

Fall 2019

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# **Effects of Employee Engagement and Adoption of Information Technology on Individual Employee Performance**

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## Abstract

*The lack of workers is one manufacturing's most dire situations. The U.S. manufacturing industry has experienced significant growth over the past few decades, and according to research conducted by Deloitte and The Manufacturing Institute, over the next 10 years, manufacturers will need to add 4.6 million manufacturing jobs, 2.4 million of which may go unfilled (Bolt, 2018). Skilled, engaged workers are critical to the success of manufacturing operations. Kahn (1990) referenced personal engagement and personal disengagement as "behaviors by which people bring in or leave out their personal selves during work role performances." According to Gallup's 2016 State of the American Workplace report, engaged employees are more present and productive, attuned to customer needs, and more observant to processes, standards, and systems. Combined, the behaviors of highly engaged employees lead to an average of 21% increased profitability (Gallup, 2016).*

*The quality and timing of information technology-enabled manufacturing systems has the potential to magnify the effects of individual efforts to achieve greater output. Conversely, poorly implemented information technology (IT) in manufacturing may create a negative effect and place pressure on shop floor team members, thus impacting manufacturing performance and employee engagement (Wall et al. 1990). This research seeks to study the impact that the relationship between IT and employee engagement (EE) has on individual employee performance (IEP) with the goal of prescribing how manufacturers may leverage their current workforce and the proper adoption of IT. This research will prescribe a study in a manufacturing environment to compare IEP measurements of safety, quality, and productivity in a control plant and in an experimental plant undergoing the adoption of enterprise resource planning (ERP) software. There are implications of this study for scholarly and practical application with suggestions for future research.*

**Keywords:** Employee engagement, individual employee performance, enterprise resource planning

## Introduction

Organizational behavior research generalizes three states employees hold as committed to organizations (Mowday et al., 1982), involved (Lawler and Hall, 1970), and alienated (Blauner, 1964). People constantly bring themselves into or remove themselves from work tasks as a response to momentary ebbs and flow during their workdays and as an expression of their selves

at sometimes and at defense of their selves at other times. Employees are most engaged when they are in a role and environment where they can express their “preferred self” in the way they connect to work and others, personal presence (physical, cognitive, and emotional), and active, full role performances. Conversely, personal disengagement is when employees withdraw their preferred self-behaviors, visible by “an evacuation or suppression of their expressive and energetic selves in discharging role obligations” (Kahn, 1990).

Understanding the drivers of EE are relevant in retaining skilled workers. The research company, Gallup, has identified twelve measures of EE related to psychological and environmental factors that are linked to business outcomes. Several psychological measurements include whether a supervisor or coworker cares about the employee, if an employee feels his or her opinion matters, and if the employee has a best friend at work. Several environmental measures are related to an understanding of job expectations, having the right tools, and measuring the quality of work of the employee’s coworkers.

IT is a critical capability of the organization and is complimentary tool that supports the organization’s functional areas. Manufacturing firms rely on enterprise-wide information systems to enhance operational performance through shared access of information across the varying production and distribution phases (Bharadwaj et al., 2007). Improved information flow, standardization and integration of activities and centralization of administrative services lead to fewer errors and delays in entering orders, as well as adoption of accepted best-practices business processes that replace inefficient manual processes (Gattiker and Goodhue, 2005). Proper technology fit is vital in leveraging information systems (IS) to serve as the right tool to support individuals within an organization. Though all firms may have access to advanced information systems, not all firms are able to seize the full benefits of these systems; only those

that can “seize and master the challenges of developing superior integrated IS capability can provide tremendous performance gains (Bharadwaj et al., 2007).

This research reviews and synthesizes current literature on the topics of EE and the proper fit and application of IT and provides a research model that shows the relationship between EE, IT, and IEP. The purpose of this research is to improve understanding of the factors that lead to improved EE and proper application of IT, grounded in theory, with the objective of assisting organizations achieve greater IEP through improved EE. Four hypotheses are proposed with a recommended experiment to validate the hypotheses. Limitations of this research and recommendations for future research are also included.

## **Literature Review**

The two primary streams of literature in this research review are EE and IT strategy. The conditions that affect EE and how EE affects IEP within an organization will be discussed. The potential value that effective assimilation of IT within an organization has on IEP will be presented.

