

## Chapter 10

## Meaningful Work

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**I don't know how real the story is, but our teacher told this story once. Someone developed a machine that could score pork roasts. You know, a lot of people were standing at this line and then they scored all these pork roasts. It was the same motion. It was hard on the wrist but they got a lot of money for it. That was also piecework. Then someone thought of making a machine that could score a whole pork roast all at once. You simply just put it in and then it was scored, all of the rind was scored all the way down on this, like, one and half meters of pork roast or however long that is. That machine never got running. Every time it ran, someone accidentally threw something in so it broke. So, in the end, it was just placed in a corner and dropped.**

*(Werner, operation and production technologist, robot developer, WIPER)*

# 10. Meaningful Work

*How the robot revolution will transform work and the worker*

## You will find here

- Definitions of work, labor, automation
- REELER findings of how robot makers view work and workers in a laboring society
- Theoretical overview of positive, deterministic, apprehensive, and resistant attitudes toward technologies
- New insights into work-life from a shop-floor view
- Empirical data challenging the rhetoric of relief, menial labor and efficiency
- New insights into robo-sabotage and its reasons

## You will acquire

- Awareness of how robot makers envision work and workers from the perspective of relief
- Awareness of how 'relief' build on an assumption of human workers as engaging hard, repetitive and wearing labor
- Awareness of how humans at the shop-floor might find even menial work meaningful and rewarding
- Awareness that work is not just about being efficient and productive, but about identity, pride, skilfulness and fulfillment

### 10.1 What is the meaning of work?


**W**hat is a meaningful work life? How will automation and robots influence what is meaningful about work? In answering these questions in robot development, can we increase acceptance and avoid robots being sabotaged or abandoned?

This chapter addresses the *meaning of work*. The philosopher Hannah Arendt makes a distinction between labor and work: The former being a means unto itself – the work that all animals do to stay alive and procreate. Labor is the 'toil and trouble', which automation and robots are expected to liberate us from (Arendt 1998, 4). Work, on the other hand, Arendt describes as productive and permanent – humanity's mark in the world. The problem is, according to Arendt, that our society has become a 'laboring'-society:

*"It is a society of laborers which is about to be liberated from the fetters of labor, and this society does no longer know of those other higher and more meaningful activities for the sake of which this freedom would deserve to be won."* (Arendt 1998, 5)

The ethnographic studies in REELER brings us in close proximity to humans engaged in many areas of work other than engineering (cleaning, inspection & maintenance, education, transportation, logistics, production and manufacturing, agriculture, construction, healthcare, scientific research), and we have interviewed 160 workers (robot developers, researchers, teachers, labor union representatives, cleaners, farmworkers, physiotherapists, doctors, warehouse workers, factory workers, construction workers, pilots, air traffic controllers, mechanics, delivery drivers).

It is from the analysis of REELER's 11 robot cases that we come to question a self-evident assumption of labor as 'toil and trouble' from which humans are happy to be liberated. What is perceived as menial and repetitive labor by some can be seen as meaningful, creative, and productive work by others. Furthermore, REELER's cross-case analysis shows that the perception of work as laborious influences how workers themselves are perceived. In the 'laboring society', a perspective shared by many

 **Work:** Remunerated human labor, both as a means unto itself and as a means of production.

developers, economists, and policymakers is that relieving humans of hard labor is always a good thing. However, in our ethnographic research we also encounter other understandings of working humans on the shop-floor. These humans take pride in their work and the skills they develop (that others would label 'toil and trouble'), they enjoy working with colleagues, and having a purpose in life. Therefore, REELER's own definition of work incorporates both labor inherent and labor productive. Work may provide us with the means for meeting our most basic needs, but can also bring us recreation, socialization, skill development, pride, fulfillment, a purpose, an identity.

