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THE SILENT ARMY: A STORY FROM PRACTICE

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The purpose of this paper is to develop a deeper understanding of the practices of cleaners. Cleaning can represent up to 45 % of a building's operating costs and is important for the comfort and well-being of a building's users. A lack of cleaning may result in uncomfortable and unhealthy environments for occupants in the building and, in extreme cases, the closure of a business to protect health and safety. The service providers' employees have been identified as a critical factor within service quality research. The quality and efficiency of cleaning depends on the work practices of the cleaners; thus, understanding these practices is important in order to create value to both the users and the owners of buildings. In the present study, a cleaning team was followed as they performed their daily activities. This qualitative case study of a UK local authority was performed to illustrate cleaning practices. This case is presented as a narrative describing cleaners' days at work. Data were obtained by shadowing the cleaners and are supported by interviews with their managers. The story of practice is discussed in relation to different aspects of the work, including the hours of duty; interactions with building users, managers and other service personnel; technology; routines; responsibilities; ergonomics and the building's impact on cleaning practice to identify aspects that enable or hinder the cleaning service with regard to the cleaning staff's efficiency and effectiveness. This work is part of a PhD project studying relationships between buildings, organisations, technology and cleaning practices. The results imply that the practice of cleaning can be improved and that the physical environments and technology as well as the organisational context can be optimised.

Keywords: *operational research, shadowing, facility management, cleaning*

INTRODUCTION

Cleaning is an essential service within facility management (FM). The longevity of buildings and the health and comfort of building users are dependent on this service. However, research on the practice of cleaning has been limited. Cleaning personnel can be seen as a "silent army," as described by an English operations manager interviewed in relation to this research. When asked about the importance of operational services, this manager responded:

"You need to know how it works. How the end user works. How the cleaner works. And understand the role they are doing, the challenges they face daily, to understand cleaning... So when you watch the cleaner working you see that people don't think twice about the cleaning. Cleaning is the silent army. Do you know what that means? I come to work at 8 o'clock in the morning and I leave at 4pm. Never see the cleaner. The cleaners. Millions of cleaners every morning and every evening go to work at 5 and 6 o'clock in the morning and then come back in the evening from 6 o'clock through to 9 o'clock in the evening. And we never see them. And there are millions of them. And they are silent to us because we never see them, but if they are not there – they don't come in – we notice straight away. So they are silent. They are the silent army. It is an army of people that just go out in the morning before people go to work or working in the evening when people have gone home. And they are working in the building when there is no one else around" (Interview Spring 2011).

The aim of this research is to describe the actual practice of cleaning. An English local authority was chosen for the case study and their army of cleaning personnel consists of more than 300 cleaners. In this case study two of these cleaners were shadowed. Their day at work is described through a narrative. The results are supplemented by interviews of their operations manager (OM) and service supervisor (SS).

The purpose of this study was to identify aspects that enable or hinder the cleaning service with regard to the cleaning staff's efficiency and effectiveness. The observations are structured to answer the following questions:

- When do the cleaning personnel work?
- Who do they interact with?
- What kind of equipment do they use?
- What are their responsibilities and routines?
- What hindrances and enabling aspects do they encounter during their workday?

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Knowledge obtained by shadowing depends on the context. Thus, the case presented here is not necessarily representative of all cleaning teams in this local authority, for the United Kingdom in general or for practices in other countries. The real value lies in the richness of data that records what actually happens in the field. To understand the practice, it is important to record what the practitioners actually do and not simply what they say they do.

