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INNOVATIONS: CONTROL AND EFFICIENCY. "KEEP AN EYE ON THEM" OR MAXIMIZING PERFORMANCE AND COSTS

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Abstract: *Recent innovations in the field of cleanliness announce remarkable efficiency that influences the way work is organized, the way people interact, and transforms perceptions of social organization. Cleaning standards are increasingly higher as social contexts demand it. These new technologies that enter the world of dirty work promise transparency and safety for beneficiaries, cost efficiency, and the possibility of reducing physical activity for workers. Examining the role that innovations have in the field of cleanliness, providing a comprehensive perspective on the effects and perceptions of users, presents a beautiful fairy tale that brings the outcome of a context related to control, stress, and the fear of tomorrow.*

Key words: *innovation, employee control, efficiency, resistance to social change, dirty work*

1. Introduction

"I don't even have a phone, and they want me to scan a code when I go through the offices," M., a 47-year-old cleaning lady who has worked in cleaning almost her entire life, told me. For the women and men who have worked in the cleaning industry, the changes happening now are hard to accept. Each person's universe is limited and depends on many variables to understand and allow new elements. It is unfair to blame technology when we cannot accept it in our homes or workplaces. These are issues related to human nature and resistance to change. Although most of the time, everything technology has brought to digitize our work is intuitive, some employees in the cleaning industry prefer to use a broom instead of pressing a vacuum cleaner button. As if cleaning should be felt. When you mop the floor, you feel like you're cleaning, whereas when you use a floor cleaning machine, you don't exert effort, so you don't feel like you're cleaning. Of course, the result is much better, but the limitations of understanding seem to be just as high. It seems that "decades of research have shown that changing someone's mind about anything is extremely difficult" (Bartlett, 2019, 71). So how can we bring technology into the hands of those who have spent decades

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providing cleaning services that involved minimal discipline, minimal control, and efficiency according to their own beliefs? The hopeful theory of suppliers, beneficiaries of professional cleaning services, and those who own companies specialized in offering these types of services make us understand that it is only a matter of time until these technologies digitize the work of those who deal with dirt.

Just as technology has been present in other environments for a long time, it seems that for a few years now, it has also made its way into the cleaning industry. If in the past you used to dry your hands with towels (in the luckiest cases), now the cleaning lady can receive notifications on her phone when the dispenser she has just used is about to run out of paper. We can see, for example, how many of the cleaning agents' activities are starting to make sense. Let us think for a moment about the lady who used to clean the toilets, offices, dining hall, and made coffee for the company's guests. Now, the same lady, although she ensures cleanliness in the exact same spaces, does it in a certain order and with color-coded utensils to avoid the transmission of bacteria from one area to another. The same gentleman is responsible for sweeping the outdoor areas, but he does it with a machine that does not spread dust, does not tire him out, and allows him to do many more activities at the same time. From traditional cleaning to modern cleaning, there is just one step that we know, and large companies want it, but they face, in addition to high costs, the fear and resistance to change of workers in the cleaning industry.

One of the great advantages of modern humans is the "transition from a world of scarce information to one of information surplus" (Bartlett, 2019, 56). However, as the saying goes, „Let us not get ahead of ourselves!". It should be noted that digitizing an activity changes the very nature of how it interacts with the actors involved. As I will show in the following, innovations have positive or even very positive aspects, but what happens when people cannot adapt? The feeling of a „battle with robots" (V, cleaning agent, 14 years of experience in cleaning) and the difficulty of adaptation can turn the workplace into a nightmare.

Algorithms, localization, notifications are just a few of the elements that cleaning agents find difficult to understand. Integrated everywhere, we are forced to adapt and avoid technological illiteracy. Providers of such modern technologies are like "modern shamans" (Bartlett, 2019, 171-172) who raise the dilemma of control vs efficiency.

2. Methodological Considerations

The analysis is based on in-depth interviews with 26 cleaning agents and three representatives of technology providers. Additionally, participatory observation provided an excellent framework for understanding the negotiations that take place when trying to implement such systems. Among the discussion topics covered in the interviews, we explored the importance of technologies in cleaning activities from cognitive, practical, and symbolic perspectives.

I have correlated the information I received during the discussions with the information I gathered through participatory observation, thus being able to build a framework for understanding the impact of digitization on the activities of a company

specialized in providing professional cleaning services.

