

Understanding Employee Electronic Monitoring Tools: An Affordances Lens

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ABSTRACT

Employee electronic monitoring has grown dramatically in recent years, with new capabilities enabling increasingly invasive surveillance and control that could negatively impact worker well-being and organizational outcomes. This study develops a systematic framework for understanding employee electronic monitoring technologies' action possibilities (affordances) through a qualitative analysis of vendor materials and product documentation. Through analysis of vendor documents from 10 leading monitoring software products, the study identifies three hierarchical levels of affordances: observational affordances (focusing on surveillance and visibility enhancement), operational affordances (enabling automated decision-making and enforcement), and strategic affordances (supporting resource and compliance management). The analysis reveals how these affordances reflect varying degrees of automation and organizational control, from basic data collection to sophisticated behavioral analytics. The hierarchical affordance framework helps explain why identical monitoring features may lead to different outcomes across organizational contexts and suggests ways to design more effective and acceptable monitoring systems.

Keywords: Employee electronic monitoring; hierarchical affordances; compliance

Word counts: 6606

INTRODUCTION

The adoption of employee electronic monitoring (EM) technologies has increased dramatically in recent years, with a 58% surge in demand for EM software from 2020 to 2021 (Migliano, 2023). This trend is particularly evident in remote work contexts, where 83% of employers use some form of EM to track employee performance and activity (ExpressVPN, 2021). These technologies have become increasingly sophisticated, with many organizations now implementing AI-enabled monitoring and analytics capabilities (Ajunwa, 2018; Kalischko & Riedl, 2021; Kropp, 2019; Migliano, 2023). For instance, contemporary monitoring systems can track keystrokes, analyze facial expressions during video calls, measure application usage time, and assess employee sentiment through communication pattern analysis (Backhaus, 2019; Pan et al., 2022). These sophisticated monitoring tools enable unprecedented visibility into employee activities, communications, and performance metrics (Abraham et al., 2019; Ahmed et al., 2022; Ajunwa, 2018). Multiple factors have driven the exponential growth in the adoption of these technologies: the rapid transition to remote work following the global pandemic, increasing concerns about productivity management in distributed workforces, growing emphasis on cybersecurity, and the broader trend toward data-driven management practices (Basu et al., 2023; Przegalinska et al., 2025; Ravid et al., 2020).

The capabilities of modern EM extend far beyond traditional supervision practices. Contemporary EM tools leverage artificial intelligence, machine learning, and advanced analytics to enable continuous surveillance of employee activities across digital platforms (Abraha, 2023; Alaimo & Kallinikos, 2021; Barati & Ansari, 2022; Cameron et al., 2023; Dwivedi et al., 2021). These capabilities allow organizations to create detailed behavioral profiles, analyzing patterns such as communication networks (who talks to whom and how

often), work rhythms (peak productivity periods and breaks), and even emotional states through sentiment analysis of written communications (Beer, 2018; Cram & Wiener, 2020; Leonardi & Treem, 2020; Parent-Rochelleau & Parker, 2022; Treem et al., 2023). The increasing adoption and sophistication of these tools raise new questions about the boundaries of acceptable workplace surveillance and the implications for employee well-being. Furthermore, the extension of workplace surveillance into employees' homes in the context of remote and hybrid work has created new tensions around privacy boundaries and work-life balance (Kalischko & Riedl, 2021; Przegalinska et al., 2025).

Although organizations may implement EM technologies with legitimate intentions, the extensive action possibilities inherent in these systems can lead to the gradual expansion of surveillance practices and unintended organizational practices that potentially compromise worker autonomy and well-being. For example, a system initially implemented to track working hours might evolve to monitor break patterns, personal device usage, or even off-hours activities when employees use company devices at home (Barley et al., 2017; Charbonneau & Doberstein, 2020; McDonald et al., 2021). While organizations usually implement EM systems with the aim of improving productivity, ensuring compliance, and protecting organizational assets, emerging research indicates complex and often contradictory outcomes for workers (Holland et al., 2015; Kalischko & Riedl, 2021). For example, recent meta-analyses of EM studies reveal significant variations in employee performance, job satisfaction, and organizational commitment resulting from EM implementation (Bhave et al., 2020; Noponen et al., 2023; Ravid et al., 2020). These mixed findings suggest that the relationship between monitoring implementation and organizational outcomes requires a more nuanced theoretical understanding, particularly through

the lens of technological affordances that can explain the different ways organizations leverage the systems' capabilities and adopt organizational practices leading to diverse outcomes.

