

# Correlation of Workplace surveillance with Psychological Health, Productivity, and Privacy of employees.

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**Abstract—** “Employee monitoring has raised concerns from all areas of society – business organizations, employee interest groups, privacy advocates, civil libertarians, lawyers, professional ethicists, and every combination possible. Each advocate has its own rationale for or against employee monitoring whether it be economic, legal, or ethical.” (Martin & Freeman, 2003). Surveillance plays an important role in managing the scenario of business and employment. No one likes to be under the watchful eye of the company's surveillance, but it is difficult to discuss surveillance without considering all sides of the subject. In the future, there will be more behind-the-desk jobs than field jobs and companies would be surveilling the employees more often (Obudho, 2017). Firms use numerous methods to control employees' activities to ensure increased productivity, performance, and profitability (Gichuhi, Senaji, & Ngari, 2016). Through employee engagement in the workplace there is assurance that employees are committed to their organizational goals, and values, motivated to add to organizational achievement, and at the same time to improve their individual sense of well-being (Gichuhi, Senaji, & Ngari, 2016). To achieve an optimal workplace surveillance system, companies use different techniques from simple camera monitoring to complex systems consisting of email monitoring, phone call monitoring, screen sharing, etc. Organizations use surveillance to increase efficiency, reduce risks, and maximize profits (Alex Rosenblat, 2014).

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## Chapter 1: Introduction

### 1.1) Background and Rationale of study

“Employee monitoring has raised concerns from all areas of society – business organizations, employee interest groups, privacy advocates, civil libertarians, lawyers, professional ethicists, and every combination possible. Each advocate has its own rationale for or against employee monitoring whether it be economic, legal, or ethical.” (Martin & Freeman, 2003). Surveillance plays an important role in managing in the scenario of business and employment. No one likes to be under the watchful eye of the company's surveillance, but it is difficult to discuss about surveillance without considering all sides of the subject. In future there will be more behind the desk jobs than field jobs and companies would be surveilling the employees more often (Obudho, 2017). Firms use numerous methods to control employees’ activities to ensure increased productivity, performance and profitability (Gichuhi, Senaji, & Ngari, 2016). Through employee engagement in workplace there is assurance that employees are committed to their organizational goals, values, motivated to add to organizational achievement and at the same time to improve their individual sense of wellbeing (Gichuhi, Senaji, & Ngari, 2016). To achieve an optimal workplace surveillance system, companies use different techniques from simple camera monitoring to complex systems consisting of email monitoring, phone call monitoring, screen sharing, etc. Organizations use surveillance to increase efficiency, reduce risks, and maximize profits (Alex Rosenblat, 2014).

### 1.2) Research Question Formulation and Derivation

It is worthwhile to state that it comes with a cost. Therefore, it is pertinent to conduct an academic study to investigate that workplace surveillance in business and employment consequently leads to what kind of impacts on health, psychological wellbeing, and productivity. Henceforth the research question derived is:

*“How does workplace surveillance affect psychological health, productivity, and privacy of employees?”*

**Keywords:** Workplace surveillance, psychological health, productivity, privacy of employees

### 1.3) Aims and Objectives of study

This scholarly piece of work attempts to:

- Identify the impact surveillance has on the employee’s psychological health, their well-being, business productivity and privacy of employees.
- Critically analyze maintaining ITGS triangle, Workplace Surveillance Technology in relation to Business, employment, productivity, health, social, ethical implications.

### 1.5) Research Methodology used for investigation

The methodological approach to study this cause-and-effect relationship of workplace surveillance on psychological health & business productivity with its impacts at global level used blend of authentic primary and scholarly peer reviewed secondary data. For primary method of research randomized sample with 41 participants was collected through a survey for employee in relation to surveillance, mental health, and productivity. The employees were set as reference group and set of questionnaires were distributed for obtaining reliable and valid data collection and statistical tools were utilized to obtain relevant analysis and evaluation. Secondary sources were collected from academic databases for maintaining credibility and validity for the relevant analysis drawn.

## Chapter 2: Technological Systems used in the Workplace Surveillance

### 2.1) CCTV

Closed-Circuit Television, also known as Video Surveillance, utilizes cameras in taking a constant sequence of images in workplace (Business Watch Group, 2020). The camera consists of a photon sensitive sensor that changes Analogue (light) signals to Electrical signals and then further into digital (Teledyne Photometrics, n.d.). The images are combined to make a video which is sent to a screen monitor using a wired or wireless network (Business Watch Group, 2020). Businesses use CCTV

to monitor the movements of their employees through video cameras and assess whether their employees are spending their time effectively in the workplace (Miller, 2013).

### 2.2) Biometrics

Bio-Metric systems make use of fingerprint and face scanning technology. The new employee is required to make a pre-scan of either their fingerprints, or face. The system takes and processes the image and save its specific characteristics of every unique finger and face in the form of a biometric encrypt key (Saudi ERP & Website Solution Blog, 2016). Upon the registration of a new face or fingerprint the system also requires the name of the employee. All this data is saved to a database (Saudi ERP & Website Solution Blog, 2016).

The next time an employee scans their face or fingerprint. The system takes an image and identifies its unique characteristics and converts it to a biometric encrypt key, this key is then matched with the pre-registered key in the database. Upon scanning the system adds a present flag and a timestamp of attendance to the employee on that date (Mitrefinch, 2017). Business utilizes Bio-Metrics to mark attendance of employees.

### 2.3) Network-Based Access Control

Network-Based Access Control is an integral part of the organizational privilege hierarchy. Only two types of access control models will be discussed here, Discretionary Access Control (DAC), and Role-Based Access Control (RBAC). In the first type, DAC, the subjects can decide who has access to their objects (Townsend, 2018).

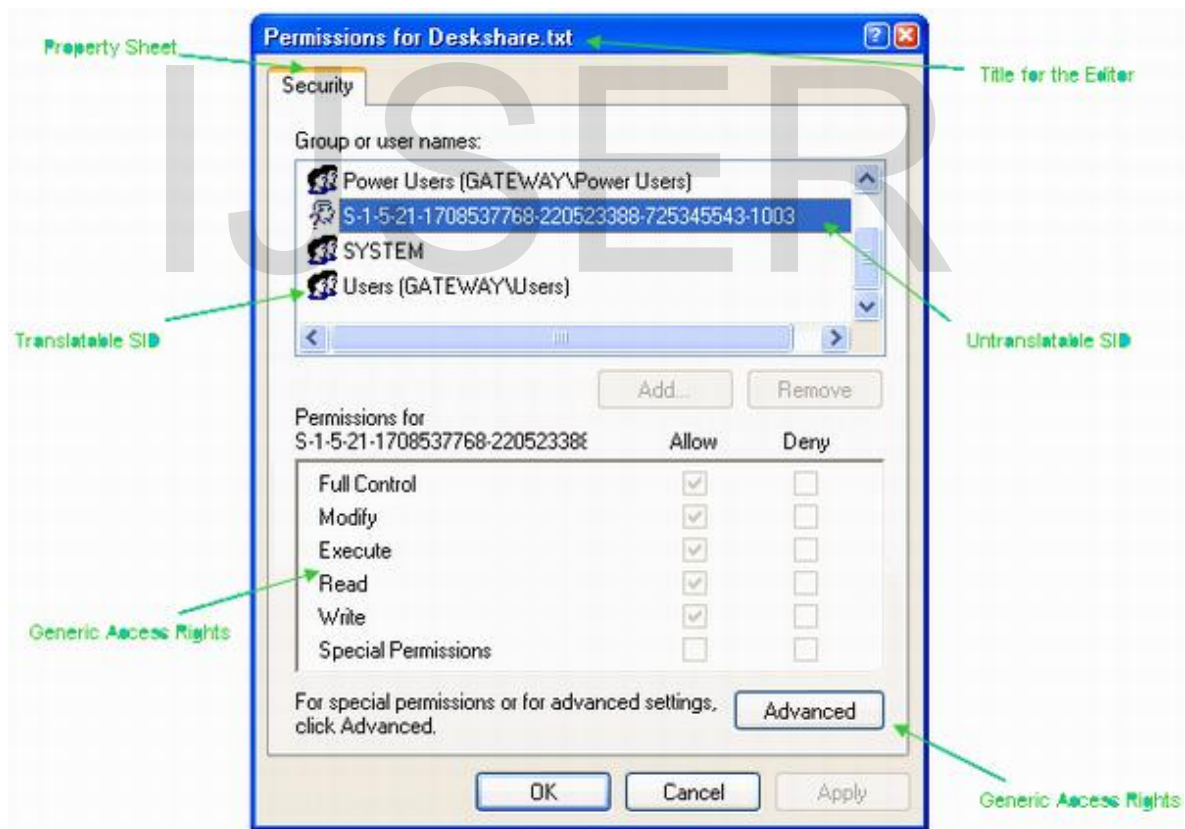


Figure 1: Discretionary Access Control in a Windows operating system. (Townsend, 2018)

As seen above the borrower can decide what privileges to give. Many organizations use this model in their intranet network (Townsend, 2018).

In the second type, RBAC, utilizes the organizational roles to assign rights. For instance, one certain group of people are employees, these individuals in the group are assigned a tag of employee using emails or usernames. This group is then given a

limited number of rights (Townsend, 2018). Businesses use this IT system to limit the access to certain files and have a system less prone to hacking.

