

RFID CHIP REQUIRED? A COMPARISON OF SCENARIOS WHEN IMPLEMENTING
RFID TECHNOLOGY IN THE WORKPLACE

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Abstract:

RFID technology has been used in various business processes for over 60 years. During this period, one of the notable use cases has been the use of RFID in employee monitoring. Previous studies on RFID implementation and employee monitoring have focused on user acceptance in order to determine whether an innovation would succeed or fail. Very little research has been conducted on the implications of RFID adoption. This research analyzed the effects that employee autonomy and technological usage had on overall job satisfaction. These two factors assisted in constructing four scenarios: mandatory-monitored, mandatory-not monitored, voluntary-monitored, and voluntary-not monitored. The results of the initial model revealed that none of the scenarios tested were significant; however, an interesting three-way interaction between gender, autonomy, and monitoring was discovered. A discussion is held to analyze why the findings for the initial test weren't significant. Future studies that are based on the significant findings of this research are also discussed.

Introduction:

Radio Frequency Identification (RFID) generally refers to a type of technology that transmits the information of an object wirelessly through radio waves (Sheng et al. 2010). The objects identified using RFID technology are dependent on the use case. RFID has been used for a variety of business purposes including, access control, inventory management, supply chain management, etc. (Wu et al. 2006). In these scenarios, the system records defined parameters from a single device and then sends the information to a central storage device. The ability to track assets and aggregate data through this method minimizes human intervention and reduces costs (Asif & Mandviwalla 2005).

While RFID has been used to assist in certain business processes for many years, RFID can be used for other purposes. Outside of improving certain logistical processes, RFID can be used to improve the experiences of employees in the workplace or help manage employee activities. The use cases radically differ for these two scenarios, but both ideas revolve around generating benefits (both tangible and intangible) for the business (Wu et al. 2006). Value generation would involve implementing RFID to alter employee behavior. By doing so, the organization would be able to enforce compliance with certain business processes (Kim & Garrison 2010, Staats et al. 2017). Managing in this fashion would involve collecting data regarding the activity and then recording the information in order to analyze the results. An example of this type of monitoring would be the patented RFID feedback system submitted by Amazon to the United States Patent and Trademark Office. These RFID wristbands would be able to better track employee movement in warehouses so that orders can be fulfilled in a timelier manner (Brady 2017).

A computer performance monitoring (CPM) system refers to a technology that is used to measure, record, store, and compile data on the activities of employees (Schleifer & Shell 1992). CPM systems have been used to monitor various business activities, but typically these systems measure the performance of employees. CPM systems have been used to monitor keystrokes, computer-based communications, etc. (Bates & Holton III 1995). More recently though, the technology has evolved. RFID technology and employee monitoring aren't new topics; however, there is an interesting discussion to be had on the use of RFID technology in employee monitoring. While previous studies have analyzed RFID adoption in different organizations (Hossain & Quaddus 2015, Shi & Yan 2016), the literature on the implications of implementing RFID technology in the workplace is rather scarce. Instead of questioning whether an employee will decide to adopt, this study questions how the implementation method used affects the employee's overall job satisfaction. By comparing the results of different implementation environments, it should be possible to understand which scenario maximizes the satisfaction of employees.

Determinants of Employee Satisfaction:

Employee satisfaction is a multifaceted concept that consists of many factors. As such, it's important to clarify what is meant by the term. Employee satisfaction (also referred to as job satisfaction in the literature) is usually defined as "the degree to which people like their job" (Spector 1997). The definition refers to the attitude an employee has about their job. If an employee has a positive attitude towards their workplace, then they should be relatively satisfied with their job. Conversely, if an individual does not have a positive attitude towards their workplace, then they should not be satisfied. Thus, job satisfaction doesn't refer to what

motivates an employee to feel satisfied in the workplace, but the feeling they have based on the actions they have taken (Aziri 2011, Parvin & Kabir 2011).

