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Laksanadjaja, Felicia; Oviedo-Trespalcios, O.

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Research Article

Uncovering the Web of Secrets Surrounding Employee Monitoring Software: A Content Analysis of Information Provided by Vendors

Felicia Laksanadjaja and Oscar Oviedo-Trespalcacios 

Faculty of Technology, Policy and Management, Delft University of Technology, Delft, Netherlands

Correspondence should be addressed to Oscar Oviedo-Trespalcacios; ooviedot@gmail.com

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Employee monitoring software enables employers to oversee their workforce, even when working remotely. While it has the potential to enhance efficiency, productivity, and profitability within an organization, there are also significant risks associated with its adoption, such as violations of privacy, security intrusions, and lack of transparency. Although recent research thoroughly discusses the role of employers in the ethical use of monitoring, the role of monitoring software vendors has yet to be explored. Therefore, this research is aimed at exploring vendors' current involvement in mitigating the risks of employee monitoring software. To achieve this, a content analysis was conducted on 15 websites selling employee monitoring software to examine how vendors address these risks. Given the lack of relevant literature and the possible reluctance of vendors to discuss the risks in surveys or interviews, content analysis enables a systematic review of the available software and the portrayal of employee monitoring on their websites. The findings show that risk-mitigating features are uncommon in the solutions offered by these companies. Furthermore, vendors tend to misrepresent and under-represent the risks of monitoring tools on their webpages compared to the benefits. With insights from this study, policymakers and advocates can develop new measures to promote the ethical use of employee monitoring. These measures could include establishing a knowledge center to provide general, evidence-based information about risks and benefits as an objective third party.

1. Introduction

Employee monitoring encompasses the practice of employers observing, inspecting, and recording their employees' performance, behavior, or personal characteristics [1]. With the increasing prevalence of digitalization in the workplace, companies are adopting software solutions to monitor their workforce, whether employees are working remotely, in a hybrid model, or in-office. A 2021 survey commissioned by ExpressVPN on the extent of surveillance in the remote workforce revealed that a significant 78% of employers utilize monitoring software [2]. This monitoring takes various forms, including time tracking, random screen captures, and tracking web and app activities [3].

Employee monitoring presents both benefits and risks. Regarding the benefits, employee monitoring systems have demonstrated their capacity to enhance operational efficiency, productivity, and overall profitability by leveraging the actionable data they collect [3]. However, these systems also present a wide range of risks. Firstly, they raise concerns about the invasion of employee privacy. As monitoring becomes more advanced and widespread, a greater amount of employee data is collected, leading to worries about privacy infringement. Employees are apprehensive about having their personal lives monitored, which can result in legal disputes [4]. The ExpressVPN survey indicates that some surveyed employees would consider quitting their jobs or willingly accept reduced pay to avoid surveillance

measures [2]. Secondly, employee monitoring can adversely affect employees' mental and physical well-being [3]. The constant feeling of being observed can lead to stress among employees, diminishing job satisfaction and fostering an atmosphere of distrust between employers and employees. Indeed, the ExpressVPN survey indicates that 59% of employees reported experiencing stress and/or anxiety related to surveillance [2]. Potential reasons for heightened stress and anxiety levels include feeling pressured to be continuously online and taking fewer breaks throughout the day.

By proactively implementing strategies, employers can adopt monitoring technology that maximizes positive outcomes and minimizes negative impacts on the work environment [5]. For instance, employers can lead with transparency about the implementation to alleviate privacy concerns [4]. Moreover, communication about the scope, purpose, and method of monitoring can dispel the perception of mistrust between employers and employees [6]. Informing employees about the benefits of monitoring, both for the company and for them, has been shown to increase employee acceptance, which is one of the factors employers must consider to ethically implement monitoring. According to Parent-Rocheleau and Parker [5], aside from transparency, there are other moderating factors that could alleviate the negative effects of employee monitoring while enhancing its positive effects. One factor concerns human influence in the system, which refers to the employees' ability to control the system or their involvement in it. However, focusing solely on transparency and control measures may overlook deeper systemic issues.

The responsibility for ethical monitoring does not just lie with employers and employees. Other stakeholders, like software vendors, policymakers, and industry regulators, also play a key role. However, despite their importance, monitoring software vendors have been underrepresented in recent research. Understanding how vendors operate is crucial since they are part of a complex extended system where the responsibility for ensuring the ethical use of employee monitoring is shared [7]. Firstly, vendors can shape employers' awareness of risks during their introduction to the software through the information provided on their websites [8]. Secondly, the human influence within the system heavily depends on the features built into the monitoring software [9]. For example, employee monitoring software companies could incorporate a feature that allows employees to turn off monitoring during breaks. By understanding how vendors currently address the benefits and risks, policymakers and advocates can develop effective regulations that apply to vendors rather than only to users.

To increase our understanding of how vendors address the benefits and risks, the following investigation was proposed. The research aimed to explore how vendors address the benefits and risks associated with employee monitoring software. The following research questions were formulated:

- a. What features are offered by employee monitoring software vendors?
- b. What benefits of employee monitoring are highlighted on commercial websites?

- c. What risks of employee monitoring are highlighted on commercial websites?

To address the research questions, a comprehensive content analysis was conducted on the commercial websites of various vendors. Employers evaluate the risks and benefits before deciding on employee monitoring. Exploring commercial websites that sell monitoring software provides valuable insights into the risks and benefits that employers encounter. However, it is also likely that vendors may attempt to make their software as appealing as possible, potentially leading to biased advertising practices. This will be further explored in this investigation.

The following section presents an overview of the literature regarding the features, benefits, and risks of employee monitoring software. Section 3 outlines the content analysis method employed. Section 4 highlights the results pertaining to the features vendors include in their tools and their advertising strategies concerning benefits and risks. Section 5 thoroughly discusses the comparison between the features, benefits, and risks found on commercial websites and limitations of the research. Finally, Section 6 presents the conclusion of the research.

2. Related Work

2.1. Features of Employee Monitoring Software. A broad spectrum of employee monitoring methodologies is presently accessible in the market and extensively examined in academic research. Ball [10] identifies four employee surveillance targets: (1) thoughts, feelings, and physiology; (2) movement and location; (3) tasks; and (4) relationships and reputation. Similarly, Kalischko and Riedl [11] classify three distinct forms of monitoring related to private matters, work behavior, and performance. According to Ball [10], monitoring thoughts, feelings, and physiology involves tracking individual attitudes and biometric data. This can be associated with the monitoring of private matters, as discussed by Kalischko and Riedl [11], which includes private email communications sent via the office PC and the frequency of employee restroom breaks. The latter scenario also relates to Ball's category of tracking employees' movement and location. Sentiment analysis is commonly used to discern thoughts and feelings, such as stress or affective responses towards the organization and colleagues. Conversely, biometrics are often employed for access control, which encompasses the use of fingerprints, retina and iris scans, and facial detection [3, 12, 13]. The tracking of movement and location can be achieved by incorporating GPS technology in personal devices or through camera surveillance [10]. Through monitoring employee locations, employers can, for example, verify attendance or authorize operations [12].

Monitoring tasks involves evaluating the quantity and quality of work accomplished. This aligns with Kalischko and Riedl [11] classification of monitoring related to performance and work behavior. Such monitoring activities can include attendance and time tracking, keystroke logging, random screen captures, and tracking of websites and

applications [3, 12]. Finally, monitoring relationships and reputation focuses on the social connections of employees. An example of this is social media monitoring, used to track employees' online activities. Additionally, Manokha [13] identifies specific employee monitoring software programs, including InterGuard, ActivTrak, and Time Doctor. However, a comprehensive overview of the available tools and their features in the market is missing.

Despite extensive research on different forms of employee monitoring in contemporary literature, the involvement of software developers and vendors has not been thoroughly examined.

2.2. Benefits of Employee Monitoring Software. The advantages of employee monitoring have been extensively explored in literature. Four commonly cited benefits include heightened productivity, a better understanding of operations, improved security, and efficient resource allocation.

Research indicates that employee monitoring can effectively enhance productivity through various means. Bhav [14] reports that employees perform better when aware they are being monitored. Ajunwa et al. [15] argue that tracking employees' activities helps maintain focus and serves as a motivational tool for increased productivity. Similarly, Trivedi and Patel [3] suggest that app and web tracking can alert employees when they visit nonproductive websites, reducing non-work-related activities and improving concentration on tasks. Additionally, Ciochetti [12] emphasizes that attendance is crucial for maximizing workplace productivity. Monitoring attendance and time can provide insights into employees' availability for task completion, thus enhancing productivity. Bakewell et al. [16] demonstrate that data-driven performance monitoring can boost worker autonomy and foster collaboration. However, Drăghici et al. [17] caution that overly intrusive monitoring systems may decrease productivity.

Another advantage is that employee monitoring offers a better understanding of an organization's operations [3]. It allows for the evaluation of an employee's potential or dedication to a task [18]. Collected data can be used to implement changes that enhance productivity or inform decisions about employee well-being and workplace conditions [19, 20].

Employee monitoring also helps safeguard the organization against internal and external security threats. Biometric authentication for access control, for example, is particularly effective in combating security threats in remote work contexts [3, 12]. Monitoring software that includes alarms can protect critical data from cyberattacks by detecting and alerting unauthorized access attempts. However, Thompson and Molnar [21] found that while cybersecurity is often cited as a reason for using monitoring software, its actual use for this purpose is lower than expected.

Improved resource allocation is another commonly mentioned benefit of employee monitoring. Research suggests that monitoring software can effectively allocate tasks to suitable employees [3, 4]. By analyzing data on device usage, employee productivity, and login times, organizations can gain valuable insights into employee performance and

habits [22, 23]. This information can inform resource allocation strategies that enhance productivity and cater to user preferences.

While the academic literature addresses the benefits of employee monitoring, there is a lack of research on how software providers communicate these benefits.

2.3. Risks of Employee Monitoring Software. Numerous risks associated with employee monitoring software have been identified in academic literature. Firstly, employee monitoring can negatively impact the relationship between employees and their employers [4]. Monitoring systems can create the perception that employees are not trusted and require constant surveillance, even if this is not the employer's intention. This perception can lower employees' trust in their employers, as they may fear the data could be used against them [24]. Additionally, Alder et al. [25] found that covert monitoring significantly reduces employees' trust in the organization postimplementation. This lack of trust affects not only the employment relationship but also job satisfaction, turnover intentions, and organizational commitment. Bernström and Svare [26] argue that the relationship between employee monitoring and intrinsic motivation is mediated by employees' felt trust and perceived control over their jobs.

Although employers aim to gain the benefits of employee monitoring, such as higher productivity, this outcome is not guaranteed. Industry proponents often argue that monitoring increases productivity because employees know they are being watched. However, research has shown that employee monitoring can lower productivity [4]. This decrease in productivity can result from monitoring inspiring deviant or counterproductive behaviors, such as working less than expected or wasting company resources [27–29].

Constant surveillance fosters a sense of distrust and has detrimental effects on employees' well-being and mental health. Backhaus [1] highlights that electronic surveillance is largely associated with psychological stress and strain. A field study in Italy during the pandemic revealed that the constraining nature of employee monitoring can lead to stress among remote workers [30]. Similarly, a survey in India found that employees alter their behavior to please employers when monitored, leading to stress and frustration [31]. The emotional labor exerted to receive positive feedback can also generate additional stress for employees uncertain about how they will be assessed [32].