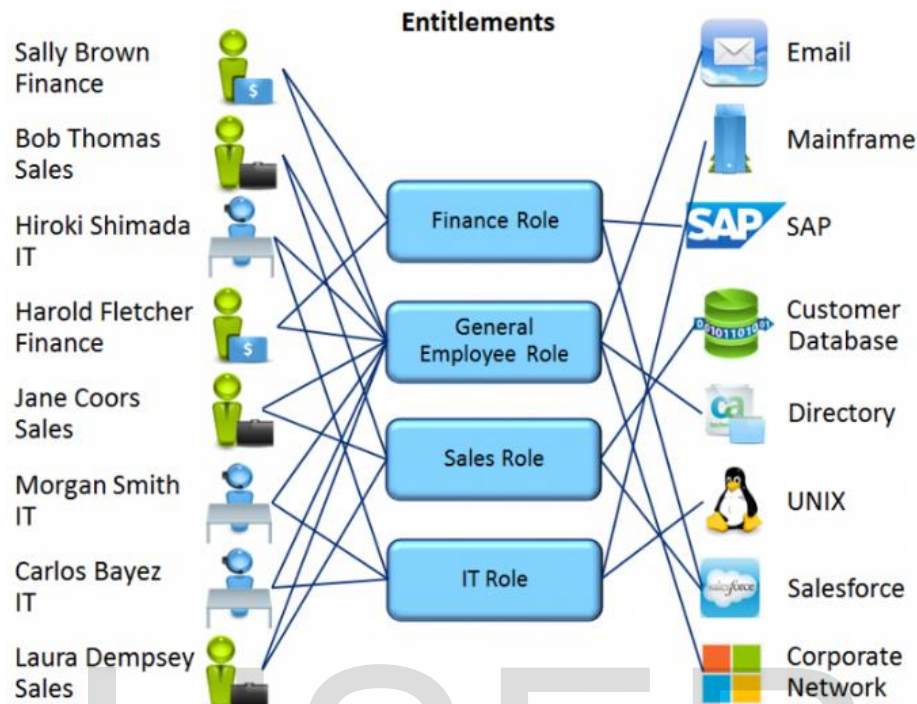


Figure 2: Image showing the Role-Base-Access-Control. (Townsend, 2018)

#### 2.4) Social Media Monitoring Software

Companies check for social media usage this is mainly done by monitoring software, like Teramind, the software analyzes the time spent on different websites and applications then creates graphs and pie charts that employers can access (Teramind, n.d.). This can be seen in Figure 3 and 4 below. Business use this to monitor whether their employees are utilizing their time efficiently.

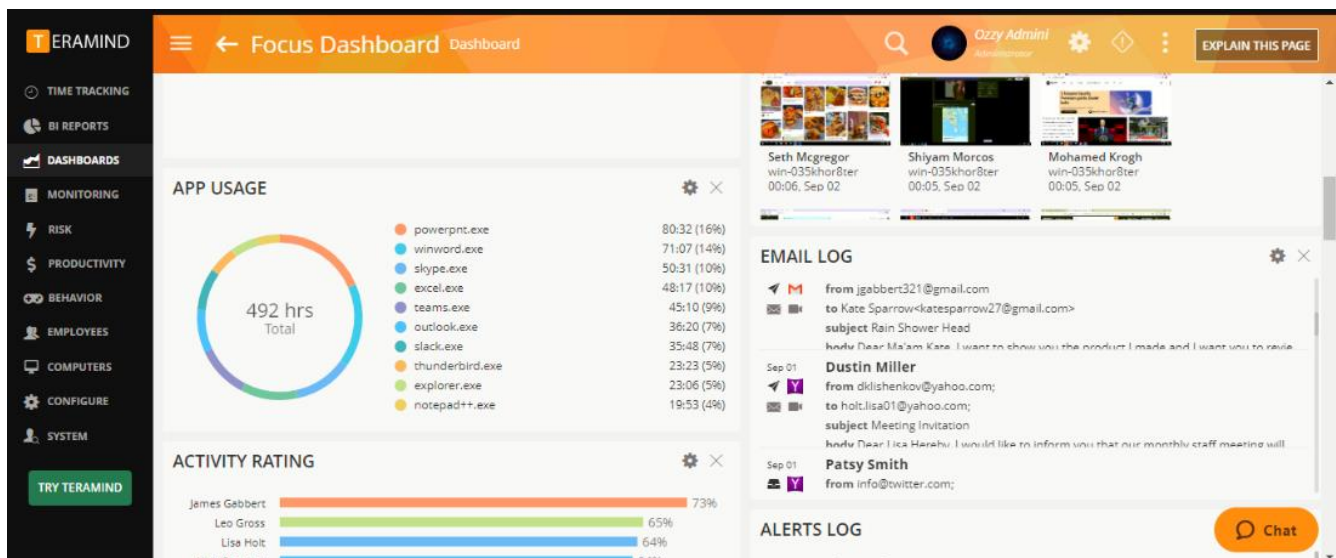


Figure.3: Tera mind app usage pie chart. (Teramind, n.d.)



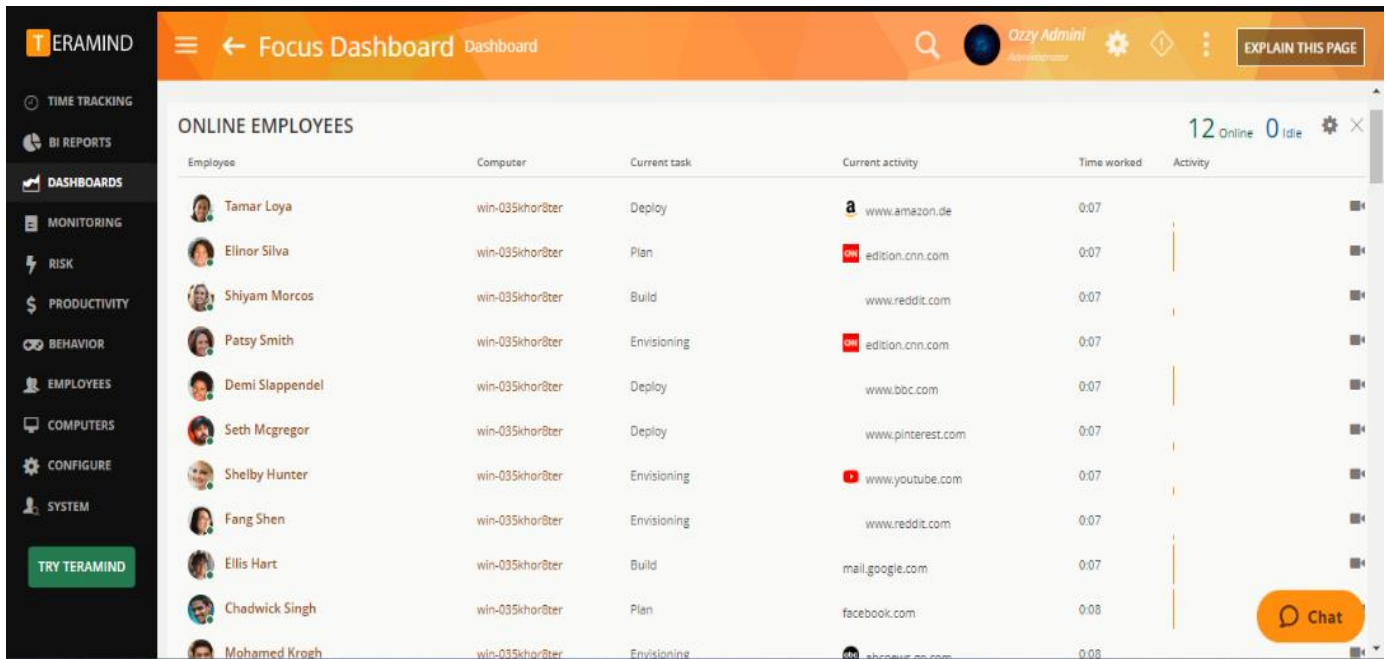


Figure 4: Teramind employee's current application. (Teramind, n.d.)

## 2.5) Screen Capture/Browser Monitoring

Screen capture and browser monitoring makes use of screen sharing. Software takes a snapshot of the employee's screen every 5 minutes (this time delay can be increased and decreased by the employer) (Time Doctor, n.d.). The taken snapshots are saved to an online storage and made available to the employer through a web control panel (Indian People Times, 2020). Employers use this to monitor whether their employees are utilizing their time efficiently.