In the context of implementing RFID technology, job satisfaction would be based on whether an employee would accept the technology and then use it in the workplace (Hossain & Quaddus 2015). Since job satisfaction is the state the employee feels based on the decisions they have made, the discussion in this paper is placed downstream from previous works on RFID implementation. Instead of questioning if employees will adopt RFID in the first place and considering the motivations that drive an employee to adopt an implemented technology (Davis, Bagozzi, & Warshaw 1989, Davis 1993), this research questions how employees feel after the technology has been implemented. The motivators observed in previous models (such as perceived usefulness) drive the behavior of the employee to adopt or not adopt, not what makes an employee satisfied. As Koh et al. (2010) noted, an employee might perceive an innovation as useful and, therefore, decide to adopt the technology; however, the employee might not be satisfied with the technology after implementation.

Based on the definition of job satisfaction, if an employee is placed in a situation which makes them dissatisfied with the implementation, then their job satisfaction will decrease and vice versa. High employee satisfaction is desirable as it is linked to numerous operational benefits. Specifically, highly satisfied employees are more likely to be satisfied with the decisions they choose to participate in while in the workplace (Jong 2016). Companies shouldn't pursue implementing technology that would make a large portion of their employees unsatisfied as the possibility of negative outcomes (such as employee turnover) increase when job satisfaction decreases (Tripathi & Pandey 2017). As such, a key goal of implementing RFID should be to increase business value while also improving the satisfaction of employees. The

best way to approach this would be to implement under a scenario that results in the overall highest job satisfaction.

Though there are many factors that influence employee satisfaction, this study is interested in two key factors: the autonomy of the employee and the monitoring capabilities of the implemented RFID technology. The decision to use two variables was due to the factors that influence employees to adopt under a voluntary scenario somewhat differ from the factors present in a mandatory environment (Koh et al. 2010). As such, it was important to limit the number of factors that influence the outcome of the implementation.

Autonomy

Job autonomy refers to the degree to which an employee can work based on their discretion (Cummings, Molly, & Glen 1975). Based on the definition, a highly autonomous job would allow employees to decide how to approach their work and how to complete tasks. Autonomy has been proven to be a significant indicator of job satisfaction. Past meta-analysis results have reported that autonomy has a substantial relationship with job satisfaction (Adjusted $r = 0.37$) (Spector 1986). Since this study is interested in the use of implemented RFID technology, autonomy would refer to the employee's ability to have the power to decide whether to adopt or not adopt. Previous literature on the topic of implementing information systems such as Hossain & Quaddus (2015) have accessed acceptance under two environments: voluntary environments and mandatory environments. Using this approach, if the employee had the option to engage with the new piece of technology, then the implementation would be considered voluntary. If the adoption of RFID technology was required, then the implementation would be considered mandatory.

Voluntariness is defined as the degree to which a perceived decision is able to be made without the influence of outside parties (Moore & Banbasat 1991). Under a voluntary scenario, employees would have the option to adopt or not adopt the technology. Then, based on their decision, this research would question how satisfied they are with the implementation. Since this research isn't interested in user acceptance, the employee's initial decision isn't important. Their state of mind after the implementation is what is important. Instead of questioning if an employee will or will not adopt, this research is questioning how a voluntary scenario will affect job satisfaction.

Since increased autonomy positively correlates with job satisfaction, one might naturally assume that voluntary implementation environments will result in higher levels of job satisfaction. Such an assumption would generally be correct as previous works on the subject have demonstrated that a positive correlation between voluntariness and job satisfaction exists (Hackman & Oldham 1976, Spector 1986). The relationship only holds true up to a certain point though, as proven in Langford (2017). In the study, the author supported the claim that high levels of autonomy will result in lower performance, especially when the relationship is mediated with low levels of monitoring. Past literature has demonstrated that job performance and satisfaction is strongly linked (Ziegler, Hagen, & Diehl 2012). Based on the literature, it's reasonable to believe that it's generally better to increase employee autonomy, but only to a certain point. High levels of autonomy could ultimately lead to employees being confused by what is required in their job, which will lead to lower levels of job satisfaction.

