Service Robots in Restaurants: Anticipated Changes in Employee Feedback, Performance, Satisfaction, and Turnover Intention

Completed Research Full Paper

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Abstract

Service robots are increasingly integrated into workplaces such as restaurants, offering numerous benefits but also posing challenges. Employees often express skepticism and apprehension about the potential changes in their work resulting from the presence of robots. Consequently, both industry practitioners and researchers have emphasized the importance of investigating how employees might perceive and react to working alongside robots. This paper addresses this concern by presenting findings from a qualitative study employing thematic content analysis based on the Job Characteristics Model (JCM) with 220 restaurant employees. The results reinforce the associations posited by JCM, but also find an inverse relationship between feedback and knowledge of results and knowledge of results and satisfaction. They also provide insights about a direct association between knowledge of results and turnover intention.

Keywords

Service robots, feedback, performance, satisfaction, turnover, job characteristics model.

Introduction

Service robots, utilized for providing and/or delivering services, bring forth a plethora of advantages for businesses, encompassing cost minimization, heightened productivity, bolstered dependability, and scalability (Jörling et al. 2019; Wirtz and Zeithaml 2018). They also improve customer retention and satisfaction (Kumar et al. 2019; Lacity and Willcocks 2016). Consequently, it comes as no surprise that organizations are progressively adopting service robots across various sectors including hospitality (Shin and Jeong 2020), retail (Bertacchini et al. 2017), and education (Gonzalez-Aguirre et al. 2021).

However, despite these widespread benefits, service robots also bring forth a set of challenges. The deployment of robots can lead to challenges like fear of job displacement, skills gap, and adverse outcomes such as resistance to adoption or underutilization (You and Robert 2023, 2024; You and Robert 2018a; Jörling et al. 2019; Kaur et al. 2023). As a result, both industry experts and scholars have initiated efforts to examine the impact of robots on the human workforce (Niemelä et al. 2019; You and Robert 2023). Specifically, IS scholars have emphasized the necessity for extending existing theories to better understand emerging human-AI collaboration in work settings (Berente et al. 2021; Burton-Jones et al. 2021; You and Robert 2018b).

Jain, A., Bhatti, S. C., and Robert, L.P. (2024). **Service Robots in Restaurants: Anticipated Changes in Employee Feedback, Performance, Satisfaction, and Turnover Intention**, *Proceedings of the 30th Americas Conference on Information Systems* (**AMCIS 2024**), Aug 15-17, 2024, Salt Lake City, UT.

To address these challenges, this study employs the Job Characteristics Model (JCM) as a theoretical lens to understand how feedback for the job itself is likely to impact job outcomes through knowledge of results. This paper centers on feedback which refers to the extent to which individuals receive clear information about the effectiveness of their performance at the job. Theoretically, feedback helps in better comprehension of the job and can create learning opportunities, thereby improving job outcomes (Oosthuizen 2019). However, it is not always clear where the robot's performance ends, and the worker's performance begins. For example, if a customer is unsatisfied with their service, it may not be clear if the human worker's performance was the problem or the robot's performance. Consequently, it is hard to establish the target for the feedback. Therefore, understanding the interplay between feedback and working with a robot is vital to ensure that the integration of automation complements rather than diminishes the human work experience (Welfare et al. 2019; Yam et al. 2023). Practically, organizations are increasingly concerned about assessing employee performance who work with robots and how employees perceive such evaluation methods (Hong and Wu 2023).

Our research seeks to address the following question: *How do anticipated changes in job feedback related to working with robots influence worker performance, satisfaction, and turnover intention through knowledge of results?*

This study contributes to the literature on technology implementation in general and robot implementation in particular by contextualizing and extending the role of feedback on job outcomes through knowledge of results. In addition, the study integrates the literature on IS, robotics, and organizational behavior to provide a multidisciplinary understanding of human-robot work.

