technological changes than lower-level employees. (De Graaf & Allouch, 2013; Flandorfer, 2012; Heerink, 2011.)

Another aspect that may affect the acceptance of robots is the individuals' competence with information technology. People with higher competence in information technology are generally more open to accepting robot assistance. (Katz & Halpern, 2014; Paluch et al., 2022.) User experience can also have a positive impact on the robot acceptance. It has been discovered that when a person has a chance to experiment with the robot, they usually gain a higher level of acceptance than before (Heerink, 2011). Gained experience with technology can also influence the effects of demographic factors. This means that individuals who are typically not so open toward robots because of their demographic factors will become more accepting of them. (Flandorfer, 2012.)

3.1.1 Employee Acceptance of Robots

Besides the general factors in the social acceptance of robots, work-related aspects can also affect the acceptance of robots. Employee acceptance of robots is crucial for companies because they will never be able to use their full potential if the employees are not motivated and accept the change (Magni & Pennarola, 2008). One critical factor in acceptance is how the implementation process of robots has been executed and how well the robots have been introduced to the workers. Prior studies highlight three crucial factors in employee acceptance: information and communication, participation, and support. According to this interpretation, employees will accept the robot better if they have been informed about the change and the communication has been transparent. (Meissner et al., 2020.) Besides communication, the employees must have opportunities to participate in the robot implementation. If the employees are included in the process early, it potentially leads to a higher readiness for change. (Meissner et al., 2020; Schyns, 2004.) The last factor of acceptance is support, meaning that employees do not want to be left alone with their problems, and they wish to get support when collaborating with the robot (Meissner et al., 2020).

Some employees' personality traits and attitudes can also impact their acceptance of robots. For instance, a positive attitude and curiosity towards robots might lead to more willingness to accept robots at work (Paluch et al., 2022). In prior research, traits such as optimism and openness to new experiences have also been associated with positive attitudes toward robots (Meissner et al., 2020).

3.1.2 Occupational Differences in Acceptance of Robots

Employee acceptance of robots can also differ in occupational fields for many reasons. To provide an example, professionals in the surveillance and military field generally accept robots well and think that using robots would create value for them, especially in dangerous tasks or search and rescue tasks. A different perspective on this matter is the opinion of healthcare professionals, who do not accept robots with too light grounds. They have had concerns about whether robots will affect patient care positively or negatively. (Wolbring & Yumakulov, 2014.) Additionally, the professionals fear robots will replace human employees and endanger the quality of care work and ethical principles (Turja et al., 2018). Despite the concerns, healthcare professionals still feel that robots could be helpful in some tasks in patient care. They believe surgery robots, telepresence robots, and assistance robots could positively affect patient care. Furthermore, robots were accepted as co-workers or as substitutes for equipment, but not to replace human workers entirely in healthcare. (Katz & Halpern, 2014.) In the education field, robots are well-accepted in work tasks, especially in subjects such as science, technology, and mathematics. Still, the teachers would not want the robot to teach, so it would have to do other assistive tasks. (Destephe et al., 2015.)

In conclusion, professionals accept robots well when replacing humans in cognitive tasks but not so well when emotional tasks are concerned. In addition, there were differences in what type of robot was better accepted in a certain field. For instance, a social robot in the form of an extroverted female was well-accepted in healthcare, and an introverted male robot had a better response in the surveillance field. (Savela et al., 2018.)

3.2 The Perceived Benefits of Working with Robots

There are prior studies that address the employees' willingness to collaborate with robots, and the perceived benefits employees see in robots, which provide valuable insights into the perspective of this study. The difference between perceived benefits and hopes is that perceived benefits are grounded in the individual’s current and past experiences and are based in a real environment. In contrast, hopes are more centered on the future and are an assessment of the most desirable outcomes, which are not necessarily the most probable ones (Leung et al., 2009). Regardless of the differences, perceived benefits and hopes are both concepts that explain how the individual foresees or experiences the outcomes of a specific situation. Therefore, prior research on employees’ perceived benefits of physical robots has been selected to form a base for hope research in this framework.

This subsection focuses on studies from four different occupational fields that have evaluated the willingness of employees to work with robots and their perceived benefits of robots. The first examined study by Van Looy (2022) states that office employees have a relatively positive attitude towards robots and feel comfortable leaving simple tasks for them to execute. They feel that robots could be helpful for some of their work tasks, which would bring them more time for specialization or value-adding tasks, and they could use their full potential better. They also think that robots could do unimportant tasks that are often neglected. Besides that, employees responded that they would have more time to focus on customer work and streamline business processes if robots took over some of their work tasks. (Van Looy, 2022.)

A study conducted on assembly workers in a manufacturing environment by Meissner et al. (2020) provides another perspective on the topic. Assembly workers responded that the perceived benefit they would gain from the robot is to relieve them physically and mentally. Their typical work involves a lot of highly repetitive tasks, so muscle and joint pain is common among the employees. The workers also felt that robots could make their work routines less stressful. Besides that, they thought that working with robots could help them develop their professional skills; hence, they were happy to familiarize themselves with new technology. (Meissner et al., 2020.) Similar discoveries were also made in the study by Willems et al. (2023) conducted on frontline employees (FLEs) in the retail industry. According to the study, the respondents think physical robots could decrease the physically demanding aspects of their work, such as repetitive tasks or lifting and reaching.

A study conducted on employees in the hospitality industry by Paluch et al. (2022) provides new perspectives on working with service robots compared to Van Looy's (2022) study. Frontline service workers in the study responded that they would find it helpful if the robot supported them autonomously, for example, by greeting the customers before they had a chance to serve them. Another thing they valued was a clear role division with the robots. Besides that, they thought collaboration with robots would be more accessible when everyone understands their responsibilities well. (Paluch et al., 2022.) Frontline service workers also thought robots could bring them other benefits. They thought that because of robots' high resilience, they could provide a more consistent performance for the customers. Robots do not require onboarding, health conditions do not influence them, and they can provide the same quality of service for every customer. The workers also responded that robots would improve the company's overall efficiency since they do not require breaks. Also, the possibility of delegating tasks to robots was significant for the employees, who thought it could increase their job satisfaction when they had a chance to focus on more meaningful tasks. (Paluch et al., 2022.) The findings in the study by Willems et al. (2023) also support these results since the FLEs hoped that the robot could handle demanding customers and do different assistive tasks. In addition, they mentioned that the robot could be helpful in situations where the employees make mistakes. (Willems et al. 2023).