While existing research has examined specific features and types of EM technologies or their organizational purposes (Charbonneau & Doberstein, 2020; Doberstein et al., 2022; Pierce et al., 2015; Stanton, 2000), to our knowledge, no study has to date systematically analyzed their affordances – the action possibilities they create in organizational contexts (Ravid et al., 2020). This gap is particularly significant given that identical technological features may enable different organizational actions depending on context and capabilities. For example, while one organization might use activity tracking features purely for time management, another might leverage the same features for detailed performance analytics and automated decision-making about promotions or terminations. This study addresses these gaps through a systematic examination of EM technologies' affordances through qualitative analysis of vendor materials and product documentation. This analysis reveals three hierarchical levels of affordances shaping how organizations deploy EM technologies.

This study asks: What affordances do contemporary EM technologies offer organizations, and how do these affordances interact across different levels of organizational control? Taking the affordance theory approach allows us to understand both the technological possibilities and human experiences of EM. Our analysis reveals how monitoring technologies' affordances manifest differently across organizational contexts. For instance, video monitoring capabilities could enable basic security surveillance in one setting but evolve into sophisticated behavioral analysis in another, depending on organizational priorities and technical expertise. Our findings contribute to theory by extending affordance theory to the workplace surveillance context and providing practical insights for organizations implementing monitoring systems. The remainder

of this paper is organized as follows. First, we review relevant literature on affordance theory, workplace privacy, and employee responses to monitoring. Next, we describe the research design and present findings. Finally, we discuss theoretical contributions and practical implications, concluding with directions for future research.

THEORETICAL FRAMEWORK

This study's theoretical framework primarily draws from affordance theory in Information Systems (Abhari et al., 2020; Bellesia et al., 2023a; Bloomfield et al., 2010; Conole & Dyke, 2004). This perspective provides a comprehensive lens for understanding the technological capabilities of EM systems. The theory has proven particularly valuable for analyzing how digital technologies shape organizational practices while accounting for the social and contextual factors that influence their implementation and use.

Affordance theory provides a valuable framework for understanding how technologies enable and constrain organizational practices. Originally developed in ecological psychology (Gibson, 2014) and later adapted to technology studies (Norman, 2013), affordance theory examines the relationship between technological capabilities and user goals. Unlike approaches focusing solely on technical features or user perceptions, affordance theory emphasizes the relational nature of technology use, recognizing that the same features may enable different actions depending on organizational context and user capabilities (Hutchby, 2001; Markus & Silver, 2008). In other words, this lens emphasizes both material attributes/features of technology and the subjective features of human users' perceptions, capabilities, power relations, and social interactions (Hutchby, 2001).

The affordance perspective is particularly relevant for EM, where the same technological possibilities may enable different forms of control depending on organizational context and

implementation. In the context of EM technologies, research has investigated technology affordances mostly from the perspective of employees (Abhari et al., 2020; Bellesia et al., 2023), while research on affordances from the perspective of employers and managers is limited. In a rare attempt, Kellogg et al. (2020) identified four affordances of algorithmic management systems for managers: comprehensiveness, instantaneity, interactivity, and opaqueness (p. 371). Their research demonstrated how these affordances enable managers to implement new forms of algorithmic control, such as using real-time performance metrics to automate task allocation or leveraging comprehensive activity logs to identify patterns in employee behavior. However, their identification strategy of affordances was unclear, and they did not attempt to investigate the relationships among and hierarchies of the affordances.

Our conceptual framework demonstrates how monitoring outcomes emerge through the managers' technology-mediated actions. This model extends previous theoretical work on EM by explicitly recognizing the role of technological affordances in shaping managerial actions (Abraham et al., 2019; Bernstein, 2017; Bernstein & Turban, 2018; Holland et al., 2015; Kalischko & Riedl, 2021; Ravid et al., 2020). The framework shows how managers' actions are determined not directly by software features but by the affordances or possibilities of action afforded by the software. This relationship is mediated by what Faraj & Azad (2012) term "technological possibility structures" - the range of potential actions that emerge from the interaction between technological features and organizational contexts. For example, a monitoring system's feature for tracking application usage might create different possibility structures in different contexts, enabling productivity optimization in one organization while facilitating privacy-invasive surveillance in another. These affordances, rather than the features

themselves, shape and direct managerial actions toward employees, fulfilling managers' needs (Jiang et al., 2012; Karahanna et al., 2018).