Literature Review

Adoption of Service Robots

Research on the adoption of service robots in the workplace underscores the advantages and challenges of human-robot collaboration. Service robots have the potential to boost productivity, satisfaction, and workplace safety by assisting employees in task completion, allowing them to allocate time to other responsibilities (Lacity and Willcocks, 2016; Barrett et al. 2012). For example, in a restaurant setting service robots assist employees in tasks like greeting customers, serving, preparing food and cleaning. Collaborative efforts between employees and robots hold the promise of delivering more reliable and accurate customer service (Wirtz et al. 2018; You and Robert 2023). Overall, the adoption of service robots offers potential benefits, including increased productivity, cost savings, improved service quality, and quality of life (Wirtz and Zeithaml 2018; Kumar et al. 2019; Lacity and Willcocks 2016).

However, the use of service robots is not without its drawbacks. Service robots are known to be a cause of frustration and perceived loss of autonomy (Barrett et al. 2012). Their use has been shown to promote feelings of depersonalization, surveillance, and disempowerment, all impacting and challenging the roles and placement of employees (Green et al. 2016; Jörling et al. 2019; You and Robert 2023). Many scholars have found evidence that advanced automation can lead to job loss for some employees (Frey and Osborne 2017; Acemoglu and Restrepo 2020). In addition, robotic technologies also lack the intuitiveness and empathy to operate completely independently of humans (Huang and Rust 2018) and humans need to make an active effort to learn to effectively use such technologies (Beane 2019). The learning curve can be hard and can cause confusion, demotivation, miscommunication, and distrust (Beane 2019).

Feedback and Job Outcomes

Technological advancements have a profound impact on work dynamics. To better understand how such changes may emerge, we employ the job characteristics model (JCM) as our theoretical lens. JCM has served as an important theoretical model for research on job design, redesign, and enrichment (Morris and Venkatesh 2010; Goldstein and Rockart 1984). The model posits that diverse job attributes, including feedback, can impact job outcomes by influencing employees' critical psychological states, such as knowledge of results (Hackman and Oldham 1974; 1975). The job outcomes highlighted by JCM include performance–the extent to which an employee knows the final results of the work; satisfaction–the degree to which the employee is satisfied and happy with the job; and turnover intention–the extent to which an employee is willing to seek employment alternatives.

Feedback is often a critical job characteristic used to understand job outcomes. It is defined as the degree to which carrying out the activities of the job results in furnishing direct and clear information about the effectiveness of the employee's performance (Hackman and Oldham 1975). It is important because it provides employees with the knowledge to effectively perceive, understand, and respond to a situation on the job (St. Claire and Mataric 2015). Robots can routinely collect automated data and report it using standard metrics like cycle time, time on task, number of orders, etc (Hong & Wu 2023). They can thus enable constant monitoring of tasks, facilitate storage and retrieval functions, and analyze data to present timely and accurate feedback. Hence, there is no doubt that the amount of feedback, its objectivity, and its accuracy will change for the better. However, impacts of feedback are a common concern in job redesign involving technology integration and automation.

JCM hypothesizes feedback to cause knowledge of results. Knowledge of results is the degree to which the employee knows and understands, continuously, how effectively they are performing the job. Employees can generally use this information to correct their errors and improve their performance on the job (Payne and Hauty 1955). Knowledge of results can also motivate employees to try harder or persist longer at a task (Payne and Hauty 1955). Traditionally, more feedback should lead to better knowledge of results, which improves job outcomes (Hackman and Oldham 1975). But in the case of robot implementation, while on the one hand feedback from working with robots can facilitate knowledge about job effectiveness by providing objective, timely, and accurate information, on the other hand, this feedback might lack the context needed to fully understand the employee's actions and provide the appropriate knowledge about their performance (Opiyo et al. 2021). Furthermore, feedback from work done in collaboration with robots fails to provide knowledge about the employees' performance at a task. It is unclear where the work of the robot ends, and the employee's work begins. Using knowledge that lacks situational awareness or separation of robot-employee task performance to change processes and improve outcomes can oftentimes result in overwhelming and challenging goals for human employees and can lead to negative impacts on job outcomes (Gim et al. 2015; Li et al. 2019). The overwhelming expectations of being as good as the robot can sometimes lead to internal pressure, decreasing performance, and satisfaction, and encouraging turnover.

In addition, most employees express frustration with electronic monitoring (Chalykoff and Kochan 1989) and have concerns about its pervasive nature (Morris and Venkatesh 2010). Knowledge of results from such feedback can also lead to negative job outcomes (Morris and Venkatesh 2010).