Privacy concerns are common among employees when monitoring systems are in place. A survey of remote workers found that privacy and safety concerns were the most cited reasons for disapproving of employee monitoring [33]. While monitoring collects data to assess productivity and detect security threats, it often comes at the expense of employees' privacy [34]. Monitoring might include instances where personal data is collected, and even productive employees occasionally tend to personal matters during work hours that they prefer to keep private [12]. Certain types of monitoring, such as live screen capture, social media monitoring, and keystroke logging, have a higher risk of privacy intrusion. Some programs even capture sensitive data,

such as passwords and credit card information, through keystroke logging [35].

There are also concerns about the potential misuse of monitoring systems. One of the main reasons is that some systems allow employees not to be informed about being monitored through stealth mode, resulting in a lack of transparency [36]. Naturally, this can lead to serious exposure of personal data, as employees cannot take measures to protect their information. The UK General Data Protection Regulation mandates that workers must be informed about any monitoring [37], though exceptions exist for suspected criminal activity. Previous studies have shown that transparency influences employee acceptance and perceived fairness, increasing trust and job satisfaction [25, 38, 39].

Extensive discussions in the literature have explored the risks associated with employee monitoring and its impact on employees, as well as the responsibilities of employers. However, the role software provider play in the availability and communication of these risks remains largely unknown.

3. Method

3.1. Content Analysis. As part of this research, a content analysis of websites promoting and selling employee monitoring software was conducted. Content analysis provides a systematic approach for identifying recurring patterns in large volumes of data [40, 41]. As such, this method allows for the identification of patterns in the portrayal and promotion of employee monitoring to understand current industry practices, including the communication of benefits and risks and the features offered to clients. Quantitative insights were derived from the frequency of a factor's appearance among websites, while qualitative insights were obtained by analyzing the quotes on the websites pertaining to the same factors. Given the need to examine risks and ethical concerns, surveys and interviews were deemed unsuitable due to vendors' possible reluctance to discuss such topics. Content analyses have previously been conducted to analyze marketing claims on electronic cigarette retail websites [42], explore the effectiveness of tourism websites [43], identify features of smartphone applications that prevent mobile phone use while driving [44], understand information about risks provided by machinery and car manufacturers in manuals [45, 46], determine features available in apps to reduce phone use [47], and classify features of technology to avoid police detection on the road [48].

3.2. Procedure. To systematically explore the portrayal of employee monitoring software on company websites, a coding sheet was iteratively designed. Three themes—features, benefits, and risks—were defined to align with the research questions. Codes were determined by combining a theoretically driven (deductive) approach with an emergent (inductive) coding approach, with the pre-established research question serving as the starting point [41]. Content analysis offers flexibility, allowing researchers to utilize both deductive and inductive methodologies. Firstly, the relevant risks of employee monitoring were identified to define several codes a priori (see Section 2.3). This deductive approach

ensures that the analysis is grounded in existing theory and research. Throughout the content analysis, these codes were refined to enhance comprehension of how vendors handle risks. In contrast, the analysis of features and benefits used an inductive approach. This means no codes were predetermined for features or benefits, allowing for the discovery of new patterns and themes directly from the data. This approach offers further insights into risk mitigation through features and allows for a comparison of how vendors address risks relative to benefits. Based on the defined codes, a preliminary coding sheet was developed. Subsequently, eligible websites were identified and filtered based on exclusion criteria. The eligible web pages were then coded using the preliminary coding sheet. In the iterative process of analyzing websites and developing the final coding sheet, websites were reanalyzed upon the addition of new codes. This iterative development of the coding sheet involved multiple rounds of website analysis and was refined through discussions between the coauthors. Given the number of websites analyzed, these deliberations sufficed to validate the coding scheme (see Appendix B). Finally, the results, including frequencies and quotes, were gathered and analyzed. When categories were defined, the average frequency was also calculated. An overview of the conducted steps is presented in Figure 1.

Once the website coding was completed, we analyzed the reliability of the results following Mayring [49] procedure. To ensure intercoder agreement, the second coder was provided with the coding sheet and a clear understanding of the definitions and coding criteria. The second coder validated the first coder's analyses, and any discrepancies were resolved through discussion until agreement was reached. This method enhances the reliability and validity of the content analysis by minimizing potential bias and increasing consistency. Discussion was deemed sufficient for ensuring intercoder reliability, as it allowed for clarifying ambiguities and reaching a mutual understanding of the coding criteria. Overall, this approach strengthens the study's findings. For studies involving a larger number of websites and multiple coders, additional reliability testing would be necessary. Finally, the codes were grouped into meaningful categories.

3.3. Search Strategy. The websites to be analyzed were identified by conducting a Google search query using the keyword "employee monitoring software," as vendors themselves use this term as well as larger review platforms ([50]; DeskTime, 2023, [51], Insightful, 2023). To evaluate eligibility, all websites with the first result page were assessed, including company websites and websites listing multiple employee monitoring software programs, as users frequently limit their search to the first page [52]. The first five listings on websites that feature multiple software programs were evaluated by visiting the respective companies' websites. A study investigating click-through rates revealed that the first five results account for the majority of clicks [53]. Additionally, the inclusion of all listings would lead to an unmanageable number of eligible websites as review sites, such as *Capterra* and *G2*, feature over 200 listings [50, 51]. For a website to be deemed eligible, it had to satisfy two criteria.

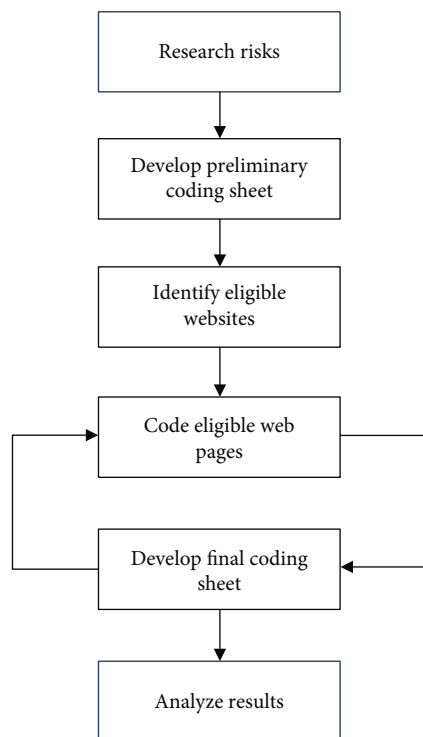


FIGURE 1: Steps conducted during the content analysis.

The first requirement was for the website to be in English. Secondly, one of the primary solutions being offered was automated employee monitoring. The latter criterion led to the exclusion of tools like <http://Monday.com> and *ClickUp*, which focused on project management. A total of 22 websites were identified, 15 of which met the eligibility criteria. Appendix A contains an overview of the websites deemed eligible and their URLs. The searches and analyses were performed during May–June 2023. The eligible websites were saved as HTML files in May 2023 to preserve the data in case of website changes. From the eligible websites, the following subpages were analyzed:

- Home page
- Subpages from the navigation menu discussing features, solutions, and functional use cases (such as insider threat detection or compliance management)
- Complementary subpages discussing features from the coding sheet

3.4. Coding Sheet

3.4.1. Features. A total of 24 features were recorded as present or absent and divided into five categories: *productivity monitoring*, *activity and usage tracking*, *communication monitoring*, *device monitoring*, and *privacy and security*. Furthermore, the explicit inclusion or exclusion of features was recorded under the category *responsibility* to examine whether vendors are taking into account the risks of employee monitoring during their software development

process. Features were excluded if they did not belong to any of the following categories:

- Direct monitoring: for example, email monitoring or time tracking
- The way of monitoring: for example, stealth mode or no monitoring breaks
- The handling of data: for example, employee access or anonymized data

Due to these established criteria, features such as payroll management and invoicing were omitted despite their inclusion in various monitoring programs, as time tracking facilitates the automation of payroll and invoicing procedures. Features like reports, logs, and dashboards were also excluded because they focus on the presentation of data as opposed to data collection or access. Tables A2 and A3 present an overview of the categories, features, definitions, and examples for the codes under category *responsibility*. These examples illustrate how vendors explicitly present the inclusion or exclusion of features to mitigate monitoring risks.

3.4.2. Benefits. The benefits of employee monitoring mentioned on the websites were recorded as present or absent. The benefits have been divided into two groups, namely, benefits for the organization and for the employees. The former was further subdivided into five categories: *workforce optimization*, *workforce administration*, *workplace culture*, *workforce planning*, and *risk management*. Tables A4, A5, and A6 present the benefits, categories, definitions, and example claims from the analyzed websites.

3.4.3. Risks. The risks documented on the vendors' website were recorded as either present or absent. Measures of prominence were also included, namely, whether risks were mentioned on the home page and if they were mentioned in a dedicated section, such as a guide or FAQ. Besides the risk of *micromanagement*, the risks were predetermined based on Section 2.3, namely, *privacy intrusion*, *negative impact on employment relationships*, *lower productivity*, *negative impact on mental health and well-being*, and *lack of transparency*. The overview of the claims, definitions, and examples from the coded websites is presented in Table A7.

4. Results

4.1. Employee Monitoring Software on the Market. The findings indicate that productivity-related functionalities are frequently incorporated into monitoring software, with all software surveyed providing both time tracking and productivity tracking capabilities. Firstly, the introduction of time tracking enables the monitoring of employee attendance by tracking their start and stop times, as well as active and idle time. This allows employers to discover “who arrives late and leaves early” (Interguard, 2023) and “how much time they actually spent working during their clocked time” (Insightful, 2023). Time tracking can be initiated automatically, although certain software programs offer the option for employees to manually start time tracking for transparency.

Monitask (2023), for instance, declares that “Monitask is a completely transparent employee productivity tool,” so it is not possible to “run it without user permission or auto-start screenshot monitoring”. Secondly, productivity tracking provides employers with insights into employees’ productivity. They can categorize programs and websites as productive or unproductive, and the monitoring software “will automatically calculate the productivity levels of your employees and team” (Insightful, 2023). This also allows employers to “determine the most productive and unproductive employees,” which can aid in evaluation or resource allocation (Kickidler, 2023). In addition to time and productivity tracking, web and app tracking has also been implemented by all vendors. This feature tracks which websites and apps employees visit and for how long. Not only can employers determine which websites and apps are most distracting for their employees, but they can also use these insights to “identify adoption gaps” and “budget for the right tools where you really need to” (ActivTrak, 2023).

Following the aforementioned features, random screen capture has the highest frequency with 93.3%. Screenshots can be employed as “proof of work to clients or for internal matters” (Time Doctor, 2023). As screenshots can capture employees’ personal data, 46.7% of vendors have also introduced the option to blur screenshots “for privacy and security reasons” (Clockify, 2023). Stealth mode and keystroke logging are also relatively prevalent, with frequencies of 86.7% and 60.0%, respectively. Despite being frequently implemented, websites vary in their way of reporting on the availability of stealth mode and keystroke logging. For instance, Hubstaff (2023) explicitly states that they do not offer stealth mode, a feature that enables covert monitoring, because they “take user privacy seriously”. InterGuard (2023), on the other hand, highlights the ability to “conduct covert investigations and bullet-proof evidence gathering without alarming the suspected wrongdoer.” Camera access is the least common feature, only offered by iMonitorSoft (2023) who explains it can be used to “view their [employees’] work scene.”