When technology adoption is mandatory, then its perceived usage is either compulsory or required (Hartwick & Barki, 1994). In a scenario where an implemented technology is mandated, then employees would believe that they are being forced to adopt RFID technology. One might

immediately assume that forcing technological adoption will make employee disgruntled, but this claim doesn't always hold true. While studies support this conclusion (Kros et al. 2012, Langford 2017), there's the possibility of the inverse occurring. The nuance of mandating technology in the workplace is that employees might ultimately be satisfied with an implemented technology they wouldn't normally accept. Mandating the use of technology can frustrate employees (Hsieh et al. 2012) which can lead to a decrease in job satisfaction, but a strict relationship hasn't been observed in the known literature. In other words, an observed increase or decrease in job satisfaction is based on the context of the implication, as well as the end users' knowledge of the technology. Both Kros et al. (2012) and Hsieh et al. (2012) grant this point. As such, though mandating technology can decrease job satisfaction, it is completely context dependent.

The research in this study is considering the implications of the innovation and not the adoption itself; however, it's still important to define the environment in which the implementation took place. The adoption itself isn't important in this research, but the effects of the adoption on job satisfaction are. People in mandatory environments interpret issues related to adopting new technology differently than people in voluntary environments (Hossain & Quaddus 2014). As previous works have demonstrated, a lack of autonomy can positively or negatively affect employee satisfaction. The difference needs to be determined by contextualizing the implementation. To do so, the purpose of the technology should be considered.

Monitoring

Employee monitoring is defined as “the collection, storage, analysis, and reporting of information about an employees' productive activities” (Office of Technology Assessment

1987). This definition can be applicable to all forms of employee monitoring; however, the report being cited places the definition within the context of electronic performance monitoring (aka CPM). As discussed earlier, computer performance monitoring systems assist in tracking the activities of employees in the workplace. The literature on this topic is quite extensive, but the positions authors have taken reveal how polarizing the conversation around monitoring employees is. As stated earlier, RFID can be used to force compliance to business process by monitoring their activities and determining if there's any deviation from what's expected (Staats et al. 2017). This approach does increase efficiency, but it doesn't directly correlate with an increase in job satisfaction. Monitoring can be positive when there's a meaningful reason as to why management is monitoring (such as training a new employee). Otherwise, increased monitoring usually decreases employee satisfaction (Chalykoff & Kochan 1989).

An important note about monitoring is that the activity must be continuous (Bates & Holton III 1995, Office of Technology Assessment 1987). For example, RFID that is used primarily for access control wouldn't be considered monitoring as it only records the location of the employee at a specific point of time. A system that would be classified as a monitoring system would generally fall under the definition of CPM. An RFID system being used for monitoring purposes would, therefore, need to be able to constantly track information about the employee. The data being recorded could record employee productivity, slack, or other measures related to how the employee functions at work (Dworkin 1990). Conversely, a lack of significant monitoring (referred to in this paper as not monitoring) includes use cases in which the main purpose of the technology isn't to electronically track employee activities. A few examples were cited previously from Wu et al. (2006). Since this research is interested in RFID technology that specifically affects employees, then a general purpose could include access control, for example.

As long as the technology doesn't continuously monitor and the use case revolves around employees, then the technology will be considered not monitoring in the arguments presented in this work.

Based on literature such as Hartwick and Barki (1994), it's feasible to purpose that the factors being considered form individual binaries. Autonomy considers how much control an employee has in an implementation environment (voluntary vs. mandatory). A voluntary environment would give employees the option to adopt the technology, while a mandatory environment would make the technology required. The monitoring scale considers the intended purpose of the technology within the organization (monitoring vs. not monitoring). RFID being used to monitor employees would continuously record the activities of employees. A RFID being used for other purposes might record the activities of employees, but such records would be discrete. Based on these scales, it's possible to derive four different scenarios that can be tested.

Mandatory-Monitored	Mandatory-Not Monitored
Voluntary-Monitored	Voluntary-Not Monitored

A mandatory-monitored scenario would require the employee to adopt the technology and its purpose would be required. A mandatory-not monitor scenario would also require the employee to adopt, but the purpose of the technology would fall outside the definition of CPM. A voluntary-monitored scenario would give the employee the option to adopt, but the technology

would be used to monitor the employee. Finally, a voluntary-not monitored scenario would give the employee the option to adopt, and the purpose of the technology would fall outside the definition of CPM. Based on these scenario, the following hypothesizes were tested.

Hypothesis 1. If RFID technology is being implemented in an environment that mandates usage and that uses it to monitor employees, then employee satisfaction will be significantly lower for those employees who are regularly monitored as compared to those who are not regularly monitored.