In conclusion, Table 5 introduces all the perceived benefits of physical robots based on these four studies and defines the meanings of these benefits. As stated in Table 5, the studies brought up many perceived benefits from the robots and meanings attached to them. There were similarities in all four studies, and the most important findings were that the robot would save time, help with physical and mental strain, and provide consistent service without making mistakes. The main difference in the perceived benefits was that the assembly workers' hopes focused on crucial and concrete aspects that would significantly improve their work well-being. The office and service workers focused more on general improvements that could influence the company's performance or make their work easier and more meaningful. (Meissner et al., 2020; Paluch et al., 2022; Van Looy, 2022; Willems et al., 2023)

TABLE 5 Perceived Benefits and their Meanings Based on the Previous Literature

The Perceived Benefit from the Robot	The Meaning of the Benefit
More time for specialization and to get employees' full potential into use	New skills, more motivation for work
More time for value-adding tasks	More value for customers
Neglected tasks would be done	Increased productivity
Physical relief	Less physical pain, better health
Mental relief	Less stress, better well-being
Developing new professional skills	More capable professionals, more motivated professionals
Autonomous support from the robots	Time-savings
High resilience (the robot is not influenced by anything and does not require training)	Increased reliability, consistent quality of service from the beginning

3.3 Conclusion of the Framework

Chapters two and three have now introduced all the relevant concepts for this thesis, thereby forming the theoretical background for this study. First, the framework presented all the critical physical robots for this research. This was conducted to help the reader understand the desires and thoughts of the respondents later in the empirical section since they work in similar environments with the same type of robots. Next, the framework presented employees' acceptance of robots, which is also a crucial concept to understand in order to identify the factors behind the respondents' hopes. Lastly, the framework introduced relevant studies to form a basis for hope research. This helps to understand employees' expectations towards physical robots from the same occupations as the respondents in this study.

4 METHODS

This chapter introduces the empirical study conducted for this master's thesis. First, it explains how the suitable research method has been selected and how the data set used for this research was chosen. Then, the chapter presents how the data collection process was conducted in order to obtain the required data set for this empirical study. Lastly, the chapter introduces the step-by-step data analysis process conducted for this master's thesis.

When researching human experiences or emotions such as hopes, qualitative research is a suitable way to gain a deep understanding of the topic. Besides that, it also suits well to research a phenomenon that is still relatively unexamined. Qualitative research has a form called the interpretive approach, which allows the researcher to identify issues from the participant's perspective. It also helps the researcher to understand the respondents' meanings of behavior, events, or objects. (Hennink et al., 2020).

Based on these qualities, the researcher determined that this study requires a qualitative data set to discover significant insights about employee hopes toward robots. A suitable data set was found from previous research by Makkonen, Pirkkalainen, and Salo in 2022. In their research, they carried out an extensive qualitative questionnaire that examined employee emotions toward robots from different perspectives. The research has already resulted in two papers examining the antecedents of the perceived intelligence of physical robots (Makkonen et al., 2022) and employees' fears of physical robots (Salo et al., 2023). However, they had also collected a large amount of data about the employees' hopes towards physical robots, which was still entirely unexamined and unanalyzed. Therefore, it was decided that the researcher could utilize the data and examine and analyze it for the purpose of this master's thesis.

4.1 Data Collection

The data collection process by Makkonen et al. (2022) was conducted through a qualitative online questionnaire with open-ended questions. This is a valid research method for wanting to get genuine emotions and experiences from the responses because the respondents can explain their thoughts in their own words (Wallbott & Schrerer, 1989).

The participants were recruited through an online crowdsourcing panel called Prolific. This specific panel was chosen to reach respondents with actual experience working with robots (Salo et al., 2023). Prolific is a platform that can provide good recruitment standards with decent costs. Another benefit of Prolific is that it clearly informs the participants that they have been recruited for participation in a specific study. (Palan & Schitter, 2018.) In a study by Peer et al. (2017), Prolific did well compared to other crowdsourcing platforms. According to the study, it delivered a higher data quality than other platforms and offered a more diverse participant population regarding geographical location and ethnicity (Peer et al., 2017). Since the researchers wanted to reach a homogeneous cultural domain for this research, Prolific appears to be a good choice for this research (Salo et al., 2023).

The questionnaire targeted respondents who are residents of the United Kingdom, the United States, or Canada. The researchers argued that the selected countries have a high usage of robots at work, which is beneficial for the results of this questionnaire. (Salo et al., 2023.) The questionnaire consisted of two parts. The first part was a short questionnaire where the respondents marked down what robots they had used at work. The second part targeted only respondents who mentioned using physical robots in their work tasks. Respondents who had not used physical robots in their work tasks were excluded from the data set. The concept of a physical robot was defined in the questionnaire as follows:

> "Physical robots: A physical robot refers to robot technology with a physical embodiment (in contrast to software robots, chatbots, etc.). Typically, a physical robot is a programmable machine that has a movable physical structure and is capable of executing specific tasks with a varying degree of autonomy (e.g., industrial robots, service robots, social robots, and care robots." (Makkonen et al., 2022; Salo et al., 2023)

The questions in the questionnaire were related to the respondents' demographic information, work-related background information, and the robots they had been working with. Besides that, the questionnaire had two open-ended questions about employees' hopes toward physical robots, which were relevant to this master's thesis. The hope-related questions were:

- What kind of hopes do employees have about working with physical robots in their jobs for the future?
- To which aspect or feature of the robots are the hopes of employees related?

There were also other open-ended questions in the questionnaire that were irrelevant to this research perspective, so they were not considered later in the data analysis process of this master's thesis.

In the research questionnaire by Makkonen et al. (2022), there were 396 responses for this research. Out of these responses, the researcher extracted 14 irrelevant responses. The following inclusion criteria was used for the extraction process: respondents who stated that they had used physical robots at work, were employed full-time or part-time, and provided an adequate description of their hope(s) were included in the data analysis. The main reason for the extraction was that the responses were aimed at the wrong kind of robots (e.g., software robots, chatbots) or that the respondents had not answered the question from the work context.

The extraction process resulted in a data set of 382 responses. Some responses were concise and clearly stated the hope, and some were rambling and multiple sentences long. There were also many responses with more than one mention of hope. The demographic background information of each respondent and their utilization rate of robots at work are reported in Table 6.