In contrast, *communication monitoring* features are not frequently implemented, with an average frequency of 25.3%. The inclusion of email monitoring is most common in this category, with a frequency of 40.0%. Email monitoring can track incoming and outgoing mails, senders and receivers, message contents, and attachments. Vendors mention that this helps “protect against data exfiltration attempts” (Teramind, 2023) and spot “signs of phishing attempts or fraudulent activities” (Controlio, 2023). Sentiment analysis, used to assist employers in identifying “negative sentiments and signs of ‘quiet quitting’” (Veriato, 2023) through deviation from regular expression patterns, is even less common with a frequency of 13.3%.

All *privacy and security* features have a frequency of less than 50.0%, except for employee and role-based access. Employee access and role-based access are offered by 73.3% of vendors. Role-based access often involves assigning users to three roles: administrator, manager, and employee. Vendors commonly note that granting employees access can “support professional growth and provide refreshing

transparency” (Insightful, 2023). In total, 73.3% of monitoring programs have incorporated features that consider risks outlined in Section 3.4.3, such as features from the *privacy and security* category. Additionally, 26.7% of programs have explicitly stated the intentional omission of features to mitigate certain risks. These vendors have all made it clear that they do not offer keystroke logging “to build trust and transparency” (Insightful, 2023) or because their platform “does not use intrusive monitoring technologies like keystroke logging” (ActivTrak, 2023). Apart from keystroke logging, features such as video surveillance and email monitoring are also excluded. An overview of the number of employee monitoring software programs that offer these features is presented in Figure 2, while Table 1 provides examples of how the inclusion or exclusion of features is communicated on vendors’ websites. Table A8 in Appendix C presents an overview of the absence or presence of features for every monitoring program.

4.2. The Benefits of Employee Monitoring on Commercial Websites

4.2.1. Organizational Benefits. *Workforce optimization* benefits are most frequently cited on average. Every website mentions that their software can enhance employee productivity. The increase in productivity is often attributed to the amount of data collected which can be utilized to make adjustments towards productivity or to the observer effect, wherein employees are more productive because they are aware of monitoring. Insightful (2023), for example, notes that “just because the employees know about the computer monitoring software, they’ll be more focused, and you can rest assured that their attention is where it needs to be.” Improved management of remote employees is also commonly mentioned, with a frequency of 93.3%. Improved management of the remote workforce is often attributed to increased visibility, which is said to boost productivity. For instance, Veriato (2023) states that employers can “gain complete visibility into [their] remote or hybrid workforce activities to boost productivity and keep sensitive data secure.” Eighty percent of vendors also mention that employee monitoring enhances the “ability to make informed decisions” as “the software collects all the data required for in-depth evaluation and growth point identification” (Kickidler, 2023).

Furthermore, it is often argued by vendors that the accuracy of automated time tracking encourages positive results, namely, other benefits within the category of *workforce administration*. Firstly, accurate time tracking can reduce administrative burden, as it “removes all time and attendance admin to pinpoint accurate clock-ins and clock-outs” (Insightful, 2023). Secondly, it can aid budgeting through improved strategizing, which is “much easier when you have accurate data” (Monitask, 2023). Lastly, automated tracking allows for simplified and enhanced payroll and invoicing processes, because employers can now “accurately track time down to the second to bill clients and pay employees correctly” (Time Doctor, 2023).

Risk management is a prevalent category, with an average frequency of 60.0%. Security benefits are most

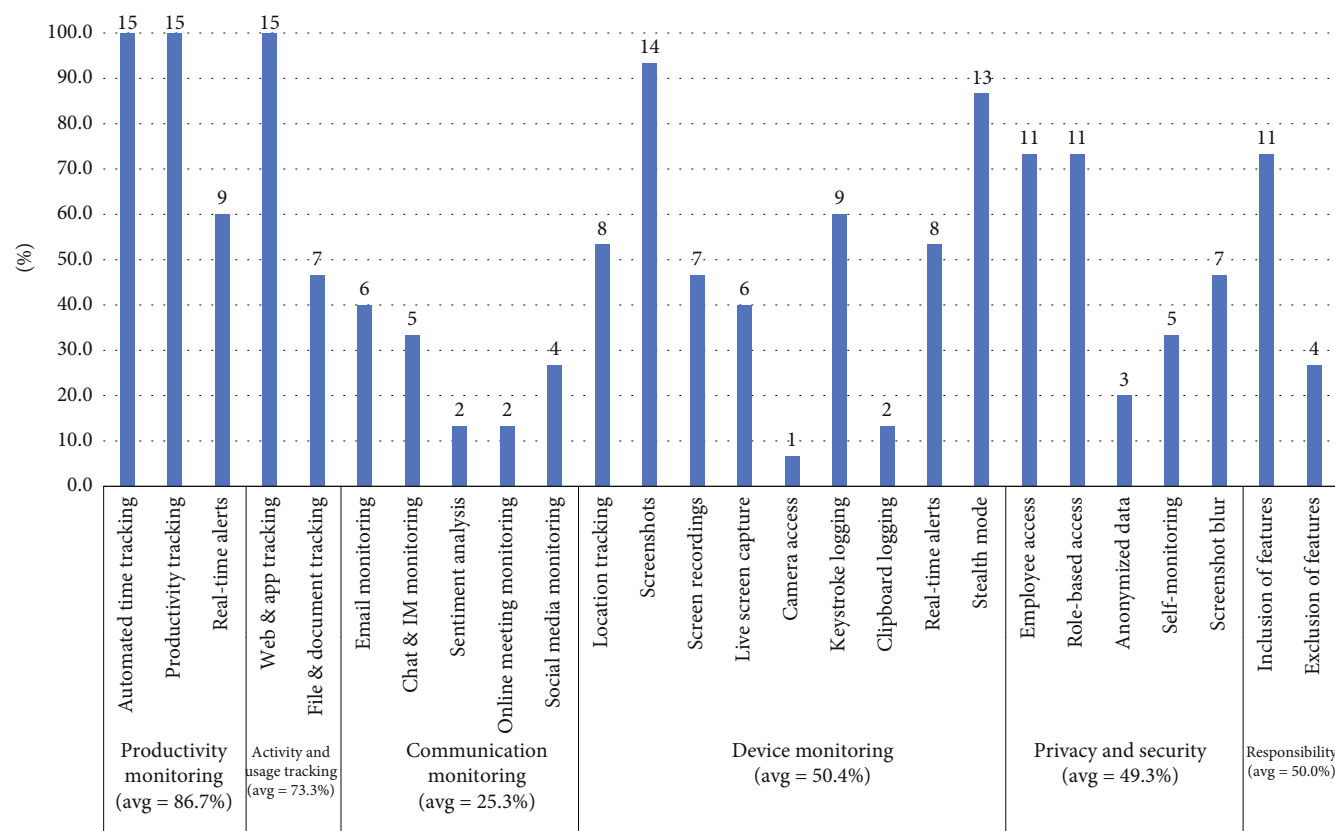


FIGURE 2: Frequency of features on websites ($N = 15$).

TABLE 1: Examples of codes under the category “responsibility” from analyzed websites.

Category	Code	Example
Responsibility	Inclusion of features	“Nobody likes being inspected over their shoulder – or in this case, through the screen of their computer. That’s why it’s essential to incorporate a sort of privacy nook within the time-tracking software you use. Private time is an excellent option for shorter or medium-length breaks like checking social media, paying bills, reading personal emails, news, etc.” (DeskTime, 2023)
	Exclusion of features	“No record of keystrokes or sensitive data” (Monitask, 2023)

commonly observed with a frequency of 80.0%. According to vendors, employee monitoring can protect data from malicious intent, be it insider or outsider threats. Employers can promptly “identify rogue employees in [their] company and catch them in the act” (Kickidler, 2023). Compliance can also be simplified through monitoring, as stated by 53.3% of vendors. For instance, Time Doctor (2023) highlights that screenshots and screencasts are an effective way to “provide [an] audit trail of what employees are doing, for compliance and security.” Lastly, 46.7% of vendors assert that monitoring facilitates collecting evidence for investigations by “reviewing and monitoring computer and internet usage” (SentryPC, 2023).

More than half of the websites cover both benefits in the category of *workforce planning*. The results reveal that 60.0% of the websites affirm their product can aid resource allocation “by better understanding how long it takes to complete projects and tasks, the tools being used, and staff assigned”

through the data gathered (Insightful, 2023). The benefit of balancing workloads was addressed by a slightly lower percentage of vendors (53.3%). Vendors who brought up this benefit typically emphasized that monitoring software helps “discover unbalanced work time patterns” as work durations and patterns are tracked (Monitask, 2023).

Finally, *workplace culture* benefits were mentioned by 45.6% of vendors on average. Better employee support was the most frequently noted (66.7%) benefit. Vendors claim that employers can leverage the collected insights “to have informed conversations with employees” (Veriato, 2023) and “identify areas where employees need additional training or support, allowing [employers] to provide the necessary resources to help employees reach their full potential” (ActivTrak, 2023). Furthermore, on more than half (60.0%) of the websites, there are statements indicating that monitoring increases team-wide accountability and transparency “by providing businesses with a record of employee activity”

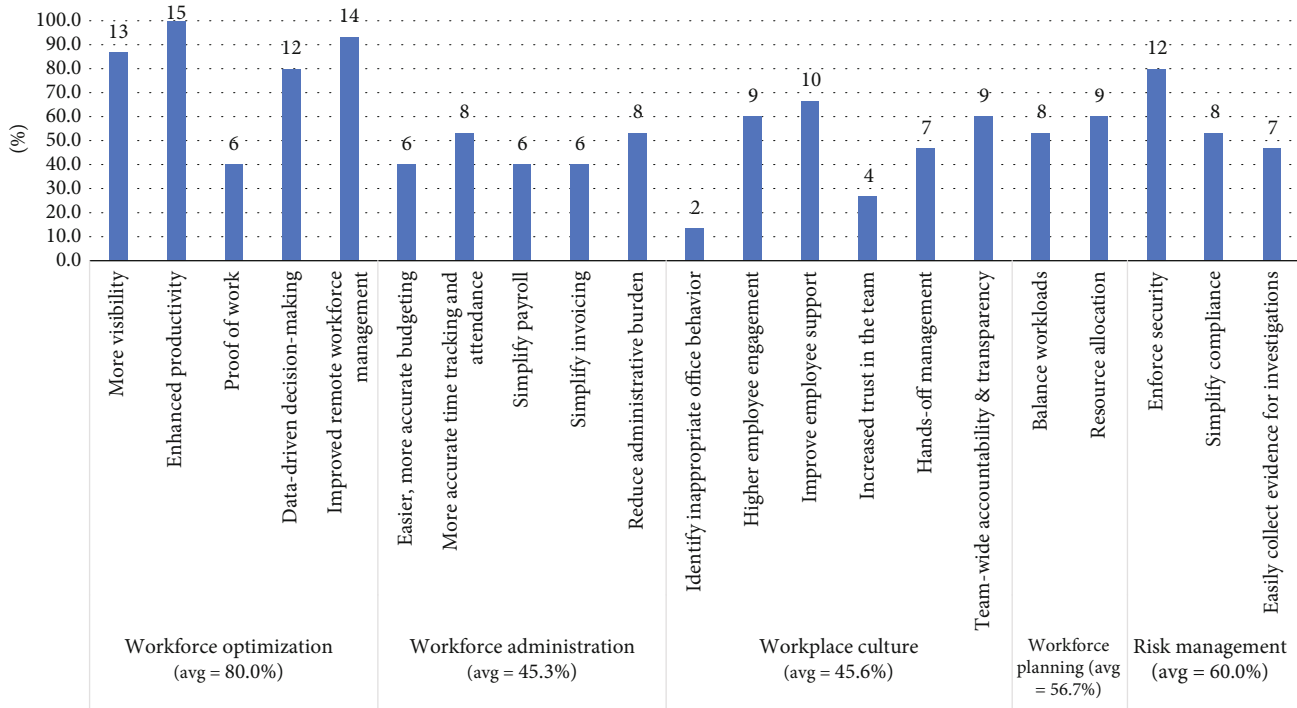


FIGURE 3: Frequency of benefits for the organization mentioned on website (N = 15).