In this chapter, we present an analysis of our data on the laboring society. In sections 2 and 3, we present the robot makers' arguments for transforming work by relieving humans of hard labor, while making production more efficient. Whether for better or for worse, quests for automation are radically transforming work life. There is a developing shift in the roles of worker and robot, challenging the long-time assumption: "machines are tools that increase the productivity of workers. Instead, machines themselves are turning into workers, and the line between the capability of labor and capital is blurring as never before," (Ford 2015, xii). This shift is tied to how we conceptualize and value work and the worker, to political discourses (Industry 4.0, and relief of the worker, e.g.), and to how quickly robot technologies are developing. On the individual level, some work is becoming more monotonous and less social, some work is demanding new skills, and some work is being made redundant. These discussions are taken up here to provoke robot makers to challenge their own ways of thinking about workers, work, and automation, to raise awareness about workers' experiences of work and automation, and to possibly align the workers' and the robot makers' motives in future automation (see 3.0 *Collaboration in the Inner Circle*).<sup>1</sup> Then, in sections 4 and 5, we present research that 'gives voice' to people whose work lives will be affected and transformed by automation and robots but as end-users, directly but also distantly affected stakeholders. It is in this realm of everyday practices that the meaningful work-life is brought to the fore – and the human workers reveal themselves to be much more than replaceable parts of a machinery. Though we will also emphasize that robots can be, and have historically been, a great help and relief to humans doing hard work, REELER want to 'give voice' to those toiling in order to give a fuller picture of how robots affect work, and how the replacement debate is about more than salaries and the development of new jobs. In section 6, we consider the consequences of upholding these perceptions of work as mere labor, and the worker as a source of labor. Finally, in section 7, we explore a future of work where robotization is a part of, and not an impediment to, the meaningful work life.

## 10.2. Perceptions of labor

In this section, we address the role of the robot makers' perceptions of labor in relation to **automation** and some of its negative effects – replacement chief among them. REELER's definition of automation is the robotization of human labor, both inherent and productive. Automation of labor is achieved at different levels, covering complex work tasks (e.g., knitting or circuit board assembly), down to the simplest labor tasks (e.g., opening doors). *Full automation* implies that the human is entirely displaced from the work, while *partial automation* keeps some humans in the workflow, where the robot performs particular tasks. Historically, both partial and full automation have transformed work life, sometimes significantly for the better and sometimes to the detriment of particular persons.

Many robot developer participants in REELER's research refute or balance issues of replacement and other negative effects of robotization with the positive effects or goals of automation. In particular, many members of the robotics community are caught up in a particular rhetoric around employment: Robots create more jobs than they replace.

**Automation:**  
The mechanization of human labor, both inherent and productive

“Then there are things like, what people talk about: 'Are the robots going to take our jobs?' If you look at what happens, then it just so happens that robots also contribute to the productivity, and productivity is better earnings, and better earnings is better competitive power. So, if you look at what happens in, well, in the short view, a year or two, then it can mean in some companies that you have to fire some people. But, most often, you also increase the company's earnings and the company grows on that foundation, so you, all in all, in reality, could increase the number of employees in that company.

(Valdemar, engineer and CEO, robot developer, WIPER)

Indeed, robotization is likely to eliminate particular occupations or sectors while opening for brand new or transformed sectors (see 9.0 *Economics of Robotization*). But, what happens to workers in these transitions? Another primary justification provided for automation is *relief*, which we challenge by giving voice to the workers expected to be relieved. We have identified in REELER's data two distinct ways of thinking about the human that permeate these conversations about relief and replacement: the human worker as a labor source, and the worker as a whole person. These perspectives bring forth particular perceptions of the good worker and desired qualities in a robot, and challenge commonly held notions of menial and meaningful work.

<sup>1</sup> This chapter is only included in the online version of Perspectives on Robots [www.responsiblerobotics.eu](http://www.responsiblerobotics.eu)





Most robot developers interviewed in REELER do not feel that their own work could be replaced by a robot or AI, but can easily imagine a robot ‘relieving’ manual laborers of burdensome tasks.

The perception of the human as a labor source seem to come with deterministic perspectives on automation. Automation decisions are often built around a particular way of thinking and talking about the human worker as a commodity, in terms of ‘productivity’, ‘expenses’, ‘efficiency’, and even ‘optimization’ and ‘standardization. This discourse is not just among the people who make robots, but also among REELER’s affected stakeholders. When the human is equated with the machine as a source of labor, reduced in complexity and measured as means of production, it becomes easy to imagine a machine replacing the human.

From this line of thinking comes an attitude of **technological determinism**, where the reasons for automation are so self-evident that technological displacement becomes inevitable. Many of REELER’s participants had a helpless or passive orientation toward robotization, their arguments often resting on historical precedence: Technologies have been evolving alongside humans for centuries, and because advanced tool-making is a cornerstone of human exceptionalism (Idhe & Malafouris 2019), technological change is thus an unstoppable force.

**Technological determinism:** *The attitude that automation is inevitable, or, that the reasons for automation are self-evident; technological progress as an unstoppable force.*

“Surely there are hazards, but I am going to make use of the slogan that we have employed many times: We live in the twenty-first century, technology surrounds us either side; we cannot avoid it.