TABLE 6 Background Information of the Respondents (N=382)

Gender	**N (%)**
Man	216 (56,5%)
Woman	164 (42,9%)
Other	2 (0,52%)
Age	
18-29 years	110 (28.8%)
30-39 years	144 (37.7%)
40-49 years	71 (18.6%)
50-59 years	46 (12.0%)
60 years or more	11 (2.9%)
Country of residence	
United Kingdom	252 (66,0%)
United States	98 (25,7%)
Canada	29 (7,6%)
Other	3 (0,8%)
Educational background	
Secondary or high school	26 (6.8%)
Post-secondary studies	45 (11.8%)
Undergraduate	188 (49.2%)
Graduate or postgraduate	119 (31.2%)
Other	4 (1.1%)
Total work experience	
Under a year	3 (0.8%)
1-2 years	14 (3.7%)
3-5 years	56 (14.7%)
6-10 years	75 (19.6%)
11-20 years	108 (28.3%)
Over 20 years	125 (32.7%)
Unknown	1 (0.3%)
Utilization rate of robots in current work	
Using robots daily	98 (25.6%)
Using robots weekly	42 (11.0%)
Using robots monthly	17 (4.5%)
Using robots a few times a year	12 (3.1%)
Using robots less than once a year	1 (0.3%)
Not using robots in current work	209 (54.7%)
Unknown	3 (0.8%)

4.2 Data Analysis

The researcher conducted the data analysis process by using qualitative content analysis. Qualitative content analysis is a generic form of data analysis and a method to analyze textual data (Forman & Damschroder, 2007). According to one definition, qualitative content analysis is "the systematic reduction (i.e., condensation) of content, analyzed with special attention on the context in which the data were created, to identify themes and extract meaningful interpretations." (Roller & Lavrakas, 2015, p. 230). As with all qualitative inquiries, qualitative content analysis aims to understand the phenomenon instead of generalizing the data and comparing it with statistical interference (Forman & Damschroder, 2007). Therefore, it was also a suitable research method for this study, which aims to find a deeper meaning for the employees' hopes and understand the experiences and aspects behind them.

The researcher searched for different ways to conduct the qualitative data analysis and decided to alter the content analysis processes of Berg (2001) and Roller and Lavrakas (2015) for this research. These two theories were chosen for this study to conduct the analysis because they had no contradictions, and the theories matched well to be utilized together.

The data analysis process was executed in the three following phases, as its goal is to categorize the data using categories generated inductively from the data, as is typically recommended in qualitative content analysis. (Morgan, 1993 as cited in Forman & Damschroder, 2007)

4.2.1 Phase 1: Data Generation (Coding)

The data analysis process started when the researcher acquainted herself with the data by going through all the responses. This part of the process is called "absorbing the content," and in this phase, it is crucial to gain an understanding of the whole data and its "big picture." At this point, the researcher also started to hypothesize some potential themes from the data. (Roller & Lavrakas, 2015, p. 235.) At the beginning of the content analysis process, it is also essential to identify what the research is trying to find an explanation for (Berg, 2001, p. 285). In this case, it was clear from the beginning that the research aims to understand the respondents' potential hopes towards physical robots in a work-related context.

Next, the researcher started to develop unique codes from the data. The purpose of the codes is to help get the data into a manageable and analyzable format. All the codes are supposed to be clearly defined and independent so that they do not share any definitions. (Roller & Lavrakas, 2015, p. 236.) The researcher carried this out by reviewing each response thoroughly and marking a code for it as clearly as possible. For instance, if the respondent had answered: "I am eager on robots helping us in tasks that have been so far very dangerous or demanding, sometimes involving a physical hazard.", the researcher marked the code as "hazardous tasks," and if the response was "Increased automation of the methods we carry out would be beneficial to reduce human error", it was marked as "to reduce human error".

4.2.2 Phase 2: Categorization

The second phase of the content analysis process was to identify categories across the codes and form the ground categories for this research. The categories are any codes sharing an underlying construct (Roller & Lavrakas, 2015, p. 238).

According to Berg (2001, p. 285), the categories should relate to the research question instead of just words arising from the responses. The researcher kept this in mind when analyzing the coded responses and made sure to capture the initial hope behind the responses.

When forming the categories, the researcher determined systematic criteria for categorizing the responses (Berg, 2001, p. 285). One criterion was, for example, to place the responses into main categories based on the perspective of the response. This way, the researcher labeled all the categories under three main categories: employee-related hopes, company-related hopes, and robot-related hopes. Each hope category has its own criterion, which will be explained more deeply in the next chapter, which introduces all the final categories.

Most coded responses were apparent and fell into the category immediately. However, some were very incoherent, and the researcher had to reread the responses to understand the initial hope behind them. At this point of the process, the researcher also noticed that in many responses, the respondents had listed more than one hope in their answers. In these situations, the researcher counted each mentioned hope as a separate marking. For example, the following response was divided into categories of affordability and reliability: "The robots need to work well and be reliable. The technology needs to be affordable and not incur extra costs because it would be pointless as only the robots' manufacturers and IT companies would benefit from profits." During this phase of the analysis process, the researcher identified 23 different category labels, which then formed the grounded categories for this study (Berg, 2001, p. 285). These 23 categories were divided into the three previously mentioned main categories based on the perspective of the hopes.

4.2.3 Phase 3: Forming the Final Categories

The final step in the analysis process was to evaluate the grounded categories and seek patterns (Berg, 2001, p. 287). Identifying patterns or themes from the data is done to support or disprove the research hypothesis or to find new ones (Roller & Lavrakas, 2015, p. 238). When executing this phase, the researcher noticed similarities in some categories and realized they could be combined into one category. For instance, responses listed under increased efficiency and increased productivity were combined into a new category, increased performance. This was done because they both focused on hopes of increasing the company's performance with the help of robots. After evaluating all the categories from the perspective that they provide new relevant information and new points of view on their topic (Berg 2001, p. 287), the researcher narrowed them down to ten hope categories. To finish the data analysis process, the researcher focused on drawing interpretations and implications from the data, which will be introduced later in chapter six (Roller & Lavrakas, 2015, p. 238).

4.2.4 Analyzing the Meanings Attached to the Hopes

Because this master's thesis aims to find answers to two different research questions, the researcher also focused on the second question during the content analysis process. According to Hennink et al. (2020), the researcher must be open-minded and emphatic in the interpretive approach to derive the information from the responses. Besides that, the researcher has to be able to listen to people telling their own stories and study people in their natural habitats to identify how the context of their lives shapes their experiences. (Hennrink et al., 2020). The researcher tried to achieve this by first coding and categorizing the hope from a certain response and then reading the relevant information provided about the respondent to understand the meaning of the hope. This was conducted to truly understand the meaning that the respondent has indented instead of the researcher's interpretation. For instance, one respondent answered that he hopes the robot would take over the dangerous tasks in his work. Based on the nature of his work (manufacturing) and the way the response had been written, the researcher identified that the meaning of the hope was to enhance the employee's labor conditions and give him mental relief. This is because, based on the answer, the respondent was mentally strained by the threat of hurting himself at work.

5 FINDINGS

This chapter introduces the results of this empirical study. First, it introduces the final categories on a more general level and justifies the choices made with them in the analysis phase. Later, it focuses more on each hope category and its possible meanings. Lastly, it concludes the meanings attached to employees' hopes.