Against this backdrop, the objective of this study is to explore the changes in and interplay between feedback, knowledge of results, performance, satisfaction, and turnover intention as a result of robot implementation. We contend that with the deployment of robots, the relationship between feedback, knowledge of results, and various job outcomes is not as stable as the traditional JCM model entails.

Methodology

The sample included 220 restaurant employees ranging in age from 18 to 67 years old with 64.5% self-identifying as female. On average, participants worked 8.8 hours per day, with a standard deviation of 2.5 hours. Additionally, their average employment in the restaurant industry was 9.5 years.

Data was collected using an online survey using the Qualtrics platform. The survey depicted pictures of robots used in restaurants. Participants were then asked about their perceptions of expected changes in the JCM dimensions with the help of open-ended questions asking them to provide a detailed example of how they believed working with a robot would change feedback, knowledge of results, satisfaction, performance, and turnover intention. An example of a question is: *Please provide a specific detailed example of how you believe working with a robot would change the amount of feedback you receive about your work.* A total of 459 responses were recorded. Data was cleaned by reading and re-reading all the answers by the first author and verified by the second author. Comments that were irrelevant to the questions were removed. For example, phrases like "I don't know", "no idea", and expressions such as "idk", "mhm", and "N/A" were eliminated. A total of 436 responses were analyzed.

The researchers proceeded with conducting a thematic content analysis. A precoding scheme was devised using the JCM framework. Comments were categorized under the JCM dimensions that they were collected for, namely feedback, knowledge of results, job performance, job satisfaction, and employee turnover intention. Then a manual cluster analysis was conducted to group the comments into positive

(increase) and negative (decrease) changes. The researchers also grouped similar comments to identify the reasons for the positive and negative changes. Further, the comments were cross-referenced for JCM dimensions and reasons for change within the main JCM categories. This helped determine the relationships between the constructs. Categorizing, grouping, and cross-referencing was conducted by two authors and verified by the third. It was then verified by an external researcher. Any disagreements were resolved through iterative discussions among the three authors until a consensus was reached. Then the bridging and bracketing approach (Venkatesh et al. 2013) was used to reinforce and explain associations. Figure 1 demonstrates the analysis.

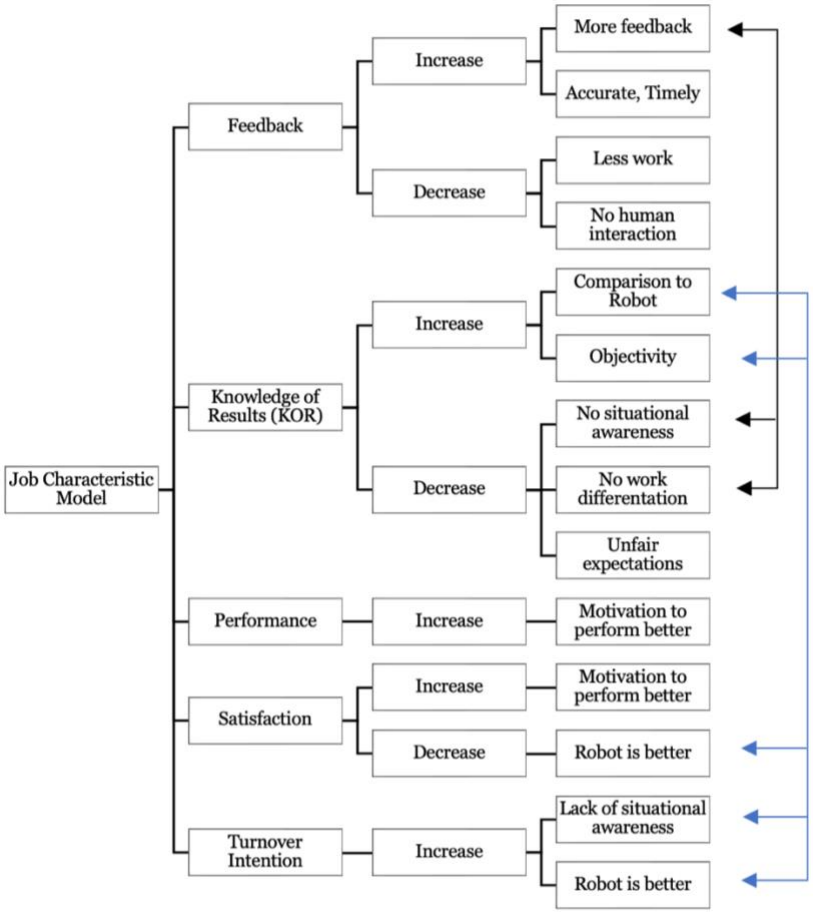

Figure 1: Dimensions, clusters, and subgroups with counterintuitive associations

Findings

Participants anticipated changes in feedback, knowledge of results of work activities, work performance, satisfaction with work, and turnover intention as a result of robot implementation in the workplace.