Recent research has demonstrated how these affordances can vary significantly across organizational contexts. For instance, Bernstein (2017) shows how similar monitoring features can enable different forms of control depending on organizational culture and managerial intentions. Similarly, Benlian et al. (2022) document how affordances evolve as managers discover new possibilities for action through technology use. Their research revealed how basic time-tracking features initially implemented for billing purposes evolved to support sophisticated performance management systems, demonstrating the dynamic nature of technological affordances in organizational settings.

Our study extends this theoretical foundation by introducing a hierarchical framework of affordances in EM technologies. This hierarchical model recognizes that affordances exist at different levels of organizational control and influence, from basic observational capabilities to strategic management possibilities. By examining how these different levels of affordances interact and influence each other, we provide a more nuanced understanding of how EM technologies shape organizational practices. This approach helps explain why seemingly similar monitoring features can lead to different outcomes across organizations, as the activation of higher-level affordances depends on the successful implementation and understanding of more fundamental affordances.

METHODOLOGY

This study employed a qualitative analysis of vendor materials and product documentation. Our research design was informed by critical realism (Volkoff & Strong, 2013), acknowledging both the objective existence of technological capabilities and the socially constructed nature of their interpretation and use. This philosophical stance aligns with our research objectives in two ways: first, it recognizes that EM has concrete, measurable capabilities independent of user interpretation; second, it acknowledges that these capabilities are enacted differently across organizational contexts through social processes and human agency. The qualitative analysis was conducted in three steps. First, a comprehensive list of employee EM software is created, from which a representative sample is taken. Details of the sampling approach are described in the following section. Second, a qualitative analysis of the content on vendors' websites was conducted, focusing on the page describing the technology's features. Third, following the affordance theory lens, the possibilities of actions and constraints afforded to the managers by EM software products were coded and categorized into generalizable concepts to develop a framework to guide future research and design studies.

Sampling

Our sampling strategy aimed to capture the breadth of contemporary EM technologies while ensuring depth in our analysis of selected vendors. We employed a three-stage sampling process, utilizing multiple sources to identify a representative and comprehensive set of companies offering employee monitoring software products. First, the sampling process started with a Google search using the search terms “employee monitoring software,” “bossware,” “employee electronic monitoring tools,” and “workplace monitoring technology.” The logic behind this sampling strategy lies in the reasonable assumption that when organizations seek to acquire employee monitoring software, they start searching Google to screen the available options and

their pros and cons (Beer, 2018; Palinkas et al., 2015). The search results were carefully examined by screening the home page to see the main selling points and then locating and examining the list of features. The selection criteria were as follows: the home page must explicitly assert that the company provides software for EM, and the features listed on the webpage must be appropriate for digital work monitoring.

Second, we conducted a systematic review of technology evaluation sources to ensure that we were not missing important vendors that might not appear prominently in search results. We explored technology review websites such as Forbes, SourceForge, and Trustpilot to identify relevant products. This method is shown to add valuable information in qualitative and mixed-method research in technology studies (Duguay & Gold-Apel, 2023; Light et al., 2018). Additionally, we consulted relevant news coverage and magazine articles to determine if they mentioned any vendor company names and, if relevant, added them to the list. A list of fifty companies emerged in this step. The third stage involved cross-referencing our findings with an established database to validate our sampling comprehensiveness. We utilized a database of employee management technologies compiled by Coworker, a worker advocate non-profit organization (Negrón, 2021). The database consists of 550 tools, including software, hardware, and platforms, focused on worker monitoring and management. Through a systematic filtering process, we narrowed this list based on several criteria: (1) tools focusing on performance and productivity monitoring rather than auxiliary functions, (2) software-based solutions rather than hardware devices, and (3) tools currently in active use. This process yielded a list of 89 tools. This triangulation in sampling strategy helped ensure an extensive and comprehensive collection of companies that provide EM software. From the resulting list, we then drew a random sample of 10 companies, following prior research in qualitative studies (Marshall et al., 2013).

Qualitative analysis

Our qualitative coding followed a systematic approach to ensure analytical rigor and theoretical contribution. To identify qualitative codes, we employed the framework offered by Grodal et al. (2021) for categorization in qualitative analyses. This framework provided a structured yet flexible approach to developing theoretical insights from our data. In this framework, categorization comprises three processes: generating initial categories, refining tentative categories, and stabilizing categories. Generating initial categories corresponds to initial data collection and analyses and contributes to theory development by linking initial categories to past theoretical insights. Refining tentative categories corresponds with further analyses and possible added data collection and contributes to theory development by linking tentative categories to elaborate or challenge existing theories. Finally, stabilizing categories co-occurs with re-analyses and theoretical integration and creates a theoretical framework (Grodal et al., 2021).