As a result of the data analysis process, the researcher was able to identify and categorize the hopes that employees have towards physical robots in their work tasks. Out of 382 responses, 371 respondents described some kind of hope for robots, and 14 respondents responded that they had no hopes for robots. Based on these responses, the researcher has formed ten hope categories, which are illustrated in Figure 1.

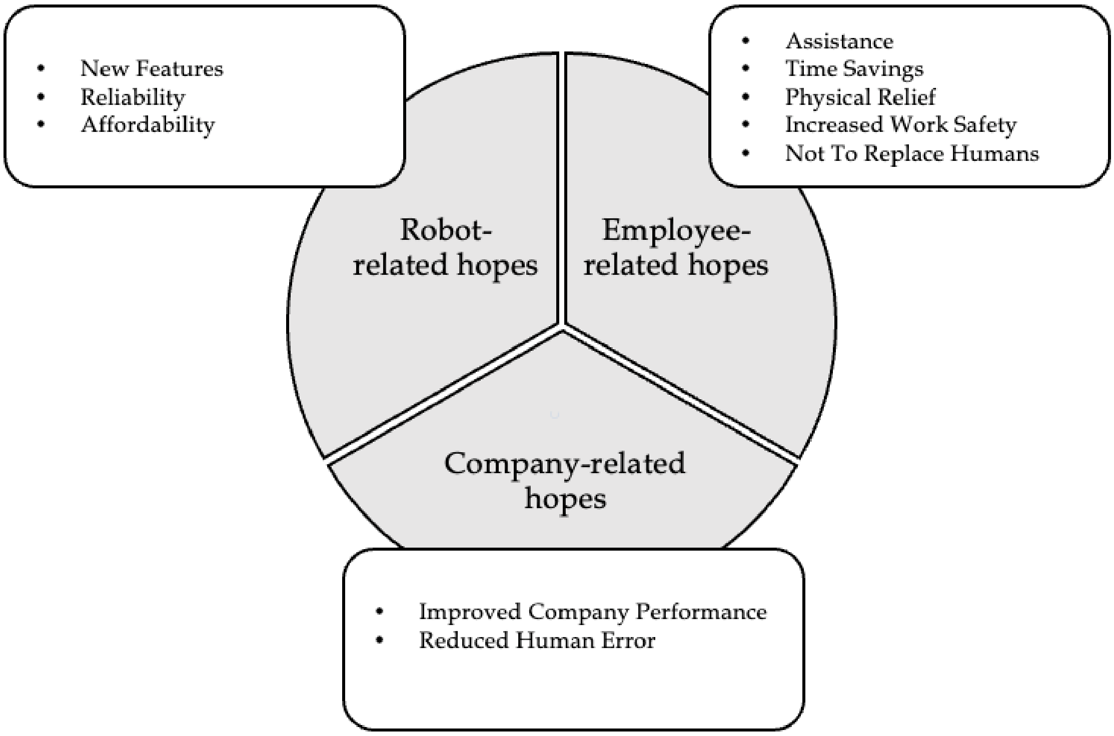

FIGURE 1 Categorization of Hopes as Illustrated

The researcher decided to divide the ten hope categories into three main categories, as described in Figure 1. The results showed that the respondents had interpreted the research questions in a few different ways, which resulted in three identified perspectives on the topic.

The first perspective was the individual point of view, where the respondents hoped the robot would do something for themselves. The quality of these responses varied the most. Some of the hopes were practical, like using robots in repetitive tasks to get more time to focus on essential tasks. Some were more vivid and, simultaneously, less realistic, like using robots as a personal maid at work. Based on these responses, the researcher analyzed that some respondents might not be fully aware of all the potential physical robots have.

Another perspective from which the respondents evaluated the topic was the company perspective. This meant that the respondents had listed hopes that would help the company succeed better in what they do. These answers often showed that the respondents understood the potential that a physical robot could bring to a company. Therefore, many hopes were related to aspects such as increasing the performance of production lines or handling heavy objects faster and more precisely. Most of the responses in this main category were from respondents who use physical robots in their current work tasks.

The third perspective was to focus more on the actual robot instead of individual or company-related aspects. These respondents had chosen to evaluate the actual physical robots they are working with and came up with some improvements they wished the robots would have in the future. These responses also varied a lot in terms of how realistic the hopes were to be fulfilled. In this category, there were also answers from fields where respondents may not be so familiar with the capabilities of the robots, such as education.

The final categorization and the description of each category are introduced more closely in Table 7. Table 7 also includes direct quotations from the questionnaire data to demonstrate what kind of responses each category includes. Since many respondents' singular responses reflected many different things, each mentioned hope has been categorized separately. Therefore, one individual's response may have contributed to multiple hopes across several categories.

TABLE 7 Categorization of Employee Hopes Towards Physical Robots

Hope Categories and the Categorization Criteria	Examples from the Questionnaire Data
Employee-related Hopes	
Assistance (110) A hope that robots would assist with different kinds of tasks.	"I hope that in the future robots will do more of the work so that I do not have to manage too many staff that are not interested in working. The majority of my workers are packing on production lines and it is very boring and repetitive, robots would do a better job."
Time Savings (87) A hope that utilizing robots will save time for something else, in work or free time.	"I would hope that physical robots could take some of the menial tasks off our hands and reduce our workload. I would like a robot that could take these non-specialized jobs away from us and free up our time for the more specialized tasks that we also have to undertake."
Physical Relief (67) A hope that robots would take over physically straining tasks.	" We already use robots to cut cakes, but I would wish robots to take on more roles in my workplace, such as repetitive tasks that can cause RSI injuries."
Increased Work Safety (37) A hope that robots would take over tasks that can be hazardous for the employee's health.	" I hope that physical robots will make the less-safe parts of people's jobs...well, safer, even if that is just by having robots do those tasks. For example, I handle radioactive materials at my job, and a robot only handles a small part of this, increasing my exposure."
Not to Replace Humans (12) A hope that a physical robot will not replace humans.	" I hope that these machines are created to work alongside individuals, not to replace workers who are already proficient in their job for the sole reason of cheaper labor."
Company-related Hopes	
Improved Company Performance (54) A hope that robots would increase the company's efficiency and productivity.	" I have high hopes that robots can cut down on working time in many companies and factories. This will usually streamline a lot of processes and make production more efficient."
Reduced Human Error (28) A hope that robots would reduce human error to improve the quality of products.	" I am hoping that physical robots will give a level of work that is less likely to be prone to mistakes that humans are likely to make from long-term monotonous work. It would make certain things easier to produce and at a higher level and standard."