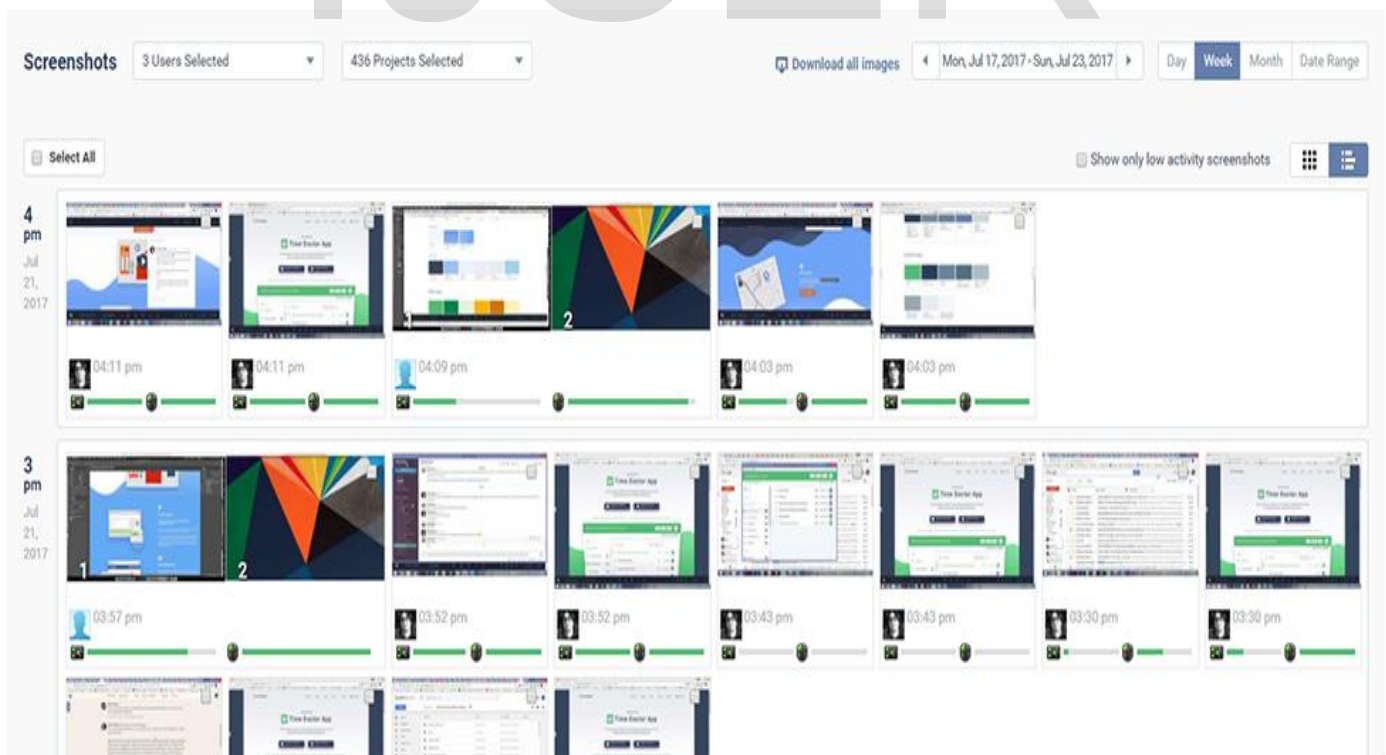


Figure 5: Showing a screen snapshot report (Time Doctor, n.d.)

## 2.6) Occupancy Tracking

Occupancy tracking systems make use of any one or all or in between of the below listed technologies.

- a) *Camera*
- b) *RFID*
- c) *Wi-Fi*
- d) *Thermosense*
- e) *Passive infrared sensor*

Camera occupancy tracking system make use of a detection algorithm and tracking. Four synchronized cameras are deployed at different parts of a pathway for employees. These cameras aim to remove the error of people occluding each other when only one camera is used (Fieuret, 2008). A color and motion tracking model are used to detect each person and track their path throughout the sensing area (Garaza & Pedrasa, 2016).

Radiofrequency identification (RFID) occupancy tracking systems require personnel to carry a RFID tag in order to for the scanner to log each their transition into each zone of the building floor (Garaza & Pedrasa, 2016).

Wi-Fi occupancy tracking estimate is based on the analysis of “probe requests”, which are periodic messages from smartphones that determine the existence of wireless access points in the vicinity. The method counts different MAC addresses and determine how many devices are in proximity (Vega-Barbas, Álvarez-Campana, Rivera, Sanz, & Berrocal, 2021).

Thermosense rely on an array of thermal sensing technology. Multiple nodes are deployed in the sensing zone to detect warm bodies and count the number of occupants in the area. Thermosense technology involves measuring the temperature gradient over an area to infer the number of people against a background (Beltran, Erickson, & Cerpa, 2013).

Passive Infrared (PIR) sensors have been used to implement doorway sensors that can detect people when they enter or exit a room by inferring the direction from multiple triggering of PIR sensors on the doorway (Garcia, Sim, Castillo, Senosin, & Pedrasa, 2016).

The data collected, with the help of Analogue to Electrical conversion, in all the above discussed technologies is sent to a back-end server which analyses data related to the same event with the help of various computational models. It then prepares the data for visualization by creating graphs and reports. The data is then sent and presented to a Web Based Visualization Panel (Vega-Barbas, Álvarez-Campana, Rivera, Sanz, & Berrocal, 2021). The whole process is shown in Figure 7. Businesses use this to check if employees are where they are supposed to be.

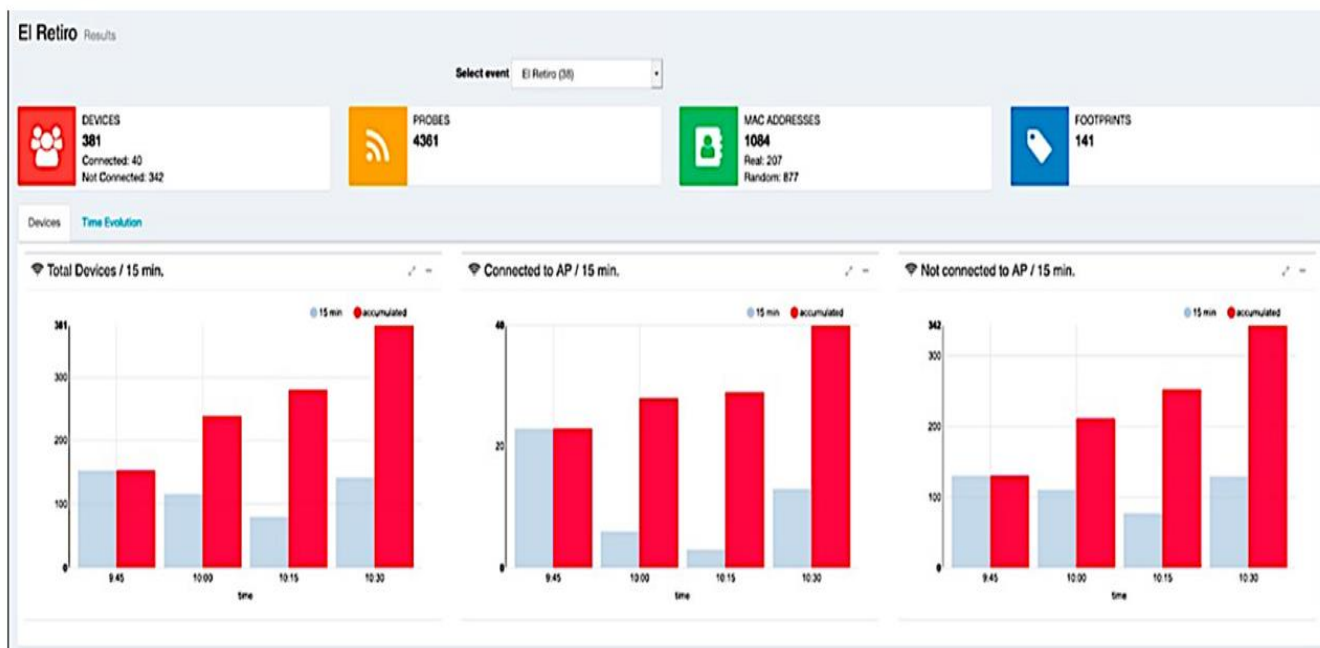


Figure.6: Visualization of occupancy tracking (Vega-Barbas, Álvarez-Campana, Rivera, Sanz, & Berrocal, 2021)

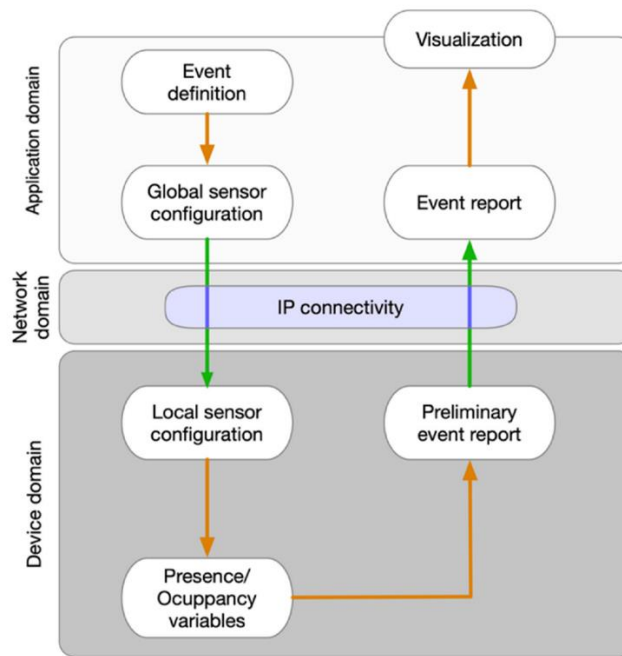


Figure 7: Visual presentation of the process of occupancy tracking  
(Vega-Barbas, Álvarez-Campana, Rivera, Sanz, & Berrocal, 2021)

## 2.7) Wire Tapping:

Wiretapping work by utilizing a Software Voice-activated recorder, meaning when the employee picks up the call/or calls the recorder will start recording, this recorder is installed in between the sender and receiver. Software also records the length of call, the number of recipient and transmitter (Harris, 2001). The employer can access this data live or in future since it is stored on a recorder. Businesses use this system to check if their employees are handling clients and potential clients in a way that is acceptable to Business policy and bylaws.