(ActivTrak, 2023). In turn, operating transparently can help “build trust between management and employees” (Time Doctor, 2023), as reported by 26.7% of vendors. Figure 3 summarizes the benefits for the organization and frequencies, while Table 2 presents examples of claims on web pages for each benefit. Table A9 in Appendix C provides an overview of all websites and benefits they mention.

4.2.2. Employee Benefits. As reported by 73.3% of websites, the use of monitoring systems enables employers to more frequently acknowledge and incentivize employees, thanks to enhanced insight into their activities and access to performance and productivity data. Employers have the opportunity to identify areas where employees excel, as noted by ActivTrak (2023), and reward them accordingly. Moreover, rewards can extend beyond performance metrics and encompass attendance as well. Monitask (2023) underscores that through an online attendance system, employees’ diligent efforts are duly recognized and rewarded.

The ability to positively impact employee mental health and well-being was reported by 60.0% of the websites. Companies often argue that burnout and stress can be prevented because employers can now identify when employees are working excessively and experiencing poor work–life balance. Employers can also “spot team members who are struggling or might need some extra help,” which is “a great way to catch and prevent burnout” (DeskTime, 2023). Moreover, ActivTrak (2023) claims that monitoring can be used preventively: “To prevent employee burnout, managers may need to advocate for additional resources, changes in deadlines, or shifts in workloads. Quantitative productivity data can be a great asset to justify these changes.”

Around half of the websites (53.3%) suggest that monitoring software enables employers to give employees “freedom to work remotely on their own terms more often as managers can now track their work from anywhere” (Insightful, 2023). Both a flexible work environment and greater autonomy from managers can be attributed to the fact that tracking is made easier and managers “can now ‘light-touch’ manage using real-time monitoring dashboard” (Insightful, 2023).

Lastly, 20.0% of the websites refer to fair decision-making as a benefit for employees. Firstly, it is mentioned in the context of collecting objective evidence for employee investigations. Veriato (2023) states that their product can “help keep the process organized and impartial” which is important because “an internal employee investigation can be a very sensitive matter, dealing not only with data breaches and theft but also discrimination, harassment and so on.” On the contrary, Time Champ (2023) discusses fair decision-making in appraisal, asserting that “with features of tracking time effectively, it will give your employees a confidence of unbiased appraisal.” Figure 4 summarizes the frequencies of the benefits, whereas Table 3 illustrates instances of claims on web pages for each employee benefit. A summary of all websites and the benefits they mention is provided in Table A10.

4.3. The Risks of Employee Monitoring on Commercial Websites. A number of risks were identified on the vendors’ web pages. The lack of transparency related to employee monitoring has been addressed the most with a frequency of 60.0%. The emphasis is often placed on the importance of guaranteeing this value, rather than simply considering

TABLE 2: Examples of benefits for the organization mentioned on websites ($N = 15$).

Category	Benefit	Example 1	Example 2
Workforce optimization	More visibility	“Gain full visibility and control over your employees’ computer and mobile activities” (SentryPC, 2023)	“iMonitor EAM provides unmatched visibility in the online communication activities of employees and contractors.” (iMonitorSoft, 2023)
	Enhanced productivity	“In-depth data insights give you a clear picture of employees’ productivity, including any setbacks they are experiencing and helps you minimize them. At the same time, just because the employees know about the computer monitoring software, they’ll be more focused, and you can rest assured that their attention is where it needs to be.” (Insightful, 2023)	“When you keep an eye on your teams’ performance, they are more productive. Most teams see a 10% to 80% increase in productivity.” (Monitask, 2023)
	Proof of work	“Time tracking is proof-of-work and DeskTime’s time tracker gives you just that – you can plan your schedule independently, while your manager can simply follow your progress no matter where you are and when you choose to work.” (DeskTime, 2023)	“Screenshots are a valuable resource for providing proof of work to clients or for internal matters, and also provide insights into activity levels such as keyboard and mouse movement.” (Time Doctor, 2023)
	Data-driven decision-making	“Ability to make informed decisions - The software collects all the data required for in-depth evaluation and growth points identification” (Kickidler, 2023)	“Gain a comprehensive real-time view of all staff activity, providing actionable insights and performance metrics to increase productivity.” (Time Doctor, 2023)
	Improved remote workforce management	“Gain complete visibility into your remote or hybrid workforce activity to boost productivity and keep sensitive data secure.” (Veriato, 2023)	“Overall, employee monitoring software is highly effective in giving visibility to managers for remote teams. By providing managers with detailed insights into their employees’ work habits and productivity, it can help ensure that remote employees stay on task and productive, while also identifying areas where additional support or guidance may be needed.” (ActivTrak, 2023)
Workforce administration	Easier, more accurate budgeting	“Strategizing is much easier when you have accurate data. Determine reasonable deadlines, pool data for budgetary planning, and decide which team members will be the best fit for future projects.” (Monitask, 2023)	“Identify applications with overlapping functionality, or those with low usage so you can eliminate unnecessary license costs.” (ActivTrak, 2023)
	More accurate time tracking and attendance	“Eliminate the effort and error of manual timesheets by replacing them with automated time and attendance that’s accurate down to the second.” (Insightful, 2023)	“Implementing Kickidler in your company will help you ease the burden on your top management and make time tracking as transparent, accurate and unbiased as possible.” (Kickidler, 2023)
	Simplify payroll	“Avoid payroll mistakes by eliminating manual time tracking.” (Time Doctor, 2023)	“With these automated daily time records, you can check the attendance of any employee at any time you want. It helps with payrolls, performance checks, etc. within the organization.” (Monitask, 2023)
	Simplify invoicing	“Accurately track time down to the second to bill clients and pay employees correctly.” (Time Doctor, 2023)	“Track billable time and expenses, show clients how much you have worked, see how much you have earned and create invoices” (Clockify, 2023)
	Reduce administrative burden	“Insightful removes all time and attendance admin with pinpoint accurate clock-ins and clock-outs via computer activity monitoring” (Insightful, 2023)	“You’ll minimize administrative tasks through automated reports and improved payroll.” (Time Doctor, 2023)

TABLE 2: Continued.

Category	Benefit	Example 1	Example 2
Workplace culture	Identifying inappropriate office behavior	“This alert feature is important to protect your business against web-based threats, insider threats, inappropriate office behavior, and more.” (Interguard, 2023)	“A case of office stalking, or putting an end to intrusive behavior in the workplace” (Kickidler, 2023)
	Higher employee engagement	“Adjust work schedules and breaks to user activity patterns and improve employee engagement and efficiency while crafting a more comfortable working environment for each worker.” (Controlio, 2023)	“With this type of real data, organizations are able to develop meaningful employee engagement strategies, training programs, and initiatives to raise levels of engagement and elevate productivity and performance across the business.” (ActivTrak, 2023)
	Provide better employee support	“Employee monitoring software can also help you identify areas where employees need additional training or support, allowing you to provide the necessary resources to help employees reach their full potential.” (ActivTrak, 2023)	“Give managers more insights to have informed conversations with employees” (Veriato, 2023)
	More trust in the team	“Operate transparently Build trust between management and employees and share productivity data between different teams.” (Time Doctor, 2023)	“A desktop time tracker with screenshots enables you to provide proof of work to accurately bill for your time, improving trust between you and your clients and employees.” (Insightful, 2023)
	Hands-off management	“Screenshots can show work in progress, so instead of pausing to hop on a call or share sketches, you can keep working. Managers can check the Hubstaff dashboard instead of interrupting their team’s workflow.” (Hubstaff, 2023)	“Employee desktop monitoring helps managers keep a finger on the pulse of their team’s progress without heavy micromanagement” (Insightful, 2023)
Workforce planning	Team-wide accountability and transparency	“Employee monitoring software improves employee accountability by providing businesses with a record of employee activity. You can use this record to hold employees accountable for their actions and to identify and address issues affecting employee performance.” (ActivTrak, 2023)	“When employees work remote, InterGuard’s employee monitoring software may be one of the most important tools for maintaining productivity and holding employees accountable for their time management” (Interguard, 2023)
	Balance workloads	“Discover Unbalanced Work Time Patterns Gain clear visibility into work durations and patterns for both in-office and remote employees.” (Monitask, 2023)	“Analyze employee work capacity based on historical data to understand which team members are at or over capacity and which are under capacity in order to help distribute workload in the future.” (ActivTrak, 2023)
	Resource allocation	“By better understanding how long it takes to complete projects and tasks, the tools being used, and staff assigned, you can budget and allocate resources more effectively.” (Insightful, 2023)	“Use changes in activity rates to identify bottlenecks and improve time management, which can help you with resource planning and utilization.” (Hubstaff, 2023)
Risk management	Enforce security	“Employee monitoring software helps you identify rogue employees in your company and catch them in the act right away. You can literally follow your employees’ every move, and you even receive notifications regarding their most risky behavior (like if they are trying to access and download a certain database).” (Kickidler, 2023)	“Ensure confidential data and company information is not leaked to outside parties and competitors.” (iMonitorSoft, 2023)
	Simplify compliance	“Optional timed screenshots and screencasts provide [an] audit trail of what employees are doing, for compliance and security.” (Time Doctor, 2023)	“Programs used can also be monitored to detect compliance violations as well as risky applications” (Interguard, 2023)
	Easily collect evidence for investigations	“Thanks to the continuous screen recording, you can now investigate any case.” (Controlio, 2023)	“Conduct employee investigations by reviewing and monitoring computer and Internet usage.” (SentryPC, 2023)