(to be continued)

TABLE 7 (continued)

Robot-related Hopes	
New Features (44) Hope for some enhancements for the robot.	"The ability for them to autonomously carry out tasks, learn and grow. Robots still struggle without rigidly defined parameters which needs to be expanded for them to reach their true potential."
Reliability (16) A hope that employees could trust robots to work without malfunction.	" But I would hope they will become more reliable - as new robots are created to do more, so we depend on them more, and the staffing numbers tend to decrease. Then, when they break down, our workflow goes right down as the remaining staff can't work manually anywhere near as fast as the robot. "
Affordability (9) A hope that robots will become more affordable.	" I hope that robots like I use in the lab will become more of an accessible price point in future, as using them can really increase the throughput of our tasks, and the automation of it makes the reliability of results better because of better standardization and removal of human error."
Other mentions, outside the hope categories	
No Hopes (14)	

5.1 Employee-related Hopes

Employee-related hopes was the broadest category with the most subcategories and responses. From these hopes, it was clear that the respondents had thought about what the robot could do for their benefit. The meanings attached to these hopes were also much more straightforward since the respondents had responded from their own perspectives.

5.1.1 Assistance

This category got many responses regardless of the industry where the respondent worked. Also, the reasons behind this hope varied a lot, but the outcome was identical in all of them: the respondents hope that physical robots could provide assistance for them in something. The need for assistance was justified for many different reasons. Medical professionals hoped that health robots could assist them in monitoring patients and delivering samples. Teachers hoped service robots could help them clean the classroom and engage children, and the manufacturing workers hoped industrial robots could take over boring and mundane tasks for them.

Based on these hopes, it appears that some of the respondents might not have been aware of the opportunities a physical robot could bring for them. This was analyzed based on some hopes that focused on quite basic tasks (e.g., "It would be nice to see robots to complete mundane tasks. Like getting me a cup of coffee. Filing paperwork.") Some of the answers from this category were from respondents who currently are not using physical robots in their job, which can explain why many of them did not come up with more advanced hopes for robots.

There were many meanings attached to this hope that could be analyzed from the data. For instance, respondents mentioned that getting assistance could develop more skillful jobs for employees, allow them to do the work quicker and more efficiently, and do more exciting tasks. Hence, the researcher analyzed the meaning behind this hope, which is to get more interesting career opportunities and improve overall job satisfaction.

5.1.2 Time Savings

The researcher categorized all the responses into this category, which mentioned the aspect of saving time somehow in the response. The respondents hoped that the robots would save time for two main reasons. Some respondents hoped they would get more time for more crucial or interesting tasks, and others hoped the robots would reduce their workload to get more free time.

The responses that were hoping for time for more crucial tasks were mainly from hectic work environments, such as the healthcare field. In many responses from medical professionals, they hoped medical robots could help with patient care to get more time for critical tasks. Mentioning the time aspect in the responses highlighted that many respondents feel overwhelmed with their workload and hope that robots would reduce it, which would be the meaning behind their hope.

On the other hand, there were also several responses hoping to get more free time with the help of the robots. These hopes did not typically argue anything specific; they just hoped that the robots would reduce their workload and get them more leisure time. These respondents were mainly people who do not currently work with physical robots, and the researcher analyzed that as the reason they chose to take a more abstract approach in their responses.

Overall, this category highlights the hecticness of work-life in this era and how valuable saving time could be for employees. Based on the responses, the researcher analyzed that the meaning of getting more time could be to reduce work-related stress and to get a better work-life balance.

5.1.3 Physical Relief

Another hope that arose a lot from the data was that employees would find it helpful if the robots could do physically straining tasks for them. The respondents stated that physically straining tasks were detrimental to their well-being. This is a common phenomenon, especially in the industrial field, which often requires physically straining tasks, such as heavy lifting or highly repetitive tasks. Therefore, many of these responses were very straightforward (e.g., "[a hope for] reduced manual labor which reduces physical strain on workers, e.g., carpel tunnel syndrome in scientists who pipette frequently, back problems with workers whose role involves heavy lifting.") These kinds of responses highlighted that respondents hoped to utilize the existing industrial robots more for heavy or repetitive tasks. Other physically straining tasks where employees hoped that robots would help them were moving patients in healthcare, which could be performed with an assistive health robot.

The responses in this category were the most coherent with each other, and it was evident in the analyzing phase that the meaning of these hopes is to avoid work injuries and to gain better physical well-being in the process.

5.1.4 Increased Work Safety

The hope for increased work safety arose mainly through hazardous work tasks that employees have to perform. Many respondents were worried about their work safety (e.g., "I hope that these robots will be able to automate certain parts of jobs that could be considered hazardous. This way, workplace accidents can be reduced, and the quality of work life improved. This would be especially helpful in the medical system. Allowing robots to work in rooms with infectious patients protecting the care staff and helping to prevent more infections.")

Hazardous tasks were an issue across many industries, and respondents named many places where physical robots could reduce safety hazards. Robots could help handle radioactive materials or chemicals, do bomb disposal, apply pesticides, and do area mapping in construction sites so that employees know it is safe to walk there. Respondents thought that taking over these kinds of tasks from humans could enhance their working conditions and decrease the number of workplace accidents and even deaths. The researcher analyzed that the underlying meaning behind many responses from this category was also to get mental relief in the process (e.g., "I would hope that robots could put me at less risk in my job by carrying out more frontline, physically intensive tasks. This would put less strain on both my general and mental health as I would be at less risk of injury while I would also be responsible for less mentally exhausting activities and could take a more laid-back role."). Hazardous tasks can also be very straining on the mental side since the employee must always be cautious about their safety. Therefore, utilizing robots more in these tasks could also help improve the employees' mental health.

5.1.5 Not to Replace Humans

Not to replace humans is the last of the employee-related hope categories. Technically, this was not a relevant answer to the research question because it is not a hope regarding work tasks. However, it appeared so many times in the responses that the researcher saw it as significant to include as a category. In many of these responses, respondents first mentioned a hope they had towards the robot but then ended the response by stating that they hope not to be replaced by a robot (e.g., “I would hope that physical robots could assist people with the labors of their work that can be strenuous/damaging to their bodies. I would also hope that employers would not trend toward replacing people with robots when possible.”). This discovery indicates that the meaning attached to these hopes is related to the ethical concerns of robots. This was the only hope category where the meanings clearly reflected ethical concerns or negative emotions employees might have towards robots.

5.2 Company-related hopes

The second main category, company-related hopes, includes the categories of improved company performance and reduced human error. In this category, the respondents' perspective was to think about what the robot could do for their workplace or what the company could do with the help of the robots. These responses were typical in the manufacturing and medical fields.