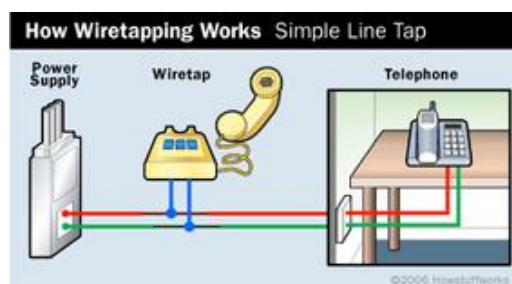


Figure 8: Wire Tapping (Harris, 2001)

## Chapter 3: Literature Review of Workplace Surveillance & their impact on Businesses & Health:

Organizations should be very careful in deciding which tasks are to be measured by the computerized monitors. Deciding to measure an excessive number of performance dimensions may result in employee health problems, stress and perceived unfairness in the performance evaluation process (Hawk, 1994). Many of the aforementioned concerns about the potential effects of CPM on stress, health, and evaluation fairness are directly related to these imperatives (Hawk, 1994). (Vorvoreanu & Botan, 2000) in their research findings, as well as other evidence, suggest that the negative effects of electronic surveillance are an issue of consequence for society. In a real work setting, there is much more at stake, and this could increase the stress and other reported negative effects of electronic surveillance (Vorvoreanu & Botan, 2000). "As noted above, stress and

privacy invasion are not the only likely effects of electronic surveillance. Other consequences, often expressed through employee behavior, are likely. This might include decreased work quality, and productivity” (Vorvoreanu & Botan, 2000). Kirstie Ball in the study conducted stated that the introduction of broader debates around information use, rights, power and social structure highlight how surveillance in the workplace may serve to perpetuate existing inequalities and create new ones (Ball, 2010). Debora Jeske and Alecia M. Santuzzi, concluded, results showed that close performance monitoring (via cameras, data entry, chat and phone recording) had significant negative effects on job attitudes such as job satisfaction and affective commitment. Similar effects were observed for employee self-efficacy and perceived control. Attitudes were furthermore negatively impacted when the monitoring was focused on individuals and unpredictable, which also reduced organizational citizenship behavior while continuous monitoring reduced self-efficacy (Santuzzi & Jeske, 2015). Further in 2015, Chory, Vela, and Avtgis in study, at the year concluded that employees contend that organizational surveillance of CMWC violates their free speech and privacy rights and increases job stress (Chory, Vela, & Avtgis, 2015). (Kiziloglu, 2018) in the face of this situation, employees perceive that this action, which is made without consultation or without informing them, is caused by the lack of confidence in the management itself, and naturally such negativities increase tension and stress in employees. (Stark, Stanhaus, & Anthony, 2020) deduced that workplace surveillance has the potential to further exacerbate already existing forms of inequality, and to entrench longstanding forms of discriminatory practice behind the veneer of technological opacity. Jessica Vitak and Michael Zimmer (2021) first conducted a series of paired t-tests to compare respondents’ attitudes toward their work environment before the pandemic with their attitudes in November. Over the course of the pandemic, workers reported a significant increase in their job stress and decreases in their job satisfaction, security, and knowledge of how their employer monitored them (Vitak & Zimmer, 2021).

#### Chapter 4: Questionnaires Data Presentation, Analysis and Interpretation

##### 4.1) Demographic Information:

The questionnaire (attached in [Appendix B](#)) was distributed to sample size of 41 respondents with the chosen random sampling technique. Information was sought out depending on employees’ characteristics. Gender, Age.

Gender		Age Bracket				Total
		20-30 years	31-40 years	41-50 years	51-60 years	
Male	Counts	10	11	1	0	22
Female	Counts	4	6	5	4	19
	Counts	14	17	6	4	41

Table 1: Gender and Age Demographics of data collection representation

##### 4.2) Types of Questionnaires analysis preformed

Two types of analysis were used to analyze collected unbiased data; first analysis provide us insights on how the presence of workplace surveillance technology affects employee’s productivity & psychological health. While the second data analysis technique provided a more detailed understanding of the relationship between number of workplace surveillance technologies installed and their effect on employee’s productivity and psychological health.

##### 4.3) Data representation of relationship between workplace surveillance monitoring and their effect on five different variables

This analysis provided numbered data of the effect of workplace surveillance on Feeling Unease/Bothered, Stress, Productivity, Time Waste, Time Management on a scale of 5 and after further categorization on a scale of 3.



Questions presented	Employees responses on a scale on 5					Employees responses on a scale on 5		
	1	2	3	4	5	1	2	3
How do you feel about the surveillance on a scale of 5?"	Not-Bothered (3 employees)	Not Bothered but Doesn't Prefer (10 employees)	Neutral (12 employees)	Bother (11 employees)	Bothered And Doesn't Prefer (5 employees)	Not Bothered (13, 32%)	Neutral (12, 29%)	Bothered (16, 39%)
How much do you feel stressed about the surveillance on a scale of 5?	Not-Stressed (3 employees)	Not Stressed but Doesn't Prefer (8 employees)	Neutral (12 employees)	Stressed (10 employees)	Stressed And Doesn't Prefer (8 employees)	Not-Stressed (11, 26.8%)	Neutral (12, 29%)	Stressed (18, 43.9%)
How do you feel surveillance has affected your productivity on a scale of 5?	It Effected Negatively (9, 21.9%)	Maybe It Effected Negatively (15 employees)	Neutral (9 employees)	Maybe It Effected Negatively (8 employees)	Maybe It Effected Positively (5 employees)	It Effected Positively (4 employees)	Neutral (12, 29%)	It Effected Negatively (23, 56%)
Will you say that workplace surveillance stops people from wasting time on a scale of 5	0.296	It Doesn't Stop (6 employees)	Neutral (13 employees)	Maybe It Dose Stop (9 employees)	It Does Stop (5 employees)	It Does Stop (14, 34%)	Neutral (13, 31.7%)	It Doesn't Stop (14, 34%)
How do you think surveillance have affected your time management skills on a scale of 5?	It Didn't Affected (8 employees)	Maybe It Didn't Affected (10 employees)	Neutral (11 employees)	Maybe It Affected (6 employees)	It Affected Immensely (6 employees)	It Affected (11, 29.2%)	Neutral (11, 26.8%)	It Didn't Affected (18, 43.9%)

Figure 9: Data analysis

a) Relationship between workplace monitoring and employees feeling unease:

This analysis from figure 9 and 10 show that more employees (39%) feel bothered in the presence of workplace surveillance. While 32% doesn't feel bothered, and the other 29% stayed neutral.

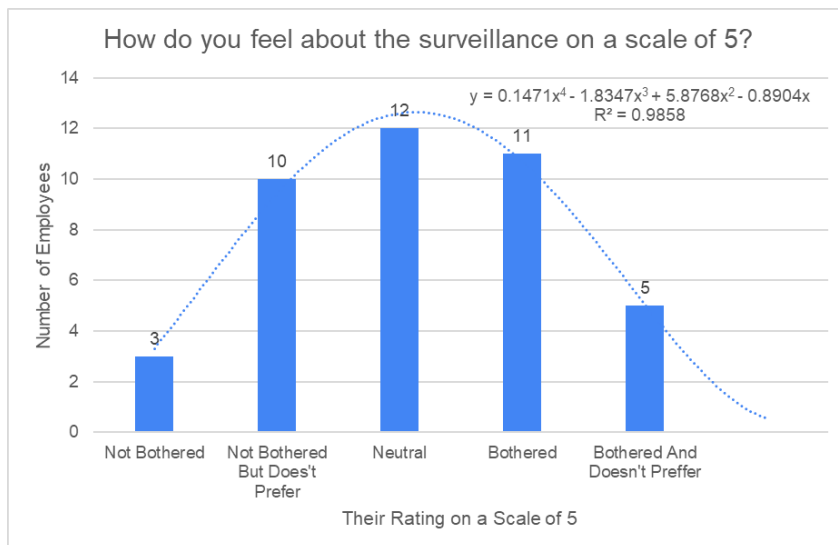


Figure 10: Histogram of Responses to the question "How do you feel about the surveillance on a scale of 5?"

**b) Relationship between workplace monitoring and employees' stress:**

The analysis from figure 9 and 11 concludes that more employees (43.9%) feel stressed in the presence of workplace monitoring, while 26.8% feel not stress, and the other 29% stayed neutral.

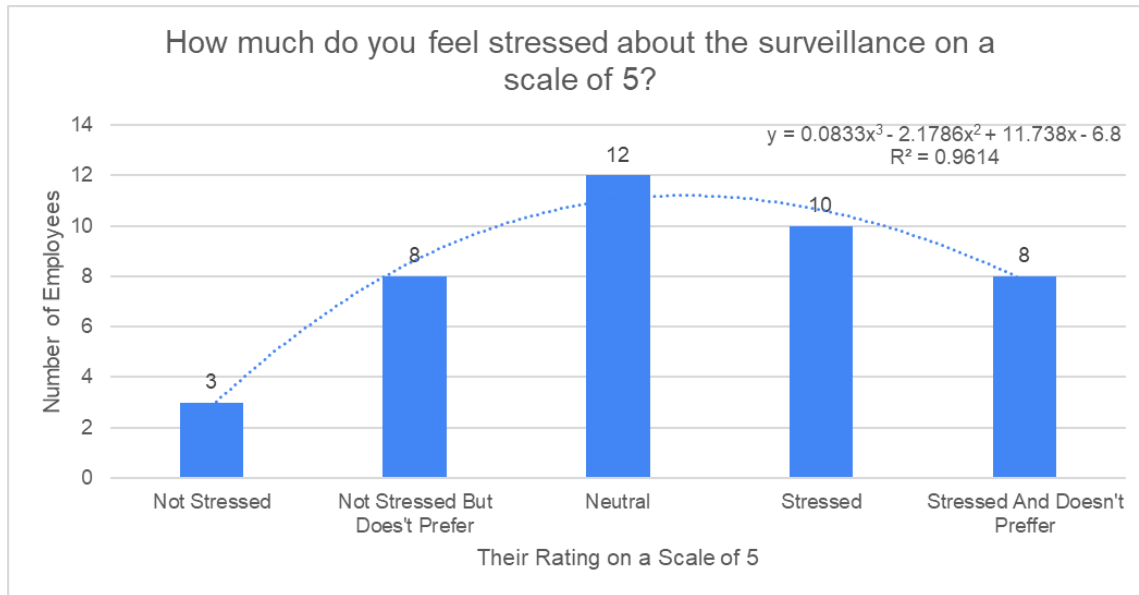


Figure 11: Histogram of Responses to the question "How much do you feel stressed about the surveillance on a scale of 5?"