Categories of initial codes included *collecting raw data, making new metrics, creating real-time visibility, analytics, alerting and notifications, decision support, and others*. Each category consisted of features commonly observed among the investigated tools. For example, while taking frequent screenshots from employee desktops is common to all the vendors, searching through the recorded screenshots by optical character recognition (OCR) was spotted only on a few websites. Furthermore, some features are explicitly listed and described on the vendor websites, while others can only be inferred from the descriptions and demos. For example, collecting email and instant messaging app content was explicitly listed as a feature. Still, the collection of calendar data could only be inferred from the description of scheduling features.

FINDINGS

Sample characteristics

Our comprehensive sampling approach yielded ten EM tools included in the qualitative analysis. Most of the products were platforms, except ActiveTrak and Tramind, which were in the form of Apps or software. None of the companies in the sample emerged during Covid-19. Most companies targeted hourly and salaried workers, except Eightfold, which targeted only salaried workers. The products were marketed toward varied industries, including but not limited to Agriculture, Call Centers, Charity, Cleaning services, Clinics, Construction & Engineering, Education, Entertainment, Healthcare, Hospitality, Hotels & Resorts, Manufacturing & Logistics, Professional Services, Retail, Security, Supermarkets.

Initial codes

The predominant category of initial codes was *collecting raw data*. In this group of codes, the type of data that the tools could collect was emphasized in the documents. For example, almost all the tools suggested that employees' time on each activity is the primary data point they collect. Categories of activities are not explicitly stated in the documents. However, some implications could be drawn from other types of data descriptions. For example, the list of websites employees visit is categorized and tagged into productive and unproductive websites. Then, a score for productive web usage is assigned to them. The same holds for application usage.

EM Affordance Framework

The resultant framework consists of three distinct levels: observational affordances, which focus on data collection and visibility enhancement; operational affordances, which enable automated decision-making and enforcement processes; and strategic affordances, which support broader organizational objectives. At each level, the affordances build upon and extend the capabilities of the previous level, progressing from basic surveillance capabilities to sophisticated organizational management tools. This hierarchical structure demonstrates how EM technologies can evolve from simple observation tools to comprehensive management systems influencing strategic organizational outcomes such as productivity, compliance, and employee well-being.

Observational Affordances: Surveillance and Visibility Improvement

The first level of the technology framework consists of observational affordances that deal with collecting, manipulating, and visualizing data. These affordances include basic functionalities for team and line managers, involve little automation, and build the foundations for higher-level affordances. Although employees are central to activating these affordances where their data are passively, and sometimes unknowingly, collected, they are not directly involved and actively interact with the EM tools.

Enhanced surveillance: The first affordance identified in the sample tools was enhanced surveillance through collecting and storing data. Various features, individually and jointly, enable this affordance. Most notably, the first category of initial codes identified in the first phase of data analysis, namely collecting raw data, is linked to the affordance of collecting and storing raw data from employee digital behaviors and activities. These data consist of traces that

employees left when doing any activities in digital space, including communicating with others, web usage, and application usage.

Some vendors have emphasized the unobtrusiveness of their tools. They state that their tools only capture the existing data passively and do not interrupt employees and work processes. For example, Proscore has stated on their website: “only captures existing usage data from business applications. It simply runs in the background and does not require input from employees.”. This emphasis on unobtrusiveness appears to be aimed at assuring the potential adopters of the minimum disruption and deployment costs of the tools. Employers would not need to buy extra data collection equipment, such as sensors and computing systems, in order to collect detailed data on employee behavior. Most of the actions and behaviors that employees take leave digital traces on their computers, and those traces are collected seamlessly and without any elaborate effort on the part of employers and their IT departments.

Enhanced visibility through creating new metrics of behavior: The second identified affordances of EM tools has been employers’ perceived ability of enhanced visibility into employee’s behavior. This ability is operationalized by some new metrics of employee behavior, such as employee productivity, work habits, distractions, benchmark performance metrics, and digital biomarkers.

One emergent theme in the sample vendor documents was the use of a consistently vague notion of productivity to encourage potential buyers. For example, in the below statement, the vendor highlights the ability of their software to derive useful insight from all types of detailed employee behavior data, most notably the time they spend on different websites and applications. “*Teramind gathers and analyzes all types of behavior data that show how employees spend their*

day. Identify areas for optimization and how improvements can be made.... Get productivity data for every employee and contractor using your organization's network..."