Within social theory, there are studies that focus on human practices in which new technologies are integrated (Latour, 2005; Pickering, 2010; Boyd & Holton, 2017), in which individuals interact with robots (Suchman, 2011; Turkle, 2012), or about the limitations of robots in terms of the biological-mechanical dilemma (Arthur, 2009; Braidotti, 2013; Restivo et al., 2014). Other studies focus on analyzing changes resulting from technological innovation and social change (Boyd & Holton, 2017) or on the social impact from the perspective of racial, gender, and social class inequalities (Dahlin, 2023).

In this regard, the purpose of this paper is to examine the role of innovations in the cleaning industry, providing a comprehensive perspective on the effects and perceptions they have on users, while also understanding the implications of digitizing dirty work.

3. About innovations – What is new in the world of dirty work?

Innovations are diverse and have entered the cleaning industry in various forms. When referring to innovations, technology, and digitization of dirty work, of course, I do not mean everything. I also do not refer to floor washing machines, steam cleaners, or even their ability to stop when the operator is no longer safe. These are already established. I am referring to digital technologies that have the role of monitoring, streamlining, and allowing an almost complete elimination of certain procedures performed until recently.

Overall, these technologies promise better information, worker, and beneficiary safety, and, of course, their happiness. But that doesn't mean they fully achieve their purpose. However, I will highlight that in the next chapter. Control, equality, good information, and streamlining are some of the elements that change the trajectory of traditional cleaning services. The technological revolution seems to have gained momentum in the segment known as facility management. These processes aim to define methods and tools that deal with functionality, safety, sustainability, and infrastructure.

At a deeper level, I see two main directions that can be taken into consideration in the discourse related to the digitalization of cleaning services. In cleaning, you either have a pre-established plan with resources already allocated based on work efficiency, or you act only when needed or upon request. Similarly, and accessible to anyone, is the security and protection system. In this system, either there is a fixed guard point with agents allocated to a specific area, ensuring the perimeter's protection throughout their activity, or they intervene only when needed, after pressing the panic button or triggering an alarm.

In cleaning, there is also the classic system where work efficiency is known, human resource needs are established, and resources are allocated based on the frequency of their intervention. This is a model that relies on estimates with a preventive rather than a utility-based organizational philosophy. A risk in this situation can be that the team may be oversized, and unnecessary resources may be consumed.

On the other hand, a new idea is spreading, that of cleaning according to need. More specifically, let us take the example of a building. It can be equipped with tablets in

various designated areas (such as near elevators or at key points). At the same time, the cleaning cart is also equipped with a tablet containing the floor plan of the building. This way, anyone who notices the need for the cleaning agent's intervention in a specific area, whether the mess is their own or someone else's, has the possibility to request the cleaning of the space through tablets or applications. In the end, the tablet of the cleaning agent highlights where the intervention is needed.

Now we can ask ourselves how can you be sure that the agent goes to those areas for cleaning? The tools also used to have a transmitter that measured movement and, implicitly, the cleaned surface area in square meters. Furthermore, the person who requested that intervention received a notification after the completion of the task, informing them about it. Interactions are reduced, the need for agent verification is almost eliminated, and situations where the space is cleaned before any mess occurs are avoided. In the same concept, on the same type of cleaning cart, there is an option where both the cart and the spaces have sensors that detect the presence of the agent.

People tend to associate the office space with their home space because they spend a lot of time at work. As a result, there is a possibility that the cleanliness standards in office areas may differ from the expected standards in other spaces, such as public areas. In this regard, the sensors we mentioned earlier can be set to notify the cleaning agent when to intervene. Based on the number of users of that space, this system relies on usage frequency. Specifically, if the cleaning intervention is set to occur every 50 uses, the agent is sent a notification when that space approaches 50 uses. These systems aim to optimize resources by limiting intervention only when necessary and requested. Of course, this does not eliminate the need for a team to thoroughly clean the spaces outside of working hours. One possible limitation in implementing such systems is that all involved parties must take responsibility and report any irregularities.

Another aspect of intervention only when necessary is the monitoring system for the consumption of various materials provided to the user, such as soap, hand towels, toilet paper, hand cream, etc. There is also the possibility of installing sensors on these dispensers. They can transmit the quantity in real time and notify the cleaning agent when a refill is needed.

