

Location-based monitoring at work: When does transparency help to increase the acceptance of monitoring?

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Introduction

The development of monitoring systems has made it technically feasible to track and trace employees. *Employee location monitoring* refers to emerging technologies that enable an organization to monitor the location of its employees in near real time outdoors with the Global Navigation Satellite System or inside buildings with wireless sensor networks (Kaupins and Minch, 2005). Thus, modern tracking and tracing systems offer a broad range of functionality to monitor employees, who may not be aware of this tracking. Employee monitoring (EM) and its impact on the working environment is a widely discussed topic in the field of organizational research. Although EM has advantages for organizations and potentially also for employees themselves, like a safer workplace (Jandl *et al.*, 2021), the extent to which employees feel that monitoring is an invasion of privacy will likely influence their acceptance of monitoring (Abraham *et al.*, 2019; Alder, 2001). Thus, EM may improve work performance, security and safety (Lucas *et al.*, 2016), but raises questions regarding engagement, privacy and social control (McNall and Roch, 2007). Therefore, it is necessary to thoroughly weigh the effects of transparency and understand when transparency positively influences employees' acceptance of being monitored.

While research has been carried out on the impact of location monitoring procedures on employees' attitudes and acceptance (Jeske, 2022), there have been few empirical investigations of the role of transparency in the acceptance of EM. Transparency is defined as the extent to which employees are given information and notified about the characteristics of workplace monitoring (White *et al.*, 2020). Since individuals are more likely to accept monitoring when organizations are transparent about the process involved in setting policies and procedures (Al-Jabri and Roztock, 2015; Leventhal *et al.*, 1980), transparency about the nature and purpose of monitoring is an important issue that needs further investigation (Brauneis and Goodman, 2018). Although increasing transparency regarding tracking systems can increase people's willingness to adopt them (Porumbescu *et al.*, 2020; Wu *et al.*, 2021), too much transparency might be counterproductive. Making people aware of the operating principles and types of data gathered could trigger privacy concerns and reduce employees' acceptance of being monitored.

Privacy in the work context can be described as the amount of control a person has over their personal information (Moor, 1991). With the advent of more invasive and ubiquitous

monitoring systems due to increasing digitalization of the work environment, organizations are forced to reconsider their concept of employee privacy. Generally, privacy-related decisions involve trades-offs and are based on individuals' "privacy calculus," that is, engaging in a cost-benefit analysis where they evaluate the perceived risks versus the perceived benefits of providing (or accessing) information (Dinev and Hart, 2006). If the perceived benefits exceed the calculated risks, individuals will be more likely to react more favorably to monitoring. Thus, perceived risk is a more situation-based factor that can override the dispositional factor of general privacy concerns (Kehr *et al.*, 2015). Ten Berg and colleagues (2019) found that despite their privacy concerns, people are willing to disclose personal information when asked to comply. Zhou (2013) also found perceived privacy risk to inhibit usage intention. Thus, we assume that perceived risk resulting from the privacy calculus will mediate the negative association between privacy concerns and the acceptance of monitoring. Therefore, *perceived privacy risk mediates the relationship between privacy concerns and the acceptance of monitoring. (H1)*

Transparency has been suggested as a general design recommendation to reduce resistance to monitoring (Abraham *et al.*, 2019) and is defined as the degree to which individuals have access to information regarding monitoring characteristics (Ravid *et al.*, 2022). Ten Berg (2019) found that most participants have no or fewer problems with tracking when the collection and usage of data is transparent. Similarly, a meta-analysis of the effects of employee performance monitoring revealed that more positive employee attitudes can be expected when the organization's monitoring is more transparent (Ravid *et al.*, 2022). Ambrose and Alder (2000) also found negative reactions to monitoring systems when employees do not know whether they are being monitored, why they are being monitored, or how they are being monitored. Together, these studies show that negative impacts can be reduced when employers are transparent about monitoring. The lack of transparency may undermine individuals' ability to effectively evaluate privacy risks associated with the collection and processing of their data (Demir *et al.*, 2014). Thus, we argue that providing transparency helps individuals obtain a better understanding of monitoring technology, formulating our second hypothesis as: *Transparency attenuates the negative effect of privacy risk on acceptance of monitoring. (H2)*

The improvident use of transparency can also have a negative effect on individuals' attitudes and acceptance of technology (Tomczak *et al.*, 2018). Full transparency may reveal information that can intensify uncertainty about (the purpose of) monitoring. Therefore, it is important that organizations clearly communicate their reasons for adopting EM technology to offset the stress associated with uncertainty. Tomczak *et al.*, (2018) suggested that organizations need to notify employees about monitoring instead of continually reminding them. While this method can be useful to avoid increasing stress perceptions, it does not ensure that the benefits of monitoring are understood by employees. Furthermore, Ravid and colleagues (2022) suggest that employees' *perception* of EM is more important than what is communicated to them. Employees may accept monitoring when they understand how it will benefit them or the organization (Acquisti, 2009). Other studies have proposed a positive relationship between understanding the system and

participants' intent to use the system (Cramer *et al.*, 2008). Thus, for transparency to have a positive effect, we suggest that individuals need to know what data is being collected and how. This is important so that employees can better perceive the value associated with it. Therefore, we assume that *the beneficial moderating effect of transparency on the relationship between privacy risk and acceptance of monitoring is particularly strong when the value of monitoring is perceived as high. (H3)*