The detailed data collected on employee behavior and activities are labeled and manipulated to build composite metrics that approximate the effort employees put into work or their productivity. A common method of constructing a productivity metric in the sample was labeling applications and websites as productive/unproductive and then aggregating the employee's time spent on each category. For example, the following quote from one of the vendors illustrates how this process works. *"Teramind enables organizations to define what apps and websites are productive and unproductive... Label activities as productive or unproductive to pinpoint what type of work is or isn't being performed."* (Teramind website)

These descriptions show that raw data are aggregated (mostly through non-transparent methods) to make new metrics of employee and team performance, behavior, and work processes. The following two quotes illustrate how the time spent on different categories of applications and websites is the primary input for making aggregate metrics of productivity and benchmarking. *"Add website and app data category-wise to identify frequent activities. Using these productivity insights, you can understand if any employee or group is spending more time emailing or messaging than high-value activities."* (Monitask website) *"Make any action a KPI in order to track and measure employee or departmental performance"* (Teramind website). The assumption in these cases is that the tools collect consistent data from different individuals and groups and thus provide a fair benchmark metric for the evaluation of employee performance. Any actions employees take can be captured by the software and turned into a performance metric as described in the following quote: *"Make any action a KPI in order to track and measure employee or departmental performance"* (Teramind website)

Real-time Visibility (*Exploring, visualizing, and organizing employee data to find patterns of behavior*): The employers wanting to have complete visibility on what employees do during work and how they do that has been always a common theme in management and organizational studies (Flyverbom, 2022; Leonardi & Treem, 2020). Employers' crave to understand the employee behavior has been a significant factor in management and organization studies and has motivated the employers to make increasingly significant investments in data analytics tools directly focused on their employees actions, behaviors, and characteristics (Hüllmann et al., 2021; Stelmaszak, 2022).

In our sample, too, this theme occurs consistently. This affordance takes in all the data collected by collecting and storing data affordance and transforms it into usable information through data manipulation, re-organization, and visualization. Creating live visibility could be achieved by a diverse set of features including live view of employee desktop, frequent screenshots of employee desktop, and live dashboards of aggregate employee and process data. The following quote from a vendor website illustrates the perceived use case for two of the listed features: frequent desktop screenshots and dashboards: *“This real-time screen capture tool frees you from monitoring the screens all the time. It can automatically capture and record real-time screenshots. On top of that, you can save screenshots for future uses;”* and *“The one dashboard shows easy-to-read summary reports of time spent on each task, client, and project. You can access reports on a monthly, weekly, or daily basis to analyze behavior patterns.”* (Monitask website)

Operational Affordances: Automated Decision-making and Execution.

The second level in the technology framework consists of the affordances that involve medium levels of automation and serve mostly the middle managers of the organization such as

departmental or HR managers. A common feature of this group of affordances is their automatic interaction with employees. These interactions include communicating performance feedback, sending warning messages, restricting access, and enforcing rules and codes of conduct. Consequently, these group of affordances are more directly and closely related to the employee every-day activities and behaviors and thus presumably affect their work behavior and outcomes the most. These affordances are discussed in more detail below.

Automated alerting: This affordance provides the employers with the ability to create and send notification alarms about employee attendance, work schedule, task performance, cybersecurity risks, and assigned tasks. Employers can set conditions for the activation and sending of notification messages based on some thresholds on constructed metrics of performance and behavior. For example, when an employee spends time on a specific group of apps or websites that is higher than the average time the employees in the department spend, a notification message with pre-specified content will be sent. In other cases, the EM tools might be equipped with predictive models that predicts certain behaviors and alerts the target employee beforehand. For example, based on apps and website usage or file activities, the predictive model might put high risk of data security risk on an employee and thus preemptively sending alert message to them. This affordance enables managers to deliver timely notifications and messages to the employees and avoid delays on feedback delivery.

Automated alerting could also be utilized to send alert messages to the managers when some undesirable activity is performed by the employees. For example, when employees spend excessive time on social media, or try to game the EM tools, or do non-work-related tasks during work hours, the software sends a notification to the manger along with a short report of the incident. The following quotes from one of the vendors illustrates this functions.

“Leverage pre-configured alarms to track and get alerts about activities of interest.”

“Get notified when users attempt to “cheat the system” with mouse jigglers or other tools that mimic work-related activity.”

“Detect non-work-related activities such as shopping, recreational browsing or gaming during work hours.” (Monitask website)

Automating compensation management (time and attendance tracking and linking it to payroll): This affordance is meant to replace traditional timesheets for tracking working time and calculating payments with less costly and more accurate automatic time management feature of EM tools. The software records and aggregates active times employees spend on assigned tasks, creates a dashboard for managers, and links it to HR and payroll solutions.