Similarly, the detergent dispensers automatically dilute the substance and measure the amount of water needed for cleaning specific spaces. Furthermore, both systems transmit information to managers regarding consumption and possible deviations by agents.

There is a risk of cleaning a space only with water. In this regard, sensors have been developed that transmit both notifications and sound alerts when the detergent container needs to be replaced. Additionally, this monitoring system is useful for material procurement, avoiding situations of excessive stock or even the lack of necessary equipment for carrying out activities. All these systems are a beautiful dream for employers and beneficiaries but can be perceived as a nightmare by cleaning agents. They may feel controlled and monitored, needing to always maintain discipline. However, it appears that “employee discipline is a critical component in the efficient operations of an organization” (Risccucci & Wheeler, 1987, 49). Therefore, mapping the cleaning agent's route through the building aims primarily at optimizing costs and

consumption. There is also a secondary purpose, which allows for activity monitoring, control, and understanding of service quality. However, currently, there is a limitation from the beneficiary's side related to the confidentiality of the space and the internal organization of activities, especially in the industrial environment.

All these systems have older versions, already considered classic and quite inefficient. For example, the predecessor of the monitoring system based on transmitters used to be done by scanning codes with a mobile phone. On the other hand, the predecessor of monitoring the need for refilling consumable dispensers was visual signalling with an intuitive color code (green-yellow-red). It is important to mention that these systems are constantly evolving, improving, and adapting to environmental requirements. For example, up until now, the machines used in floor cleaning would monitor the number of operating hours, speed of movement, and could emit alarms if they were taken outside the established perimeter by the agent, and so on.

Now there is an attempt to introduce new algorithms that are linked to Google maps and can build a map with the route taken by the agent with the car within a certain time interval, currently with limitations related to coordinate accuracy.

Given all these developments, it seems that their purpose is control and surveillance. Whether the cleaning agent does not have to do anything and just moves with a transmitter that monitors them, or if this agent needs to mark that it is near a certain area, the role of these systems is also to record the time spent in that area. Electronic surveillance and the data collected by the systems can be placed under the umbrella of the electronic panopticon concept (Lyon, 1993). In addition, the implication of such monitoring, when carried out by the employee, puts them under constant stress, knowing that they can be controlled and checked at any time.

Control over employees is not new in any field. Both attendance at work and the methods by which work tasks are performed are monitored and have been considered important for ensuring work quality (Masso, 2012). Control over work schedules, in any form, can be considered among the first forms of control, which has attracted researchers' attention due to the context and conditions of the labor market (Berg et al., 2004).

All of these are worrying for employee freedom. Maintaining a balance between the objectives of digitization activities, control, and efficiency becomes a real need.

4. Perception of innovations- Resistance to social change. Are innovations stressful?

Not only is the perception of increased control at work an important element in employees' physical health and subjective well-being (Spector, 2002), but perceived pressure can also lead to job turnover (Heintz, 2005). Employees can get tired of the many norms they have to comply with, and both the job itself and the relationships within it can suffer. The introduction of technologies in the cleaning industry is like the changes brought by electric vehicles. Electric vehicles users perceive them through cognitive, practical, and symbolic lenses (Anfinsen et al., 2019). Building on this idea, workers' perception of the digitalization of activities in the cleaning industry can be viewed through these three dimensions.

Stress is “endemic to the modern workplace” (Spector, 2002, 133), but does it apply to all workplaces? What can make a job stressful? Workplace stress factors are related to both the nature of the job and the tasks involved, as well as interpersonal relationships such as conflicts with colleagues and abusive behavior from higher-ranking superiors (Spector, 2002). Stress can also be linked to the use of certain tools, technologies, or resources. Lack of knowledge or fear of damaging certain equipment are just two examples of stressors for workers in the cleaning industry. Equipment breakdowns and especially their cost can make cleaning workers refuse or be unable to operate the machinery due to the stress it generates. “The salary for a year is not enough to pay for this machine” (V., cleaner, 8 years of experience) or “I'm not afraid of driving, but if I hit something, will you deduct money from my pay?” (S., cleaner with 13 years of experience) are just two examples that highlight the fear of employees in the cleaning industry. The belief that they cannot use the equipment or that they are incapable of using it are also stressors. Expressions like “How am I supposed to know how to use it? I've seen it before, but they didn't let me touch it” (M., cleaner with 8 months of experience) or „Men should drive, how are we women supposed to understand? We're meant for sweeping, dusting, those things are for us” (I., cleaner, 9 years of experience) are just a few examples that support this idea. After having 23 discussions with employees in the cleaning industry, almost all of the speeches included expressions at some point such as: “You do better with a mop” (M., cleaner, 2 years of experience), “You sweep better” (I., cleaner, 9 years of experience), “Well... that's how it feels, you can't clean everything properly with that machine” (C., cleaner, 3 years of experience). One of the main explanations is that most people resist change.