Feedback from the job

Several employees stated that "more feedback" will help them "become better at their job". They also appreciated the "accuracy", "timeliness", and "seriousness" of the feedback that can be furnished with robot implementation.

"I'd get a lot of good feedback."

"More accurate, and more seriously."

> *"Keep track of orders entered/sent to the kitchen. Food run for me if I was w/ another table. Keep track of tip % to guest count. Alcohol sales/ guest count."*

Other people talked about getting "less feedback" as a result of less work and lack of communication with other human beings.

> *"I would not be doing most of the job, so they won't have much to give me feedback on."*
>
> *"…I'm unsure how people would tell me I'm doing well or poorly in that circumstance."*
>
> *"I would hear from my supervisor about my performance, but not interacting with customers would make it harder to tell if I was doing well."*

Knowledge of Results

Employees anticipated positive and negative changes to their knowledge of results as a result of robot implementation. Some felt that more feedback would help them understand the effectiveness of their work better, and comparison with the robot would help them become more "efficient" at their work.

> *"Working beside a robot would make me more aware of how efficient the production could be, therefore causing me to self-evaluate."*
>
> *"I would be able to see how well the robot functioned and compare myself to it."*
>
> *"It would greatly increase my ability to do the job well."*

Others appreciated the "unbiased", "objective" and "relevant" nature of feedback when working with robots, resulting in knowledge that would be an accurate reflection of an employee's effectiveness at work.

> *"All relevant feedback would directly involve performance and customer-related activity."*
>
> *"It would give back unbiased feedback."*
>
> *"Working with humans sometimes gets crazy because humans have emotions and robots don't so therefore, we would get a lot done if we worked with AI's."*

Some people thought that the feedback received from robots would lack "emotion" or understanding of the situation.

> *"Robots don't have any emotion and would not be able to judge how I handle a situation."*
>
> *"Managers and supervisors are the ones to give feedback. If you are not functioning well with the robot and its system, then that could portray you as not able to get along well with others."*

Others thought that the feedback the job furnishes would provide knowledge about the robot's effectiveness at work, not theirs. They also feared that feedback would not acknowledge the work done by a human versus a robot in a collaborative task.

> *"[I]f a robot did my job, then the feedback I would get would be for the robot's performance, not mine."*
>
> *"Tasks performed by me, and the robots collectively will not allow my performance to be measured."*
>
> *"Because you don't know exactly who is doing the job the robot or the human."*

Some participants also complained about being "compared to the robot" because of the knowledge furnished from feedback on a task done with robots. They thought that such a comparison could lead to "higher expectations" from human beings and "put their job at risk."

> *"I will be compared to how fast my performance compared to the robot's putting my job at risk because if the robot does a better job, then they would rather have him do the work. They won't have to pay him."*
>
> *"I believe human workers would be held to a higher expectation…"*

Others complained about not being able to differentiate their work from the robots resulting in unnecessary "blame" and unfair "comparison".

"If something went wrong during a meal, I may be blamed for it even if it was a robot error."

"If you were working sorely with robots, it would be hard to compare your work to theirs.

Work Performance

Employees believed that knowledge about the results of tasks done with robots could encourage them to "perform better" at the job, by reflecting on the results and wanting to be better than the robot.

"I would be more focused if I am working with a robot and would be more motivated to perform better and complete my task all the way."

"It would encourage me to work harder and more efficiently."

"If that was the case, I would probably want to show I can do a much better job than a robot and that could increase my performance…"

Work Satisfaction

Only a few people felt that working with robots would increase their job satisfaction. They thought that a comparison to robots could motivate them to be better at their jobs and be more satisfied with it.