Automated enforcing compliance with internal rules: When organizations set policies to regulate employee behavior they also have to put effort to monitor the employee’s compliance and enforce it with sanctions and rewards. This enforcement could be costly and inaccurate with most conventional ways of monitoring. EM tools afford employers this enforcement through diverse features including, but not limited to, set rules of using technology at work, detecting any major divergence from the defined rules, automated responses to violations and suspicious activities, and documentation of any violation.

The third, and last, level in our technology framework consists of higher-level affordances of EM tools that mainly support higher managers and regulate employee’s behavior regarding interorganizational relations, industry standards and codes of conduct, and government regulations. Affordances of ensuring compliance with regulatory requirements, containing cybersecurity risks, enhanced employee health and safety are in this level of our framework.

Strategic Affordances: Resource and Compliance Management

Managing resources (technology and people): Mid-level managers can utilize EM tools to estimate the amount of resources, including people and technologies, needs and optimize their allocations across departments and teams. The distribution of resources among teams and departments can save the organizations cost and thus this affordance can be attractive to the managers. Since, EM tools constantly and consistently gather and analyze employee work activities to find patterns on how tasks are being done and how time employees spend on different tasks, the resulting insights are used for task allocation among employees, distribution of employees and technology among teams and departments.

Features that are utilized by managers to yield this affordance include but not limited to viewing application usage and time allocation, team comparison data, work distribution dashboards, and viewing an aggregation of productive time across teams. In other words, information gained through the utilization of EM tools about on how employees spend work time and what technologies they use, on one hand, and the productivity outcome of different allocations of people and technologies can help managers in optimization of organizational resource management.

Enhanced cybersecurity management: Supporting higher level organizational goals of ensuring cybersecurity and protection against insider and outside threats is an affordance that has not been identified in previous studies of EM. This affordance is a significant and recurrent theme in the websites analyzed in this study. The EM software tools promise that they can detect early signs of both intentional and unintentional acts that could lead to the compromise of organization's cybersecurity. This affordance is enabled by manual and automatic monitoring and review of the employee computers to detect suspicious behavior. For example, live view of

employee desktop is proposed enable managers to identify risky behavior of an employee sharing sensitive personal data via email and thus lower the risk of a major data breach.

Furthermore, time-stamped screen recordings is feature that could help employers to investigate every action that happened on employee computer before and after a security breach. This post-event investigation helps employers identify vulnerabilities and avoid them in future. The following quote from one vendor illustrates this point. *“A single data point isn’t enough to get the context you need. Use recordings to see the events leading up to and immediately after any security incident. Screen recordings can also be set to trigger based on acceptable use policies and specific rulesets.”* (Teramind website)

The other feature that contributes to this affordance is smart rules and automated responses which are offered by EM tools. Managers can set rules on the usage patterns of employees and define pre-specified responses when a rule is violated by some employees. On example is setting a limit on the amount of upload or download from a pre-specified list of websites and sending alert messages to those who exceed these limits. This affordance thus simplifies cybersecurity management and protect the organization from potential financial and reputational losses.

Ensuring compliance with regulations: Employers can leverage EM tools to ensure that their organization comply with regulatory requirements that could hurt them in case of any violation. Our analysis of vendor websites data revealed that this affordance is common and employers are encouraged to leverage the monitoring tools to achieve compliance goals. Some of the common ways in which this affordance is materialized include time tracking to ensure compliance with labor laws regarding working hours and overtime, computer screen monitoring and email and communication monitoring to ensure compliance with data privacy and data protection laws and prevent unauthorized access to sensitive personal data (violation of HIPAA

and GDPR), network monitoring to ensure compliance with cybersecurity regulations, and user behavior analytics to detect unusual employee behavior in violation of regulatory requirements.

Some of the regulations recurrently mentioned in our data were the following. Employee EM tools afford employers *ensuring compliance* with the Data Protection Regulation (GDPR) with their ability to monitor data access and usage to ensure that personal data is handled in compliance with GDPR's stringent data protection requirements. Compliance with the Health Insurance Portability and Accountability Act (HIPAA) is ensured with the tools' ability to monitor employee access to patient records and ensure that Protected Health Information (PHI) is safeguarded according to HIPAA standards.