THEORY

Cleaning is a cost demanding service that has been estimated to represent from 20-45 % of the operations cost of buildings, depending on contextual changes such as the country of location and the building type (Strand, 2000; Bjørberg, Larsen and Øiseth, 2005; Stoy and Johrendt, 2008; Madritsch, Steixner, Ostermann and Staudinger, 2008). Mascoporrán and Tucker (1996) found that the median cost for the cleaning of Australian office buildings was 19 % of the total operating cost. This fraction is supported by Stoy and Johrendt (2008), who state that “costs of cleaning owner-operated office buildings amount to an approximate 20 per cent share of the operating costs.” The cost of cleaning in Norwegian office buildings has been estimated by Bjørberg et al. (2005) to represent 33 % of the total operating cost, whereas Madritsch et al. (2008) estimated that cleaning represented as much as 39.1 % of the operating cost in Austrian long-term-care facilities. This finding is supported by Strand (2000), who found that cleaning costs represent as much as 35-45 % of the total operations cost for buildings in 114 Norwegian local authorities. These results illustrate that the cost of cleaning should not be underestimated as it is likely to represent a large portion of the total operations cost.

In Norway, the majority of the cleaning cost is accounted for by labour. It is estimated that salary, including salary-related costs, represents as much as 85 % of the cost of cleaning (NHO Service, 2011). Therefore, the use of time is important for the efficiency of cleaning; mapping of the enabling and hindering aspects of cleaning activities is important to provide a clearer picture of how this service can become more efficient. The ease with which a physical environment can be cleaned, the equipment used and the method and frequency of cleaning all affect cleaning efficiency, effectiveness and quality (Hellstrøm et al., 1969; Schneider, Nilsen and Dahl, 1994 and Nilsen et al., 2008).

Cleaning is not only a matter of cost but also a service that helps to ensure the health of building users. Nilsen et al. (2001 and 2002) investigated the relationship between indoor-climate-related health complaints, productivity and cleaning quality over a period of one year and found that the short-term absence (up to 16 days) of workers as a result of sickness was reduced by 12.5 % until 39 % in the office floors receiving the intervention and increased by 3.9 % in the control group. These authors also concluded that there was a need to investigate the relationship between dust on surfaces, dust in the air and indoor-climate-related health complaints. This study was followed up by Skulberg et al. (2004) and Skulberg (2006), among others, who conducted intervention studies while investigating the relationship between dust levels and the health of office workers (mucosal symptoms). It was found that “infrequent cleaning was associated with an increased risk of a high general symptom score (Skulberg 2004 and 2006).” These results are supported by the findings of Frankie et al. (1997), among others, who investigated whether deep cleaning could improve indoor air quality. A decrease was found in all parameters measured, which “included fungi (61%), airborne bacteria (40%), nonfloor surface fungi (25%), nonfloor surface bacteria (29%), carpet dust fungi (40%), and carpet dust bacteria (84%).”

Cleaning not only represents a matter of health and cost but also adds value to the core business. According to Jensen, Nielsen and Balslev Nielsen (2008), the concept of adding value has an element of surprise, as it should go beyond expectations, demands and instructions. These authors describe added value as “spontaneous” and emphasise that added value does not need to be expensive, which indicates the mutual cooperation and support of humans, things and machines is insufficient for a service to add value. Cleaning is a practice; according to Czarniawska (2007), a practice is “usually performed in cooperation among humans, things, and machines.” For a service to add value, it can be argued that three aspects, i.e., humans, things, and machines, need to support each other. The addition of value at an operational level may be challenging if these three aspects are not properly coordinated.

The cleaning personnel may influence the building users’ experiences of service quality. Stershic (1990) states that employees (such as front-line staff) are “the critical link in delivering service quality and customer satisfaction.” This statement is supported by Yusoff et al. (2010), who state that understanding the perspective of the service provider is “absolutely vital” to ensure service quality. As such, the importance of front-line staff (such as cleaners) should not be underestimated.

METHODS: SHADOWING AND INTERVIEWS

This is a case study that involves an empirical investigation of a particular contemporary phenomenon within its real-life context (Yin, 2009). The study relies on several sources of evidence and focuses on understanding processes. The case presented here is from the in-house service within one of the larger local authorities in the UK. Only one part of the case study, the shadowing, is presented here. This case provides valuable insight into the ways in which cleaning services are performed and the hindering and enabling aspects encountered by the cleaners.