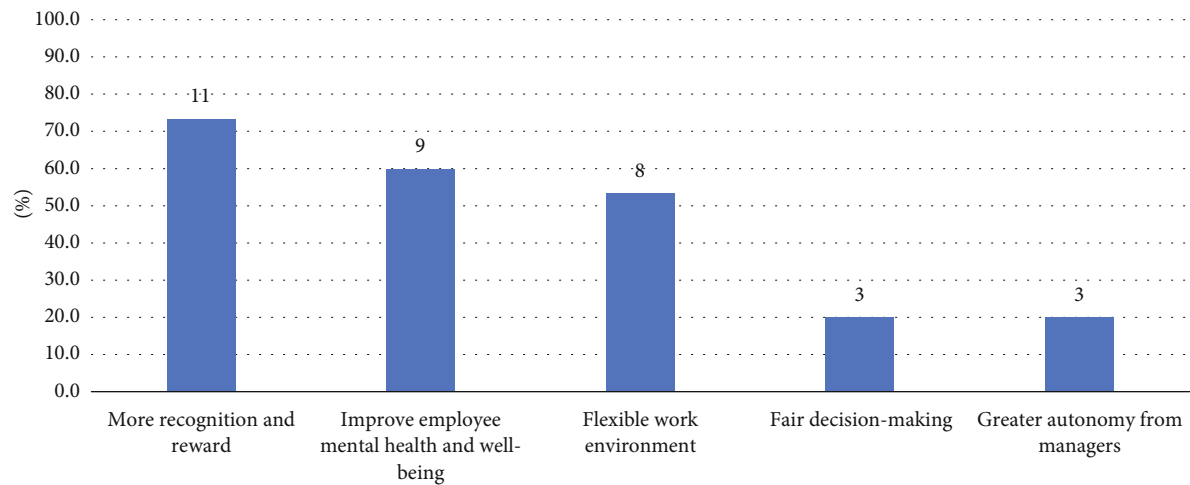


FIGURE 4: Frequency of benefits for employees mentioned on website (N = 15).

TABLE 3: Examples of benefits for employees mentioned on websites.

Benefit	Example 1	Example 2
More recognition and reward	“Additionally, employee productivity monitoring software helps businesses discover areas where employees excel so you can reward them for their hard work.” (ActivTrak, 2023)	“Once employees clock in, the cloud attendance system starts a timer on the hours you have been clocked in. Thus, through an online attendance system, employees’ efforts are properly recognized and rewarded accordingly.” (Monitask, 2023)
Improve employee mental health and well-being	“Using a time tracker can help highlight overachievers and spot team members who are struggling or might need some extra help. This is a great way to catch and prevent burnout, as well as rethink resource distribution.” (DeskTime, 2023)	“To prevent employee burnout, managers may need to advocate for additional resources, changes in deadlines or shifts in workloads. Quantitative productivity data can be a great asset to justify these changes.” (ActivTrak, 2023)
Flexible work environment	“Freedom to work remotely on their own terms more often as managers can now track their work from anywhere” (Insightful, 2023)	“Happy employees are productive employees so Time Doctor facilitates their happiness by enabling a “work from anywhere world” with full transparency and accountability. Whether at home, in-office or on the road, they’ll work the way that works best for both you and them.” (Time Doctor, 2023)
Fair decision-making	“An internal employee investigation can be a very sensitive matter, dealing not only with data breaches and theft but also discrimination, harassment and so on. It is crucial to keep the process impartial and fair to safeguard employee and company reputation. Employee investigation software can help keep the process organized and impartial.” (Veriato, 2023)	“With features of tracking time effectively, it will give your employees a confidence of unbiased appraisals.” (Time Champ, 2023)
Greater autonomy from managers	“Greater autonomy from managers and team leaders who can now ‘light-touch’ manage using a real-time monitoring dashboard” (Insightful, 2023)	“Increasing the autonomy of employee efficiency monitoring Self-monitoring interface is autonomous from the start. The notification system only needs to be set up once, and then you adjust it if necessary by adding new rules or overriding existing ones. After that, the recording of violations and sending notifications about them is completely automatic. As a result, supervisor’s participation in the employee monitoring process becomes minimal.” (Kickidler, 2023)

it a risk. Insightful (2023) recommends employers to “give [their] employees access to their productivity data to support professional growth and provide refreshing transparency.” In addition to data transparency, vendors assert that it is crucial for employers to “tell [their] subordinates about the monitoring and explain to them exactly how and for what purposes [they’re] doing it” (Kickidler, 2023).

Privacy intrusion follows with 53.3% of the vendors acknowledging this risk. Teramind (2023), for instance, states that “in today’s privacy-first data environment, privacy and transparency should also be taken into consideration for an ethical execution.” Vendors also provide ways to ease employees’ privacy concerns. To illustrate, DeskTime (2023) offers a feature that “disables the website and time tracker for when [employees] have to take care of non-work-related tasks during office hours” and notes that “employees can feel safe knowing their privacy is protected.”

The negative impact monitoring can have on the employment relationship, and workplace culture is recognized by nearly half (46.7%) of the vendors. The discourse primarily centers around the issue of distrust and growing resentment in the employment relationship. Kickidler (2023) notes that “monitoring remote employees’ user activities can cause your workers to feel like you don’t trust them to do their jobs.” Similar to the aforementioned risks, vendors provide employers with recommendations to mitigate this risk. For instance, Control.io (2023) suggests allowing “employees to view their productivity data and turn the monitoring off during permitted breaks.”

Both the adverse effects of monitoring on employees’ mental health and well-being and the risk of micromanagement were discussed on 26.7% of the websites. Insightful (2023) states that “there is the potential to cause stress and burnout,” and DeskTime (2023) adds that one of the causes is “the possibility that employee computer monitoring might reveal some sensitive information.” Micromanagement was introduced as a risk which managers could be exposed to because employee monitoring software facilitates real time and continuous information about employee activities. Kickidler (2023) cautions employers against micromanagement to show employees “that monitoring is intended to make their lives better, not worse.”

In total, 13.3% of websites included the risk of a decrease in productivity. ActivTrak (2023) states that productivity may decrease because of employees’ “feelings of resentment and distrust towards their employer.” Similarly, Kickidler (2023) notes that monitoring without consent “can create serious problems in the workplace culture, resulting in lowered morale and productivity.”

Risks were mentioned on 26.7% of the home pages, and 53.3% of the vendors included dedicated sections to discuss the risks. Figure 5 and Table 4 include the frequencies and quotes from the websites. Table A11 provides an overview of the websites and discussed risks.

5. Discussion

5.1. Features of Monitoring Software. Vendors are offering features that can facilitate the improved management of

remote workforces through advanced monitoring capabilities, but these features could also be misused. For example, our investigation revealed that keystroke logging is a prevalent feature, with 60% of the monitored software incorporating this capability. Some software providers, such as SentryPC and Kickidler, go further by recording usernames and passwords, raising substantial privacy concerns. While keystroke logging can serve the legitimate purpose of detecting insider threats, it also raises ethical questions regarding employee privacy and access to sensitive information [54]. For instance, Kickidler (2023) states that it captures “keystrokes of what employees type in every program on their workstations,” encompassing email applications, social networks, and instant messengers. This includes not only usernames and passwords but also unfiltered and spontaneous thoughts, such as emotionally charged emails, even if they are ultimately deleted. This capability poses a significant ethical dilemma, as it may grant employers access to their employees’ private thoughts and communications [55]. Achieving a delicate balance between safeguarding employee rights, protecting an organization’s legal interests, and responsibly using monitoring software is paramount in addressing these ethical concerns [12]. Furthermore, while some argue that keystroke logging can enhance productivity analysis, Ciocchetti [12] raises concerns about its adequacy as a sole method for measuring employee performance. Productive employees may not necessarily be fast typists, and unique workflows may elude accurate evaluation through keystroke monitoring.

Another prominent finding of our study is that approximately 86.7% of the examined software offerings include a stealth mode feature. Notably, some software programs designate stealth mode as the default configuration, a practice that prompts discussions about transparency in monitoring practices (iMonitorSoft, 2023). Indeed, iMonitorSoft (2023) goes so far as to emphasize that their software operates “totally stealthily,” making it challenging for employees to detect its presence on their computers. The contrasting perspectives on the use of stealth modes among vendors further accentuate the nuanced ethical considerations in this context. While some, like Kickidler (2023), recommend open monitoring, citing potential morale-boosting effects, others, such as Insightful (2023), contend that stealth mode can alleviate the stress resulting from monitoring. The mere knowledge of monitoring, even if not overtly intrusive, can induce stress in some employees (Insightful, 2023).

The study found that 73.7% of the monitoring tools integrated at least one feature aimed at addressing the risks associated with employee monitoring. Most of these integrated features focused on employee or role-based access, emphasizing transparency and empowering employees (Insightful, 2023). These practices align with discussions in the literature emphasizing the importance of transparency [56]. Providing employees with the right to access collected personal information is considered a fundamental management tool that fosters transparency. Moreover, employee access allows them to independently verify employers’ interpretations of their data, granting a sense of control and enhancing employee acceptance [6].

Our study explored less common attributes such as sentiment analysis and webcam access. Sentiment analysis, available in only 13.3% of the monitored software, introduces

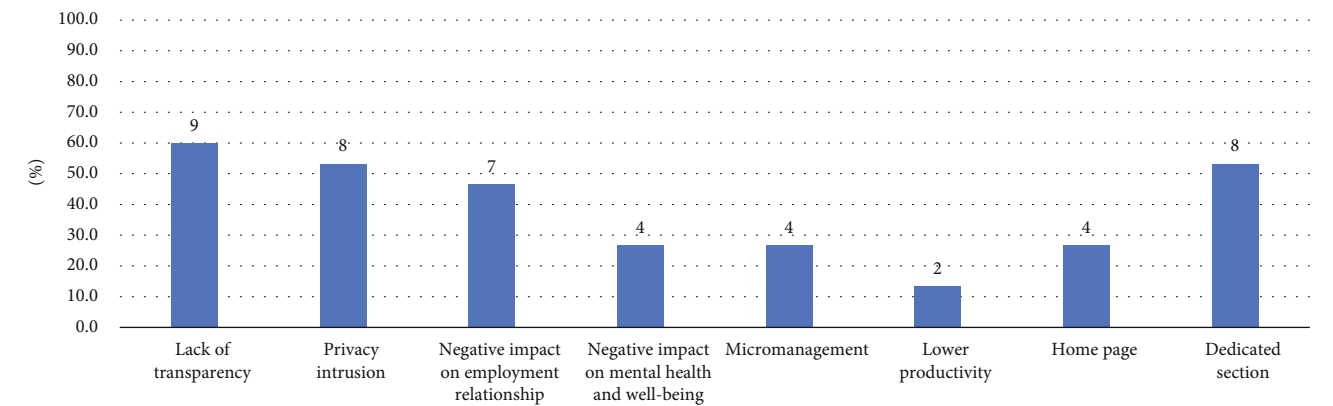


FIGURE 5: Frequency of risks mentioned on website (N = 15).

TABLE 4: Examples of risks mentioned on websites.