5.2.1 Improved Company Performance

It arose various times from the data that the respondents hope that the utilization of robots would improve the overall efficiency and productivity in their workplace (e.g., “These hopes are really just about increasing the efficiency of the production worker using robots. With robots a human could be more efficient and produce more with less physical work”). This was argued in the responses because robots could perform tasks faster and more precisely and would not require breaks from work like humans. In the respondents’ opinion, utilizing robots would also reduce costs and increase profits.

The answers from this category were often related to the hope of increasing companies' use of automation. Most of these responses were from fields that utilize industrial robots in their work. The reason could be that industrial robots are the best-known type of physical robots utilized for the longest time, so respondents most likely understand their capabilities the best. The initial meaning behind these hopes did not show as clearly as in some categories. The researcher identified the meaning of this hope as wanting the company to make better results.

5.2.2 Reduced Human Error

Based on the questionnaire data, respondents also had a strong hope that using robots would reduce the errors humans make in repetitive tasks. Many respondents reported that it is causing harm that humans make mistakes in manual, possibly repetitive work tasks. Therefore, they thought the robots could reduce the number of mistakes and produce more quality products or services. This was a typical response in the manufacturing fields, where the employees assemble products in a production line or collect items to orders.

Besides the mistakes made by accident, some respondents felt that robots could also help in situations where employees make intentional mistakes based on their emotions (e.g., "Robots can operate with more precision and less emotion than humans. For example, they will distribute the exact amount of medication ordered and not be swayed by a patient requesting more. Further, they can help to reduce medical error.") Based on this response, industrial distribution robots or health robots serving medicine would also reduce intentional human error in healthcare and provide better patient care. The researcher also analyzed the meaning behind this hope, which could be to provide better services or products to customers.

5.3 Robot-related hopes

Robot-related hopes is a main category that focuses on responses that hoped for some improvements for physical robots. In this category, the quality of the responses differed a lot. Some were realistic hopes, and the respondents reflected on why they hoped for a particular aspect. Besides that, there were hopes that seemed more unconsidered and less realistic. The subcategories in this area are new features, reliability, and affordability.

5.3.1 New Features

This subcategory had the most considerable number of unattached hopes that could be related to any new robotic feature or function employees hoped the robot would have. For instance, there were hopes that robots would be utilized in new fields, like in the restaurant industry as chefs and servers, or that there would be automated vehicles or drones for inside use.

Many of these hopes were also related to the characteristics of robots, such as the hope for more intelligence to handle tasks better, better social skills, better adaptability, or programmability. Also, the hope for more autonomy often arose from the responses since respondents hoped the robot would require less human monitoring and could function individually. This subcategory reflected that the respondents were somewhat satisfied with the current physical robots they are using. However, they were still hoping to get some improvements with them to make the collaboration even better. These responses came from various industries from respondents who work with all kinds of physical robots.

5.3.2 Reliability

The aspect of reliability also arose multiple times from the responses. The respondents mentioned having issues with their current physical robots at work, such as malfunctions. They were hoping that they could rely more on the robot to complete its task (e.g., "reliability to know that when you dispense something it will pick the right medication and not get blocked"). Also, some were worried that humans would start to trust the robots too much in their business, leading to bad outcomes if the robot suddenly malfunctions and stops working.

Based on the researcher's analysis, the responses gathered for this subcategory were from the respondents who were the least satisfied with the current physical robots. From the responses, it was clear that the robots had failed the respondents' trust, so they could not come up with any other hopes besides the need for more reliable robots. These responses arose from manufacturing fields where industrial robots perform repetitive tasks around the clock and from pharmacies where they have medicine-dispensing industrial robots. Also, the service robots used for assistance in customer service had failed some respondents, who then needed to correct their work afterward.

5.3.3 Affordability

The last category of the robot-related hopes is affordability. In this subcategory, it highlighted that many respondents thought the robots should cost less so that more companies would have an opportunity to utilize them (e.g., "I hope that robots like I use in the lab will become more of an accessible price point in future, as using them can really increase the throughput of our tasks and also the automation of it makes the reliability of results better because of better standardization and removal of human error.") Some respondents also mentioned that in the healthcare industry, there may only be a few rehabilitation robots in the whole hospital, and having more of them would significantly help patients in recovery. The affordability aspect is highlighted especially in healthcare and manufacturing industries, where robots are typically a considerable expense.

5.4 The Meanings Attached to the Hopes

The researcher analyzed the meanings employees had attached to the hopes during the analysis process. In some of the responses, it was not possible to detect a clear meaning behind the hope because of the way the respondents had answered the questions. Most of the analyzed meanings were from the employee-related hope categories. When the respondents had considered the topic from their own perspective, the meanings could be analyzed more easily.

Figure 2 represents the most relevant meanings analyzed from the responses regarding employee-related hopes. It also introduces their potential implications based on the researcher's analysis. The first meaning, career-related ambitions, came from the hope of getting more meaningful work tasks if the robot took over some simple tasks from the employee. The career-related ambitions could potentially lead to professional satisfaction and increased motivation for work. Another meaning that was analyzed was to get a better work-life balance by saving time with the assistance of robots. This could lead to better health, job satisfaction, and increased motivation. The same implications would also apply to the last positive meanings: less work-related stress and fewer risks of work-related injuries. Lastly, there was also a negative meaning attached to the hope of the robot not replacing humans. The meaning in this context was ethical concerns of losing jobs over robots, which could lead to a more critical attitude towards robots and potential resistance.

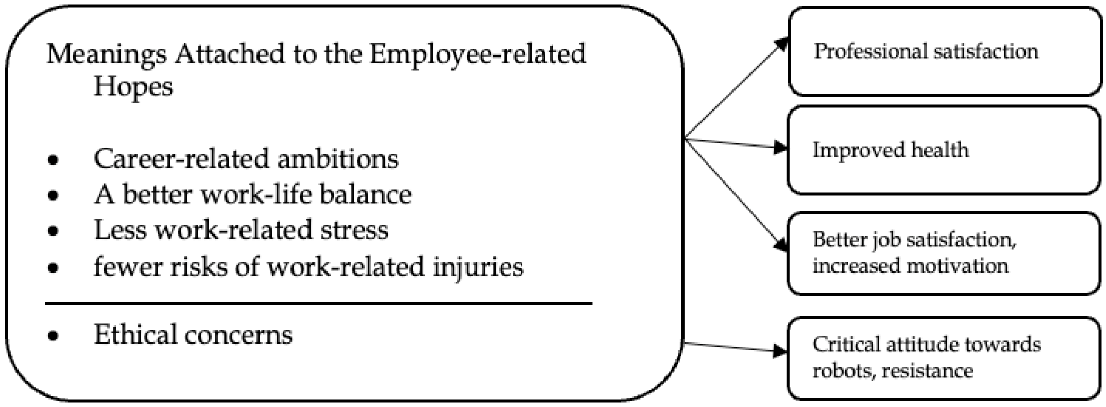

FIGURE 2 Meanings Attached to Employee-related Hopes

There were also meanings attached to hopes in company-related and robot-related categories, as introduced in Figure 3. The first meaning, better service for customers, was related to the category of reduced human error. Its meaning is apparent, and it aims for better company results. The second and the third meanings were related to the category of reliability. The meaning of better collaboration focuses on achieving better collaboration between the employee and the robot in order to utilize the robot's potential fully. The meaning of gaining back the trust of robots that have previously failed the employees could potentially lead to more satisfied and trusting employees.