Hypothesis 2. If RFID technology is being implemented in an environment where adoption is voluntary, then employee satisfaction will be statistically higher for those who are not regularly monitored as compared to those who are regularly monitored.

Hypothesis 3. If RFID technology is being implemented in an environment where employees are not regularly monitored, then there will be no significant difference between those environments that mandate usage as compared to those who do not mandate usage.

Analysis:

As discussed above, it was rather difficult to properly model the identified factors as each of them have numerous factors that influence them. The literature in many ways reflects this difficulty as many of the instruments used in prior studies consider multiple factors. While these scales did contain some questions that would have been perfect for measuring the purposed variables, more often than not, over half the items in the scale would be irrelevant to the question being asked.

For example, job satisfaction was measured using the Michigan Organizational Assessment Questionnaire Job Satisfaction Subscale (MOAQ-JSS) as adopted from Bowling & Hammond (2008). The MOAQ-JSS is a short scale derived from the popular Minnesota Satisfaction Questionnaire created by Weiss et al. (1967). The long-form survey contains 100 measurable items. Not only would the scale impose a massive time constraint, but many of the items in the long-form survey were deemed irrelevant to the question being asked. To avoid these issues, the short scale was used instead. The job satisfaction scale consists of the following questions:

In this scenario, I would be satisfied with my job.

In general, I wouldn't like the job in this scenario.

In general, I would like to work at the company in this scenario.

Monitoring was measured using scales from Chalykoff & Kochan (1989). As explained earlier, the topic of monitoring employees can be very difficult to approach since people are either okay with monitoring or are completely against it. This was reflected in some of the scales used to measure employee monitoring. Though scales have been used to measure monitoring, the context of the questions being asked seemed to be leading. More often than not, the questions seemed very black and white. The only scale the author found satisfactory was found in the Chalykoff & Kochan study. While the authors of the 1989 study did express their opinions on employee monitoring in the work, the tests they conducted were valid. The monitoring scale consisted of the following questions:

In this scenario, monitoring employees with RFID chips would be a good tool if used properly.

Monitoring employees with RFID chips in this scenario would be an invasion of privacy.

Supervisors in this scenario should not be allowed to do any monitoring.

Autonomy was measured using scales from Moore & Benhasat (1991). Autonomy was also a difficult scale to find since autonomy itself can refer to many different aspects of a job. For example, Breugh (1999) measured autonomy using three separate scales: one for method autonomy, one for scheduling autonomy, and one for criteria autonomy. Instead of measuring the different factors that comprise autonomy, a single-item, scale was used. The author, after some assistance, settled on the Moore & Benhasat scale. The scale places autonomy within the context of employees adopting an innovation in the workplace. The scale questions the employee's perception of autonomy in the workplace. Context can be given to the tested scenario, but ultimately it's the perception of autonomy that will affect job satisfaction. The autonomy scale consisted of the following questions:

My superiors in this scenario would expect me to use RFID monitoring.

My use of embedded RFID chips in this scenario would be voluntary (as opposed to required by my superiors or job description).

In this scenario, my boss would not require me to use embedded RFID chips.

Although it might be helpful, the use of embedded RFID chips in this scenario would not be compulsory in my job.

After determining which scales to use, a survey was developed that comprised of three seven-point measurements. The survey was distributed electronically to all students enrolled in the Operations Analytics course in the Spears School of Business at Oklahoma State University. 370 student responses were recorded within the five week window allotted to take the survey. Respondents were provided a base prompt. After reading the prompt, participants were randomly provided one of the four scenarios being tested. After carefully reading the scenario, respondents were asked to provide their thoughts to the questions listed above on a scale from 1 (strongly disagree) to 7 (strongly agree). Respondents were shown all prompts in order to verify if there was any noticeable difference between a single response and a between subject response model. A single-response analysis was desired as it would prevent individuals from learning how to respond to the prompts.

The environment and use case in each prompt given to a participant was consistent with the literature. For example, the not monitoring scenarios defined the use case in terms of security. The RFID wristbands in this scenarios had the ability to non-continuously record data (which would not classify it as a CPM). The monitoring scenarios explicitly informed participants that the RFID wristbands would be able to record their movement within the building.