Risk	Example 1	Example 2
Lack of transparency	“Give your employees access to their productivity data to support professional growth and provide refreshing transparency. Deep productivity insights help identify the need for extra resources, support or training needs.” (Insightful, 2023)	“Tell your subordinates about the monitoring and explain to them exactly how and for what purposes you are doing it.” (Kickidler, 2023)
Privacy intrusion	“In today’s privacy-first data environment, privacy and transparency should also be taken into consideration for an ethical execution.” (Teramind, 2023)	“DeskTime’s Private time feature disables the website and time tracker for when you have to take care of non-work-related tasks during office hours. Employees can feel safe knowing their privacy is protected.” (DeskTime, 2023)
Negative impact on employment relationship	“Monitoring remote employees’ user activity can cause your workers to feel like you do not trust them to do their jobs” (Kickidler, 2023)	“In addition, employees may feel like their employer is not trusting and this can damage the employer-employee relationship.” (Monitask, 2023)
Negative impact on mental health and well-being	“It’s not a secret that if you monitor computer activity there is the potential to cause stress and burnout among your employees.” (Insightful, 2023)	“The possibility that employee computer monitoring might reveal some sensitive information can cause stress and even resentment in your team.” (DeskTime, 2023)
Micromanagement	“Be careful not to micromanage. If you go around alerting people each time they open up the news instead of work emails, you’ll likely create an unhappy and stressed workforce.” (Insightful, 2023)	“Avoid micromanagement, improve working conditions of your employees – this way, you’ll show them that monitoring is intended to make their lives better, not worse.” (Kickidler, 2023)
Lower productivity	“Employees may feel that their privacy is being invaded, which can lead to feelings of resentment and distrust towards their employer. This can ultimately lead to decreased productivity and increased turnover rates.” (ActivTrak, 2023)	“What’s more, monitoring them without consent can create serious problems in the workplace culture, resulting in lowered morale and productivity.” (Kickidler, 2023)

privacy concerns due to the scrutiny of employees’ personal thoughts and the inherent uncertainties surrounding its accuracy [57, 58]. Accurate sentiment analysis extends beyond the comprehension of the words used; it necessitates an understanding of tone and context, further complicating its ethical implications [58]. Webcam access, an even rarer feature, allows employers to observe employees’ work environments, ensuring their presence and productivity. However, this feature raises profound privacy concerns, especially in the context of remote work, as it can inadvertently disclose more than intended, potentially revealing aspects of employees’ personal lives, such as the presence of family members in the background [10, 33]. Indeed, Ball [10] argues that such tech-

nology introduces psychosocial risks, including decreased job satisfaction, increased counterproductive work behaviors, and heightened stress.

Conversely, approximately 26.7% of monitoring software providers have explicitly excluded certain features, such as stealth mode, keystroke logging, and webcam access, to mitigate specific risks (ActivTrak, 2023). For instance, ActivTrak (2023) clearly states on their website that they avoid “invasive employee monitoring technologies like keystroke logging and continuous screenshots.” This explicit exclusion of features indicates that a significant portion of companies have contemplated the ethical and risk-related aspects of employee monitoring. However, it remains unclear whether the remaining

companies have similarly deliberated these issues. Notably, websites frequently recommend that employers take proactive measures for ethical use, such as maintaining transparency and promoting open communication. For instance, one vendor advises clients to “be transparent and honest about implementing a time tracker and take the time to show its benefits” (DeskTime, 2023). Nevertheless, the responsibility for ensuring ethical use also lies with the monitoring software developers. Mulvenna et al. [7] highlight the importance of an ethics-by-design approach, which entails considering ethical aspects during the design of technology-based products, including software. They argue that design thinking must encompass ethics and that designers should strive to surpass the ethical guidelines established by regulatory bodies. Leidner and Plachouras [59] generalized a set of seven principles from the Privacy by Design Framework proposed by Cavoukian [60] to be applicable to ethics by design. One of these principles suggests that developers adopt a proactive approach to avoid reacting to nonethical situations after they occur. Therefore, considering ethics during the development of monitoring software and deliberately incorporating specific features can significantly promote ethical use in the context of employee monitoring.

5.2. Benefits. One of the prevailing assertions on vendor websites is the enhancement of employees’ mental health and well-being through the adoption of monitoring software. They argue that such software can help prevent burnout by identifying employees working excessive overtime and promoting healthier work habits (Controlio, 2023; ActivTrak, 2023). However, it is important to acknowledge that the enforcement of employee monitoring may yield adverse effects on mental health and well-being. Studies suggest that the stress induced by monitoring, persisting for extended hours over the years, can have long-term implications for employees’ health and well-being [29]. The potentially constraining nature of employee monitoring, despite being underrepresented in the discourse, needs due consideration. Some companies even posit that the feeling of being monitored is positive, as it fosters focus and attention (Insightful, 2023). Companies should avoid this statement without providing the necessary evidence.

Another discrepancy lies in the assertions surrounding increased productivity. While all vendors list heightened productivity as a primary benefit, only a small fraction (13.3%) acknowledge that monitoring can also lead to reduced productivity. Negative impacts on the employment relationship and the emergence of counterproductive behaviors are among the factors contributing to diminished productivity [4, 27]. Additionally, studies have shown that the mental and physical symptoms of stress induced by monitoring can have detrimental effects on overall productivity and performance [61]. These effects can translate into substantial costs for employers, counteracting the financial benefits often championed by employee monitoring vendors [62]. For instance, SentryPC (2023) asserts that their software will increase employee productivity, saving costs while increasing work output. More transparency of the unintended consequences of the technology is needed.

It is noteworthy that 80.0% of the websites highlight data-driven decision-making as a prominent advantage of

employee monitoring software. They emphasize the software’s capacity to collect comprehensive data for in-depth evaluation and identification of growth points (Kickidler, 2023). However, a critical observation emerges as none of the vendors stress the importance of the types of decisions that should be made based on this data. Research, such as the survey conducted by Yiu et al. [4], suggests that there is limited support for using employee monitoring data for performance evaluations linked to pay-related decisions. Employees often express concerns about the fairness of decision-making processes and outcomes [63]. Despite more than half of the vendors (53.3%) mentioning the accuracy of time and attendance tracking and 20.0% asserting that employee monitoring promotes fair decision-making by instilling employee confidence in unbiased appraisals (Time Champ, 2023), they fail to address potential caveats. Assessing performance can be a complex matter due to varying workflows, even among productive workers [12]. The websites, however, appear to assume the inherent accuracy of the monitoring software and the ensuing decisions derived from it. Many of the benefits championed by these companies in the realm of employee monitoring software are subject to debate and often lack empirical substantiation.

5.3. Risks. Violations of privacy, lack of transparency, and negative impacts on the employment relationship are the most frequently discussed risks among vendors, each mentioned with an approximate frequency of 50%. While it is commendable that vendors acknowledge these risks, their approach often centers on suggesting management practices for adopting monitoring solutions rather than designing ethical technology that mitigates such risks. Essentially, they are proposing administrative solutions to address an engineering problem that they are facilitating. For example, Insightful (2023) acknowledges that employees often worry about their private lives being exposed to management but suggests that these concerns can be alleviated with proper explanations about monitoring practices and data usage. While this guidance can be valuable for employers, it is important to recognize that monitoring software companies themselves also have a significant share of responsibility as they are the ones who design the technology [7]. Unfortunately, this perspective is not consistently reflected on the vendors’ websites.

In contrast, certain risks identified in the literature, such as lower productivity and negative impacts on mental health and well-being, are less prominently featured on vendor websites, appearing on only 26.7% or fewer of them. The scarcity of mentions regarding lower productivity as a risk could stem from this being a key motivation among employers to implement monitoring [2]. Vendors may be cautious not to undermine this selling point. Similarly, some vendors include the employee’s perspective, possibly to portray themselves as employee-friendly, asserting that monitoring can improve employees’ mental health and well-being by allowing employers to spot signs of burnout and work-life balance issues more rapidly. Countering this claim might diminish the perceived benefits of employee monitoring. Consequently, the representation of employee benefits lags behind the emphasis on benefits for the organization,

with only five employee benefits compared to the 21 organizational benefits mentioned on websites (see Tables A4 and A5 in Appendix B).

Despite more than 50.0% of monitoring software vendors acknowledging concerns about privacy intrusion and lack of transparency, these risks are rarely mentioned (26.7%) on their home pages. Even when risks are discussed, they are often relegated to the bottom of the page, receiving less attention from employers. The number of identified risks is also notably lower than the benefits, with only six risks compared to 26 benefits. This imbalance in representation raises concerns about the ethical framing of employee monitoring. While some benefits are mentioned on all websites, the risks peak at 60%, revealing a disproportionate focus on benefits relative to risks. This skewed approach impedes the ethical implementation and use of employee monitoring, potentially leading employers to dismiss certain risks. The framing of software features, benefits, and risks can vary based on the vendor's stance on privacy and the perceived invasiveness of monitoring. For instance, ActivTrak (2023) emphasizes its ethical viewpoint, claiming to have designed its software with "principles of transparency, collaboration, and informed insight," leading them to reject certain "invasive monitoring technologies like keystroke logging and continuous screenshots."

5.4. Limitations and Future Research. This study is not without its limitations, which should be acknowledged to provide context for future research endeavors. Firstly, the study's focus primarily rested on the examination of vendors' website pages, which excluded blogs and help centers from the analysis. These omitted resources might contain valuable insights and information regarding risk and benefit factors associated with employee monitoring. In future research, expanding the scope to include these additional sources could offer a more comprehensive perspective. Secondly, certain monitoring programs assessed in this study predominantly served as time-tracking tools, with limited inclusion of features from other categories like communication and device monitoring. Future research could benefit from the introduction of inclusion criteria that require the inclusion of software with a broader focus on multiple categories of employee monitoring, ensuring a more diverse and representative sample.

Future research should explore the correlation between the portrayal of employee monitoring on vendor websites and its practical ethical implementation in organizations. Additionally, this research could examine the extent to which such practices mislead consumers and create a biased perception of products. It is also important to consider the implications for informed consumer choice and the ethical considerations of prioritizing corporate gain over consumer welfare. Understanding these dynamics could inform guidelines or regulations to ensure more balanced and transparent marketing practices in the tech industry. By addressing these areas, future research can contribute to the development of more ethical and responsible approaches to employee monitoring.

6. Conclusion

The aim of this study was to explore how vendors of employee monitoring software address the risks associated with their products. This was achieved through a content analysis of 15 vendor websites. The findings indicate that while vendors acknowledge risks such as privacy violations, lack of transparency, and negative impacts on employment relationships, they often suggest administrative solutions rather than designing technology to mitigate these risks. Features like keystroke logging and stealth mode are prevalent, raising significant ethical concerns. Conversely, some vendors explicitly exclude invasive features, indicating a consideration of ethical aspects, though this is not consistent across all companies.

The research underscores the importance of an ethics-by-design approach in developing monitoring software. Vendors should integrate ethical considerations into the design phase to prevent shifting the responsibility for ethical use onto employers. Additionally, improving the communication of risks associated with employee monitoring is crucial for promoting ethical practices. This involves ensuring that vendors provide balanced views that equally emphasize potential risks and benefits. Policymakers and advocates can use these insights to develop measures such as establishing a knowledge center to provide objective, evidence-based information. Policymakers may also consider regulating the content presented on vendor websites, in addition to regulating employers. This approach aligns with mandates such as warning labels on social media and health warning messages on tobacco products, which have proven effective in influencing behavior and promoting ethical practices [64, 65].