Method

To test these hypotheses, an experiment with 135 participants was conducted in a laboratory setting in which participants were exposed to a real work situation while being electronically monitored. Transparency was manipulated using two conditions: One group received a detailed explanation of the monitoring and what data was being collected, whereas the other group did not receive any information about how the monitoring data would be processed during the experiment (but was informed after the experiment). After carrying out the work tasks, participants were asked about their acceptance of surveillance, their privacy concerns, perceived risk, and perceptions of monitoring to investigate how these interact with acceptance of EM. This enabled us to identify the role of transparency for acceptance of tracking and tracing systems. Many studies call for transparency when employing EM, while our study describes how transparency can be used properly to increase acceptance and what negative effects too much transparency may have. Our moderated mediation model of perceived value, transparency, perceived risk, privacy concern and acceptance of monitoring can serve as a foundation for future research in this context.

Results

A t-test between the two groups showed a significant difference between the experimental ($M = 4.15$, $SD = 0.84$) and control ($M = 2.42$, $SD = 1.04$) conditions; $t(133) = 10.59$, $p < 0.001$ suggesting a successful manipulation. For testing the hypotheses, PROCESS SPSS script was used (Hayes, 2013). The results were tested using 1000 bootstrapped samples and 95 percent confidence intervals. For H1, privacy concern was the predictor variable, with perceived risk as the mediator. The outcome variable was acceptance of monitoring. Age, gender and interactional justice were entered as covariates. The results revealed a significant indirect effect of privacy concern on acceptance of monitoring (unstandardized interaction $B = -0.10$, $BSe = 0.04$, 95% CI = -0.20; -0.04). Furthermore, the direct effect of privacy concern on acceptance of monitoring was not significant in the presence of the mediator (unstandardized $B = -0.01$, $BSe = 0.08$, $t = -0.08$, 95% CI = -0.16; 0.15). Supporting H1, it indicates that perceived risk completely mediates the relationship between privacy concern and acceptance of monitoring. For H2, privacy concern was the predictor variable, with perceived risk as the mediator. Transparency was the mediator. Transparency did not moderate the effect of perceived risk on acceptance of monitoring (unstandardized interaction $B = 0.00$, $Bse = 0.04$, $t = 0.08$, $p = 0.94$). The overall moderated mediation model was not supported, with the index of moderated mediation = 0.00 (95% CI = -0.05; 0.06). As zero is within the CI, this indicates no significant moderating effect

of transparency on the indirect effect of privacy concerns via perceived risk on acceptance of monitoring. For H3, the hypothesized moderated mediation model was tested in a single model. Transparency was found to moderate the effect of perceived risk on acceptance of monitoring (unstandardized interaction $B = -0.34$, $Bse = 0.09$, $t = -3.74$, $p < 0.001$). Perceived value was also found to moderate the effect of transparency on perceived risk and acceptance of monitoring ($B = 0.08$, $Bse = 0.02$, $t = 3.85$, $p < 0.001$). The overall moderated mediation model was supported, with the index of moderated mediation = 0.05 (95% CI = 0.02; 0.09). As zero is not within the CI, this indicates a significant moderating effect of transparency and perceived value on the indirect effect of privacy concerns via perceived risk on acceptance of monitoring.

Conclusion

Location-based tracking technologies are rapidly being developed, and their implications for the workplace will increase. While transparency about monitoring has been suggested as a general design recommendation, it is still not clear when transparency helps increase acceptance of monitoring and when it does not. Our empirical investigation showed that increasing transparency can sometimes backfire and negatively affect acceptance of monitoring. However, increased transparency together with high perceived value diminishes the negative effect of perceived risk on acceptance of monitoring. Moreover, we found that increasing transparency also promotes interactional justice. These results suggest that in order to increase acceptance of monitoring at workplaces, transparency needs to be adopted strategically in a way that allows the perceived value of monitoring to outweigh the perceived privacy risk. This highlights the need for careful communication about monitoring with employees.