**c) Relationship between workplace monitoring and employees' Productivity:**

The analysis from figure 9 and 12 show that more than half of the employees (56%) think that workplace monitoring negatively effects their productivity, while 21.9% think it affects positively, and the other 21.9% stayed neutral.

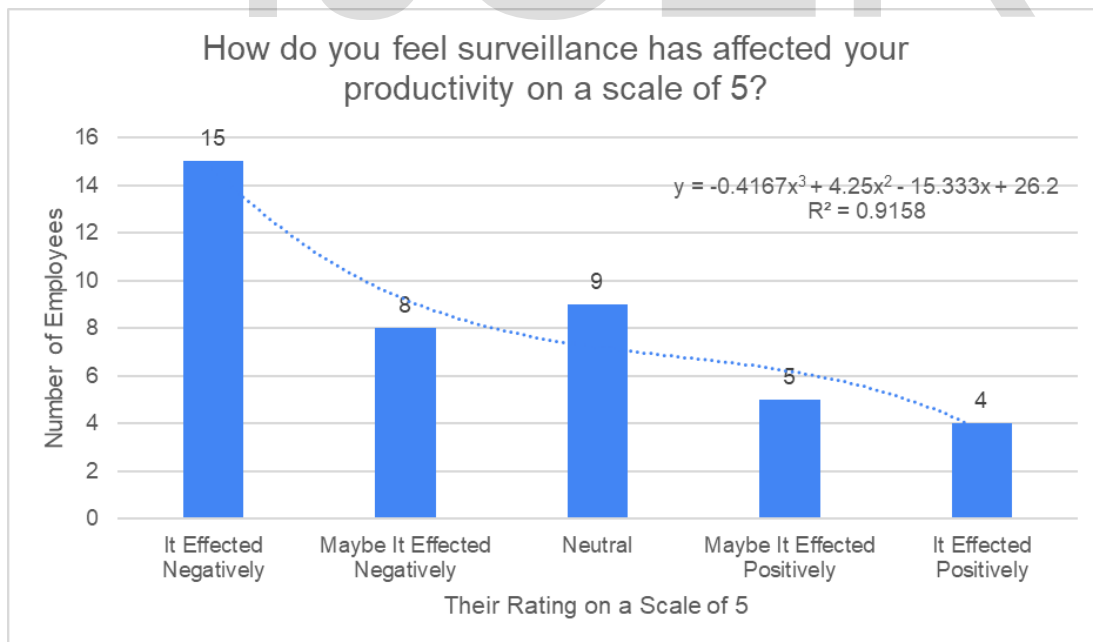


Figure 12: Histogram of Responses to the question "How do you feel surveillance has affected your productivity on a scale of 5?"

**d) Relationship between workplace monitoring and employees' Time waste:**

It could be analyzed from figure 9 and 13 that 34% of the employees believe that presence of workplace surveillance doesn't stop them from wasting time, while 34% think it does stop them, and the other 31.7% stayed neutral.

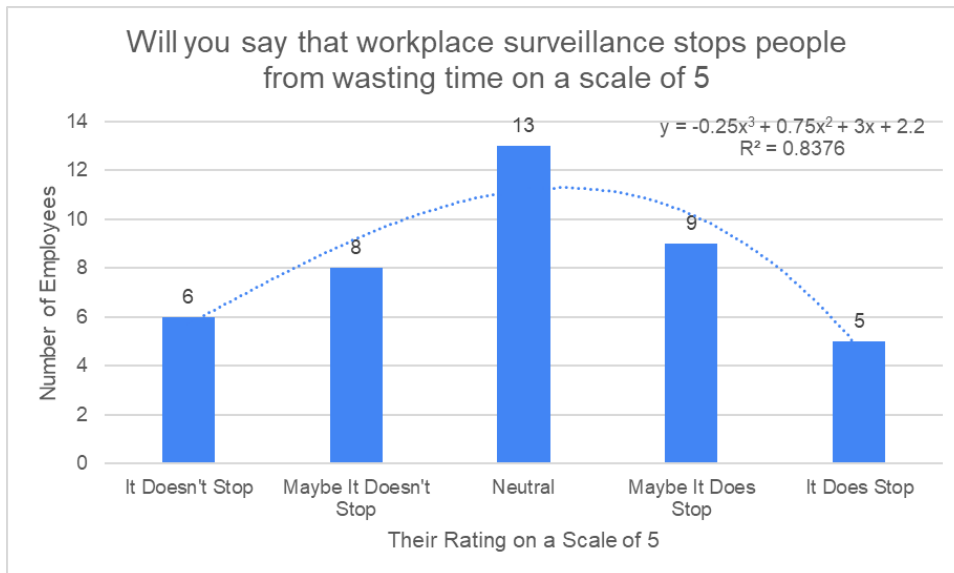


Figure 13: Histogram of Responses to the question "Will you say that workplace surveillance stops people from wasting time on a scale of 5"

**e) Relationship between workplace monitoring and employees' Time Management:**

The following analysis from figure 9 and 14 could be drawn, 43.9% of the employees believe that presence of workplace surveillance doesn't affect their time management skills, while 29.2% think it does, and the other 26.8% stayed neutral.

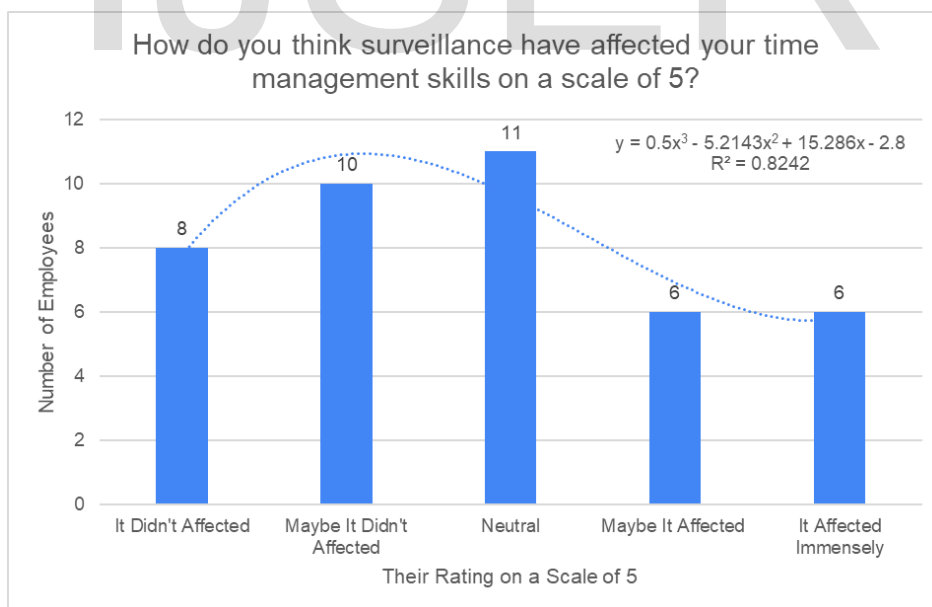


Figure 14: Histogram of Responses to the question "How do you think surveillance have affected your time management skills on a scale of 5?"

4.4) Relationship between number of workplace monitoring technologies installed and their effect on five different variables

Relevant knowledge gained through literature review (see [chapter 3](#) Literature review) it can be hypothesized that the following five are **dependent variables**:

- a) *Feeling Unease/Bothered*
- b) *Stress*
- c) *Productivity*
- d) *Time Waste*
- e) *Time Management*, whereas

a) *Number of Workplace Surveillance Technology installed is an independent variable*

**Hypothesis Formulation:** Dependent variable (feeling unease/bothered, stress, productivity, time waste and time management) had some degree of impact or variance due to independent variable (number of workplace monitoring technologies installed in the work environment) of the chosen sample, assuming the rest of the other factors, like, working conditions, atmosphere constant. (See [Appendix C](#) for further details about other factors).

To test this hypothesis Spearman's rank correlation was run to test whether the independent variables (number of workplace surveillance technologies) had a statistically significant relationship with the dependent variables (feeling uneased/bother, stress, productivity, time waste, time management). Simple linear regression analysis was used to test the hypothesis relating to effect the number of monitoring technologies installed has on the above mentioned five variables.

#### 4.5) Understanding the Terms

Before analyzing the data, few terms need to be explained from the statistical regression analysis:

##### Dependent Variables:

1. *Feeling Unease/Bothered*
2. *Stress*
3. *Productivity*
4. *Time Waste*
5. *Time Management*

##### Independent Variables:

1. *Number of Workplace Surveillance Technologies Installed*

##### Terms:

1.  *$r$*
2.  *$r^2$*
3. *P-value*
4. *X-variable*
5. *Hypothesis test*

$r$  denotes Correlation Coefficient,  $r$  is the relationship between the predicted and observed value (Ayanso, 2014), means if Number of Workplace Surveillance changes, will there be any change in Feeling Unease/Bothered, Stress, Productivity, Time Waste, Time Management? A value of  $r$  greater than 0 will highlight that there is change in Feeling Unease/Bothered, Stress, Productivity, Time Waste, Time Management due to change in Number of Workplace Surveillance. If value of  $r$  is between 0 and 1, this represents how strong has been the change in five different dependent variables (Feeling Unease/Bothered, Stress, Productivity, Time Waste, Time Management) due to change in the independent variable: Number of Workplace Surveillance Technologies installed. See [Appendix E](#) for further information depending on my data.

