

# **THE IMPACT OF TECHNOLOGY ON EMPLOYEE MEANING OF WORK**

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## **ABSTRACT:**

As the 21st century opens, organizations are thrust into the information age. This age is characterized by access to enormous amounts of data and advances in technology associated with computation, automation, and communications. The speed of these advances creates an environment that is volatile, ambiguous, complex, and uncertain. In an effort to compete, organizations often adopt technology and computing solutions based exclusively on an economic rationale without considering the unintended impact of these changes on their decision making and organizational culture.

This paper looks at the impact of technology on an organization by studying the reasons for automation, the burdens that were removed, as well as the human focal practices that were replaced by technology. We apply the Albert Borgmann concept of the device paradigm to analyze a manufacturing facility in Southern United States. This international company has introduced a state-of-the-art automation solution in one of their manufacturing facilities. Due to this change, they have discovered that their employees have suffered a loss of identity and meaning in their work due to these technological changes.

Our findings point to the need for leaders to leave old bureaucratic leadership models to adopt complexity leadership practices where leaders share their leadership to enable organizational members to collaborate and solve problems. A level of collaboration and organizational learning is needed to allow frontline problem solving to tap into the collective cognitive resource of its members. Leaders remove barriers and stimulate robust discussions to provide clear guidance and expectations on the quality or nature of the automation integration.

Furthermore, our findings uncover attributes that impact workplace meaning and relationships. We propose a model of the impact of technological change on employee meaning of work. This model has five components: business market pressures, decision to adopt technological change, integration of technological change, employee integration of the change, and the impact on organizational culture. Essential to the reengagement of the employees is the development of a compelling company narrative that combines automation and the new meaning of work. Through these, organizations can provide powerful anchors for employees

to grasp, find identity and meaning in the midst of a society full of chaos and instability.

**Keywords:** technology integration, meaning of work

### **Modern Technological Context**

To better understand the impact of technology and automation we turn our attention to the industrial revolution and its impact on the world. In 1925 an American could buy a Ford Model T for \$260, the equivalent in 2021 to \$3,750. When first introduced in 1909, the Model T was placed on the market at a price of \$835 or about \$23,500 in today's currency (Encyclopedia Britannica, 2021). The process that enabled Ford to reduce the price of the car is a familiar one. The company reduced the time and cost of building the cars by introducing assembly line technology. Workers built cars using standard/interchangeable parts, and they performed specialized tasks as cars passed on the assembly line. Such techniques allowed Ford to produce cars more quickly (10,666 in 1909 vs. 20,011,125 in 1923) with consistent quality while paying workers approximately double the prevailing rate (\$5 vs. \$2.27 per day) for a shorter than average workday (ibid). It is difficult to deny that Ford's efficiency techniques produced impressive results that benefitted the company, its employees, and the American people.

Unfortunately, the techniques and technology (hereafter referred to as technology) pioneered by Ford Motor Company and other companies during the second industrial revolution also brought about some negative changes in the lives of individuals and communities. When discussing the negative impact of such technology, researchers have tended to focus on the unhealthy working environments of industrial facilities, the transactional and autocratic leader behaviors adopted, the poor living conditions created by the mass migration of workers from rural to urban areas, the use of child labor, and the pollution generated as a result of industrialization (ibid). This paper proposes the idea that technology's impact reaches beyond the physical and social environment to affect the way in which people view the world and experience reality. This paper will make use of ideas proposed by several philosophers of technology in order to support its thesis. However, the Device Paradigm proposed by Albert Borgmann (1987) will supply the fundamental concepts upon which much of the paper's arguments rely.

### **Device Paradigm**

According to Borgmann, technology promises to bring nature under control, liberate humanity from misery and toil, and enrich human life. He believes that technology has, to a great degree, brought nature under control and liberated man from misery and toil but has had limited success in enriching human life. In order to understand Borgmann's arguments, we must first look at his device paradigm. He separates objects into Devices and Things. A Thing is an object that cannot be separated from its environment. In order to make use of that object (Thing) we must participate within its environment. Borgmann gives the example of the wood burning stove, popular in previous centuries, as an example of a Thing. A family with a wood burning stove was required to interact with the local environment in order to use the stove. Family members were required to cut down trees, chop wood, and tend the fire. Furthermore, the stove became a focal point