### **Employee Engagement (EE)**

I will first provide context for EE and employee disengagement, followed by five themes selected from EE literature to help the reader understand the components of the psychological and environmental conditions of EE, namely: 1) self-fulfilling prophecy, 2) organizational and strategic commitment, 3) strategic knowledge, 4) strategic change, and 5) strategic alignment.

## Employee Engagement and Employee Disengagement

Kahn's (1990) research illustrates and provides examples of personal engagement and personal disengagement. It should be recognized for this research that the terms personal engagement and personal disengagement also represent the researcher's intent for EE and employee disengagement. Self and role exist in some dynamic, negotiable relation in which the individual both drives personal energies within the role (self-employment) and the degree of self within the role (self-expression). People become physically involved in tasks, cognitively vigilant, and empathetically connected with others in their work in ways that reflect what they think and feel, their creativity, their beliefs and values, and their personal connections with others (Miner, 1987). In an interview at the architecture firm participating in one of Kahn's (1990) research experiments, a senior designer described a moment of personal engagement when she was (physically) "flying around the office," (cognitively) working out the design-construction interfaces, and (emotionally) refused to give public criticism, empathizing with other people's feelings. At the same time, she expressed herself -the dimensions that hooked in the job of creating designs both aesthetic and functional -by exhorting team members to think about how the clients would actually use the work, questioning the chief architect's assumptions about the design, providing criticism to others in ways both constructive and gently, and working with the clients as a collaborator rather than a "hired gun" (Kahn, 1990).

When I was a manager of a purchased parts warehouse, a critical shipment was due in on a Saturday when my team was not scheduled to work. I was unable to run the equipment required to safely unload the shipment. One of my team members volunteered to be on-call and later came in when the shipment arrived and unloaded the truck. He did this because of his commitment to the organization.

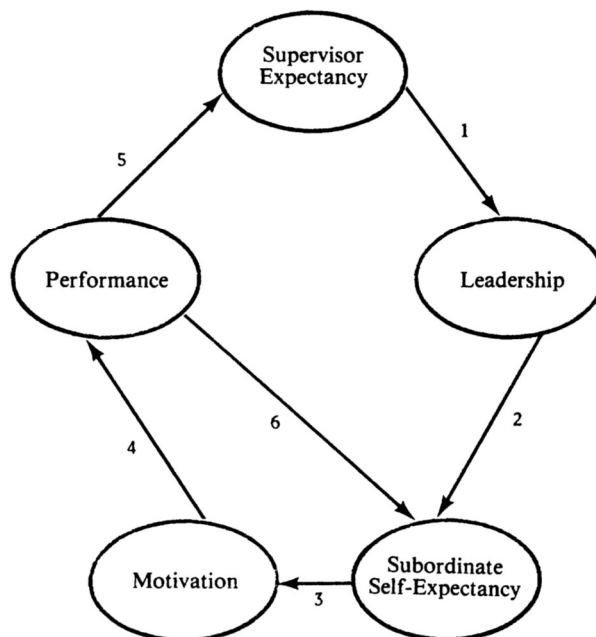
Becoming personally disengaged could be represented by the withdraw of preferred dimensions from physical, cognitive, and emotional labors through underlying task behaviors researchers have called automatic or robotic (Hochschild, 1983), burned out (Maslach, 1982), apathetic or detached (Goffman, 1961), or effortless (Hackman and Oldham, 1980). People perform tasks at some distance from their preferred selves, which remain split off and hidden. Another research example by Kahn (1990) describes a moment where one of the camp directors felt personally disengaged while teaching a windsurfing class. She reported withdrawing herself (physically) by “sending them out and just laying around”, (cognitively) by “not telling them much or helping them out much,” and (emotionally) by being “more bland, superficial, talking in flat, unemotional tones.” At that moment, she was not displaying her personal self. “I was really shut down, not letting loose or being funny or letting them get close to me by talking more about myself. I just didn’t let them in, I guess.” Her personal disengagement meant withdrawing and defending herself against the interpersonal connections that defined her typical personal preferences in her counselor role (Kahn, 1990).

The three psychological conditions that shape how people inhabit their roles as either personally engaged or disengaged are 1) meaningfulness, 2) safety, and 3) availability. Psychological meaningfulness is associated with work elements that create incentives or disincentives to personally engage. Psychological safety is associated with social systems created nonthreatening, predictable, and consistent in order to engage. Psychological availability is associated with the degree of personal distractions that preoccupied personal resources available to engage (Kahn, 1990).