"I believe if you strive to be as good as the robot, it can increase your satisfaction when you do well."

Many people anticipated negative changes to satisfaction. They believed that the presence of robots would stop them from doing their "job well". And results indicating that the robot is better than them will lead them to be dissatisfied with their work.

"As I have already stated, I would not be able to do my job as well as I can now, and if I am unable to do my job well, I will not be satisfied."

"… Interaction with my customers is essential to me and not doing that as much would have a direct effect on my job satisfaction."

"Hard to stand out on my job performance."

Turnover Intention

People expressed their willingness to leave a workplace with robots. They stated that robots lacked the understanding of human nature and would limit human interaction in the workplace. These factors would not only hinder productive feedback but also lead to biased feedback and knowledge of results, motivating people to look for jobs elsewhere.

"I don't think a robot would appreciate me as a human, and my everyday battles."

"I want to work with humans that understand the reason behind their work… Not a programmed machine such as a robot."

"I enjoy my workplace because of who I am surrounded by. To not have a human connection; conversations and interactions in real time it would feel extremely bizarre and much less gratifying."

Others felt that knowledge of results will always make the robot seem better, and they as human beings "will not be able to compete" with it. So sooner or later the employers would want them to leave. They thought that they would probably leave before it came to that.

"Working with a robot would change my intention to leave my organization because the robot may become more advanced in a short amount of time so my employer might find the robot better than me."

"If they feel a robot is better at running the business than an axial person then I can't compete…"

Inferences: Bridging and Bracketing

The JCM posits that feedback leads to job outcomes (performance, satisfaction, and turnover) through knowledge of results. We test these propositions in the context of robot implementation using a bridging approach that involves connecting our findings with established theoretical frameworks (Venkatesh et al. 2013). This process helps to contextualize and interpret the data within the broader theoretical landscape, enriching the analysis and providing deeper insights. Thus, after categorizing the comments under their respective JCM dimension, we tagged the comments for possible other dimensions that they represented. This helped us determine relationships between the dimensions.

Furthermore, we also employed bracketing to explore and explain contradictory findings. The bracketing approach uses diverse and opposing views about the phenomenon of interest to reveal hidden information in the findings (Venkatesh et al. 2013).

Feedback and Knowledge of Results

We found evidence that changes in feedback will lead to changes in knowledge of results. And just like the model, our analysis confirms a direct association between feedback and knowledge of results but presents some counterintuitive results as well.

Bridging

The majority of the participants believed that the implementation of robots would lead to more feedback through *real-time tracking, storing, and reporting* of information. These people also thought more feedback would lead to more/better knowledge of results. They thought that robot implementation would provide *unbiased, objective, relevant, accurate, serious,* and *real-time* feedback to understand the effectiveness of work. They also believed that more feedback would help them compare the effectiveness of their work with the robots', helping them understand their performance better.

Some employees felt that the implementation of robots would lead to less feedback due to *reduced workload* and *lack of interaction with other human beings*. These people felt that less feedback would lead to less knowledge of results because of the robot *taking over* most tasks.

Bracketing

The data also showed evidence for anticipated changes in knowledge feedback that signify a negative association with feedback. Several people who thought that robot implementation would lead to more feedback associated it with less knowledge of results. These people believed that the feedback furnished by the robot lacked situational awareness – *emotions, human nature, awareness of the context* – and hence did not help determine the effectiveness of an employee's job. They also felt that most of the feedback received for a task done with a robot furnished feedback for the robot's performance and *not the employees'*, and in most cases, joint tasks presented *joint feedback* that did not help the workers understand the effectiveness of their work.

Knowledge of Results and Job Outcomes

Our analysis confirmed that changes in knowledge of results impact job outcomes. However, our analysis also offers insights into counterintuitive associations.

Bridging

The JCM presents a direct association between knowledge of results and the job outcomes of satisfaction and performance. It hypothesizes an indirect association between knowledge of results and turnover intention. We found evidence in the data to support these relationships.

Many employees who believed that the implementation of robots led to an increase in knowledge of results and improved their understanding of the effectiveness of their jobs, also believed that an increased understanding of work leads to positive changes to job performance. The participants felt that effective feedback gave them an *objective* view of viewing and understanding their job performance and helped

them improve it. They also stated that comparison with the robot *motivated them to become better* at their job which led to greater satisfaction at work.