$r^2$  (value is between 0-100 indicates in percentage when we multiply it by 100) represents the percentage of change from average value in Feeling Unease/Bothered, Stress, Productivity, Time Waste, Time Management due to change in Number of Workplace Surveillance.  $r^2$  will be utilized in this study to show how much independent variable (number of Workplace Surveillance Technologies installed), is responsible for change in dependent variables. (Obiefuna, 2021). See [Appendix E](#) for further information depending on my data.

**P-value** (P-value lower than 0.1 will indicate strong significance of model), regression analysis model, means it helps determine whether the relationships observed in the sample also exist in the larger population (Marasini, Quatto, & Ripamonti, 2016), that would be any scenario of Business and employment around the globe. This is used in the study to indicate weather same trends of change in dependent variables will be witnessed at a global level (Feeling of Unease/Bothered, Stress, Productivity, Time Waste, Time Management) with change in independent variable (Number of Workplace Surveillance Technologies installed). **P-**

*value* minus 1 and then multiply by 100 will give us a chance of getting the same results in larger population in percentage. See [Appendix E](#) for further information depending on my data.

*X-Variable* is the coefficient obtained from the regression analysis; it indicates the nature of relationship (*r*). It highlights whether the relationship is positive (direct) or negative (indirect) (Ali & Younas, 2021). If the value is positive, it will indicate a direct relationship meaning if Number of Workplace Surveillance increases; Feeling Unease/Bothered, Stress, Productivity, Time Waste, Time Management will increase, while a negative value will indicate an indirect relationship, if Number of Workplace Surveillance increases Feeling Unease/Bothered, Stress, Productivity, Time Waste, Time Management will decrease. See [Appendix E](#) for further information depending on my data.

*X-Variable* is used in this exploration to indicate if increase in the Number of Workplace Surveillance Technologies installed has a positive or negative relationship with the above-mentioned dependent variables. *X-Variable* will decide the *Correlation nature*. See [Appendix E](#) for further information depending on my data.

*Hypothesis test* is the evaluation of data and what does it indicate about the previously mentioned hypothesis of this exploration:

HA = Hypothesis is true

H0 = Hypothesis not true

<b>HA</b>	<b>There is significant relationship between data</b>	<b>HA:</b>	<b><math>r \neq 0</math></b>
<b>H0</b>	<b>There is no significant relationship between data</b>	<b>H0:</b>	<b><math>r = 0</math></b>
<b>P-value</b>	<b><math>P &gt; 0.1</math> is the probability that the null hypothesis is true.</b>		

It would be used to draw an answer whether the independent variable: Number of Workplace Surveillance Technologies installed, has any effect on dependent variables, Feeling Unease/Bothered, Stress, Productivity, Time Waste, Time Management.

<i>Dependent and Independent Variables</i>	<i>R</i>	<i>r<sup>2</sup></i>	<i>P-value</i>	<i>X-Variable</i>	<i>Hypothesis test</i>	<i>Correlation Nature</i>
<b>Independent Variable = Number of Workplace surveillance technologies installed</b>						
<i>employees' feeling unease and Independent Variable</i>	0.246	0.060	0.147	(Unease) 0.147	H0	Positive
<i>employees' stress and Independent Variable</i>	0.453	0.200	0.002	(Stress) 0.278	HA	Positive
<i>employees' productivity and Independent Variable</i>	0.304	0.090	0.052	(Productivity) -0.216	HA	Negative
<i>employees' time-waste and Independent Variable</i>	0.296	0.087	0.060	(Time Waste) -0.191	HA	Negative
<i>employees' time management and Independent Variable</i>	0.328	0.107	0.036	(Time Management) -0.228	HA	Negative



Figure.15: Data from Regression analysis

#### 4.6) Interpretation & Analysis of Statistical findings

The results in the table above were extracted from sheets attached in [Appendix E](#). The results gives the following conclusion about how Number of Workplace Surveillance affect the following five variables,

- a) *Feeling Unease/Bothered*
- b) *Stress*
- c) *Productivity*
- d) *Time Waste*
- e) *Time Management*

- a) Number of Workplace surveillance did not have any statistically significant effect on employees' Feeling Unease/Bothered. Hence not supporting the relevant hypothesis of the study for Employee Unease/Bothered.
- b) Number of Workplace Surveillance had a direct and statistically significant relationship with employee's Stress. Meaning when the number of workplace surveillance increased, it increased employee's stress. Number of workplace surveillance was responsible for 20% of increase in average value of stress. It also shows that these results have a 99.8% chance of repeating in other scenarios of Business and Employment. Hence supporting the relevant hypothesis of the study for Employee Stress.
- c) Number of Workplace Surveillance had an indirect and statistically significant relationship with employee's Productivity. Meaning when the number of workplace surveillance increased it decreased employee's productivity. Number of workplace surveillance was responsible for 9% of decrease in average value of productivity. It also shows that these results have a 94.8% chance of repeating in other scenarios of Business and Employment. Hence supporting the relevant hypothesis of the study for Employee Productivity.
- d) Number of Workplace Surveillance had an indirect and statistically significant relationship with employee time waste. Meaning when the number of workplace surveillance increased it decreased employee time waste. Number of workplace surveillance was responsible for 8.7% of decrease in average value of time waste. It also shows that these results have a 94% chance of repeating in other scenarios of Business and Employment. Hence supporting the relevant hypothesis of the study for Employee Time Waste.
- e) Number of Workplace Surveillance had an indirect and statistically significant relationship with employee time management. Meaning when the number of workplace surveillance increased it decreased employee time management. Number of workplace surveillance was responsible for 10.7% of decrease in average value of time waste. It also shows that these results have an 96.4% chance of repeating in other scenarios of Business and Employment. Hence supporting the relevant hypothesis of the study for Employee Time Management.

### Chapter 5: Health and Productivity implications on Stakeholders

This section would discuss the research finding (see [Chapter 4](#)) of the study and would analyze the impact of workplace surveillance on employees' health and productivity in the scenario of Business and Employment. It would also analyze and cite credible resources that back up the hypothesis.

#### 5.1) Workplace Surveillance Technology and impact on Health

The findings of primary data analysis (See [Chapter 4](#)) shows that as number of workplace surveillance technologies installed increase the stress of employees also increases. Out of 41 employees 43.9% felt stressed and 39% felt bothered/unease under the presence of surveillance. These findings can also be backed up by secondary literature, Employees who were monitored by CCTV, the working conditions were perceived as stressful, and these individuals reported an increase in job boredom, psychological tension, anxiety, depression, frustration and fatigue (Gichuhi, Senaji, & Ngari, 2016). Being under the watchful eye of cameras can have detrimental effects on employees' both physical and psychological wellness, the use of cameras in the workplace has been correlated with increased stress and anxiety, as well as a higher risk of injuries due to repetitive strain injuries (RSI) since workers are frightened to take breaks (Jaswal, 2017). May researches also indicate how employees change their behavior to "please the authority", this behavioral alternation can further lead to frustration and quitting job, this can be supported by employees' comments from figure 16. "I feel always being looked with suspicion and is stressful. I change my behavior to please the authority. Feeling exhausted, think to quit the job." (INDIPARAMBIL, 2017).

<b>Employee Concerns (Negative)</b>
Please don't even ask about CCTV modern slaverism.
I feel being spied on and untrusted and [I] loses trust to the management. It also affects my health and diminishes my self-confidence.
I am not a slave to work like this. It takes away my privacy and work-satisfaction. It also affects my health and diminishes my self-confidence.
Our personal privacy is sometimes compromised, when we are aware that, we are being monitored then we tend to be more conscious unsettled.
I feel always being looked with suspicion and is stressful. I change my behaviour to please the authority. Feeling exhausted, think to quit the job.
Sometimes it's really irritating, staffs mend to hide their faces and work. Privacy is getting monitored.
Do they not trust us? Surveillance inhibits freedom at work. The more we are restricted the more rage with others we become.

Figure 16: Employees' comments from research study (INDIPARAMBIL, 2017)

The continuous monitoring and increased workload can lead to stress-related health problems, decreased morale and motivation (Kiziloglu, 2018). Employees who were monitored reported more boredom, depression, tension/anxiety, and anger than those who were not (Smith, Carayon, Sanders, Lim, & LeGrande, 1992) Even proponents of electronic surveillance acknowledge that monitoring can cause negative stress-related and health effects (Posch, 1993). In equal worth, female employees report distrust, power control, and related stress as a result of workplace monitoring (INDIPARAMBIL, 2017). In a survey conducted by Gary Cwitco of Communications Workers of Canada for 700 Bell Canada operators, 33% of respondents regarded their surveilled jobs as very stressful or moderately stressful. 70% of the workers told Gary Cwitco "Perceived preference for speed over quality of service created psychological distress." (Doheny, 1989). Table 7 below compares health complaints among monitored with unmonitored employees. Both group of workers work as service representatives (Stanford University, n.d.). This highlights how the presence of the IT system, Workplace Surveillance, effects the stake holders', employees', Health in the scenario of Business and Employment. It can be deduced that the businesses should decrease the intensity of IT System (workplace Surveillance) to reduce its effects on employees' psychological health.

Figure 17: (Stanford University, n.d.)