After all responses were recorded, an ANOVA was conducted to determine whether there was any significant difference between the means of four groups. To substantiate the hypotheses purposed, only the mandatory-monitored scenario and the voluntary-not monitored scenario needed to be statistically significant.

Findings:

The results have the analysis have been summarized in the tables below. These tables present the initial model (Table 1), the relationship between the tested factors and job satisfaction (Table 2), and the means of the individual scenarios tested (Tables 3). The results presented were based on the final sample drawn (n = 370) and wasn't based on any analysis conducted on the sample prior to the closing of the survey.

Table 1 presents the results of the model of the study. One might notice several glaring issues with the model. First, the model isn't significant as the p-value established before the test ($p = 0.05$) was barely exceeded ($p = 0.510$). As such, the model was unable to reject the null, insinuating that there is no significant difference between implementation environments when only considering the two factors used in the model. Even if the model was significant, the relationship between autonomy, monitoring, and job satisfaction is extremely weak. The explanatory power of the model is almost nonexistent (Adj R = 0.130). The results of the model indicate that there is no significant difference between the four groups. The sample size for each group was achieved (minimum n = 251) which lends the findings more confidence.

Table 1: Summary of the Model

	SS	df	MS	F	P>F	Adj R
Model	23.4425284	3	7.81417614	2.61	0.0510	0.0130
Residual	1093.96558	366	2.98897699			
Total	1117.40811	369	3.02820626			

Table 2 contains data on the specific variable interactions found in the model. Even though the model itself isn't significant, there were some notable relationships. For example, job autonomy was found to be significant ($p = 0.0065$) which reinforces the findings of previous

studies. Monitoring as well as the voluntary-monitoring interaction was found to not be a significant predictor of job satisfaction.

Table 2: Summary of Variable Interactions

	SS	MS	F	P>F
Vol	22.37482667	22.37482667	7.49	0.0065
Mon	1.05980673	1.05980673	0.35	0.5519
Vol*Mon	0.00160178	0.000160178	<0.001	0.9815

Table 3 notes the least square means of the groups found when conducting the ANOVA. The values were validated by comparing the least square means with the arithmetic means and showing that they are identical. The mandatory-not monitored had the lowest overall average while the voluntary-monitored had the overall highest. The model’s lack of significance would indicate that it’s better to use the null model instead of the tested model. Based on the averages, a naïve interpretation of the results would suggest that the voluntary-monitored scenario leads to the highest job satisfaction since the average of the group was the highest overall.

Table 3: Summary of Scenario Means

Group	Means
Mandatory-Monitored	2.95505618
Mandatory-Not Monitored	2.84375000
Voluntary-Monitored	3.44318182
Voluntary-Not Monitored	3.34020619

Discussion:

The purpose of this study was to try and understand the implications of implementing RFID technology in the workplace using autonomy and monitoring as mediators. While the results of the purposed model weren't significant, there is several interesting bits of information that can be used to improve the model moving forward. For example, there was an interesting three way relationship that existed between autonomy, monitoring, and gender that was significant ($p < 0.05$). A summary of the model can be seen in Table 4.

Table 4: Summary of Three-Way Interaction

	SS	df	MS	F	P>F	Adj R
Model	50.908337	7	7.27620	2.47	0.0174	0.045701
Residual	1063.042883	361	2.944717			
Total	1113.951220	368	10.220917			

While this model still doesn't fully explain the relationship between the used variables and job satisfaction (Adjusted R is barely over 4 percent) it was possible to draw some interesting conclusions. Based on the variable interactions summarized in Table 5, the three-way interaction between gender, autonomy, and monitoring was significant. Women cared about the degree of autonomy they had when not being monitored, but they didn't care about the degree of autonomy when being monitored. Men were the complete inverse. Men cared about the degree of autonomy when not being monitored, but they didn't care about the level of autonomy they had when not being monitored.