Shadowing is an approach that is used within management research, but it has seldom been applied when studying front-line staff such as cleaners (Czarniawska, 2007). Shadowing records what actually happens (Gillham, 2008). It is a way of observing people without participating in their work; it involves following all of their movements and asking them about their actions to understand why they do as they do (McDonald, 2005). However, the presence of a researcher may influence the actual behaviour of the person being observed (Mintzberg, 1973; Czarniawska, 2007). McDonald (2005) conducted a literature review of studies that used shadowing as a method and described two main types of shadowing: quantitative and qualitative. The studies were categorised according to three forms: 1) experimental learning, 2) recording behaviour (quantitative shadowing) and 3) understanding roles or perspectives (qualitative shadowing). This paper deals with understanding the roles of the cleaners, and the results of the shadowing are presented as a narrative that provides insight about the workdays of the cleaners.

Researchers in the social sciences occasionally use stories to provide insight into actors' circumstances and the context surrounding them (Johannessen, Tufte and Christoffersen, 2010). A narrative approach allows different aspects to be highlighted that may otherwise be difficult for the researchers to convey. As such, narratives were chosen for the present study because they more clearly illustrate the aspects of the cleaners' workdays.

New insights can be gained through observations because an observer "can see different things than actors and natives can" (Czarniawska, 2007). Some of the observations may seem obvious to the native while seeming case-specific to the observer; other observations may only truly be understood by the actor. Nevertheless, observations can only provide a snap shot of the reality and "even when extended over time it can only incorporate a narrow section..." (Gillham, 2008).

The cleaners were shadowed for one morning and one evening; together, this evaluation provides a picture of the cleaners' workday in one office building. The data from the shadowing were recorded through field notes and digital photographs, which provided a vast amount of information when combined. When possible, the cleaners were also asked questions during the shadowing. The following narrative provides a brief summary of this collected material. During the shadowing, the following topics were studied in particular:

- Interactions between persons and the core business (types of contact and types of person)
- Cleaning methods/equipment/technology and performance
- Tasks, the sequence of tasks and the division of tasks among peers
- Hindering and enabling aspects
- The time of day
- Rewards for work and feedback on work
- The handling of events

The shadowing was agreed to by the operations manager (OM) and the service supervisor (SS), who asked the cleaners if they would like to be shadowed. Prior to the shadowing, the SS was also interviewed. In this interview, the SS said that she was responsible for 150 cleaners and that she tried to meet the cleaners face-to-face at least once during a three month period, which was a goal that was not always easy to achieve. Annie was the first cleaner to be shadowed. She met the researcher (R) for the first time in the evening together with her SS, who introduced R to her. The following morning, Annie was shadowed for another hour until Frank arrived. Frank was then shadowed from the time he signed in until he left the building.

"BRICK" AND THE CLEANING TEAM

The shadowing of the two English cleaners was conducted in an old English administration building, here referred to as "Brick". The building is open from 0700 until 1900 for office workers. In the evening and at night, a security guard patrols the building until the cleaners arrive in the morning. The building has a total area of 2,406 internal m², and its age is unknown, but the cleaners and their

SS estimate the building to be over 100 years old. The building is made of brick and mortar, and it has begun to crumble. Five months after the shadowing, the building was scheduled to be demolished, and the building users had already started to move to their new location.

The building's ground floor is used as offices. The basement consists of a few rooms that are used as storage, and the first-floor areas are used as a lunch room, computer training room and meeting room. The former cleaner at "Brick" retired, and the two current cleaners are temporarily employed at the building. The area to be cleaned in the building is split between the two cleaners (see Figure 1).