<b>Somatic complaints</b>	<b>Monitored</b>	<b>Unmonitored</b>
Loss of feeling in fingers/wrists	36	23
Stiff or sore wrists	39	19
Pain or stiffness in shoulders	72	71
Shoulder soreness	72	61
Pain or stiffness in arms/legs	64	55
Neck pain into shoulder/arm/hand	58	44
Neck pressure	80	66
Back pain	74	77
Racing or pounding heart	58	42
Acid indigestion	67	56
Stomach pains	50	48
Headaches	90	94
Depression	78	67
Severe fatigue or exhaustion	79	66
Extreme anxiety	68	57
High tension	84	76

### 5.2) Workplace Surveillance Technologies and impact on Business Productivity

Regression analysis indicates that as number of workplace surveillance technologies installed increase the productivity and time management skills of employees decreases. Out of 41 employees 56% said that due to the presence of workplace surveillance their productivity was affected negatively. Workplace monitoring activities have negative consequences for employees such as diminished morale, decreased motivation and reduced performance (D, 2006) (Alge, Ballinger, & GREEN, 2004). Furthermore, surveillance is perceived as a modern form of slavery and can decrease job-attrition and job-absenteeism (INDIPARAMBIL, 2017). Devasheesh P. Bhave in his study says, excessive and non-excessive levels of electronic performance monitoring can have a detrimental effect on employee performance (Bhave, 2014). Although meant to function as a ‘good watchdog’ in general, these systems have the unintended effect of creating negative feelings among workers that negatively affect their productivity and wellbeing (INDIPARAMBIL, 2017).

Increase in job stress can also have negative influence on productivity, “boss constantly flashed a message to a heavily monitored employee: “You are working less hard than the person next to you”. This increased anxiety and lowered productivity (Furnham, n.d.). Research findings of this study also indicate that as the stress of employees increase their productivity decreases. Employee Performance Monitoring (EPM) systems’ current application are based on job design theories, but do not account for worker stress and may produce unsatisfying results (Smith, Carayon, Sanders, Lim, & LeGrande, 1992). This shows the impacts of IT system, Workplace Surveillance, on the stakeholders’, employees’, Productivity in the scenario of Business and Employment. It can be reasoned that the businesses should decrease the intensity of IT System (workplace Surveillance) to reduce its effects on employees’ which result in low productivity.

### 5.3) Social and Ethical implications on Stakeholders:

Monitoring can raise a number of social and ethical concerns; one such concern is privacy. For instance, research shows, employees argued that CCTV monitoring should not be used in the workplace because it interferes with individual privacy and shows a lack of trust in employees (Gichuhi, Senaji, & Ngari, 2016). The negative effects of excessive surveillance at workplaces

include stress, loss of identity and the emergence of privacy issues (Jaswal, 2017). Unreasonable and arbitrary monitoring violates the employees' privacy right. If an employee feels they have no control to their privacy they become suffocated and depressed while at work, they will likely be less productive (Kupfer, 1987). Furthermore, it is an individual's right to disclose secrets about his personality to whom he likes. However, compulsion to reveal those parts of his memory and personality that he regards as private, constitutes a violation of his psychological privacy (Westin, 1967). Privacy can be compromised if employees do not authorize the disclosure of their information, and it is broadcast to unknown third parties without their consent (Lloyd, 2006). The study by Alder and Tompkins (1997) showed that workplace monitoring activities were found to reduce privacy and had ethically negative repercussion for privacy breaches (Alder & Tompkins, 1997). Several researches revealed how employees feel their privacy is invaded by workplace monitoring.

Figure 18: Employees' comments from research study (Gichuhi, Senaji, & Ngari, 2016)

Reason	Frequency	Percent
Interferes with individuals privacy	30	23.8
It shows lack of trust in the employees	10	7.9
It is expensive to maintain	9	7.1
It reduces staff freedom	9	7.1
They are not perfectly reliable or efficient for supervision	9	7.1
They are not perfect and are bound to fail or get damaged	8	6.3
It may not reflect fair conduct of the employee	7	5.6
It causes anxiety and tension at work place	6	4.8
It is time consuming	6	4.8
Others	32	25.4

Employee Concerns (Negative)
Please don't even ask about CCTV modern slaveryism.
I feel being spied on and untrusted and [I] loses trust to the management. It also affects my health and diminishes my self-confidence.
I am not a slave to work like this. It takes away my privacy and work-satisfaction. It also affects my health and diminishes my self-confidence.
Our personal privacy is sometimes compromised, when we are aware that, we are being monitored then we tend to be more conscious unsettled.
I feel always being looked with suspicion and is stressful. I change my behaviour to please the authority. Feeling exhausted, think to quit the job.
Sometimes it's really irritating, staffs mend to hide their faces and work. Privacy is getting monitored.
Do they not trust us? Surveillance inhibits freedom at work. The more we are restricted the more rage with others we become.

Figure 19: Employees' comments from research study (INDIPARAMBIL, 2017)

As seen in Figure 18 line 1, 23.8% of the employees responded, "Interferes with individuals privacy", while Figure 19 lines 3, 4, and 5, shows comments from employees raising concerns of privacy invasion.

Violation of employee's privacy can have a negative impact on their personality and identity. It can also affect the individual's sense of autonomy. In such circumstances, employees are prevented from forming meaningful relationships with others (Himma & Tavani, 2008). Privacy issues raised by workplace monitoring can have aggregated problems at societal level, for example, Alan F. Westin says indeed, privacy is a necessary condition for the effective operation of social structures (Westin, 1967). Democracies require individuals who are willing to engage with others in order to function properly. A lack of privacy can hinder the development of these individuals, as well as their willingness to engage with others (Himma & Tavani, 2008). This underlines how the IT system, Workplace Surveillance, in the scenario of Business and Employment effects the

stakeholders', employees', privacy. It can be deduced that the businesses should decrease the intensity of IT System (workplace Surveillance) to reduce its effects on employees' feeling their privacy being invaded.

### Chapter 6: Conclusion

In the light of the analysis of primary and secondary data and in response to the question posed "How does workplace surveillance affect psychological health, productivity, and privacy of employees?" It can be reasoned that the IT system, workplace surveillance, negatively effects the psychological health of stakeholders, employees, in the scenarios of Business and Employment. It can also be said that the severity of these negative effects on mental well-being increase with increase in the number of workplace surveillance technologies installed.

After statistical analysis and evaluation of secondary data, it can be deduced that the productivity and time management skills of employees are negatively affected by the presence of workplace monitoring. The gravity of the negative effects intensifies as the number of workplace surveillance increases. However, the employees time-waste significantly reduces in the presence of workplace surveillance and the reduction further carries with increase in number of workplace surveillance. While discussing privacy under the light of secondary research, it can be said that, most employees feel their privacy is being invaded, from primary research 39% the employees felt bothered by monitoring. However, there wasn't any statistically significant relationship between number of workplace surveillance and employees' feeling bothered/unease. Business should reduce the magnitude of IT system, Workplace Surveillance, to increase Productivity, Psychological well-being and sense of Privacy of employees. This will result in increased profitability, job satisfaction, job security, and less job resignations. However, the IT system is only responsible for some fraction of the afore mentioned effects, other factors are mentioned in [Appendix C](#).

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## Appendix A (Questionnaire)







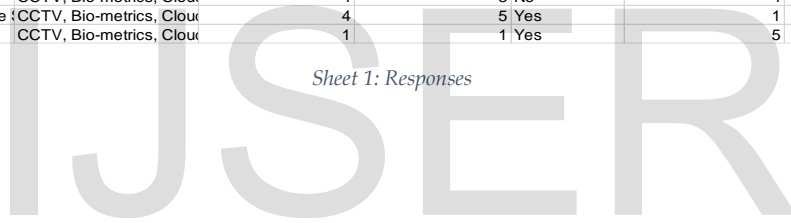


Appendix B (Responses):



Age	Gender	Where do you	What kind of surveillance	How do you feel about	How much do you fee	Have you ever	How do you feel surve	Will you say that wo	How do you think su
43	Male	I.T Company	Occupancy Tracking	3	3	Yes	4	4	3
35	Male	Alsager Family	CCTV, Cloud-based Acc	3	3	Yes	4	4	3
33	Male	Remote job	Screen Capture/Browser	2	2	Yes	3	3	1
37	Male	Nayatel	CCTV, Bio-metrics	2	2	No	2	2	2
32	Male	Nayatel	CCTV, Bio-metrics	2	1	No	1	2	3
27	Male	Nayatel	CCTV	4	3	No	3	3	5
25	Male	Nayatel	CCTV, Bio-metrics, Wire	2	2	Yes	1	5	3
23	Male	Nayatel	CCTV	1	3	Yes	3	5	5
31	Male	Asad Ijaz &Co.	Occupancy Tracking	2	2	Yes	2	4	2
24	Male	Asad Ijaz &Co.	Occupancy Tracking	3	5	Yes	4	3	5
31	Male	Asad Ijaz &Co.	CCTV	3	3	No	1	4	1
25	Male	Asad Ijaz &Co.	Occupancy Tracking	5	2	Yes	3	3	3
22	Male	Asad Ijaz &Co.	CCTV	5	2	No	5	3	5
35	Male	Asad Ijaz &Co.	Occupancy Tracking	2	2	No	4	3	3
27	Male	Asad Ijaz &Co.	CCTV	3	3	No	3	3	3
25	Male	Asad Ijaz &Co.	CCTV	3	1	No	5	4	5
30	Male	Asad Ijaz &Co.	Occupancy Tracking	2	3	No	2	3	3
29	Female	Beaconhouse	CCTV, Bio-metrics, Clou	4	4	Yes	3	2	4
50	Female	Beaconhouse	CCTV, Bio-metrics, Clou	3	4	Yes	1	2	2
26	Female	Beaconhouse	CCTV, Bio-metrics, Clou	4	5	Yes	1	2	1
56	Female	Beaconhouse	CCTV, Bio-metrics, Clou	2	4	Yes	1	3	2
29	Male	Beaconhouse	CCTV, Bio-metrics, Clou	3	3	No	2	1	2
49	Female	Beaconhouse	CCTV, Bio-metrics, Clou	1	3	No	1	5	4
49	Female	Beaconhouse	CCTV, Bio-metrics, Clou	3	4	Yes	1	1	1
37	Female	Beaconhouse	CCTV, Bio-metrics, Clou	2	3	No	1	4	3
31	Male	Beaconhouse	CCTV, Bio-metrics, Clou	3	4	Yes	1	4	4
49	Female	ALTUM CAPIT.	CCTV	2	2	Yes	1	3	1
29	Male	ALTUM CAPIT.	Bio-metrics	3	4	Yes	2	4	4
29	Female	ALTUM CAPIT.	Bio-metrics	4	5	Yes	3	1	3
32	Female	Beacon House	CCTV, Bio-metrics, Clou	4	4	Yes	2	4	4
45	Female	Beaconhouse	CCTV, Bio-metrics, Clou	3	4	No	3	3	1
33	Female	Beacon House	CCTV, Bio-metrics, Clou	5	5	No	2	3	4
28	Female	BeaconHouse	CCTV, Bio-metrics, Clou	4	5	Yes	1	2	2
51	Female	Beacon House	CCTV, Bio-metrics, Clou	5	4	No	1	1	2
36	Female	Beacon House	CCTV, Bio-metrics, Clou	5	5	Yes	1	1	1
43	Female	BMI	CCTV, Bio-metrics, Clou	4	4	Yes	2	2	2
35	Female	BMI	CCTV, Bio-metrics, Clou	4	5	Yes	3	3	3
39	Male	beaconhouse	CCTV, Bio-metrics, Clou	4	3	Yes	5	5	2
33	Male	BMI	CCTV, Bio-metrics, Clou	4	3	No	4	2	2
35	Female	BeaconHouse	CCTV, Bio-metrics, Clou	4	5	Yes	1	1	1
52	Female	BSS	CCTV, Bio-metrics, Clou	1	1	Yes	5	5	5