An important element to consider when referring to occupational stress seems to be the perception of control. As I mentioned in the first part of the paper, control can take various forms and purposes, but how it is interpreted and assimilated is an important part of employees' subjective well-being.

Regarding the cleaning activity, the control here differs from other types of activities. Due to the high hygiene and quality standards that need to be met for the finished product, as well as the difficulty in understanding the importance of the work they do, the cleaning agents' activity in the industrial sector can be extremely standardized and controlled. Although at first glance, when you see a cleaning agent, you might think that they only clean, their work in certain companies can be very clearly defined, segmented, and documented. However, it seems that they do not mind being checked on, saying “they can come and check me”, “go and see how I did it”, the only dissatisfaction being “just don't stand behind me”, „I do it, it shows after me... just don't breathe down my neck because it annoys me.”. Therefore, how would cleaning agents react if they were to find out that the entire building was covered in those tags I mentioned in the first part of the building, and that they would be monitored at every step? At a declarative level, it seems that they are not bothered by being checked through monitoring systems, “so what? I do my job”, „don't they constantly watch us on cameras anyway?”, “let it be, it's nothing new. They are watching us anyway”. However, when you talk more with them, you will find out that they feel mistrust, fear, and stress. Expressions like “am I an animal to be chipped?”, “so they start following us and how many times we go to the

bathroom?", "I have nothing to hide, they can come and see, but do I really need to have phone signal?". It seems that the cleaning workers are not against the control but make them feel like objects. The limitations are related to the ability to understand how new technologies work, "Madam... I don't know how to read. I don't understand what it says there", fear that results in financial losses, „what if I break it? Will they deduct money from my salary?", „don't bring robots here because I don't pay them when they break", or strong stress related to the fear of control, „are we sheep? Are they going to mark us?", "strictness everywhere". All these are supported by empirical evidence that shows that the perception or experience of control is associated with anxiety, frustration, and various physical symptoms (Spector, 2002). Such results may suggest an important role of control in the subjective well-being of employees and, probably, in their retention rate.

I have shown that the introduction of such systems requires a combination of aspects that need to be considered due to the complexity of human relationships and standards. Given this resistance to change, it is understandable, but how can you make workers in the cleaning industry accept them? Through persuasion, rewards, or even threats? It seems that in the coming decades, we will face resistance to all that new technologies represent, and we will fight to make cleaners understand that the goal, which initially seems to be control, is to make work more efficient. Embracing new technologies will not only help them reduce the effort they currently put in, but also transform their activity into a much more honorable and less dirty job.

5. Conclusions

For an „institutionalized" person, the certainty that certain standards will be met for their well-being requires the sacrifice of other standards (Goffman, 2003, 76). Similarly, for workers in fields that until recently have involved intense physical activity, they will have to understand that to make the work of dealing with dirt less unpleasant, dirty, and degrading, they must accept the remarkable efficiency that new technologies can bring through the digitization of their work. The cleanliness standards that one institution has may not be the same for another, and the level of tolerance that one employee has may not be the same for another. In the cleaning industry, doors are opening for greater care for us, others, and the environment. All technologies that involve monitoring cleaning activities have the main goal of avoiding cross-contamination. More precisely, to ensure that the cloth used by a cleaning agent in a toilet is not the same as the one used in the dining area, it can have an emitter that will alert non-compliance. To ensure that each workspace is sanitized at the end of their shift, the cleaner can wear a badge that detects their location, proving that they have passed through that space. Furthermore, to ensure that a space is not only visited but also cleaned, the tools used by those working in the cleaning industry can also have transmitters that calculate how many square meters have been cleaned, in what time frame and how many times that tool has been used.

The need for safety, care for the environment, as well as cost efficiency, gave rise to all of these innovations in the field. Because innovations come from necessity.

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