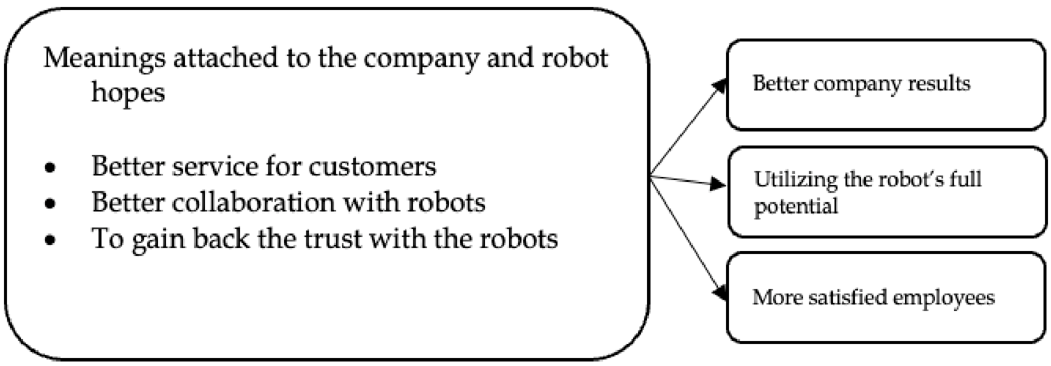

FIGURE 3 Meanings Attached to Company and Robot-related Hopes

6 DISCUSSION

This chapter introduces the findings by addressing the research questions of this study. Then, it evaluates the findings from the perspective of prior research. Besides that, it considers the significance of this study and how the findings could be implicated in practice. Lastly, it introduces the potential limitations of the study and future research agendas.

This study examined employee hopes towards physical robots in their work tasks. The study aimed to gain a deep understanding of the hopes and the meanings attached to them and provide significant insights about a research area that was previously unexamined. These objectives resulted in the following research questions:

- What kind of hopes do employees have about working with physical robots in their jobs for the future?
- What kind of meanings do employees attach to these hopes?

In order to find answers to these research questions, an empirical study was conducted. The study employed an earlier data set from Makkonen, Pirkkalainen, and Salo (2022) about the fears and hopes of employees towards robots and conducted a qualitative content analysis (Berg, 2001; Roller & Lavrakas, 2015) to understand the hopes employees have, and why the hopes are focused on specific aspects.

The empirical study resulted in a categorization of the employee hopes gathered from the data set. The categorization consists of ten hope categories, which are also divided into three main categories based on their perspectives. The meanings that were attached to these hopes were also analyzed in the data analysis process and introduced as another main finding of this study.

6.1 Research Contributions

When beginning the research process, the researcher noticed that this topic was relatively unexamined in the field of Information Systems. Therefore, this study aimed to provide new and meaningful information to the field and lay the groundwork for research about employee hopes towards physical robots.

Since previous studies regarding employee hopes could not be found to support this study, studies that reflected employee attitudes and perceptions towards robots were chosen to form the study's theoretical background. Studies from Meissner et al. (2020), Paluch et al. (2022), Van Looy (2022), and Willems et al. (2023) gave four different perspectives on the employees' perceived benefits for robots to this research. These studies were selected for this study because they were conducted on employees in the same occupational fields as the respondents in this study and on the similar robots that the respondents have utilized.

The results obtained from this empirical study align well with the prior studies regarding the topic, and similarities to the hope categories created in this research can be perceived from them. For example, the study by Meissner et al. (2020) conducted on assembly workers highlighted the importance of getting support in physical tasks for better physical health and less stress. Similar findings have also been made in the study by Willems et al. (2023), where the respondents stated that physical robots are well equipped to support them with physically demanding job tasks and would help with the strain on their bodies. These studies are well-aligned with the findings of this study, which highly emphasized the need for physical relief from heavy and repetitive tasks. The mention of getting mental relief in the process was also prominent among the responses of this study and was analyzed as one of the underlying meanings behind the hopes. However, contrary to the study by Meissner et al. (2020), getting mental relief arose more in the responses of this study regarding the hope of better work safety.

There were also similarities in results with Van Looy's (2022) and Paluch et al. (2022) studies. In both studies, employees mentioned that a perceived benefit of the robot could be assistance with simple tasks so they could focus more on value-adding tasks and get their full potential into use. This was also one of the main findings of this study. A hope for assistance was one of the largest categories in this research, with over 100 mentions in the data. Therefore, it can be considered as a significant hope for the respondents. The study by Willems et al. (2023) also supports this finding since the respondents stated that they would want the robots to handle assistive tasks such as inventory, filling shelves, or handling demanding customers.

Another replicable finding from the study was that the Paluch et al. (2022) respondents hoped the robot could support them more autonomously. The same observation was made in this study, where the respondents from the new features category hoped the robots could function more independently without human interference. Another discovery from the same study was that employees think the robots could improve the company's efficiency and provide more consistent performance for the customers with their high resilience (Paluch et al., 2022). These same discoveries were made in this study in the increased company performance category and the reduced human error category. The results from the Willems et al. (2023) study also support the reduced human error category in this research since they hoped that the robots could fix the front-line employees' forgetfulness or mistakes.

The hope for time savings is also highlighted in this study's findings and prior studies (Paluch et al., 2022; Van Looy (2022); Willems et al., 2023). The most important factor regarding the time savings for respondents in all of the mentioned studies was doing something more meaningful at work, which would simultaneously improve their job satisfaction. The responses of this study matched that perspective, but they also provided another point of view on the matter. Some responses in this study highlighted the aspect of leisure time and a chance for a better work-life balance, which did not appear in the previous studies. This important finding could indicate that some respondents are starting to see the robots as an opportunity instead of a threat.

Some completely new perspectives that this study brought up were discovered from the main category of robot-related hopes. The category of new features brought up many new angles to the employees' hopes and showed the most creativity among the responses in the questionnaire. Regarding further development of the robots, it could be significant to learn that the end users hope for features such as better adaptability, better social skills, and more intelligence.

