

Automation in cleaning: why dirty, invisible, and risky jobs will not be replaced by robots yet.

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BRIDGES 5.0 MASTERCLASS: Building gender-equal workplaces: From vision to practice

17/04/2026

The cleaning sector

- ❖ The cleaning sector is characterized by **weak industrial relations** (Larsen et al., 2023; Nizzoli, 2015; Tapia and Turner, 2013) and **significant stratifications along class, gender and race lines** (Bezuidenhout and Fakier, 2006; Benelli, 2011).
- ❖ The workforce is **predominantly composed of women, immigrant and low-skilled workers who are typically engaged in labor-intensive tasks with minimal skill requirements** (Eurofound, 2014).
- ❖ In the case of **Italy**, out of around 450 thousand workers employed in 2023 as janitors in offices, commercial services and shops, **women represent 73% of the total workforce**, while around **34% of new arrivals to the sector are immigrant workers** (Source: Istat).

Cleaning as “invisible” job

- ❖ Cleaning is socially perceived as an **innate female and dirty activity** because of the constant handling of trash and fluids (Hughes, 1962; Rabelo and Mahalingam, 2019).
- ❖ Such job’s attributes translate **into a structural “invisibility”** of workers both in the political, economic and work sphere, in line with the systemic denial of the **social reproductive sphere in a capitalistic system** (Federici, 2021).
- ❖ These jobs are very **badly remunerated** and usually located in the lowest quartile of national wage distributions (Cetrulo et al., 2024; ILO, 2023).
- ❖ Increasing **outsourcing practices** according to which non-core activities such as cleaning, have been progressively outsourced by public administrations and private companies, resulting in higher **labor intensity, wage dumping and deterioration of physical and psychological conditions for outsourced workers** (Mori, 2015).

The cleaning service market

- ❖ The **market of cleaning services** is **highly competitive**, with user-firms typically selecting the lowest priced offer, forcing cleaning companies to squeeze their costs and shorten job contracts.
- ❖ The **market of facility management services**, including both in-house and outsourced provision of either hard or soft facility management, has experienced a **steady increase accompanied by the concurrent rise of big players** offering integrated services to end-users, observed in both the US and European markets.
- ❖ **Overall push towards job “professionalization”** through technological upgrading aimed at integrating digital and automated tools.
- ❖ Instead of making these workers more visible and valuable, the professionalization and technological upgrading was adopted to make them **“the least noisy as possible”**.

The aim of the chapter is to provide new qualitative evidence on how and to what degree the use of **advanced technologies** occurs in a context characterized by dynamics of **gender segregation, low wages and labour fragmentation.**

Automation and digitalization

- ❖ First cleaning robots adopted in 80s. In recent years the development of cleaning robots has benefited from **Industry 4.0**, mainly due to advances in sensor systems, connectivity and battery technology improvements.
- ❖ Modern cleaning robots are able to **autonomously generate surface maps** thanks to laser scanners, working out the most efficient cleaning paths.
- ❖ Are **connected via wi-fi** or cellular data, and able to be **managed remotely** and provide real-time information of their performance. **Improvement in battery life and recharging times**, with greater cost-effectiveness.
- ❖ **Multi-functionality has been expanded**, enabling combinations of different cleaning techniques in the same robot.
- ❖ Finally, artificial intelligence and machine learning techniques are being implemented in the latest models to refine the **perception and navigation systems** (Elkmann and Saenz, 2023).

Neo is powered by Avidbots Autonomy and features 10 onboard sensors, resulting in 360° visibility and advanced obstacle avoidance. Combined with Avidbots Real-time Monitoring and Remote Assistance, Neo is unmatched in autonomy, navigation and safety.

Achieve a consistent, fully autonomous and measurable electrostatic disinfection of high touch surfaces every time.

Neo ensures a safe environment. State-of-the-art technology combines with advanced safety features including e-stop buttons, bumpers, vibrant lights, audible alerts and a Blue Light.

Neo's rugged and robust construction features separate cleaning solution and recovery tanks. Interchangeable, industrial-strength batteries allow up to 6 hours of runtime for 24/7/365 operation.



The Neo robot - developed by the Canadian company Avidbots - are, for example, widespread in several airports around the world. Source of the image: <https://avidbots.com/home-old/>

Main results

- ❖ Still limited implementation and diffusion of automated technologies, while **digital tools are progressively integrated**.
- ❖ **Full automation projects** are hampered by several obstacles (**manual dexterity** needed for specific tasks, **workspace** adequacy and relatively **huge costs** of investment).
- ❖ Once implemented, the **labor-saving effect** seems to be **very limited** in the short term, since, at least until full operational autonomy is achieved, **the robot needs to be constantly monitored by operators**.
- ❖ Advanced technological solutions act as an important competitive leverage to affirm the “**professionalized**” nature of the service provided.
- ❖ **Investments are not accompanied by a process of re/up-skilling of operators**. At the same time, workers are invested with new responsibilities and maintenance tasks that increase the **work intensity and related stress**.

Gender division

In one case, it emerges that male colleagues seem to perceive **female workers as generally lacking familiarity with digital technologies**. Thus, a certain digital gender divide seems to emerge both because women tend to avoid night shifts (during which these technologies are more widely used) and because they are deemed as less skilled in terms of digital competences with respect to their male counterparts.

“When the new machine arrived, they used to rotate workers for the night shift, but [...] there were female workers with families who complained about the rotation system [...] and now there are 20-25 people working voluntarily at night on a permanent basis. [...] With the rotating night shift, it was possible that even women had to operate the machine [...] but they generally lacked a bit of digital skill [...] so it is better now.”

Cleaning Operator (Airport company)

Future challenges

Despite the incidence of occupational hazards and environmental workplace risks in the cleaning sector, **health and safety issues and job quality are not significantly addressed** when discussing technological innovations.

This goes in contrast with what emerges in the manufacturing sector where ergonomic goals are presented as one of the main drivers of technological upgrading also to gain workers consensus and higher legitimacy.

Weak role played by unions, which are neither informed about investment plans in new technologies nor involved in defining the implementation strategies.

This evidence reflects a more structural **weakness of social actors in exercising their political role in a context characterized by labor fragmentation and loose institutional constraints.**

Thank you!

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