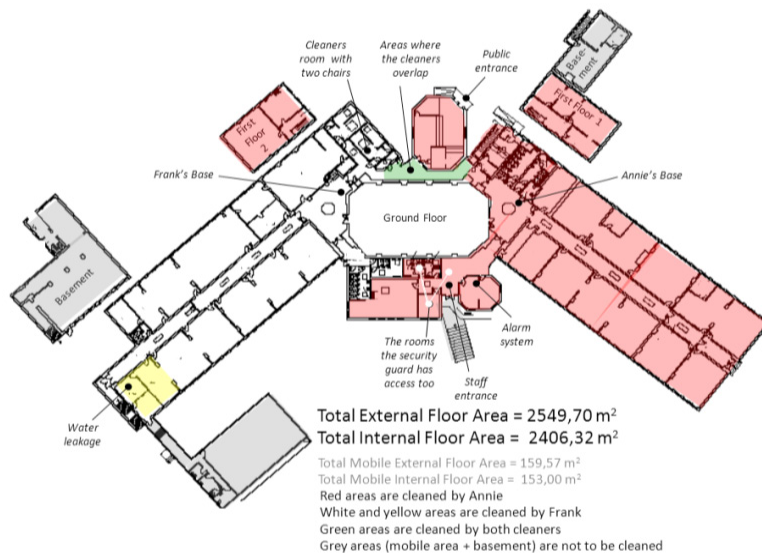


Figure 1: The floor plan of "Brick" and the cleaners' different areas

THE CLEANING TEAM AND THEIR HOURS OF DUTY

The two cleaners, Annie and Frank, have different relationships with the council's soft FM department which is responsible for cleaning, catering and school patrols. Frank, who is a semi-retired automotive engineer, is part of the council's mobile caretaking team and works (by choice) for only 3 hours in the morning from 0600 until 0900; Annie, who has been employed as a cleaner for many years within the FM department, works full-time. Annie normally arrives and leaves earlier in the morning than Frank, and she works alone in the evenings, as her job is divided into three parts. She begins by cleaning at "Brick" from 0510 until 0840 and continues to work as a caterer from 1100 until approximately 1315 after a few hours off, which enables her to eat lunch and perform chores or errands, such as ironing, at home before going to the school canteen. Finally, after a couple of hours off again, this time for a shower and dinner at home, she returns to clean at "Brick" in the evening from 1510 until 1900.

RESPONSIBILITIES

Annie's and Frank's responsibilities are divided within "Brick". Frank is responsible for one of the corridors, the large oval room and the nearby toilets. Annie has responsibility for the other corridor, the public entrance, the medium oval room, the staff entrance area, and all toilets in this area in addition to the areas at the first floor.

Annie has responsibility for the keys at "Brick". At night, a security guard is on site, but he has access only to the entrance, the toilets by the entrance hall, his own security booth and the property's external areas. Annie locks all other areas inside the building, engages the alarm system and locks the door to the room where the alarm system can be accessed when she leaves in the evenings. The security guard closes the gate in the 2-metre-tall fence surrounding the property when Annie leaves in her car. At this point, the security guard is alone on the premises, and he does not leave until Annie arrives again in the morning and disengages the alarm system.

In the morning, Annie first disengages the alarm system and then briefly greets the security guard (who seems to be ready to leave as soon as she arrives) before she begins patrolling the building to open the locked doors and turn on the lights. In the evening, Annie pays attention to who is still at work when she cleans. She tries not to bother those who are still working for as long as possible. When most of the cleaning is complete, she walks around the building and closes open windows, turns off the lights, closes or locks the doors and checks whether any office workers are still present. At the end of her shift, she sits down with a cup of coffee by the entrance and waits for the last office workers to leave the premises so that she can complete her work and lock the building up. The

office workers, the security guard, Frank, and the SS all do not have keys to the building; thus, Annie has to ensure that everything is in order before she leaves.

ROUTINES AND PACE

Annie's responsibility for the building's keys influences her routine because she has to work from early in the morning, when no one is present, until a few hours after the office workers have arrived. She also has to work from late in the afternoon, from the time when the office workers begin to leave, until the building is empty. In contrast, Frank can choose when to work, but he prefers to work early in the morning and to achieve as much as possible before the workers arrive.