In financial sector, Sarbanes-Oxley Act (SOX) is one regulatory requirement that employers can ensure its compliance through the tools' ability to track and log access to financial systems and data to ensure accuracy and integrity in financial reporting as required by SOX. Similarly, when employees deal with payment card data, organizations want to ensure their compliance with Payment Card Industry Data Security Standard (PCI DSS). The studied tools can provide this affordance by monitoring and restricting access to payment card data.

In education industry, employers can leverage this affordance to ensure compliance with the Family Educational Rights and Privacy Act (FERPA) where these tools can ensure that student education records are accessed and handled in accordance with FERPA's privacy requirements. Furthermore, government agencies and their contractors in all sections can use EM tools to monitor and report on information security practices, ensuring compliance with Federal Information Security Management Act (FISMA) requirements for protecting federal information and systems.

DISCUSSION

Through a qualitative analysis of the EM technology websites, this study developed a framework for encapsulating the technology affordances that can guide future research into technological impacts or responsible designs. The developed framework is distinguished from and complements an existing framework in the literature (Ravid et al., 2020) as it is focused on technology's affordances emerging from common applications in the market rather than being driven by academic literature. For example, while Ravid et al. (2020) categorized EM technologies based on their purpose to be used for performance management, training, administration, and surveillance, our analysis found that most current software and applications focus on performance management, cybersecurity, and compliance management as the main purposes. In terms of monitoring targets, drawing from the academic literature, Ravid et al., (2020) categorized them into thoughts and feelings, location, tasks, and relationships. We found that tasks are the most common targets offered by the current technology to enable the common aim of performance management and cybersecurity. These findings could reflect the common requests from organizations, current capabilities of the commonly available technologies, or the cost considerations.

The identified affordances are categorized into three levels based on the level of management they support, aligned with other employee monitoring and algorithmic management research (Abhari et al., 2020; C. M. Mao & DeAndrea, 2019; J. Mao & Shearer, 2019). These levels facilitate research into technological impacts by focusing on the technology's affordances instead of the designer's intentions or users' perceptions (Markus & Silver, 2008). Focusing on affordances makes it feasible for researchers to visualize the possibilities of the technology's use,

not bound by the designers' imaginations or users' perceptions, thereby finding the consequences and impacts on people and organizations. Furthermore, being based on common applications, this categorization facilitates research into common and understudied aspects of EM, such as synchronous feedback (Ravid et al., 2020), which this study found to be an important affordance commonly provided by available applications.

At the foundational level, EM tools provide basic surveillance and visibility improvement affordances. These capabilities focus on collecting and manipulating data about employee activities, creating new metrics of behavior, and enhancing real-time visibility of work processes. This aligns with what Zammuto et al. (2007) term "visualizing work processes" affordances. The surveillance affordance manifests through features like keystroke logging, application usage tracking, and communication monitoring, reflecting what Ball (2010) identifies as the core elements of workplace surveillance. Vendors emphasize the unobtrusive nature of these data collection mechanisms, positioning them as passive observers of existing digital traces rather than active interventions in work processes. This framing, as noted by Sewell & Taskin (2015), appears aimed at minimizing concerns about deployment costs and workplace disruption. The enhanced visibility affordance emerges through the creation of novel behavioral metrics and performance indicators, often focusing on productivity measures derived from digital activity patterns. However, as Hoeyer & Wadmann (2020) caution, the reliability of these metrics as performance indicators remains questionable.

The category of operational affordances centers on automated decision-making and execution capabilities, reflecting what Parent-Rochelleau & Parker (2022) identified as algorithmic management functions. These affordances represent a significant evolution in monitoring technology, moving beyond passive observation to active intervention in workplace

processes. The automated alerting affordance enables organizations to establish and enforce behavioral thresholds through automated notification systems, a capability that Alizadeh et al. (2023) term "algorithmic directing." The automation of compensation management through time tracking and payroll integration represents another significant affordance at this level, potentially reducing administrative overhead while raising questions about the accuracy and fairness of automated time accounting (Ravid et al., 2020). The automated enforcement of compliance with internal rules demonstrates what Faraj & Azad (2012) describe as the materialization of organizational control through technology.

The highest level in our framework is strategic affordances, which are related to resource and compliance management capabilities, aligning with what Strong et al. (2014) describe as organizational-level affordances. These sophisticated affordances enable organizations to optimize resource allocation, enhance cybersecurity management, and ensure regulatory compliance across multiple domains. The resource management affordance facilitates what Fischer et al. (2020) term "actionable knowledge" for decision-making about personnel and technology deployment. The cybersecurity management affordance reflects growing organizational concerns about data security, offering capabilities for early threat detection and incident investigation (Stelmaszak, 2022). The regulatory compliance affordance addresses what Illéssy & Saeed (2022) identify as the growing complexity of workplace EM regulations.