Table 5: Summary of Three-Way Variable Interactions

	SS	MS	F	P>F
Vol	21.53300565	21.53300565.	7.31	0.0072
Mon	0.88834913	0.88834913	0.30	0.5832
Gender	2.35422954	2.35422954	0.80	0.3718
Vol*Mon	0.01454722	0.01454722	< 0.01	0.9440
Vol*Gen	0.00665590	0.00665590	< 0.01	0.9621
Mon*Gen	2.36787153	2.36787153	0.8	0.3705
Vol*Mon*Gen	23.74367763	23.74367763	8.06	0.0048

The three-way interactions perfectly explains one of the major limitations of this study. Prior research on the topic of job satisfaction have tied the functions of the job with the immutable characteristics of the employee (Bradley, Taylor, & Anh 2003). The model presented in this study did consider factors related to the job, but it didn't necessarily consider individual factors (gender, nationality, etc.). When reproaching this research in the future, the model should be adjusted to consider both the environment in which the implementation is taking place and the employee's characteristics.

There are a few other reasons that could explain why the initial model wasn't significant. For example, the prompt that users were given was intentionally abstract in order to better understand the effects RFID implementation has on job satisfaction in a general sense. A problem with this approach is that the relationship between job satisfaction and the variables used in the model are context dependent. Though some context was given, certain factors that have been shown to affect job satisfaction, such as the level of feedback given, weren't considered. Chalykoff and Kochan (1989) noted that there are three factors of a CPM that affect

job satisfaction: the use case of the technology, the control and feedback components of the system, and the employee's responses to the implementation. Two of the factors were considered in the model, but not all three. Since both autonomy, perceived monitoring, and feedback are notable determinants of job satisfaction, future models will consider all three factors instead

Another key issue was the sample itself. The average age of the sample was 22 years old (20 excluding outliers). Since the age group that was sampled was so young, it's possible that participants haven't been readily exposed to a scenario where new technology was being implemented at work. In other words, the individuals sampled were not entirely representative due to participants lacking work experience. As such, future research on the topic should consider the influence that age plays in the scenarios being modeled.

Overall, while the results of the initial model were fruitless, there were some interesting findings that can be used when reapproaching this topic. A notable result of this research was the significant interaction found between gender, autonomy, and monitoring (discussed above). Another possibility to consider in the future would be to account for system feedback. A rework of the model should analyze the effects of implementing technology upon the three dimensions defined in Chalykoff and Kochan (1989) while also considering the individual characteristics of the employee. By doing so, it will be possible to come to a better understanding as to what specific factors influence job satisfaction when implementing RFID technology.

Conclusion:

RFID usage in the workplace is likely going to continue for the foreseeable future. Thus, it's important for management to understand the different implementation environments of this technology and how they affect the satisfaction of their employees. Failing to do so could result

in the business experiencing easily avoidable negative consequences. Ultimately, this study attempted to start a conversation that is almost non-existent in the current literature and some great insight was discovered. Though the initial model of this research was fruitless, this study was nonetheless able to provide some insight through the three-way interaction that was discovered. Armed with the information in this study, the model developed in this research can be further fleshed out and examined.

References:

- Asif & Mandviwalla (2005). Integrating the Supply Chain with RFID: A Technical and Business Analysis. *Communications of the Association for Information Systems*, 15(24), 392-427.
- Aziri (2011). Job Satisfaction: A Literature Review. *Management Research and Practice*, 3(4), 77-86.
- Bates & Holton III (1995). Computer performance monitoring: A review of human resource issues, 5(4), 267-288.
- Bowling & Hammond (2008). A meta-analytic examination of the construct validity of the Michigan Organizational Assessment Questionnaire Job Satisfaction Subscale. *Journal of Vocational Behavior*, 73(1), 63-77.
- Brady (2017). Wrist Band Haptic Feedback System. U.S. Patent 9,881,277.
- Bradley, Taylor, & Nguyen (2003). Job autonomy and job satisfaction: new evidence. Lancaster University Management School.
- Breaugh (1999). Further Investigation of the Work Autonomy Scales: Two Studies. *Journal of Business and Psychology*, 13(3), 357-373.
- Chalykoff & Kochan (1989). Computer-Aided Monitoring: Its Influence On Employee Job Satisfaction And Turnover. *Personnel Psychology*, 42(4), 807-834.
- Cummings, Molloy, & Glen (1975). Invention strategies for improving productivity and quality of work life. *Organizational Dynamics*, 4(1), 52-68.
- Davis, Bagozzi, & Warshaw (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*, 35(8), 982-1003.
- Davis (1993). User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. *Man-Machine Studies*, 38(3), 475-487.