The first and the last activity when arriving at or leaving "Brick" is to sign a book located at the staff entrance hall. This unsupervised book keeps a record of who is in the building at any given time. Both cleaners seem to work according to a system which can be categorized as a routine that consists of sequences of the various tasks. They begin at a specific place and work their way down their corridor and up the other side. In general, the cleaners perform one task at a time, e.g., emptying rubbish, cleaning/polishing desks, vacuuming, cleaning toilets. The cleaners do not change tasks before they are finished unless they are interrupted.

Frank seems to work task-by-task, finishing one task in all of the spaces before continuing with the next task. Annie seems to have two sets of routines: the same routine as Frank in "her" corridor but a different routine in the other areas. In the areas of the public entrance and the staff entrance and on first floor in the lunch room, Annie seems to finish all of the tasks within the different areas/rooms before she continues to the next area/room. In this routine, the sequence of the tasks seems to be the same as that for the aforementioned routine: emptying rubbish first and then cleaning/polishing desks before vacuuming the floor and cleaning areas with hard floors.

Frank, who works only during the mornings, begins with the offices and works as quickly as he can until most of the office workers have arrived. His pace slows as the building fills up. Frank expresses it as such:

"I only work in the morning from 6 o'clock till 9 o'clock. So, I tend to do the jobs I can do when there is nobody in. And a bit later on, because they tend to come in at different times. Some come in for 7, some for 8 and by 9 o'clock it is full. So, it is only certain things you can do after, cause then everybody is messing out and about."

Annie also works quickly, but because she was not shadowed while the office workers were arriving, there is no record of whether their presence had any effect on her pace. The cleaners' do not seem to have an obvious common understanding of practice. The most apparent difference between Frank's and Annie's toilet cleaning routines is that Annie uses gloves when cleaning, whereas Frank uses his bare hands. Another difference is that Annie distinguishes between the types of cloths and the types of buckets that are used for the toilets (the blue cloths and the blue bucket) and for the vanity counters and the dispensers (the pink cloths and the red bucket), whereas Frank only distinguishes between the colours of the cloths. Annie also cleans outside the toilet bowls, whereas Frank does not (this may be because of R's presence). Both Annie and Frank use a blue toilet cleaner and descaler inside the toilet/urinal bowl. Annie uses her glove-covered hand and the blue viscose cloth to clean inside the toilet bowl, whereas Frank seems to use a toilet brush (this may be a matter of personal preference).

Other differences between the routines of the two cleaners are that Frank seems to move fewer objects when he vacuums compared with Annie and that Frank vacuums and wipes the desks every other day, whereas Annie wipes half of the desks and vacuums the floors every day. Annie also changes her wiping routine every other day - one day she wipes with water and chemical while she uses a flannel cloth and wood wax spray to polish the desks the following day.

This day Annie's evening routine was interrupted by a rainwater leakage in Frank's corridor which includes that Annie and SS had to collaborate in order to provide a wet vacuum and vacuums the water. Annie's evening routine was in addition interrupted by a member of the public visiting the public entrance - consequently Annie had to change task and area to clean as she is not allowed to be at the public entrance when members of the public enquire assistance.

Listing the cleaners' routines reveals differences (see Table 1) that may be a result of personal choice, of differences in training or a natural consequence of the time of day when the tasks are conducted.

Table 1: The cleaners' routines

	ANNIE'S MORNING ROUTINE	ANNIE'S EVENING ROUTINE	FRANK'S MORNING ROUTINE
1	Opening the building	Unknown + rainwater leakage	Emptying the rubbish
2	Cleaning the desks (half of the desks)	Cleaning the toilets	Cleaning the toilets – first the furniture and then the floor
3	Vacuuming the “corridor offices”	Cleaning up the pooled rainwater with a wet vacuum	Vacuuming the floor or wiping desks (on alternate days)
4	Dusting/cleaning the glass/doors (based on observations obtained while shadowing Frank)	Cleaning the public entrance area; first rubbish, then polishing the desks before vacuuming	Refilling the paper hand towels and toilet paper in the toilets
5		Mail room; first rubbish, then polishing before vacuuming	Dusting/cleaning glass
6		Vacuuming the staff entrance and toilets	Scrubbing the urinals
7		Emptying the rubbish in “corridor offices”	Discarding the refuse bags
8		Finishing the vacuuming of the public entrance	
9		Cleaning the kitchen on the first floor	
10		Coffee break	
11		Closing the building	
12		Discarding the refuse bags	

INTERACTIONS

Annie and Frank interact with each other every day in various ways (see Image 1). They drink water together, and it seems that Annie regularly helps Frank by checking that ladies are not in the lavatory before Frank enters (because it appeared natural for her to do this, it seems likely that this is one of their routines).