References

- Abraham, M., Niessen, C., Schnabel, C., Lorek, K., Grimm, V., Möslin, K. and Wrede, M. (2019), "Electronic monitoring at work: The role of attitudes, functions, and perceived control for the acceptance of tracking technologies", *Human Resource Management Journal*, Vol. 29 No. 4, pp. 657–675.
- Acquisti, A. (2009), "Nudging Privacy: The Behavioral Economics of Personal Information", *IEEE Security & Privacy*, Vol. 7 No. 6, pp. 82–85.
- Al-Jabri, I.M. and Roztocki, N. (2015), "Adoption of ERP systems: Does information transparency matter?", *Telematics and Informatics*, Vol. 32 No. 2, pp. 300–310.
- Alder, G.S. (2001), "Employee reactions to electronic performance monitoring: A consequence of organizational culture", *The Journal of High Technology Management Research*, Vol. 12 No. 2, pp. 323–342.
- Ambrose, M.L. and Alder, G.S. (2000), "Designing, implementing, and utilizing computerized performance monitoring: Enhancing organizational justice", *Research in Personnel and Human Resources Management*, JAI PRESS INC., Vol. 18, pp. 187–220.
- Brauneis, R. and Goodman, E.P. (2018), "Algorithmic transparency for the smart city", *Yale JL & Tech.*, HeinOnline, Vol. 20, p. 103.
- Cramer, H., Evers, V., Ramlal, S., van Someren, M., Rutledge, L., Stash, N., Aroyo, L., *et al.* (2008), "The effects of transparency on trust in and acceptance of a content-based art recommender", *User Modeling and User-Adapted Interaction*, Vol. 18 No. 5, pp. 455–496.
- Demir, L., Cunche, M. and Lauradoux, C. (2014), "Analysing the privacy policies of Wi-Fi trackers", *Proceedings of the 2014 Workshop on Physical Analytics - WPA '14*, presented

- at the the 2014 workshop, ACM Press, Bretton Woods, New Hampshire, USA, pp. 39–44.
- Dinev, T. and Hart, P. (2006), “An Extended Privacy Calculus Model for E-Commerce Transactions”, *Information Systems Research*, Vol. 17 No. 1, pp. 61–80.
- Jandl, C., Wagner, M., Moser, T. and Schlund, S. (2021), “Reasons and Strategies for Privacy Features in Tracking and Tracing Systems—A Systematic Literature Review”, *Sensors*, Vol. 21 No. 13, p. 4501.
- Jeske, D. (2022), “Remote workers’ experiences with electronic monitoring during Covid-19: implications and recommendations”, *International Journal of Workplace Health Management*, Emerald Publishing Limited, Vol. 15 No. 3, pp. 393–409.
- Kaupins, G. and Minch, R. (2005), “Legal and Ethical Implications of Employee Location Monitoring”, *Proceedings of the 38th Annual Hawaii International Conference on System Sciences*, presented at the 38th Annual Hawaii International Conference on System Sciences, IEEE, Big Island, HI, USA, pp. 133a–133a.
- Kehr, F., Kowatsch, T., Wentzel, D. and Fleisch, E. (2015), “Blissfully ignorant: the effects of general privacy concerns, general institutional trust, and affect in the privacy calculus: Privacy calculus: dispositions and affect”, *Information Systems Journal*, Vol. 25 No. 6, pp. 607–635.
- Lucas, J., Burgett, J., Hoover, A. and Gungor, M. (2016), “Use of Ultra-Wideband Sensor Networks to Detect Safety Violations in Real Time”, *ISARC. Proceedings of the International Symposium on Automation and Robotics in Construction*, Vol. 33, IAARC Publications, p. 1.
- McNall, L.A. and Roch, S.G. (2007), “Effects of Electronic Monitoring Types on Perceptions of Procedural Justice, Interpersonal Justice, and Privacy”, *Journal of Applied Social Psychology*, Vol. 37 No. 3, pp. 658–682.
- McNall, L.A. and Roch, S.G. (2007), “Effects of Electronic Monitoring Types on Perceptions of Procedural Justice, Interpersonal Justice, and Privacy”, *Journal of Applied Social Psychology*, Vol. 37 No. 3, pp. 658–682.
- Moor, J.H. (1991), “The ethics of privacy protection”, Graduate School of Library and Information Science. University of Illinois
- Ravid, D.M., White, J.C., Tomczak, D.L., Miles, A.F. and Behrend, T.S. (2022), “A meta-analysis of the effects of electronic performance monitoring on work outcomes”, *Personnel Psychology*, Wiley Online Library.
- ten Berg, K., Spil, T.A.M. and Effing, R. (2019), “The Privacy Paradox of Utilizing the Internet of Things and Wi-Fi Tracking in Smart Cities”, in Dwivedi, Y., Ayaburi, E., Boateng, R. and Effah, J. (Eds.), *ICT Unbounded, Social Impact of Bright ICT Adoption*, Vol. 558, Springer International Publishing, Cham, pp. 364–381.
- Tomczak, D.L., Lanzo, L.A. and Aguinis, H. (2018), “Evidence-based recommendations for employee performance monitoring”, *Business Horizons*, Vol. 61 No. 2, pp. 251–259.
- White, J.C., Ravid, D.M. and Behrend, T.S. (2020), “Moderating effects of person and job characteristics on digital monitoring outcomes”, *Current Opinion in Psychology*, Vol. 31, pp. 55–60.
- Wu, W., Wu, Y.J. and Wang, H. (2021), “Perceived city smartness level and technical information transparency: The acceptance intention of health information technology during a lockdown”, *Computers in Human Behavior*, Vol. 122, p. 106840.
- Zhou, T. (2013), “Examining continuous usage of location-based services from the perspective of perceived justice”, *Information Systems Frontiers*, Vol.15 No.1, pp.141-150.