## Self-Fulfilling Prophecy

The Pygmalion effect is the enhanced performance of subordinates of whom supervisors expect more. Pygmalion design sets random members of a group as “high” achievers from a credible source. Unknown to the instructor and individual, those labeled as “high achievers” have the same potential as their control-condition peers. The Pygmalion hypothesis is confirmed if subjects designated as “high achievers” outperform the control group (Eden, 1984). Vroom (1964) defined expectancy in work-motivation theory as “a momentary belief concerning the likelihood that a particular act will be followed by a particular outcome.” Eden continued that the higher the level of an individual’s self-expectancy, the greater his ability to perform. Eden (1984) provides a model of self-fulfilling prophecy at work in Figure 1 below.

**Figure 1**  
**A Model of the Self-Fulfilling**  
**Prophecy at Work**





Supervisor expectancy is the first link in the model. One impact of high supervisory expectancy is better leadership (arrow 1). Through the Pygmalion effect, higher leadership expectations instill higher subordinate self-expectancy (arrow 2). Likert (1961) stressed the communication of high expectations by supervisors to their subordinates is an important part of leadership behavior. The highly effective manager who has the most productive subordinates, “his confidence in his subordinates leads him to have high expectations as to their levels of performance. With confidence that that he will not be disappointed, he expects much, not little” (Likert, 1961). Eden (1984) offers 4 suggestions for implementing a Pygmalion leadership style: 1) Gain awareness of possible effects of subordinate self-efficacy, 2) reduce occurrence of low expectations, 3) set challenging goals to communicate to subordinates and communicate that they are capable of achieving such goals, and 4) use times of organizational change to induce positive expectancies in employees (Kierein and Gold, 2000).

The combination of expectancy and high leadership expectations produces overall motivation (arrow 3) and leads to the employee investing greater effort, which leads to improved performance (arrow 4). The loop is closed by the causal effect that improved performance was initiated by the supervisor’s expectancy. The Galatea effect shows that a supervisor’s leadership may be dispensable through an experiment where a supervisor was replaced midway through the course without repeating the supervisory expectancy stage with the subordinates (Eden and Ravid, 1982). Results of a “second generation” of Pygmalion are represented through the three variable loop in Figure 1 between arrows 3, 4, and 6, positing that subordinates may sustain high levels of performance on their own, motivated by self-expectancy, motivation, and performance (Eden, 1984; Kierein and Gold, 2000).

Pinder (1984) said that if people are assigned to jobs for which they are not trained, “their expectancy perceptions will be low, and we will not expect to see them trying to perform.” He cites equipment, staff, and budget as preconditions for positive expectancy. The relevance is that expectancy is a perception of the situation, rather than a belief about self, and that through changing the situation and not the individual, expectancy may be realized (Eden, 1988).

### Organizational and Strategic Commitment

Organizational commitment is an individual’s attachment and willingness to support his or her organization considering the dimensions of an individual’s intensity of commitment and object to which individuals commit. Gagnon et al., (2008) focused research on three antecedents to strategic commitment and strategic change: 1) Openness to experience, 2) perceived company trust, and 3) company tenure.

First, individuals open to experience are typically broad-minded, curious, learning-oriented, willing to face new challenges, better able to deal with change, and better able to commit to strategic change (Barrick and Mount, 1991). Individuals high in openness to experience will be better able to commit to strategic change since most strategies involve setting new learning objectives and means to accomplish the strategy (Gagnon, et al., 2008).

Second, research shows that trust in leadership has a positive relationship with organizational commitment and desired work (Dirks and Ferrin, 2001). This is especially important for hourly employees facing new strategy, as they may have less education and exposure to business knowledge regarding strategy compared to salary employees. Trusting in the organization’s leaders becomes a proxy for supporting strategic initiatives and building commitment (Gagnon et al., 2008).

Third, company tenure represents individual's structural involvement with their organization, capturing the degree of embeddedness an individual has within an organization's structure. Mitchell et al. (2001) found that embeddedness within an organization was positively related to organizational commitment. There is a difference between organizational commitment and strategic commitment; strategic commitment has more to do with supporting change. Highly tenured individuals often embody the rituals and routines that give structure to an organization, leading to increased organizational commitment, but decreased strategic commitment, as they are more likely to follow the *status quo* (Gagnon et al., 2008).