The ways in which the office workers react towards the cleaners differs. Some workers do not seem to notice the cleaners, even a researcher following their movements. Others seem to give the cleaners more attention because there is someone shadowing them. The “good morning” greeting seems to be common for the cleaners and the office workers. The OM's statement that “people don't think twice about the cleaning” became apparent when the users in one of the offices turned off the light as they left a room that both Annie and R were still in. This may be a typical behaviour when there is no researcher present, but it may also have been a mistake.

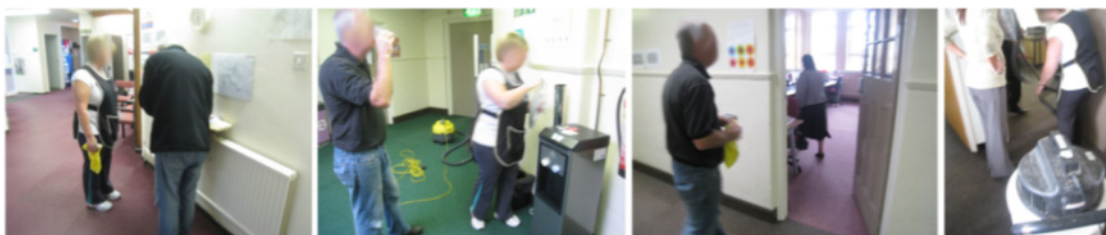


Image 1: Annie and Frank interact in various ways with each other, SS and the building users

During the shadowing period, no negative comments regarding the cleaners were observed. The comments from the building users were that 1) dusting (in this building) is pointless and 2) these cleaners do a good job (indicating they perform better than the previous cleaner). Frank seems to meet more people during his three hours than Annie does during her hours at “Brick”, although it seems as Annie has more varied interactions than Frank. In addition to meeting building users she also interacts with other service personnel as the security guard and SS. In the evening, there was a rainwater leak at “Brick”, Annie and the SS had interactions with several building users: first with the 2-3 ladies who reported the flooding and then with 5 users of the flooded area of the building. Annie and the SS also collaborated with one of the building users when vacuuming the water from the floor. They took turns with the wet vacuum machine. This event also showed that Annie was most likely more experienced with this machine than the SS because the SS was unsure of how to empty it.

The most surprising information gained through Annie's interaction with the building users and her SS was that neither the building users nor the service supervisor seemed to be aware that Annie had keys to the building. The SS seemed shocked when Annie noted

that she had the keys to the building and that she was also the one who had the responsibility for opening and closing the building, including all accompanying tasks, such as checking the windows, lights and doors and that the building was empty.

BUILDINGS IMPACT AND ERGONOMIC

The cleaners' equipment is located in different places around the building (see Image 2). The cleaners' storage space seems to be insufficient because it is located in several places. This aspect, combined with the time that the cleaners spend to change or find equipment, seems unnecessarily time-consuming.

The cleaners have two rooms that may be defined as theirs: the room (with the cleaners' two chairs) that is also used for storing envelopes and office supplies for the core business and a large toilet room by Annie's base, which is used as an equipment room. Aside from these areas, the cleaning equipment is stored in the spaces dedicated for the core business, including the gentlemen's room, a corner by the staircase leading to the kitchen, a kitchen sink in the ladies' room, and a corner in one of the meeting/training rooms on the first floor. The toilet room where Annie stores her equipment does not have any shelves. Therefore, her equipment is spread out on the floor, and when she begins her duties, she chooses the things that she needs and organises them on and by the edge of the plant-island (the circle at the floor plan) at her base. This practice may indicate a need for a more dedicated storage room.