Some employees who believed that robot implementation led to a decrease in the understanding of their work thought that it led to a decrease in work performance. These people felt that they were not able to do their *job well* because of a *lack of feedback from other humans* and a *lack of work* that was now taken up by robots. They also expressed feelings of dissatisfaction because it was difficult for them *to stand out on their job performance* due to their inability to understand how to get better at their jobs.

Less knowledge of results was also associated with turnover intention. Employees felt their performance would be overshadowed by the robot's performance, and they were not able to differentiate between their work and the robot's work, employees felt dissatisfied and *wanted to quit*.

Bracketing

We found two contradictory associations. The first one reflected a negative association between knowledge of results and satisfaction. Employees talked about how more knowledge of results was leading to less job satisfaction. They expressed concerns about *being compared with a robot*. They thought of more information from robots as a basis for unfair comparisons and believed that objective feedback would lack situational awareness. Hence, even with more knowledge, they feared mechanical expectations from human beings and the complete loss of human interaction that was the soul of the restaurant industry. We also found that more knowledge of results could lead to higher turnover intention because of constant *comparison with the robot* and their inability to compete with it leaving employees dissatisfied.

Discussion

This study aimed was to identify anticipated changes in feedback due to the integration of robots into the workplace that are expected to influence job outcomes mediated by knowledge of results. Our thematic content analysis revealed insights highlighting the importance of feedback in determining work performance, satisfaction, and turnover intention through knowledge of results.

Our study highlights the issues associated with having more feedback in the case of robot implementation. Several times, more feedback is deemed to be good. However, we find in our analysis that it can lead to negative outcomes when employees find it lacking in situational awareness. While JCM refers to factual feedback only, some research has tried to introduce interpersonal feedback in the JCM framework to accommodate these concerns (Morgeson and Humphrey 2006). Considering the growth of robots in the service sector, it is perhaps critical to introduce and assess interpersonal feedback in the future.

Our findings also highlight the importance of work differentiation and task allocation in providing effective feedback to improve job outcomes. Extant research has identified a number of task allocation models to increase the effectiveness of collaborative work (Ali et al. 2022). Organizations certainly see value in collaborative tasks, therefore, they should aim to enable mechanisms that support transparent and comprehensive task allocation and provide differentiated feedback to the employee.

Another important finding of the analysis is that organizations should ensure that employees and robots are evaluated on a different set of metrics to ensure fair and just comparisons. Sometimes, feedback relative to the robots can demotivate and disappoint employees who think that they can never compete with a robotic co-worker and hence will eventually be replaced. These feelings can lead to less satisfaction and high turnover intention. These findings may also help to explain extant research where employees found more satisfaction in working with imperfect robots (Goštautaitė et al. 2023).

Finally, our results answer recent calls (Berente et al. 2021; Burton-Jones et al. 2021; You and Robert 2018b) and highlights that new AI-enabled technologies, particularly robots, represent important boundary conditions for traditional work-related theories. In our study, we identify some drivers of the hypothesized associations between feedback, knowledge of results and job outcomes, but further research in this domain in needed. Investigating and empirically testing these drivers will improve the understanding of using JCM with other variables of interest when studying technological implementations in organizations. Our findings invite scholars to further investigate the underlying psychological mechanisms associated with changes in job outcomes as a result of working with robots.

Conclusion

Robots have the potential to fundamentally change the dynamics of work, for better or for worse. This research delves into the effects of introducing robots into a restaurant setting, emphasizing the crucial role of feedback in influencing job performance, satisfaction, and turnover intentions. Employing a thematic content analysis and a bridging and bracketing approach, the study confirms the relationships outlined by the Job Characteristics Model (JCM) while also uncovering additional insights.

REFERENCES

Acemoglu, D., and Restrepo, P. 2020. "Robots and jobs: Evidence from US labor markets," *Journal of political economy* (128:6), pp. 2188-2244.

Ali, A. Azevedo-Sa, H., Tilbury, D. and Robert, L. P. 2022. "Heterogeneous Human-Robot Task Allocation Based on Artificial Trust," *Scientific Reports*, 12, Article: 15304.