Appendix A

TABLE A1: This table provides an overview of analyzed websites selling employee monitoring software, accessed in May 2023.

Employee monitoring software name	Web page (URL)
Veriato	https://veriato.com/
Insightful	https://www.insightful.io/
Teramind	https://www.teramind.co/
ActivTrak	https://www.activtrak.com/
Controlio	https://controlio.net/
Hubstaff	https://hubstaff.com/
DeskTime	https://deskttime.com/
SentryPC	https://www.sentrypc.com/
iMonitorSoft	https://www.imonitorsoft.com/
Interguard	https://www.interguardsoftware.com/
Clockify	https://clockify.me/
Kickidler	https://www.kickidler.com/
Monitask	https://www.monitask.com/en/
Time Doctor	https://www.timedoctor.com/
Time Champ	https://www.timechamp.io/

Appendix B

TABLE A2: Category definitions and related features.

Category	Definition	Features
Productivity monitoring	Features related to tracking and monitoring an employee's time spent on various tasks and their overall productivity levels. It helps employers understand how employees allocate their time and identify areas for improvement.	• Automated time tracking • Productivity tracking • Real-time alerts
Activity and usage tracking	Features that monitor an employee's activities and usage of different applications, websites, and social media platforms. It provides insights into how employees utilize their work hours and helps identify any potential distractions or unproductive behaviors.	• Web and app tracking • File and document tracking
Communication monitoring	Features that monitor various communication channels, including email, chat, instant messaging (IM), and online meetings. It enables employers to track employee communications for compliance purposes, evaluate collaboration, and identify any inappropriate or unauthorized activities.	• Email monitoring • Chat and IM monitoring • Sentiment analysis • Online meeting monitoring • Social media monitoring
Device monitoring	Features related to tracking an employee's device location and device usage. It can provide information about employees' whereabouts during work hours and enable monitoring of devices for productivity or security purposes.	• Location tracking • Screenshots • Screen recordings • Live screen capture • Camera access • Keystroke logging • Clipboard logging • Real-time alerts • Stealth mode
Privacy and security	Features aimed at ensuring privacy and security within the employee monitoring software. It can give employees a sense of control over the monitoring or the data collected.	• Employee access • Role-based access • Anonymized data • Self-monitoring • Screenshot blur
Responsibility	Whether the vendor takes into account employee monitoring risks during development.	• Inclusion of features • Exclusion of features

TABLE A3: Coding scheme for the features of employee monitoring benefits.

Feature	Definition	Example
Automated time tracking	Tracks the time employees spend on tasks. Includes idle and active time.	n.a.
Productivity tracking	Tracks the time employees spend productively. Employers can configure which programs/websites are labeled as productive.	
Real-time alerts (productivity)	Alerts employers or employees themselves if employees have been idle for a long time.	
Web and app tracking	Tracks what websites/URLs and applications are used.	
File and document tracking	Tracks employees' interactions with files and documents, such as downloads, uploads, and print jobs on local, removable, and cloud storage.	
Email monitoring	Tracks incoming and outgoing emails, contents, and attachments.	
Chat and IM monitoring	Tracks incoming and outgoing messages and contents.	
Sentiment analysis	Identifies the sentiment of text written by employees by examining the employees' regular expression. This can help identify insider threats.	
Online meeting monitoring	Logs the duration of meetings, the app used, participants, and the direction of the call. Some software enables recording the meetings as well.	
Social media monitoring	Tracks activity on social media platforms, such as new posts and comments.	
Location tracking	Tracks employees' location/IP address.	
Screenshots	Screenshots are taken on employees' computers. The employer can configure the interval between screenshots.	
Screen recordings	Screen recordings are made of employees' screens that can be reviewed.	
Live screen capture	Employers can watch employees' screens live.	
Camera access	Employers have access to the employees' webcam and see their surroundings.	
Keystroke logging	Record and count all keystrokes made by the user.	
Clipboard logging	Track content copied by employees on their device.	
Real-time alerts (security)	Alerts employers when employees show suspicious or inappropriate behavior. Employers can configure the triggers, for example, based on keywords.	
Stealth mode	Monitoring is completely invisible to the employee. Stealth mode might be optional.	
Employee access	Grants employees access to their collected data.	
Role-based access	Configure permissions, so not every user has access to all data.	
Anonymized data	The option to anonymize data so employees cannot be identified.	
Self-monitoring	The option for employees to toggle their monitoring on and off, for example, during their breaks.	
Screenshot blur	The option to take blurred screenshots to avoid capturing employees' personal data.	
Inclusion of features	The explicit inclusion of a feature or it being enabled by default to mitigate risks of employee monitoring.	“Gain even more trust from your team members by letting them turn the monitoring on/off to separate their personal and work-related activities.” (Controlio, 2023)

TABLE A3: Continued.

Feature	Definition	Example
Exclusion of features	The explicit exclusion of a feature or it being disabled by default to mitigate risks of employee monitoring.	“Measure productivity and protect employee privacy No keystroke logging No email monitoring No camera access No personal device monitoring No video recording” (ActivTrak, 2023)

TABLE A4: Categories, definitions, and employee monitoring benefits for organizations included in the categories.

Category	Definition	Benefits
Workforce optimization	A strategic management approach that aims to maximize the efficiency, productivity, and performance of the entire workforce.	• More visibility • Enhanced productivity • Proof of work • Data-driven decision-making • Improved remote workforce management
Workforce administration	Management of administrative tasks related to the workforce, including activities such as budgeting, time tracking, and attendance management.	• Easier, more accurate budgeting • More accurate time tracking and attendance • Simplify payroll • Simplify invoicing • Reduce administrative burden
Workplace culture	It encompasses the overall atmosphere, dynamics, and relationships among employees, as well as the organization’s values, ethics, and work practices.	• Identify inappropriate office behavior • Higher employee engagement • Improve employee support • Increased trust in the team • Hands-off management • Team-wide accountability and transparency
Workforce planning	The strategic process of identifying and aligning the right resources, including personnel, skills, and capacities, to meet organizational goals effectively.	• Balance workloads • Resource allocation
Risk management	The systematic process of identifying, assessing, and mitigating potential risks and uncertainties that could impact an organization’s objectives or operations.	• Enforce security • Simplify compliance • Easily collect evidence for investigations

TABLE A5: Coding scheme for employee monitoring benefits for organizations.

Benefit	Definition	Example
More visibility	Conveys an increase in visibility of productivity and activity of the entire workforce and the importance of visibility (e.g., references to keeping track of employees to keep them productive).	"It's impossible to watch your employees every minute of the day. But Insightful employee monitoring software can do it for you, creating a more productive workplace." (Insightful, 2023)
Enhanced productivity	Conveys an increase in productivity (e.g., references to easily spotting unproductive workers, more productivity because employees are aware of observers).	"Instantly improve productivity It's simple psychology. When your team tracks time with Hubstaff, everyone is more aware of how they are spending each minute of their day. This improves focus and keeps your team on task." (Hubstaff, 2023)
Proof of work	Conveys that monitoring provides proof of work so employers know what is happening (e.g., references to understanding progress and reviewing an employee's activity).	"Time tracking is proof-of-work and DeskTime's time tracker gives you just that – you can plan your schedule independently, while your manager can simply follow your progress no matter where you are and when you choose to work." (DeskTime, 2023)
Data-driven decision-making	Conveys that decisions can now be made based on actual data provided and that proactive management to boost performance is easier now (e.g., references to actionable data insights, a data-centric approach or data-driven objectivity).	"Better data. With improved data regarding your employees' computer etiquette, you can make decisions to improve your business processes and set reasonable goals." (Monitask, 2023)
Improved remote workforce management	Conveys the ability to more effectively manage the remote workforce because there is more visibility now (e.g., references to visibility or making sure employees are working).	"Manage Remote Workers Monitor remote workers to ensure they stay on task. Trust, but verify." (Interguard, 2023)
Easier, more accurate budgeting	Conveys the ease and accuracy of budgeting as a result of having accurate data available.	"Improve project budgeting - Tracking workday activity gives historical insights to help improve project forecasts and time costs." (Time Doctor, 2023)
More accurate time tracking and attendance	Conveys the accuracy of automated time tracking in comparison to manual time tracking.	"Fully automatic start and end times, no manual entry, and no human error" (DeskTime, 2023)
Simplify payroll	Conveys the ease of the payroll process as a result of accurate time tracking and easier automation.	"Now it's easier than ever to track time accurately, bill clients quickly, and pay employees." (Time Doctor, 2023)
Simplify invoicing	Conveys the ease of the invoicing clients as a result of accurate time tracking and easier automation.	"Track time of individual projects and tasks. Get an idea of the status of your projects, estimate the time required for similar projects in the future, and bill your clients accurately for the work done." (DeskTime, 2023)
Reduce administrative burden	Conveys the decrease of administrative burden as time is not tracked manually anymore (e.g., references to lack of paper timesheets).	"Every minute spent on admin, is a minute that could be better used elsewhere. Insightful removes all time and attendance admin with pinpoint accurate clock-ins and clock-outs via computer activity monitoring." (Insightful, 2023)
Identify inappropriate office behavior	Conveys that inappropriate office behavior, such as harassment, can be identified quicker as a result of communication monitoring.	"This is ideal for protecting key files that contain sensitive data with labels such as "client list", "pricing", "confidential" etc., and is also useful to protect against workplace harassment in IM chats or emails amongst staff." (Interguard, 2023)
Higher employee engagement	Conveys that employees are more engaged, which results in employees being more motivated, committed, and active.	"Actionable workforce insights to guide engaged, profitable teams" (Hubstaff, 2023)
Improve employee support	Conveys the ability to better identify employees' needs for training and support and to conduct more informed conversations/evaluations.	"Employee monitoring software can also help you identify areas where employees need additional training or support, allowing you to provide the necessary resources to help employees reach their full potential." (ActivTrak, 2023)
Increased trust in the team	Conveys that employee monitoring increases trust within the team as a result of increased visibility and the ability to provide proof of work.	"A desktop time tracker with screenshots enables you to provide proof of work to accurately bill for your time, improving trust between you and your clients and employees." (Insightful, 2023)

TABLE A5: Continued.

Benefit	Definition	Example
Hands-off management	Conveys a lower risk of micromanagement and that management is now possible without interrupting employees' workflow when checking in.	"Get a complete view of work processes across remote teams and individual workers without distracting them with emails, phone calls, or messages." (Controlio, 2023)
Team-wide accountability and transparency	Conveys that there is team-wide accountability as a result of transparency in employees' activity.	"Employee monitoring software improves employee accountability by providing businesses with a record of employee activity." (ActivTrak, 2023)
Balance workloads	Conveys that balancing workloads is simplified due to automated time tracking and collected data.	"To redistribute the workload, you first need to understand how much time each employee actually spends doing certain work-related activities. The easiest way to acquire these statistics, which will also be unbiased and automatically collected, is to use employee monitoring software." (Kickidler, 2023)
Resource allocation	Conveys that strategic resource allocation is simplified as a result of more available data about employees' productivity and their tracked time.	"With accurate time tracking you can allocate resources better and reduce costs by eliminating office space." (Time Doctor, 2023)
Enforce security	Conveys that security can be safeguarded as a result of monitoring, collected data, and the ability to send alerts in case of suspicious behavior (e.g., references to insider threat detection, visibility, and keeping sensitive data secure).	"Ensure confidential data and company information is not leaked to outside parties and competitors." (SentryPC, 2023)
Simplify compliance	Conveys the ease of complying with laws and regulations as a result of monitoring and activity logs.	"Many organizations deal with complex corporate and regulatory compliance requirements and audits, especially in healthcare, legal and financial services industries. Employee monitoring software makes staying compliant and running audits much easier, with real-time alerts to customizable reporting and dashboards." (Veriato, 2023)
Easily collect evidence for investigations	Conveys the ease of collecting evidence in case of internal investigations as a result of monitoring and the data collected.	"Thanks to the continuous screen recording, you can now investigate any case." (Controlio, 2023)

TABLE A6: Coding scheme for employee monitoring benefits for employees.