### Strategic Knowledge

An individual's global understanding of their organization's strategy in terms of explicit and tacit knowledge is strategic knowledge. Examples of explicit knowledge could include production targets or safety objectives. Tacit knowledge, sometimes known as tribal knowledge, requires individuals to personalize knowledge or personalize their linkage to strategy based on their knowledge and experience. Employees with a high level of strategic knowledge will have a shared interpretation among its members as to the nature of its strategy, goals, and how each member may contribute in achieving the goals. Gagnon et al. (2008) further suggests that strategic knowledge serves as raw material to an individual's judgement about their organization's strategy.

Gagnon et al. (2008) posit that strategic knowledge leads to strategic commitment. Cognitive theory indicates that knowledge serves as the medium for the formation and maintenance of schemas, or cognitive structures that individuals create and use to make sense of the world. Increased knowledge creates more rich content schemas about the strategy (Fiske and

Taylor, 1991). There may be times when increased knowledge regarding an organization's strategy may lead to a decrease in commitment, such as when strategic knowledge has negative perceived implications for the individual or organization. The positive prediction of the relationship between strategic knowledge and strategic commitment is assumed by Gagnon et al. (2008), that the strategic knowledge presented to employees is requisite for their position and the timing of the communication of organizational strategic efforts.

### Strategic Change

Organizations of all types routinely attempt strategic change, but many implementations efforts fail. Change implementation is considered a game of high stakes where success can reinvigorate a business, but failure can have catastrophic consequences, including the demise of the firm (Hofer & Schendel, 1978). Though a substantial knowledge base exists regarding how firms attempt strategic change through top managers, little research exists about the ways in which employees contribute to the achievement of a new strategic direction. This is due to several factors. First, traditional research favors the formulation of change strategies over its implementation. The emphases of the change strategies by top management leads to overlooking the critical actions of other managers and employees implementing the strategies (Sonenshein & Dholakia, 2012). Second, change research often takes a top-management perspective, and with little research on employees' role in strategic change (Gioia & Thomas, 1996) it is often assumed that the dominant response to change by employees is resistance (Dent & Goldberg, 1999).

Individuals are more likely to positively adapt to life changes by explaining those changes within a dominant worldview (understanding) and in finding more benefits that outweigh the downside of the changes (benefits finding). This provides a foundation to explain the conditions under which employees can overcome difficulties in implementing strategic

changes at work. The meaning-making change adaption model (MCAM) creates a theoretical framework that makes three important claims on change adaption behavior: 1) the core meaning-making constructs (understanding and benefits finding) lead to psychological resources for important change implementation behavior, 2) psychological resources of commitment and identification with the organization and efficacy explain how those resources activate EE during strategic change, and 3) communication affects the meaning-making process (Sonenshein & Dholakia, 2012).

### Alignment with strategy

Strategic alignment is used to describe individual strategic contributory behavior in both academic and practitioner contexts. The problem of individuals misaligned with organizational strategies (i.e. not behaving in a manner that supports organizational strategy or objectives) has extensive history with the common theme that there is a need for employees to behaviorally contribute in order to support organizational strategies. Ensuring they do is a challenge (Gagnon et al., 2008).

Research suggests that supervisors are a central contributor to positive employee work attitudes. Supervisors seeking to improve employee strategic alignment should increase levels of both strategic knowledge and trust and be considerate of the critical role of human capital during strategic change program design and implementation. Additionally, during the strategic program design stage, training programs and communication plans should be established to facilitate knowledge and commitment as well as open and honest dialogue regarding the change and perceptions about the change in order to build trust and commitment that will lead to strategically aligned behavior (Gagnon et al., 2008).

Helping employees make the connection between strategic changes and their efforts make strategic initiatives relevant to them. Gagnon et al. (2008) illustrate this when management and union leaders had established a sense of urgency by communicating to hourly team members the necessity of the strategy to transform to lean environment in order to reduce costs and lead time, improve quality, and remain competitive with overseas manufacturers.

### **Information Technology (IT) Strategy**

IT adoption is essential for firm survival. I use prior literature and theory to explain why firms utilize IT capabilities, the need for strategic guidance and fit within a firm when implementing IT, the value of proper assimilation of IT, and the need for management to build upon existing cultural strengths while creating a digital culture.