Barrett, M., Oborn E., Orlikowski W., and Yates J. 2012. "Reconfiguring Boundary Relations: Robotic Innovations in Pharmacy Work," *Organization Science* (23:5), pp. 1398-1408.

Beane, M. 2019. "Shadow learning: Building robotic surgical skill when approved means fail," *Administrative Science Quarterly* (64:1), pp. 87-123.

Berente, N., Gu, B., Recker, J., and Santhanam, R. 2021. "Managing artificial intelligence," *Management Information Systems Quarterly* (45:3).

Bertacchini, F., Bilotta, E., and Pantano, P. 2017. "Shopping with a robotic companion," *Computers in Human Behavior* (77), pp. 382-395.

Burton-Jones, A., Butler, B. S., Scott, S., and Xu, S. X. 2021. "Next-generation information systems theorizing: A call to action," *Management Information Systems Quarterly* (45:1), pp. 301-314.

Chalykoff, J., and Kochan, T. A. 1989. "Computer-aided monitoring: Its influence on employee job satisfaction and turnover," *Personnel Psychology* (42:4), pp. 807-834.

Frey, C. B., and Osborne, M. A. 2017. "The future of employment: How susceptible are jobs to computerisation?," *Technological forecasting and social change* (114), pp. 254-280.

Gim, G. C., Desa, N. M., and Ramayah, T. 2015. "Competitive psychological climate and turnover intention with the mediating role of affective commitment," *Procedia-Social and Behavioral Sciences* (172), pp. 658-665.

Goldstein, D. K., and Rockart, J. F. 1984. "An examination of work-related correlates of job satisfaction in programmer/analysts," *MIS Quarterly* (8:2), pp. 103-115.

Gonzalez-Aguirre, J. A., Osorio-Oliveros, R., Rodríguez-Hernández, K. L., Lizárraga-Iturralde, J., Morales Menendez, R., Ramírez-Mendoza, R. A., ... and Lozoya-Santos, J. D. J. 2021. "Service robots: Trends and technology," *Applied Sciences* (11:22), pp. 10702.

Goštautaitė, B., Liubertė, I., Parker, S. K., and Bučiūnienė, I. 2023. "Can You Outsmart the Robot? An Unexpected Path to Work Meaningfulness," *Academy of Management Discoveries* (ja).

Green, T., Hartley, N., and Gillespie, N. 2016. "Service provider's experiences of service separation: the case of telehealth," *Journal of Service Research* (19:4), pp. 477-494.

Hackman, J. R., and Oldham, G. R. 1974. "The Job Diagnostic Survey: An instrument for the diagnosis of jobs and the evaluation of job redesign projects," Technical Report No. 4, Department of Administrative Sciences, Yale University.

Hackman, J. R., and Oldham, G. R. 1975. "Development of the job diagnostic survey," *Journal of Applied psychology* (60:2), pp. 159.

Hong, B., and Wu, L. 2023. "How Robots Can Enhance Performance Management for Humans," *MIT Sloan Management Review* (64:4), pp. 1-3.

Huang, M. H., and Rust, R. T. 2018. "Artificial intelligence in service," *Journal of service research* (21:2), pp. 155-172.

Jörling, M., Böhm, R., and Paluch, S. 2019. "Service robots: Drivers of perceived responsibility for service outcomes," *Journal of Service Research* (22:4), pp. 404-420.

Kaur, G., Banerjee, S., and Banerjee, N. K. 2023. "Perception of Human-Robot Collaboration Across Countries and Job Domains," in: *2023 IEEE International Conference on Advanced Robotics and Its Social Impacts*, ARSO: IEEE, pp. 116-121.

Kumar, V., Rajan, B., Venkatesan, R. and Lecinski, J. 2019. "Understanding the role of artificial intelligence in personalized engagement marketing," *California Management Review* (61:4), pp. 135-155.

Kumar, V., Rajan, B., Venkatesan, R., and Lecinski, J. 2019. "Understanding the role of artificial intelligence in personalized engagement marketing," *California Management Review* (61:4), pp. 135-155.

Lacity, M. C., and Willcocks, L. P. 2016. "A new approach to automating services," *MIT Sloan Management Review*.