- Dworkin (1990). Protecting Private Employees from Enhanced Monitoring: Legislative Approaches. *American Business Law Journal*, 28, 58-85.
- Hackman & Oldham (1976). Motivation through the Design of Work: Test of a Theory. *Organizational Behavior and Human Performance*, 16, 250-279.
- Hardwick & Barki (1994). Explaining the Role of User Participation in Information Systems Use. *Management Science*, 40(4), 440-465.
- Hossain & Quaddus (2015). Radio frequency identification (RFID) adoption: A cross-sectional comparison of voluntary and mandatory contexts. *Information Systems Frontiers*, 17(5), 1057-1076.
- Hsieh et al. (2012). Impact of User Satisfaction with Mandated CRM Use on Employee Service Quality. *MIS Quarterly*, 36(4), 1065-1080.
- Jong (2016). The Role of Performance Feedback and Job Autonomy in Mitigating the Negative Effect of Role Ambiguity on Employee Satisfaction. *Public Performance & Management Review*, 39(4), 814-834.
- Kim & Garrison (2010). Understanding users' behaviors regarding supply chain technology: Determinants impacting the adoption and implementation of RFID technology in South Korea. *International Journal of Information Management*, 30(10), 388-398.
- Koh et al. (2010). A Model for Mandatory Use of Software Technologies: An Integrative Approach by Applying Multiple Levels of Abstraction of Informing Science. *The International Journal of an Emerging Transdiscipline*, 13, 177-203.
- Kros et al. (2012). Technology emergence between mandate and acceptance: an exploratory examination of RFID. *International Journal of Retail & Distribution Management*, 40(2), 128-156.

- Kulik & Ambrose (1993). The Impact of Computerized Performance Monitoring Design Features on the Performance Appraisal Process. *Journal of Managerial Issues*, 5, 182-197.
- Langford (2017). Too Much of a Good Thing? Negative Effects of High Trust and Individual Autonomy in Self-Managing Teams. *The Academy of Management Journal*, 47(3), 385-399.
- Moore & Benbasat (1991). Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. *Information Systems Research*, 2(3), 173-239.
- Office of Technology Assessment (1987). The Electronic Supervisor: New Technology-New Tensions. Washington, DC: US Government Printing Office.
- Parvin & Kabir (2011). Factors Affecting Employee Job Satisfaction Of Pharmaceutical Sector. *Australian Journal of Business and Management Research*, 1(9), 113-123.
- Schleifer & Shell (1992). A Review and Reappraisal of Electronic Performance Monitoring, Performance Standards and Stress Allowance, *Applied Ergonomics*, 23(1), 49-53.
- Sheng et al. (2010). Ubiquitous RFID: Where are we? *Information Systems Frontiers*, 12(5), 485-490.
- Shi & Yan (2016). Factors affecting RFID adoption in the agricultural product distribution industry: empirical evidence from China. *SpringerPlus*, 5(1), 1-11.
- Spector (1986). Perceived Control by Employees: A Meta-Analysis of Studies Concerning Autonomy and Participation at Work. *Human Relations*, 39(11), 1005-1016.
- Spector (1997). Job Satisfaction: Application, Assessment, Causes, and Consequences. Thousand Oaks, CA. Sage Publications.

- Staats et al. (2017). Motivating Process Compliance through Individual Electronic Monitoring: An Empirical Examination of Hand Hygiene in Healthcare. *Management Science*, 63(5), 1563-1585.
- Tripathi & Pandey (2017). Examining the Relationship between Work-Family Conflict, Job Satisfaction and Employee's Turnover Intention. *Journal of Psychological Research*, 12(2), 451-459.
- Weiss et al. (1967). Manual for the Minnesota Satisfaction Questionnaire. Minneapolis, MN.
- Wu et al. (2006). Challenges to global RFID adoption, *Technovation*, 26(12), 1317-1323.
- Ziegler, Hagen, & Diehl (2012). Relationship Between Job Satisfaction and Job Performance: Job Ambivalence as a Moderator. *Journal of Applied Social Psychology*, 42(8),