for family activities. Use of the stove placed requirements on family members and forced them exercise skill, interact socially with others, and engage the natural world. In contrast, a Device does not require engagement with the environment and does not impose burdens on individuals. A Device simply provides a commodity without requiring any involvement in, or knowledge of, the Device's world. According to Borgmann, a Device demands no skill, strength, or attention from those who make use of it, and in its purest form, only the commodity provided by the Device is seen (1987). The means by which the commodity is produced are hidden from its users and only the end product is made available. Those who make use of commodities are disburdened of responsibility, and they are also distanced from the context in which the commodity was produced. Inevitably this loss of context increases the degrees of separation between the user and the process of developing the commodity. The impact of this separation is that we choose short-term benefits of the commodity over long-term benefits of engaging with Things. We therefore lose a rich context of relationships with the natural world and society, altering our meaning of work found in their use. We choose the ease of using a commodity and trade long term complexities for the short-term complexities which have considerable hidden costs. One of these hidden costs is the false sense of freedom and autonomy through the ease of use of commodities (Cahalan, 2002).

### **Device Paradigm and the Workplace**

Applying Borgmann's Device Paradigm to the workplace encourages us to be more aware of the Things in our lives. Key Things and practices in our workplace are called focal Things or focal practices. These focal things bring great meaning and identity to employees and their organizations. When deciding on integrating technological changes Borgmann would suggests to thoughtfully consider the impact of losing focal Things and practices that have considerable hidden costs.

In turbulent and uncertain business environments leaders have relied on complexity leadership theory to increase organizational adaptative and effectiveness (Lichtenstein, Uhl-Bien, Marion, Seers, Orton & Schreiber; 2006; Uhl-Bien, Marion, & McKelvey, 2007). As leaders seek to understand the perceptions of their employees on the impact of technological changes, they will be able to identify focal Things and practices (Borgmann, 1987). Identifying these key drivers of workplace meaning enables a dialogue to start concerning the integration of technology. Leaders help their organization through uncertainty by articulating issues, sensemaking and providing a compelling vision (Arena & Uhl-Bien, 2016). Considering employees' opinions increases their buy-in to modify the technology integration. To the extent leaders are able to engage their employees in this dialogue, will they lower the negative employee internalization of the change and by consequence the new meaning of work.

### **Integration of technological change**

Hui Yuk provides a helpful discussion on technology and its impact on people. Hui describes cosmotechnics as a way of life realized through unifying existence with one's moral life through technical activities (2019). In a digital age, technology has become a way of life, with which we develop our identity. As humans pursue meaning in life, Hui contends, this pursuit is always locally

contextualized. For the individual, as local culture interacts with technology (Devices) those that do not contribute to one's well-being are ignored (Hui, 2019). This concept further reinforces Borgmann's charge to critically evaluate the integration of technology, considering the impact of changes to our focal Things and practices. Through an intentional dialogue with local stakeholders about the hidden costs of commodifying and thus losing focal Things, one can decide on the best level of technology integration.

### **Speed of technological change in business**

Organizations are created to provide a product or service for consumers. Modern business pressures continually move organizations towards being profitable by adapting to market demands, primarily through seeking to provide a product/service at a higher quality and or lower price. These pressures impact the people and their organizational culture as tensions mount between managers and employees. These business pressures, often through automation and change, challenge these partnerships between those organizing the work (managers) with those doing the work (employees). If this partnership is not intentionally managed, either group can easily fall into a survival mindset. Survival thinking moves people out of working as a team into being self-focused in trying to control outcomes and behaviors of others. Survivalist behaviors migrate into toxic "us versus them" organizational cultures where self-centered behaviors are rationalized, and retaliatory behaviors appear. Since both groups derive meaning from their work, they have strong opinions about what and how work is to be accomplished.

### **Research question**

This research explores a potential framework to understand the impact of technology and automation on the meaning of work. We use an interview with an executive of a Fortune 40 company to compare different scenarios where automation and technology process changes affected employees.