The technology framework developed in this study significantly advances affordance theory by extending its application to the context of EM technologies. Traditionally, affordance theory has been employed to explore the relational properties between users and objects in various contexts, including environmental design and human-computer interaction (Gibson, 1977; Norman, 1988). By focusing specifically on EM technologies, our framework introduces a

nuanced understanding of how these technologies can shape and are shaped by organizational practices. Specifically, it identifies unique affordances such as enhanced/real-time visibility and automated performance management, which are pivotal in modern workplaces (Leonardi, 2011). This specialization enriches the conceptual landscape of affordance theory and bridges a gap in the literature by linking it directly to organizational behavior and technology management (Zammuto et al., 2007). Additionally, the framework's emphasis on high-level goals such as employee health and well-being provides a balanced perspective that could inform future theoretical developments and practical applications in the design and deployment of monitoring systems (Smith & Sandberg, 2018). This contribution underscores the dynamic interplay between technology and organizational processes, offering a robust platform for subsequent research and theory refinement.

The findings from this study underscore the necessity for robust policy frameworks to govern the implementation of EM technologies. Policies should ensure that monitoring practices are transparent and fair and respect employee privacy rights. Clear guidelines on the scope and purpose of EM can help prevent misuse and build trust within the organization (Ravid et al., 2020; Watkins Allen et al., 2007; Yost et al., 2019). Organizations should consider employee attitudes and responses when implementing EM systems, as research shows that employee interpretations significantly influence EM outcomes (Anteby & Chan, 2018). As Ravid et al. (2020) noted, the perceived purpose and implementation of EM systems directly affect employee responses and organizational outcomes. Furthermore, policies should comply with existing legal standards and ethical guidelines to protect both the organization and its employees from potential legal repercussions (Posey & Shoss, 2023). Regular audits and assessments of EM practices can help ensure ongoing compliance and adapt policies to evolving technological and regulatory

landscapes (Moore et al., 2017). By establishing comprehensive policies, organizations can create a balanced approach that safeguards employee rights while leveraging the benefits of EM technologies.

This study has some limitations due to its observational methodology and sampling. First, although a systematic and comprehensive approach is taken for sampling EM vendors, there might still be generalizability issues. For example, some EM software products may not have been explicitly marketed as monitoring tools and are not caught in our search strategy. Furthermore, a variety of digital technologies, not designed and intended for monitoring and control purposes, could be appropriated by managers to support the monitoring of employee performance and behavior (Pianese et al., 2023). These, for example, include computer-mediated communication tools like Zoom and Microsoft Teams, which are not designed to monitor employee performance and behavior but end up being used, often as complementary tools, by managers for measuring employee effort indicated by the amount of time spent on the tool. This study focuses only on digital tools specifically designed for employee monitoring and surveillance, and therefore, findings cannot be generalized to other types of monitoring technologies.

CONCLUSION

Drawing together the key findings and implications of this research, the practical implications of our framework for organizations are multifaceted, emphasizing both the potential benefits and the need for responsible implementation of EM technologies. One key implication is enhancing performance management through increased visibility and enhanced surveillance. By

leveraging these affordances, managers can gain more accurate insights into employee productivity and identify areas for improvement (Ball, 2010). However, organizations must balance these benefits with ethical considerations, ensuring that monitoring practices do not infringe on employee privacy or lead to unnecessary stress (Ajunwa, Crawford, & Schultz, 2017). Implementing clear policies and transparent communication about monitoring practices can help mitigate these risks and foster a culture of trust (Jeske & Santuzzi, 2015). Additionally, organizations should consider the potential for monitoring technologies to support employee development by providing real-time feedback and identifying opportunities for skill enhancement (Gurses & Carayon, 2009). By adopting a balanced approach that prioritizes both performance and well-being, organizations can harness the full potential of monitoring technologies to drive both efficiency and employee satisfaction. Future studies can apply our framework to understand the impact of technology in different contexts or with different technologies. Specifically, longitudinal studies are recommended to examine the long-term effects of EM technologies. Furthermore, it is essential to explore how cultural differences impact the perception and effectiveness of EM technologies. Therefore, applying this framework to different industries and countries of operation is a promising area of research. Finally, documenting technology's affordances over time can provide insights into how debates around public concerns over workers' well-being and corporate profit maximization evolve.

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