There are three technology-driven forces transforming the nature of management. Automation is making it more possible for companies to work without human involvement. Data-driven management supplements intuition and experience with data and experimentation. Resource fluidity match tasks to the people who can best perform them, whether inside or outside of the company (Westerman, 2016). He cautions that the three digital forces could transform management for the worse if taken to the extreme. Think of digital forces as vitamins or prescription drugs: right amounts applied under right conditions can yield fabulous results. Using too much or in the wrong conditions, can be poisonous. He reminds us that it is people who make companies work, and that the vision of management in five or ten years should not be one where all employees are seen as contracted resources laboring under tight, machinelike supervision. It should be one where computers help employees to collaborate fluidly, make

decisions scientifically, and manage better with automation than they ever could without it. In the long run, digitally savvy companies that engage the hearts and minds of employees will outperform those that treat people like machines (Westerman, 2016).

In order to gain a deeper understanding of the value of IT within an organization, I explore why organizations process information. Organization theory literature suggests two reasons: 1) to reduce uncertainty and to 2) reduce equivocality (Daft and Lengel, 1986). Based on earlier work in psychology, uncertainty is described as the absence of information. As information increases, uncertainty decreases. This can be illustrated by two people playing the game of 20 questions. As yes-no questions are answered, the object may be identified. Once the object has been identified, uncertainty is gone and additional questions provide no additional information (Daft and Lengel, 1986). Equivocality means ambiguity, or the existence of multiple and conflicting interpretations about an organizational situation where asking yes-no questions are not feasible. Decision making under these conditions where almost nothing was given or easily determined require managers to figure things out for themselves (Daft and Lengel, 1986).

Daft and Lengel (1986) ask, “How can organizations be designed to meet the needs for uncertainty and/or equivocality?” They extend previous research by answering in two parts: 1) amount of information and 2) richness of information. First, uncertainty may be reduced by using formal information systems that have greater capacity to carry useful data to managers such as production workflow, employee absenteeism, downtime, productivity, etc. than standing rules and procedures. Second, equivocality is the reduction of time required for the ability of information to change understanding (Daft and Lengel, 1986). Machine shop managers within my current organization have limited visibility of real-time part tracking information. In one

facility that supports a large share of replacement parts for our customers, I asked the manager how significant the lack of part tracking was to him and his team. He said he is required to provide updates on rush orders throughout the day. He has implemented an excel-based tracking system at approximately 15% of his machines. He said if his excel-based program was implemented at every station, his productivity would improve 5-10%.

Quaadgras et al., (2014) suggests four management commitments that significantly explain impact of IT to organizations: 1) strategic choice making, 2) development of digital platforms, 3) working smarter with information, and 4) action-oriented assessment. First, strategic choice making is determining what a firm will do with IT and what it will not do. Answering the following questions can aide in strategic choice making: Which processes will be standardized? What data will be shared across the enterprise? How digital assets will be coordinated? What activities will be outsourced? Second, the development of digital platforms provides scalable and reusable solutions. Firms can build innovative applications that can add short-term boost to performance, however, management experience and research highlight the difficulty of sustaining benefits when competitors can build a similar application. Worse still, proliferation of one-off IT solutions creates a messy IT and business environment than invariably limits future business opportunities (Ross et al., 2006). Implementing digital platforms, rather than individual IT solutions, firms can improve business performance and enable future business opportunities (Bharadwaj et al., 2007). Based on their research and consistent with prior literature, Quaadras et al. (2014) found four types of digital platforms: 1) Technology infrastructure, 2) Digitized business processes, 3) Data, and 4) Electronic linkages to external parties. According to Woerner et al. (2013) the development of platforms enables reuse of systems and processes, which both cut costs and reduces time to market. Third, working smarter



with information means empowering operational decision makers with useful information, clear business rules, and creating and revising business rules based on business analytics (Quaadras et al., 2014). Fourth, action-oriented assessments leading to IT organizational impact include using small sets of business metrics that focused people throughout the firm on enterprise-wide goals, incorporating incentives that balance enterprise and local goals, providing rapid feedback to help individuals understand how they are performing, and the reliance on clear metrics for assessing the success of IT projects (Quaadras et al., 2014).

When considering what technology to adopt, fit of the technology within the organization should be considered. Organization information processing theory states that performance is influenced by the level of fit between information processing mechanisms (such as ERP) and organization context (Gattiker and Goodhue, 2005). Two important elements of this context are 1) interdependence and 2) differentiation. First, the greater the interdependence, the greater the need to share information between organizational units. For example, an enterprise solution may be a good fit that 1) enables process standardization, 2) passes information across organization giving better visibility to KPIs, 3) automates many back-end processes, and 4) standardizes processes in conjunction with the implementation (Gattiker and Goodhue, 2005). Second, an example of differentiation is multiple subunits within an organization intentionally operating under differing business processes. Each subunit may require a unique, non-standard solution to cope with its circumstance (Tusnman & Nadler, 1978).