### **Methodologies**

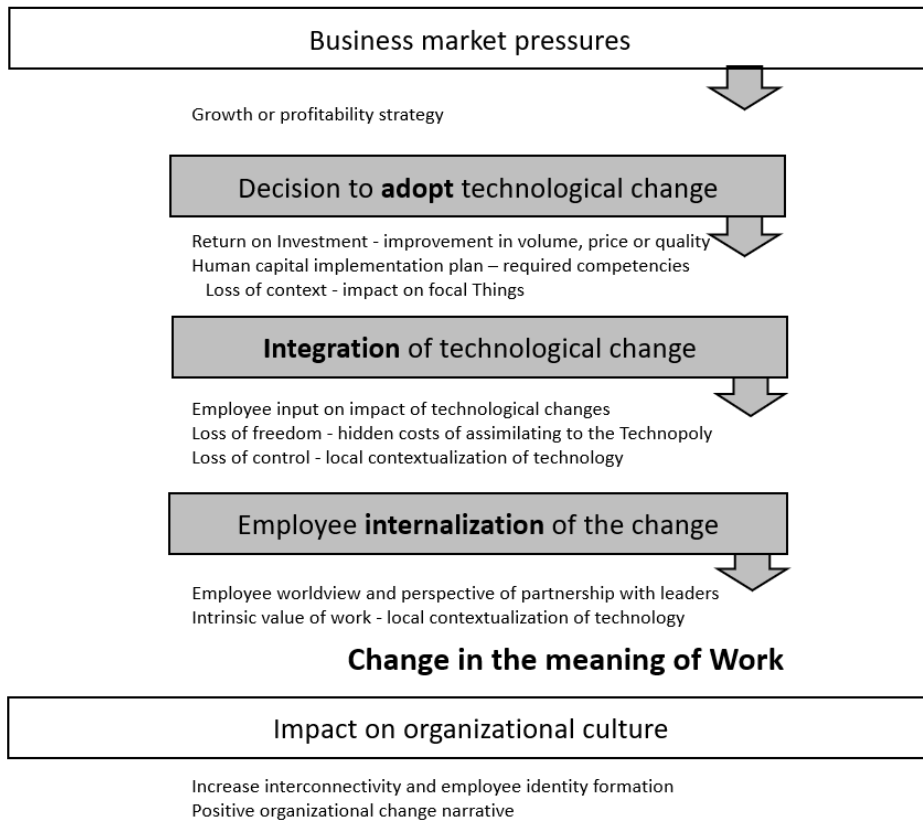
An interview concerning five automation initiatives are studied in a Fortune 40 company to begin a dialogue around thinking about the impact of technological change on meaning of work. Using a grounded theory approach, we seek to understand the reality from the leader's perspective (Strauss & Corbin, 1990). We look at five different instances of technology initiatives within one of the largest American corporations to propose a preliminary theory (Eisenhardt & Graebner; 2007; Yin 2003).

### **Findings**

We overlay our findings, at a Fortune 40 company, onto a philosopher framework of technological impact on the meaning of work. Found in diagram 1, this framework starts with 1) business market pressures. We incorporate Borgmann's Device Paradigm perspective with 2) decision to adopt technological change, by considering the loss of context of focal Things, and 3) degree of integration of technological change, through the loss of control. Hui further identifies the need for contextualization and individual incorporation of technology into one's identity with 4) employee internalization of the change.

Finally, the individual's change in meaning of work affects the team, such that we identify 5) impact on organizational culture.

**Diagram 1: Technological change impact on employee meaning of work**



We turn to a large North American company to understand the impact of automation and changing technology in the workplace. We interviewed the president of an American business unit, engineer by training, who rose up through operations, is currently working for one of the largest companies in America.

**Business Market Pressures**

Market pressures and demands are the starting point for considering a technological process or automation change, using a return on investment business rationale. Responding to these market demands the organization seeks to improve operations through price, quality, consistency, or sustainability of the customer relationship. A return on investment analysis takes into consideration capital expenditures as well as an automation implementation plan.

We look at five products that due to market changes have an opportunity to introduce automation or technology improvement to their process. The first product, **product A**, was a standard universal manufacturing process where the market demanded higher volumes to be produced at a lower cost. The second product, **product B**, was a specialized product that was used in US military and

was mandated to keep production in the USA. This market demanded higher quality at 100% consistency to remain on the cutting edge. The customer was willing to pay a premium over a long-term contract to guarantee product specifications. The third product, **product C**, was a product that had the potential of finalizing in the USA instead of sending it to a subcontractor. The US market demanded a lower price with increased in volume. The fourth product, **Product D**, was an opportunity to capture a market in the US by purchasing equipment and a technology process in England. Their facility in the Southeastern part of the United States had available capacity to integrate the new business. New employees would have to be hired to operate this line. The fifth product, **Product E**, was a product in a union plant with an opportunity to lower production costs through automation, resulting in doubling manufacturing volume output.