The storage of equipment on the first floor seems convenient because the building does not have an elevator. Thus, it is not necessarily a direct disadvantage to have the equipment distributed throughout the building. However, such a broad distribution of the equipment may make it challenging to keep an overview of the equipment and supplies. It can also be argued that this placement of the equipment inconveniences the building users.



Image 2: Frank's and Annie's bases, storage rooms and water refilling possibilities

The lack of door sills and the presence of swinging doors made it easy for the cleaners to pull their tub vacuums. Power outlets high on the walls (above hip height) were also useful because the cleaners could stand upright when plugging in their tub vacuums. In the toilets each lavatory was separated with an interior partition having a 5 - 10 centimetres gap from the floors allowing the cleaners' string mop to manoeuvre easily without also mopping the wall. However, the cleaners had difficulties accessing the floor area around the back of the toilet as the space left between the wall and the lavatory was too narrow to allow appropriate access. The cleaners also experience difficulties reaching windowsills when dusting and had to use the tub vacuum to reach the sills.

The distance between the power outlets in this building seems to be appropriate for the length of the power cords; in the only observed incident in which a tub vacuum's electrical wire was stretched taut, the cleaner was able to change to another power outlet.

TECHNOLOGY AND COLOUR CODES

The cleaners' equipment can be categorised as follows: a) Cloths and string mops, b) Buckets and mop handles, c) Fluid and spray chemicals, d) Vacuum cleaner, e) Refuse bags and paper refills.

The cleaners' equipment (see Image 2) is listed according to its location (see Table 2), and it is apparent that colour coding is important in cleaning. Some colour codes seem to have a purpose (mops, cloths and buckets), whereas others seem to be random (spray bottles and tub vacuums):

- Yellow: cloths for tables, mops for food service areas such as dining areas
- Pink/red: cloths for sinks, buckets for tables, mops for unknown
- Blue: cloths for lavatories, string mops for toilets and buckets for toilets

Frank was the one who indicated that colour had a meaning through telling the soft FM department had a saying for remembering which cloth to use: "The rime is: Pink for sinks. Blue for loos."

Table 2: The cleaners' equipment according to storage space

STORAGE ROOM	EQUIPMENT
By Frank's base	Two chairs, primary stores of toilet paper rolls and paper towels, two yellow tub vacuums, yellow flannel cloths, wood wax sprays, air freshener, black refuse bags and refill bags for the tub vacuums, among other items.
Gentlemen's room	A blue string mop bucket with a blue string mop in it, a green vinyl pad, some used and dried cloths of various colours on top of 5-litre chemical containers, a black bucket (used to catch the rain water leaking through the roof above the urinal), some unmarked spray bottles (marked with coloured plastic parts: green; blue, containing the blue glass-cleaning chemical; white, containing the red toilet-cleaning solution; and yellow, containing a blue solution), a 1-litre bottle of blue toilet cleaner and descaler and two different chemical containers (one with a green chemical and a green label and one with pink chemicals and a red label), which can be attached to a flexible tube connected to the utility sink's mixing battery
By Annie's' base	A complete toilet room containing a ladder, a trolley (which she does not use), a cardboard box containing twelve 1-litre chemical bottles, a red and a blue string mop bucket (both containing a yellow string mop), a red and a blue (approx. 10-litre) bucket with a handle (and Annie's name written on with permanent ink), two yellow caution-wet-floor signs, a red tub vacuum and two 5-liter containers on the floor. The trolley itself contained a great amount of equipment: refuse bags, wood wax sprays, air freshener sprays, two porcelain coffee cups (most likely her private cups), two transparent spray bottles containing solutions, new unused and unpacked viscose cloths of various colours (yellow, blue and pink) and some hand towel paper refills inside a red, square bucket hanging where a refuse bag is supposed to be.
First floor 1	One yellow tub vacuum
First floor 2	One yellow tub vacuum, one blue string mop bucket and one yellow string mop

DISCUSSION

The aim of this research was to describe the actual practice of cleaning with the purpose of identifying enabling and hindering aspects for cleaning services with regard to efficiency and effectiveness.