Sinha and Noble (2008) stress the importance of a managerial technology vision in developing a technology strategy and managing firm survival. Their research found that firms that can identify and successfully adopt industry-changing manufacturing technology had greater chance for survival. They caution against adopting technologies that do not yield financial

success as they may cause disruption. They suggest that these decisions should be left to senior management. Though firm survival is the ultimate measurable, more short-term and traditional measurements should also be used to gauge adoption of manufacturing technology and firm performance.

When discussing the importance of IT, consideration should be given to IT's complimentary potential, and not merely its individual contribution to the firm's and individual employee's success. Complementarity theory suggests that the value of an organizational resource can increase in the presence of other complementary resources (Bharadwaj et al., 2007). Robey et al. (2002) argue that successful implementation of complex IS, such as ERP, is contingent on the interactions and communication between IS and other functional areas. This point is relevant in my current (manufacturing) organization. ERP has been established within the organization for many years, however, the adoption of ERP technology on the shop floor has been a challenge, due to the scale and complexity of the issue, but also given the level of organization support and communication required between IS and Manufacturing.

According to Sinha and Noble (2008), manufacturing technologies are the "master tools of industry that magnify the efforts of individual workers and enable production of all manufactured goods, with production tools including machine tools and other related equipment, their accessories, and tooling." They continue that while radical manufacturing technologies often promise benefit to adopters, the timing of adoption is critical. Firms should be intentional about the strategic benefit to their organization when choosing an adoption policy. Some firms may not learn of emerging technology as quickly, some cling to their current model where they knowingly use less than state of the art technologies given the synergies that exist within the other firms' assets (Chari and Hopenhayn, 1991).

Westerman et al. (2019) continues by suggesting that “rather than ditching current practices, create digital culture that preserves best of legacy practices.” Further recommendations include: 1) conduct rapid experimenting when delivering solutions, 2) give people autonomy to organize and participate in teams, including with external partners, 3) replace intuition with intentional testing and data-driven decision making, 4) create guidelines that enable speed and autonomy without sacrificing integrity, 5) develop processes to rapidly identify places where guidelines are not being followed, 6) help employees keep skills through current training and stretch assignments, 7) constantly focusing on results, 8) make sure everyone understands performance goals, 9) grant people autonomy to act quickly within clear guidelines, and 10) link employee actions to customer. Start in a high impact area and give people chance to make small impact Westerman et al. (2019).