### **Decision to adopt technological change**

Upon review of the decision-making process there are two phases. The first is the market and return on investment analyses, which involve directors from operations, engineering and finance. The second phase is the implementation of the automation in regard to human capital.

In the first phase, the president explained the rationale behind these decisions as: “We make business decisions to protect the business based on market demands and return on investment.” However, he pointed to the inherent risk of the decision to automate or not automate. First the risk to automate arises from purchasing technology solutions which become capital expenditures and “lock you in”. This automation investment is at the mercy of a new technology that changes the product landscape, rendering your investment obsolete as customers demand new product specifications based on the new technology. The risk of not automating is to lose your market presence. However, if the market disappears in the near term, the organization is better served not having invested in the automation and incurring it’s debt.

The second phase is the implementation with the employees and seeking to gain their buy-in. The business determines if they have the skill set needed to operate the new automation. If that is not the current situation, they will need to hire qualified operators or retrain their current employees. Another component of the employee engagement is creating a win/win scenario where employees have a motivation in the well-being of the business. This can be done with bonus plans that are paid out quarterly. As employees help improve the profitability of the business, they also benefit.

The decision for **Product A** was taken to establish a manufacturing facility in China where the Chinese customers were located. Choosing to establish a facility in China instead of expanding the US facility was based on an ROI calculation. Shipping costs would be greatly eliminated, Chinese labor was a fraction of the US cost and economies of scale were available. The challenge would be to manage both American and Chinese employees. The decision for **Product B** to automate was positive from a market and return on investment perspective. Having an American government guaranteed contract was a niche market where their customer guaranteed increased prices for training and automation. For **Product C** they automated the US plant, however during the implementation they were not able to produce the quality and meet the customer expectations. The automation went unutilized and the capital expenditure did not

improve the financial health of the organization. For **Product D** they went to England, learned the process by working with local operators. They successfully shipped the equipment to the US and improved the process through technology change. For **Product E** the company successfully implemented the automation and technology change that achieved a 100% increase in production volume.

### **Integration of technological change**

In every example, employees were not consulted about the impact of the technology integration. Due to the multitude of technology and automation opportunities, management does not invest in creating buy-in during the planning phase. Depending on the manager an autocratic or participative approach is used with the employees. Autocratic managers dictate that the organization has decided to incorporate this change and employees are free to work with that change or find a new place of employment. Participative managers use different bonus structures to incentivize employees to view the new changes as beneficial.

At the center of technology change is the tension of differing manager and employee motivation. Managers are rewarded for finding efficiencies and ways to cut costs. These rewards are often in conflict with the rewards of the employee. Employees often do not see a benefit in change as they want to maintain the status quo, earning a paycheck for a pre-agreed amount of work. There is a tension between the manager's and the employee's motivation for change. The alignment of these motivations are an important part in determining how positive or negative their workplace partnership will be. Practicing enabling and participative, interactivity will engage employees to join a team instead of creating a hostile, us versus them, culture (Northouse, 2011; Marion, 2008).

### **Employee internalization of the change & change in the meaning of work**

The US employees affected by establishing a production facility of **Product A** in China positively internalized the change. Management offered employees career opportunities by being sent over to China for a few months to train Chinese operators. They were further incentivized as they became employees with greater skills, responsible for training Chinese supervisors who came to the US. These US employees, with limited family responsibilities, and for the first time, traveled internationally. Employees perceived this opportunity as improving their potential for promotion within the company. Employees working with **Product B** perceived that they benefited from technology and automation changes as the US government customer paid for their training and certifications. Management also incentivized the employees with a bonus plan that was calculated on total quality provided to the customer. For **Product C**, employees were not impacted by the failed automation initiative. Engineering was not able to get the equipment to produce to customer specifications. **Product D** saw a different internalization by the British employees compared to the American employees working with the process. The British who originally had developed their own process to use the technology were set in their ways after a decade of operating the machines. They perceived any recommendation to change the process or automate it, as a loss of work and a devaluation of their know how. Furthermore, social barriers between older British operators became apparent as they dealt with young American engineers. These factors created a negative employee perception of the change and further reduced their meaning of work.