Li, J. J., Bonn, M. A., and Ye, B. H. 2019. "Hotel employee's artificial intelligence and robotics awareness and its impact on turnover intention: The moderating roles of perceived organizational support and competitive psychological climate," *Tourism Management* (73), pp. 172-181.

Morgeson, F. P., and Humphrey, S. E. 2006. "The Work Design Questionnaire (WDQ): developing and validating a comprehensive measure for assessing job design and the nature of work," *Journal of applied psychology* (91:6), pp. 1321-1339.

Morris, M. G., and Venkatesh, V. 2010. "Job characteristics and job satisfaction: Understanding the role of enterprise resource planning system implementation," *MIS Quarterly* (34:1), pp. 143-161.

Niemelä, M., Heikkilä, P., Lammi, H., and Oksman, V. 2019. "A social robot in a shopping mall: studies on acceptance and stakeholder expectations," *Social robots: Technological, societal and ethical aspects of human-robot interaction*, pp. 119-144.

Oosthuizen, R. M. 2019. "Smart technology, artificial intelligence, robotics and algorithms (STARA): Employees' perceptions and wellbeing in future workplaces," in *Theory, research and dynamics of career wellbeing: Becoming fit for the future*, I. L. Potgieter, N. Ferreira, and M. Coetzee (eds.), Switzerland, Springer, pp. 17-40.

Opiyo, S., Zhou, J., Mwangi, E., Kai, W., and Sunusi, I. 2021. "A review on teleoperation of mobile ground robots: Architecture and situation awareness," *International Journal of Control, Automation and Systems* (19), pp. 1384-1407.

Payne, R. B., and Hauty, G. T. 1955. "Effect of psychological feedback upon work decrement," *Journal of Experimental Psychology* (50:6), pp. 343.

Shin, H. H., & Jeong, M. 2020. "Guests' perceptions of robot concierge and their adoption intentions," *International Journal of Contemporary Hospitality Management* (32:8), pp. 2613-2633.

St. Clair, A., and Mataric, M. 2015. "How robot verbal feedback can improve team performance in human-robot task collaborations," in: *Proceedings of the tenth annual acm/ieee international conference on human-robot interaction,* pp. 213-220.

Venkatesh, V., Brown, S. A., and Bala, H. 2013. "Bridging the qualitative-quantitative divide: Guidelines for conducting mixed methods research in information systems," *MIS Quarterly* (37:1), pp. 21-54.

Welfare, K. S., Hallowell, M. R., Shah, J. A., and Riek, L. D. 2019. "Consider the human work experience when integrating robotics in the workplace," in: *2019 14th ACM/IEEE international conference on human-robot interaction* (HRI), IEEE, pp. 75-84.

Wirtz, J., and Zeithaml, V. 2018. "Cost-effective service excellence," *Journal of the Academy of Marketing Science* (46), pp. 59-80.

Wirtz, J., Patterson, P. G., Kunz, W. H., Gruber, T., Lu, V. N., Paluch, S., and Martins, A. 2018. "Brave new world: service robots in the frontline," *Journal of Service Management* (29:5), pp. 907-931.

Yam, K. C., Tang, P. M., Jackson, J. C., Su, R., and Gray, K. 2023. "The rise of robots increases job insecurity and maladaptive workplace behaviors: Multimethod evidence," *Journal of Applied Psychology* (108:5) pp. 850.

You, S. and Robert, L. P. 2018b. "Emotional Attachment, Performance, and Viability in Teams Collaborating with Embodied Physical Action (EPA) Robots," *Journal of the Association for Information Systems* (19:5), pp. 377-407.

You, S. and Robert, L. P. 2018a. "Human-Robot Similarity and Willingness to Work with a Robotic Co-Worker," in: *Proceedings of the 13th Annual ACM/IEEE International Conference on Human Robot Interaction,* HRI 2018. Chicago, IL, USA.

You, S. and Robert, L. P. 2023. "Subgroup Formation in Human-Robot Teams: A Multi-Study Mixed Method Approach with Implications for Theory and Practice," *Journal of the Association for Information Science and Technology* (74:3), pp. 323-338.

You, S. and Robert, L. P. 2024. "Trusting and Working with Robots: A Relational Demography Theory of Preference for Robotic over Human Co-Workers," *MIS Quarterly* (forthcoming) https://doi.org/10.25300/MISQ/2023/17403.