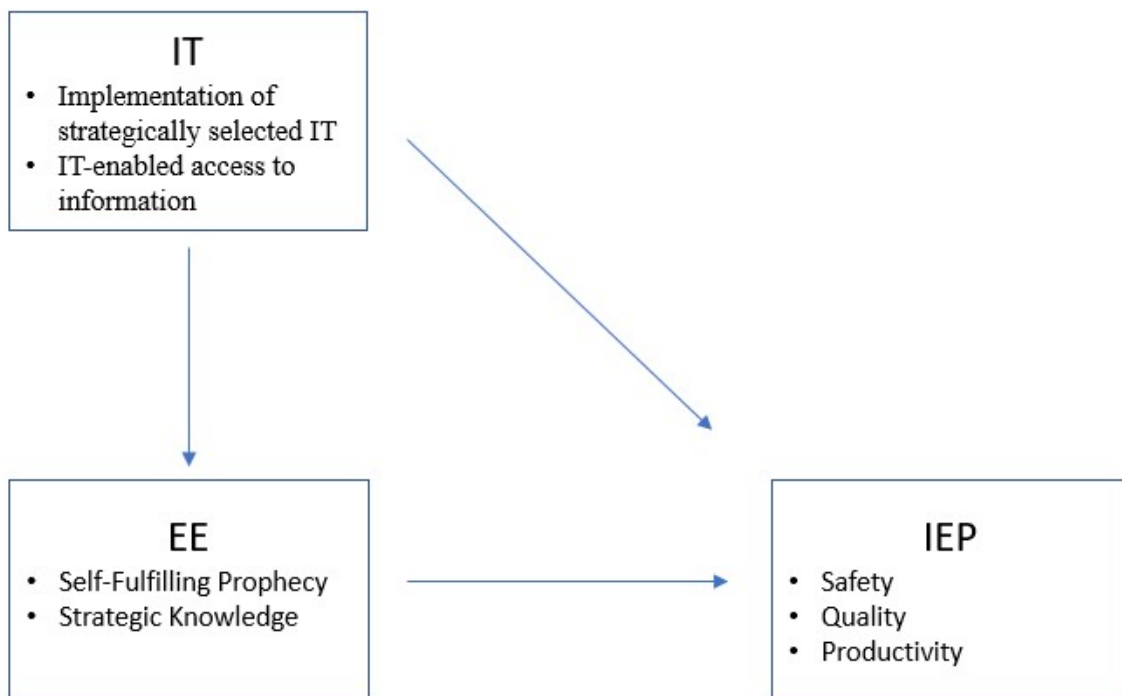
Recognizing the potential value of leveraging IT capabilities to process and share critical information within the organization, IT and top management should create a digital culture that is prepared for greater amounts of data and technology to support strategic growth. Culture is a set of values and norms that guide human interaction and presents the values of management, represents the unspoken assumptions of employees, and accepted behaviors that have helped an organization succeed in its environment (Westerman et al., 2019). Four key values of digital culture are 1) creating impact through constant innovation, 2) achieving speed by moving fast and iteratively rather waiting to have all of the answers, 3) openness by engaging broadly with diverse sources of information and insight, and 4) enabling autonomy by granting a high level of discretion to do what is needed rather than relying on formally structured coordination and policies. Values of digital culture can foster an engaged, empowered workforce where

employees feel a personal responsibility to constantly change the company (Westerman et al., 2019), often leading to a more innovative and timelier solutions development to the customer.

## Theoretical Background and Hypotheses

A research model describing the relationship between IT and IEP, EE and IEP, and IT and EE is shown in figure 2. Its design is founded on theory from the literature review and serves as the guide for the recommended research experiment to test against the proposed hypotheses.

**Figure 2**  
Influence of Employee Engagement and Information Technology on Individual Employee Performance



Pygmalion theory demonstrates that those designated as “high achievers” by an authoritative figure may perform above those within their control-condition peers and that the higher the level of an individual’s self-expectancy, the greater his ability to perform (Eden, 1984). Vroom (1964) cited that through expectancy in work-motivation theory, a momentary belief concerning the likelihood that an act will be followed by a particular outcome may also be a source of employee motivation.

*Hypotheses 1a: Higher levels of self-fulfilling prophesy will be associated with higher levels of IEP.*

Cognitive theory indicates that knowledge serves as the medium for the formation and maintenance of schemas, or cognitive structures that individuals create and use to make sense of the world (Gagnon et al., 2008). They continue that employees with a high level of strategic knowledge will have better understand how their contributions may contribute in achieving the goals. Increased knowledge creates more rich content schemas about the strategy (Fiske and Taylor, 1991).

*Hypotheses 1b: Higher levels of strategic knowledge will be associated with higher levels of IEP.*

Complementarity theory suggests that the value of an organizational resource can increase in the presence of other complementary resources (Bharadwaj et al., 2007). This research suggests that IT, when implemented as a strategic fit for the organization, is a

complementary resource to individual employees. For the proposed research model, IT fit for the organization will not be measured, and is assumed to be a good fit. Further research beyond the proposed experiments to measure fit will be recommended if reasonable based on results of testing against hypotheses 2a.

*Hypotheses 2a: Implementation of strategically selected IT within the organization will be associated with higher levels of IEP.*

Organization theory addresses uncertainty and equivocality. Decision making under these conditions where almost nothing was given or easily determined require managers to figure things out for themselves and creates waste and confusion within an organization. Daft and Lengel (1986) suggest using formal information systems to provide employees the information needed to make decisions in a timely manner.

*Hypotheses 2b: Higher levels of IT-enabled access to information will be associated with higher levels of IEP.*

The implementation of IT helps the organization remain competitive. Gagnon et al. (2008) predict a positive relationship between strategic knowledge and strategic commitment for the employee, and “is requisite for their position and the timing of the communication of organizational strategic efforts.” Employees better accept and support change through IT adoption when they understand how it connects to the strategic growth of the organization.