Interestingly, as the technology was transferred to the United States, management changed the technology process to incorporate the American engineering recommendations. These changes were incorporated in the launch of the new production line for which new operators were hired. The employees, newly hired, did not have any negative perceptions of these changes, and production outputs were improved. Finally, employees in **Product E**, part of a union, had a much different reaction to automation and technology changes. Automation was introduced to a manufacturing line that doubled the manufacturing output. Employees now completed their production work in a half day. Management provided other production duties in another part of the facility for employees to complete. They perceived this change negatively as they experienced a loss of freedom over their pace of work and a loss of control over what work they were expected to do. Employees intentionally decreased and slowed their production to the point of sabotaging the line. They would deliberately misfeed product to jam the machines thus stopping production. Finally, the union sided with the employees and claimed that having employees do other work outside of the production line was a breach of contract. Management was forced to acquiesce to their demands. Employees kept the same original production targets and added breaks during the day to stretch out their production targets. The automation did not have any beneficial impact to the company.

### **Impact on organizational culture**

Employees working in producing **product A and B** were very positive about the changes and saw a direct opportunity for improvement of their skills and ability to increase their earnings. This positive perception moved the organizational culture towards adopting, championing, and implementing the changes even at considerable personal cost by living abroad for a long period of time. However, employees in **product C and D** production lines had a very negative perspective, having felt a loss of control and perceived the intentions of the management to be hostile to them. They resulted in an “us versus them” mentality that did not favor adaptability and innovation which decreased the business ability to respond to market demands.

### **Summary**

Organizations are continuously having to evaluate how to respond to the market pressures and the demands. Often automation and technological changes are considered to increase production, decrease cost or improve quality. Corporations are effective in identifying business market pressures and making decisions to adopt technological changes. However, management is less intentional with pursuing employee integration and internalization of technological change due to the complexity of often competing motivations. We recommend that management intentionally integrate employee perceptions and open a dialogue over the internalization of the technological changes as they impact meaning of work. This complexity leadership practice of intentional dialogue, before implementation of automation, would increase the total effectiveness of change and seek to improve manager and employee partnerships.



## REFERENCES

- Arena, M., & Uhl-Bien, M. (2016). Complexity leadership theory: Shifting from human capital to social capital. *People + Strategy Journal*, 39(2), 22-27.
- Borgmann, A. (1987). *Technology and the character of contemporary life: A philosophical inquiry*. University of Chicago Press.
- Cahalan, K. A. (2002). Technology and Temperance.
- Eisenhardt, K. M., & Graebner, M. E. (2007). Theory building from cases: Opportunities and challenges. *Academy of Management Journal*, 50, 25-32.
- Encyclopedia Britannica. (2021, March 27). *Biography of Henry Ford*. <https://www.britannica.com/biography/Henry-Ford>
- Encyclopedia Britannica. (2021, March 27). *History of Europe: The Industrial Revolution*. <https://www.britannica.com/topic/history-of-Europe/The-Industrial-Revolution>
- Hui, Yuk. (2019). *The question concerning technology in China: An essay in Cosmotronics* (Vol. 3). MIT Press.
- Lichtenstein, B. B., Uhl-Bien, M., Marion, R., Seers, A., Orton, J. D., & Schreiber, C. (2006). Complexity leadership theory: An interactive perspective on leading in complex adaptive systems. *Emergence: Complexity & Organization*, 8(4), 2-12.
- Marion, R. (2008), "Complexity theory for organizations and organizational leadership", In M. Uhl-Bien & R. Marion (Eds.), *Complexity leadership, Part 1: Conceptual foundations* (pp. 1-15), Information Age Publishing, Charlotte, NC.
- Northouse, P. G. (2021). *Leadership: Theory and practice*. SAGE Publications, Incorporated.
- Strauss, A. and Corbin, J. (1990), "Basics of Qualitative Research: Grounded Theory Procedures and Techniques", Sage, Newbury Park, CA.
- Uhl-Bien, M., Marion, R. and McKelvey, B. (2007), "Complexity leadership theory: shifting leadership from the industrial age to the knowledge era", *The Leadership Quarterly*, Vol. 18 No. 4, pp. 298-318.
- Yin, R.K. (2003), *Case Study Research: Design and Methods* (3rd ed.), Sage, Thousand Oaks, CA.