Another interesting and new perspective was the hope for more affordable robots. It can be considered as a crucial discovery because it highlights the critical obstacles to robot adoption in companies and could point toward some solutions that could increase the integration of robots in workplaces.

In closing, based on these similarities in the findings, this study can support the validity and reliability of the prior studies. This also confirms that the chosen framework was suitable for this study. Besides that, the research has produced new valuable information about employee hopes since some hope categories were completely new and did not reflect previous studies.

6.2 Implications for Practice

Besides the goal of making a theoretical contribution to the field of Information Systems (IS), this study aimed to produce information to support the implementation of robots in workplaces. There are several ways in which companies could benefit from the hope categories resulting from this study, such as utilizing robotics more efficiently and increasing employee satisfaction and safety.

When a company considers a robot purchase, there are actions they could do from the perspective of the employee-related hopes. The company should consider the hope for assistance in their purchase decision and consider integrating robots into tasks where the employees think they would need the most support. Then, the employees could focus on more meaningful tasks to increase their job satisfaction. Another thing companies could do to benefit the employees is to examine which tasks are time-consuming and how robots could help to speed them up in order to fulfill the hope of time savings. The same thing could be done with the hazardous and straining tasks. The company could examine what tasks would be the most crucial to automate to reduce the employees' physical strain. The hope of not replacing humans could also be taken into account with a solid communication policy. By letting the employees know that the robots are here to support them and not to replace them, they might feel better about it, which results in less resistance to change.

The company-related hopes of employees could also help the company with purchasing decisions. Since improved company performance and reduced human errors are essential hopes for the employees, the organization should actively ask the employees' opinions on how these aspects could be achieved in their opinion. The employees who are performing the actual tasks could have new insights about what should be automated. By listening to the employees, the company can learn valuable insights and also give the employees the feeling of being included in the process. As discovered in earlier employee acceptance studies, the opportunity to participate in the process leads to a higher readiness to change (Meissner et al., 2020; Schyns, 2004). Besides, participation can also be associated with higher organizational commitment and job satisfaction (Speier and Venkatesh 2002), making the robot implementation process much more manageable.

6.3 Limitations

Some limitations might affect the interpretation of the results and the generalizability of the study. First, the researcher is the only person who has analyzed this data, so the analysis and the categorization have been done purely based on her interpretation. Based on the recommendation of Roller & Lavrakas (2015, p. 236), impartial coders should conduct the data coding to get the most reliable results. Since this thesis has to be individual work, it could not be done, which naturally leaves room for misinterpretation in analyzing the responses. The researcher tried to avoid misinterpretations by reviewing the data multiple times and saving all the old markings if some responses were shifted to other categories. Another limitation could potentially be the subjectivity of the researcher. In content analysis, the researcher's interpretation and evaluation are crucial, which can also lead to subjectivity in the coding and analysis. The researcher tried to avoid this issue by going through the data for the first time right at the beginning of the thesis process to avoid having preconceptions about the desirable results. A third potential limitation of this study is the ambiguity of the responses. It is typical for qualitative questionnaires that the responses can be ambiguous, and the respondents might understand the questions differently, making analyzing difficult. This also happened in this study; therefore, the researcher had to extract several responses from the data that did not answer the research questions correctly. Some remaining responses were still very challenging to interpret, even with the extracted responses. Based on the researcher's analysis, this could be because some respondents were not familiar enough with physical robots, so they could not produce quality responses.

6.4 Future Research Agendas

Since this study is one of the first ones of its kind in the field of robot-related hope research, the future research possibilities are extensive. There is much potential in this research area for future studies to deepen the understanding and reach new dimensions about employee hopes for robots. One interesting future research topic could be to conduct a quantitative study with the categories that have resulted from this research. A follow-up study could validate if the hope categories are generalizable in a larger sample. It would also be interesting to research if different hopes are highlighted in different demographic groups since this study did not consider the topic from that perspective. Since this study was targeted only at the United Kingdom, the United States, and Canada, it would also be essential to see if the results are similar in other geographic locations or if some cultural differences affect the hopes.

Another perspective could be to research what impacts it would have if the respondents got what they hoped for from the robot. It would be interesting to see if the fulfilled hopes impacted the employees' job satisfaction, work efficiency, and general well-being, as the hypothesis was, and what long-term effects these factors would have on their lives.

There is also potential for research from a practical point of view. Conducting a study where a company would utilize the hope categories in its information technology strategy to see the implications in practice would be essential. This study could provide new perspectives to the organization that they have not considered earlier. It would also be interesting to study if fulfilling some of the employee's hopes would have concrete impacts on the business, as has been estimated in this study, for instance, with the hope of reducing human error. It would also be interesting to broaden the research to compare the employee hopes with the organization's strategic goals for the robot. It would be significant to find out if the employee's hopes are aligned with the organization's goals and if some actions could be taken to fulfill some of them.

Lastly, it would be remarkable to deepen the understanding of the meanings attached to the hopes, for instance, from the ethical perspective. The researcher analyzed that some employees had ethical concerns about the robots based on their responses, for instance, regarding their job security. Unfortunately, most of these responses could not be analyzed further because of the question formation in the questionnaire. By gaining a deeper understanding of the underlying meanings of the hopes, the hopes and their significance to the employee could be better understood.

7 CONCLUSIONS

This master's thesis utilized qualitative research methods to examine employee hopes about working with physical robots. The goal of this study was to define what hopes employees have towards robots and to what meanings employees attach to these hopes. The study aimed to produce significant information about a new research topic to form grounds for future research, and to offer crucial information to companies to utilize in adopting physical robots into workplaces.

The empirical study was conducted as a qualitative content analysis. The thesis employed an earlier data set by Makkonen et al. (2022). The data set provided broad data about employee hopes, which was suitable for the point of view of this research. The researcher analyzed the data set using qualitative content analysis methods, which resulted in a systematic categorization of employee hopes. The categorization revealed three different ways the respondents had considered this topic. Some considered the topic from their own perspective, some from the company's perspective, and the rest considered improvements for their current robots. The categorization process also unveiled many different meanings attached to these hopes. These meanings disclosed that employees value mostly benefits that the robots could bring to their wellbeing.

This study brought forth significant and new insights about employee emotions toward physical robots. It also supports the prior studies about the perceived benefits of robots that employees have had. This research can provide a fundament for future hope research since there is still a lot to discover in this research area. Besides the theoretical contributions, this research provides valuable information that companies can utilize in practice. By understanding the employees' hopes, companies can enhance their goals and strategies for robotics in order to integrate the robots better into the company and increase employee satisfaction. In conclusion, this research was able to discover meaningful insights about employee hopes toward robots and create an extensive hope categorization that could be utilized for theoretical and practical purposes.

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