Sheet 1: Responses



Appendix C:

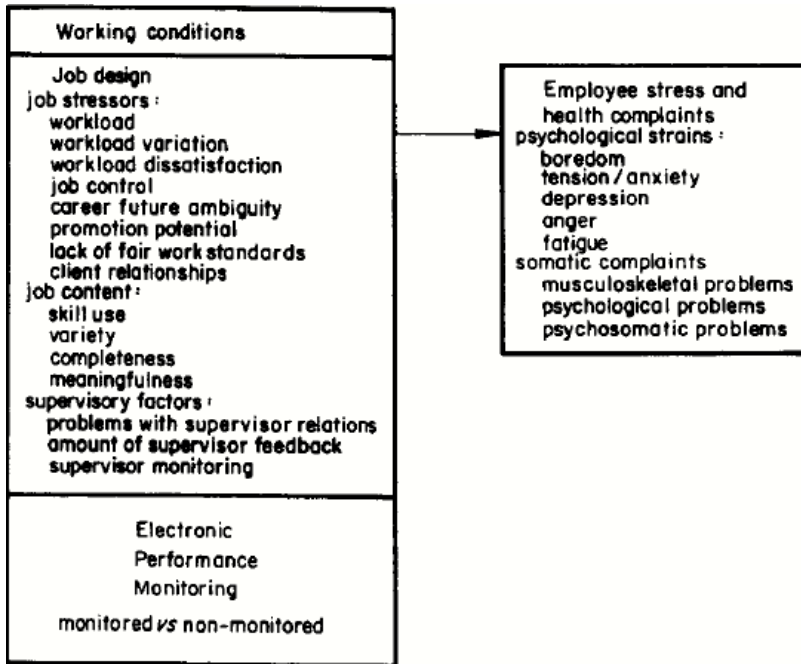


Figure A.1: Showing other factors that contribute to job stress (Smith, Carayon, Sanders, Lim, & LeGrande, 1992)

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Appendix E (Analysis):

SUMMARY OUTPUT: for No. of Surveillance technologies and feelings								
<b>Regression Statistics</b>		Statistically Significant						
Multiple R	0.2463	<b>r</b>	Rejects Null Hypothesis					
R Square	0.060664	<b>r<sup>2</sup></b>						
Adjusted R Square	0.036578		This is a statistically significant relationship (r= 0.2463, p=0.19)					
Standard Error	1.12332		between No. of Surveillance technologies and Feeling bothered					
Observations	41							
<b>ANOVA</b>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	3.178184	3.178184	2.51867448	0.120580819			
Residual	39	49.21206	1.261848					
Total	40	52.39024						
	<i>Coefficients</i>	<i>standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	2.664322	0.337529	7.893615	1.3133E-09	1.981605402	3.347038	1.981605	3.3470378
X Variable	0.147739	0.093091	1.587033	0.12058082	-0.04055586	0.336033	-0.04056	0.3360332
<b>Slope</b>				<b>P value</b>				
				<b>Significance</b>				

Sheet 3: Regression analysis of Number of workplace surveillance and Feeling Unease/Bothered

SUMMARY OUTPUT: for No. of Surveillance technologies and Stress								
<b>Regression Statistics</b>		Statistically Significant						
Multiple R	0.453265	<b>r</b>	Rejects Null Hypothesis					
R Square	0.205449							
Adjusted R Square	0.185076		This is a statistically significant relationship (r= 0.45327, p=0.0029)					
Standard Error	1.091594		between No. of Surveillance technologies and Stress					
Observations	41							
<b>ANOVA</b>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	12.01628	12.01628	10.08435	0.002919			
Residual	39	46.47152	1.191578					
Total	40	58.4878						
	<i>Coefficients</i>	<i>standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	2.402848	0.327996	7.325847	7.68E-09	1.739413	3.066282	1.739413	3.066282
X Variable	0.28727	0.090462	3.175586	0.002919	0.104293	0.470246	0.104293	0.470246
				<b>P value</b>				
				<b>Significance</b>				

Sheet 4: Regression analysis of Number of workplace surveillance and Stress

SUMMARY OUTPUT: for No. of Surveillance technologies and Productivity								
<b>Regression Statistics</b>		Statistically Significant						
Multiple R	0.304548	<b>r</b>	Rejects Null Hypothesis					
R Square	0.09275							
Adjusted R Square	0.069487		This is a statistically significant relationship (r= 0.30455, p=0.0528 between No. of Surveillance technologies and Productivity					
Standard Error	1.309876							
Observations	41							
<b>ANOVA</b>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	6.840855	6.840855	3.987034	0.052865			
Residual	39	66.91524	1.715775					
Total	40	73.7561						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	3.061642	0.393584	7.778877	1.87E-09	2.265543	3.85774	2.265543	3.85774
X Variable	-0.21675	0.108551	-1.99676	0.052865	-0.43632	0.002815	-0.43632	0.002815
	<b>P value</b>							
	<b>Significance</b>							

Sheet 5: Regression analysis of Number of workplace surveillance and Productivity

SUMMARY OUTPUT: for No. of Surveillance technologies and Time waste								
<b>Regression Statistics</b>		Statistically Significant						
Multiple R	0.296121	<b>r</b>	Rejects Null Hypothesis					
R Square	0.087688	<b>r<sup>2</sup></b>						
Adjusted R Square	0.064295		This is a statistically significant relationship (r= 0.29612, p=0.0601 between No. of Surveillance technologies and time waste					
Standard Error	1.194311							
Observations	41							
<b>ANOVA</b>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	5.346799	5.346799	3.74851	0.060126			
Residual	39	55.62881	1.42638					
Total	40	60.97561						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	3.569179	0.35886	9.945888	2.98E-12	2.843317	4.295042	2.843317	4.295042
X Variable	-0.19162	0.098974	-1.93611	0.060126	-0.39182	0.00857	-0.39182	0.00857
	<b>P value</b>							
	<b>Significance</b>							

Sheet 6: Regression analysis of Number of workplace surveillance and Time waste



SUMMARY OUTPUT: for No. of Surveillance technologies and Time management								
<b>Regression Statistics</b>		Statistically Significant						
Multiple R	0.328013	<b>r</b>	Rejects Null Hypothesis					
R Square	0.107593	<b>r<sup>2</sup></b>						
Adjusted R Square	0.08471	This is a statistically significant relationship (r= 0.32801, p=0.0362)						
Standard Error	1.269568	between No. of Surveillance technologies and time management						
Observations	41							
<b>ANOVA</b>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	7.578723	7.578723	4.702017	0.036289			
Residual	39	62.8603	1.611803					
Total	40	70.43902						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	3.511558	0.381472	9.205273	2.53E-11	2.739957	4.283159	2.739957	4.283159
X Variable	-0.22814	0.105211	-2.16841	0.036289	-0.44095	-0.01533	-0.44095	-0.01533
	<b>P value</b>							
	<b>Significance</b>							

Sheet 7: Regression analysis of Number of workplace surveillance and Time management

SUMMARY OUTPUT: For stress and productivity								
<b>Regression Statistics</b>		Statistically Significant						
Multiple R	0.345356	<b>r</b>	Rejects Null Hypothesis					
R Square	0.119271	<b>r<sup>2</sup></b>						
Adjusted R Square	0.096688	This is a statistically significant relationship (r= 0.345356, p=0.027)						
Standard Error	1.290589	between Stress and Productivity						
Observations	41							
<b>ANOVA</b>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	8.796965	8.796965	5.2814996	0.027000345			
Residual	39	64.95913	1.665619					
Total	40	73.7561						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	3.667223	0.591081	6.204261	2.695E-07	2.471647939	4.862797	2.471648	4.8627974
X Variable	-0.38782	0.168754	-2.29815	0.02700034	-0.729161209	-0.04649	-0.72916	-0.046485
	<b>P value</b>							
	<b>Significance</b>							

Sheet 7: Regression analysis of Stress and Productivity