Benefit	Definition	Example
More recognition and reward	Now that data is collected, it is easier to recognize top-performing employees and reward them.	"More recognition and reward for their performance through user activity monitoring that highlights high achievers" (Insightful, 2023)
Improve employee mental health and well-being	Conveys an increase in employee mental health and well-being, because of time tracking. This way employers can keep track of employees working a lot of overtime (e.g., references to burnout, work-life balance, or overtime).	"Understand the factors that contribute to stress, fatigue, and burnout, and how to modify work habits accordingly." (ActivTrak, 2023)
Flexible work environment	Remote work is now more observable due to monitoring, resulting in employers more often giving employees the freedom to work remotely.	"Time Doctor provides the visibility and accountability that is necessary for leaders to promote flexible work." (Time Doctor, 2023)
Fair decision-making	Conveys the objectivity of decisions during employee investigations and performance evaluations now data is collected.	"With features of tracking time effectively, it will give your employees a confidence of unbiased appraisals." (Time Champ, 2023)
Greater autonomy from managers	Managers do not need to (physically) check in as often as they can check employees' status in the monitoring software.	"Greater autonomy from managers and team leaders who can now 'light-touch' manage using a real-time monitoring dashboard" (Insightful, 2023)

TABLE A7: Coding scheme for employee monitoring risks.

Risk	Definition	Example
Lack of transparency	If monitoring is done without the employees' consent, there is a lack of transparency resulting in mistrust and privacy concerns.	"Productivity monitoring software should not be used in the shadows. With transparency you get with ActivTrak, you can invite team members to the conversation and remind them that the business' success is their success." (ActivTrak, 2023)
Privacy intrusion	The monitoring of employees' activity can cause concerns of employee privacy not being respected where there is risk of personal data being monitored as well.	"On the other hand, employees are rightfully concerned about their right to privacy. One of the great things about Monitask is that it ensures that employee monitoring is done in a way that respects privacy rights." (Monitask, 2023)
Negative impact on employment relationship	Employee monitoring can create the feeling that employers do not trust their employees and feelings of resentment.	"As a rule, covert monitoring eventually becomes obvious, which creates a lot of problems – employees stop trusting top management, they become discontented and sometimes even sue their employer. That's why we suggest using covert monitoring only for short periods of time and only in the following two situations:" (Kickidler, 2023)
Negative impact on mental health and well-being	The feeling of always being observed can heighten stress levels, cause anxiety and fatigue among other conditions.	"The possibility that employee computer monitoring might reveal some sensitive information can cause stress and even resentment in your team." (DeskTime, 2023)
Micromanagement	The real-time availability of employee data can result in employers constantly checking in on employees and micromanaging.	"Be careful not to micromanage. If you go around alerting people each time they open up the news instead of work emails, you'll likely create an unhappy and stressed workforce." (Insightful, 2023)
Lower productivity	If employees experience negative emotions as a result of monitoring, this can lead to lower productivity and performance.	"You must also be aware of the potential negative effects that monitoring can have on employee morale and productivity. Employees may feel that their privacy is being invaded, which can lead to feelings of resentment and distrust towards their employer. This can ultimately lead to decreased productivity and increased turnover rates." (ActivTrak, 2023)
Home page	Whether any risks were mentioned on the home page or not.	n.a.
Dedicated section	Whether there was a dedicated section to address risks, such as a FAQ or a guide, or not.	n.a.

Appendix C

TABLE A8: Websites and the features included.

(a)

Vendor	Productivity monitoring				Activity and usage tracking			Communication monitoring				Device monitoring			
	Automated time tracking	Productivity tracking	Real-time alerts	Web app tracking	File and document tracking	Email monitoring	Chat and IM monitoring	Sentiment analysis	Online meeting monitoring	Social media monitoring	Location tracking	Screen shots	Screen recordings		
Veriato	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No		
Insightful	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes	No		
Teramind	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes		
ActivTrak	Yes	Yes	No	Yes	No	No	No	No	No	No	Yes	Yes	No		
Controlio	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes		
Hubstaff	Yes	Yes	No	Yes	No	No	No	No	No	No	Yes	Yes	No		
DeskTime	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	No	Yes	No		
SentryPC	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No		
iMonitorSoft	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No		
Interguard	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes		
Clockify	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes	Yes		
Kickidler	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	Yes		
Monitask	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	Yes	No		
Time Doctor	Yes	Yes	Yes	Yes	No	No	No	No	Yes	No	No	Yes	Yes		
Time Champ	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	Yes	Yes		

(b)

Vendor	Device monitoring					Privacy and security				Responsibility			
	Live screen capture	Camera access	Keystroke logging	Clipboard logging	Real-time alerts	Stealth mode	Employee access	Role-based access	Anonymized data	Self-monitoring	Screenshot blur	Inclusion of features	Exclusion of features
Veriato	No	No	Yes	No	Yes	Yes	No	No	No	No	No	No	No
Insightful	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Teramind	Yes	No	Yes	No	Yes	Yes	No	Yes	No	Yes	No	Yes	No
ActivTrak	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Controlio	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Hubstaff	No	No	No	No	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes

TABLE A8: Continued.

Vendor	Device monitoring					Privacy and security				Responsibility			
	Live screen capture	Camera access	Keystroke logging	Clipboard logging	Real-time alerts	Stealth mode	Employee access	Role-based access	Anonymized data	Self-monitoring	Screenshot blur	Inclusion of features	Exclusion of features
DeskTime	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No
SentryPC	No	No	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
iMonitorSoft	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No
Interguard	Yes	No	Yes	No	Yes	Yes	No	No	No	No	No	No	No
Clockify	No	No	Yes	No	No	No	Yes	Yes	No	No	Yes	Yes	No
Kickidler	Yes	No	Yes	No	No	Yes	Yes	Yes	No	Yes	No	Yes	No
Monitask	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Time Doctor	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No
Time Champ	Yes	No	Yes	No	No	Yes	Yes	Yes	No	No	Yes	Yes	No

TABLE A9: Websites and the benefits for organizations included.

(a)

Vendor	Workforce optimization					Workforce administration				Workplace culture	
	More visibility	Enhanced productivity	Proof of work	Data-driven decision-making	Improved remote workforce management	Easier, more accurate budgeting	More accurate time tracking and attendance	Simplify payroll	Simplify invoicing	Reduce administrative burden	Identify inappropriate office behavior
Veriato	Yes	Yes	No	Yes	Yes	No	No	No	No	Yes	No
Insightful	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Teramind	Yes	Yes	No	Yes	Yes	No	No	No	No	Yes	No
ActivTrak	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	No
Controlio	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
Hubstaff	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
DeskTime	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	No	No
SentryPC	Yes	Yes	No	No	No	No	No	No	No	No	No
iMonitorSoft	Yes	Yes	No	Yes	Yes	No	No	No	No	No	No
Interguard	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	Yes
Clockify	No	Yes	No	No	Yes	No	Yes	Yes	Yes	No	No
Kickidler	Yes	Yes	No	Yes	Yes	No	Yes	No	No	Yes	Yes
Monitask	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Time Doctor	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Time Champ	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No

(b)

Vendor	Workplace culture				Team-wide accountability and transparency		Workforce planning			Risk management		
	Higher employee engagement	Improve employee support	Increased trust in the team	Hands-off management	accountability and transparency	Balance workloads	Resource allocation	Enforce security	Simplify compliance	Easily collect evidence for investigations		
Veriato	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Insightful	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	
Teramind	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	
ActivTrak	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	No	
Controlio	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Hubstaff	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	
DeskTime	No	No	No	No	No	Yes	Yes	Yes	No	No	No	
SentryPC	No	No	No	No	No	No	No	Yes	No	No	Yes	
iMonitorSoft	Yes	No	No	No	No	No	No	Yes	Yes	Yes	Yes	

TABLE A9: Continued.

Vendor	Higher employee engagement	Workplace culture			Team-wide accountability and transparency	Workforce planning		Risk management		
		Improve employee support	Increased trust in the team	Hands-off management		Balance workloads	Resource allocation	Enforce security	Simplify compliance	Easily collect evidence for investigations
Interguard	No	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes
Clockify	No	Yes	No	No	No	No	No	No	No	No
Kickidler	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes
Monitask	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Time Doctor	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Time Champ	No	No	No	Yes	Yes	No	No	No	No	No

TABLE A10: Websites and the benefits for employees included.

Vendor	More recognition and reward	Improve employee mental health and well-being	Flexible work environment	Fair decision-making	Greater autonomy from managers
Veriato	No	No	No	Yes	No
Insightful	Yes	Yes	Yes	No	Yes
Teramind	No	Yes	No	No	No
ActivTrak	Yes	Yes	Yes	No	No
Controlio	Yes	Yes	Yes	No	No
Hubstaff	Yes	No	Yes	No	No
DeskTime	Yes	Yes	Yes	No	No
SentryPC	No	No	No	No	No
iMonitorSoft	No	No	No	No	No
Interguard	Yes	No	Yes	No	No
Clockify	Yes	Yes	No	No	No
Kickidler	Yes	No	Yes	Yes	Yes
Monitask	Yes	Yes	No	No	No
Time Doctor	Yes	Yes	Yes	Yes	Yes
Time Champ	Yes	Yes	No	No	No

TABLE A11: Websites and the risks included.

Vendor	Lack of transparency	Privacy intrusion	Negative impact on employment relationship	Negative impact on mental health and well-being	Micromanagement	Lower productivity	Home page	Dedicated section
Veriato	No	No	No	No	No	No	No	No
Insightful	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Teramind	Yes	Yes	Yes	No	No	No	No	Yes
ActivTrak	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controlio	Yes	Yes	Yes	No	No	No	No	No
Hubstaff	Yes	No	No	No	No	No	No	Yes
DeskTime	Yes	Yes	Yes	Yes	No	No	Yes	Yes
SentryPC	No	No	No	No	No	No	No	No
iMonitorSoft	No	No	No	No	No	No	No	No
Interguard	No	No	No	No	No	No	No	No
Clockify	No	No	No	No	No	No	No	No
Kickidler	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Monitask	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Time Doctor	Yes	Yes	No	No	No	No	No	Yes
Time Champ	No	No	No	No	No	No	No	No

Data Availability Statement

The authors have nothing to report.

Conflicts of Interest

The authors declare no conflicts of interest.

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