*Hypotheses 3a: The implementation of strategically selected IT will be associated with higher levels of EE.*

Clear work instructions contribute to an employee achieving high levels of expectancy perception (Pinder, 1984). The implementation of digital work instructions at Vermeer Corporation is replacing tacit knowledge and the paper-based work instructions and has served as an engaging factor to provide proper instructions to employees with a wide-range of experience. IT-enabled access to information enables standardization and is a means to change the situation, not the individual, in order to realize expectancy (Eden, 1988).

*Hypotheses 3b: Higher levels of IT-enabled access to information will be associated with higher levels of EE.*

## **Research Method**

This study will use two experiments using both secondary and primary data in order to test the hypotheses. For the first experiment, Hypotheses 1 will be tested by collecting a random sample of secondary data for two years of previous individual performance results of EE, measured by the Gallup Q12® survey administered by the organization, as well as safety, quality, and productivity results. Data from two production areas in separate manufacturing plants within the same organization will be collected. The production areas manage shop floor super-markets, or stores of manufactured parts held on rack and shelving for secondary processing. The control plant uses a manual approach to maintaining inventory levels, using a

combination of the production schedule parts release and visual management to ensure the proper level of inventory is maintained for each part. The experiment plant is undergoing the implementation of the ERP system's materials requirement planning (MRP) feature to connect the parts release process to the plant's independent demand and the use formal inventory control processes within the ERP system.

The data will be retrieved directly from the production databases. These data will be analyzed through linear regression to determine the relationship between IT and EE, IT and IEP, and EE and IEP, and determine if causality can be established between IT and EE on IEP. Standard deviation will be used to determine the variance between each of these three results in both areas to determine the impact IT has on the area with greater IT support (i.e. ERP implementation).

For the second experiment, primary data will be collected from the production team members and the ERP system in order to test Hypotheses 2. Like the first experiment, two production areas in separate plants will be used. For the second experiment, each production area is responsible for a complex manufacturing process where parts are fabricated internally, sent outside the organization for additional processing, then received back into to the organization where they are stored in a warehouse until required for assembly. Currently, both production areas use manual methods for managing the timing of the release of parts to manufacturing, purchase order creation in the ERP system for the external processing of the parts, and then receiving the parts back into inventory. This experiment includes the implementation of MRP functionality from the ERP system and the automation of the purchase order creation process within the ERP system in the first area, or experimental group. The second area, or control group, will remain on the current system. Data will be collected from



each group, measuring EE and individual employee performance on a quarterly basis. The same analysis will be performed as the first experiment to determine the relationship between IT and EE, IT and individual employee performance, and EE and performance. The reason for the primary data collection in the second experiment is to provide the researcher with the opportunity to observe the changes in process and behavior and determine if there are additional factors not supposed in the theoretical foundation and hypotheses listed in this research.

## **Results**

This research paper proposes the research design and does not contain the statistical analysis of the research methods to be employed.

## **Implications**

This study has implications for research and practical application. If Hypotheses 1a and/or Hypotheses 1b are supported, research and management may consider further investigation into the relationship between EE and IEP. This may also cause management to review the focus of EE in their organizations and determine if improved focus of or creation of an EE strategy may increase IEP. If Hypotheses 1a and/or 1b are not supported, this study still contributes to the literature reviewing the relationship between IT, EE, and IEP, however, may not serve practical purposes.

If Hypotheses 2a and/or 2b are supported, management can use these results to evaluate the effectiveness of their IT application strategies and partnership with business areas of the organization. If Hypotheses 2a and/or 2b are not supported, more research should be reviewed

and employed to determine additional factors that create a positive relationship between IT and IEP and IT and EE.

## **Limitations and Future Research**

This study has limitations that should be overcome in future studies. First, this study does not measure the degree of fit of IT capabilities in the proposed experiment within the organization. Understanding the fit of IT capabilities within the scope of the experiment will provide a higher level of confidence of the results of the relationship between IT and EE and IT and IEP. Like the first limitation, the second would be to identify how to predict the level of fit for a given application to a manufacturing process. An identified technology (i.e. advanced planning and scheduling) may provide success in one organization but not attain the desired return on investment (ROI) in another. This leaves organizational leaders and team members frustrated when an IT projects delivers lack-luster results. Finally, identifying variables that measure the current maturity or readiness of an organization to implement EE programs would better describe the relationship between IT and EE. If EE is not currently measured within an organization, this relationship may not be applicable if a similar study is conducted within said organization.

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