The results illustrate that the cleaners interact with various people; building users, persons visiting the building, security guard, SS and other cleaners. The majority of the cleaners' work is performed outside of core business hours; thus, there is not necessarily any loss of efficiency from interruptions by building users. However, mingling with building users might increase the effectiveness of cleaners because their work would automatically receive feedback, such as when a building user commented that they were more satisfied with Annie's and Frank's work than with the previous cleaners' work.

The results show that the cleaners perform differently within the same organisation: the sequence of tasks, the types of equipment used and some aspects of the performance are similar, still the tasks seem to be performed differently. One of the cleaners seems to be more thorough (or experienced) than the other. Despite this the available trolley remains unused. The use of a trolley may have saved time and made the service more efficient without reducing its effectiveness. Increased efficiency may generate additional time to ensure the effectiveness of cleaning tasks.

The narrative illustrated two different cleaning routines; 1) one-task-in-all-spaces and 2) all-tasks-in-one-space-at-the-time. The first routine seem effective when no one else are around as it demands less thinking and as it possibly is more efficient as the cleaner don't use time on changing equipment. On contrary, if this routine is conducted when building users are present the users will be disturbed repeatedly. Such a routine would then be rather disturbing and not add value to the core business. The second routine

where all tasks are performed in the specific space before moving to the next may reduce the efficiency as time is spent on changing equipment. However, this routine might increase the effectiveness as the cleaner can concentrate on a smaller area at the time which gives more time to (unconsciously) check the already conducted work before leaving the room. This is also a routine which seems to be less disturbing for the core business, a routine which may increase the building users satisfaction as they see the work being done (thereby knows it is performed) and a routine that would be easier to coordinate with the routine of the core business, especially if conducted at the same time on a daily basis.

The results also indicate that it may be challenging for one manager to keep track of the responsibilities for 150 frontline staff as SS in this case did not know the complete responsibility for the cleaners'. The results show that the cleaners mostly use manual equipment in their daily work and that the only used machine is tub vacuums. The efficiency and the effectiveness may be increase by using trolley allowing all necessary equipment to be transported at once. A cordless vacuum could add to the efficiency, if the battery could manage minimum one hour vacuum before the battery discharges.

The building supports the cleaners through swinging doors, a lack of door sills, power outlets high on the wall (above waist height) and interior partitions with 5 - 10 centimetre gaps above hard floor (allowing string mop access underneath it), but it hinders the cleaners because it lacks adequate storage rooms or a common base with a suitable storage system. Ensuring effectiveness and efficiency seems also to be challenging for the cleaners in the toilets as the available space between lavatories and walls seems to hinder the cleaners in their work since the space beside and behind lavatories is difficult to access.

The lack of an elevator contributes to the inefficiency because of the time spent moving in stairs and corridors and because of the need to purchase extra equipment to be stored on the first floor. It can be argued that this extra equipment may have been unnecessary because the cleaners could have carried the equipment up and down the stairs. However, this practice would have cost the cleaners extra effort and time and most likely would have been disadvantageous to their health because some of the equipment is heavy.

CONCLUSION

This illustrate there may be a potential to improve efficiency and effectiveness in relation to building, technology and organisation when it comes to:

- ergonomic
- accessibility
- training of staff
- ease of cleaning
- adequate storage
- coordination with core business
- arrangements for effective operation
- keeping an overview of whom actually does what
- individual responsibility for defining routines with no obvious common understanding of practice

This research is part of a PhD project on cleaning services in local authorities. The aim of the project is to understand the work practices of these services and the impact that buildings, technology and organisation have on their work. A next step for this research could be to develop a framework which further explains the studied aspects in this paper and coming research on this particular topic.

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