(Erwin, university psychologist, robot maker, ATOM)

This argument assumes technological displacement as a part of the natural order. Sometimes coupled to the passive attitude of technological determinism is the more active or biased attitude **technochauvinism**, where technology is assumed superior to all other potential solutions or sources of labor. These biases are intertwined with the depictions of robots and humans we encounter in news and popular media (see 8.0 Imaginaries).

**Technochauvinism:** *The assumption that technology is superior to all other potential solutions, or, in automation, to all other sources of labor.*

In REELER’s case material these discussions are tied to the *purpose* of robots and what it means to people to have a job. On the one hand, some point out that we have seen in agriculture since 1900s that robots really help people free from the toil of hard work that breaks their bodies and wears them down. The robot type that replaces people can have a positive effect on affected stakeholders, if they can subsequently create or find new and better jobs. The robot that help workers or free workers to find better jobs will have a positive effect, as the robot is a genuine help for them in their work and does not affect their pleasure and identity in work in a negative way. However, robots can also have a negative effect on affected stakeholders’ work life, if humans are replaced altogether by robots – and do *not* find new satisfactory work. In this case, they not only lose a salary (which some want to remedy with Universal Basic Income), they also lose identity, human contact in the shape of colleagues, pride in skills, etc. However, this is only apparent if one views humans as more than replaceable parts in a machinery.

Throughout REELER’s data, both robot developers and robot buyers frequently compare robots to human workers as labor sources – often preferring the machine. Even the workers themselves can see themselves as a less attractive labor force compared to robots. When confronted with an imaginary of the robot laborer which does not get sick, need coffee or cigarette breaks, and which works 24 hours a day (including Sundays), the replacement of the human worker can seem very appealing:

“[Robots] don’t have hangovers on a Monday morning, they don’t ring in sick.

(Brian, wholesale store owner, affected stakeholder, WAREHOUSE)

*” They're not standing there having a cup of tea and a fag, are they?*

(Benny, mechanic at family-owned garage, affected stakeholder, HERBIE)

This is especially the case for small and medium size enterprises (SMEs) where fluctuations in human labor or in production output are much more difficult to tolerate or accommodate:

*” You always need to think like that, what would happen, if someone gets sick, while at the same time another gives notice, and one then would be alone. Then that person has to do the work of three, the whole manufacturing would break down.*

(Karl, SME owner, affected stakeholder, COBOT)

Technochauvinistic attitudes lead to the application of technologies to solve, for instance, socio-political problems like labor challenges or environmental problems, like developing robotic pollinators in response to declining bee populations (Potts et al. 2018). These perspectives, which measure humans against robots as labor commodities and frame the automation of human labor as self-evident, inevitable, most effective, and natural, leave little room for exploring non-technological solutions to human problems. Of course, there are other viewpoints that are not so deterministic in our data material.

Not everyone is convinced that human workers can be fully substituted by robots and some are also sceptical towards the idea. Most robot developers interviewed in REELER, for instance, did not feel that their own work could be replaced by a robot or AI. However, they could envision robots taking over some of their manual labor tasks.

*” Really for my work I think it's not a problem because my work requires to use the mind, about the design, but I think for a lot of people this transformation will be not simple. It's like all the revolutions, like the industrial revolution, or the internet revolution. All the revolutions have a specific problem for a certain type of people. I think in this case it's the same, the same. For me it's not a problem, but maybe for the person that is in a factory, just putting a screw, a robot is a competitor really and a big problem for his income, I think.*

(Hugo, mechanical engineer, robot developer, HERBIE)

Among the manual workers (i.e. affected stakeholders in REELER) some did fear that robots would take over their jobs, even if they would not perform as well as the human: *“Robots can't wash a table.”* (Elif, hospital cleaning staff, affected stakeholder, SPECTRUS).

A number of participants interviewed by REELER researchers described robots as slower or less effective, more expensive, less flexible, and less intuitive than human workers, but others emphasize they are too fast to do a proper job. At small businesses (and we have only visited a few) they also see a problem in relying on robots actually being the better choice. SMEs must be more flexible for small-batch manufacturing, and that robots are still too costly to regularly reprogram and re-integrate into production processes.

*” The product the robot is making should cost as little as possible. We are the zero-cost-faction here. Yes, it should come at no cost. Every price that you submit already is one too high. Definitely, and you need a price break-down; do I use a worker, who earns ten euros, who does the job, or do I choose a robot, which, I don't know, in principle, costs 10,000 Euros, and which needs to be programmed by an extremely expensive man. But why should I delegate work to a robot, if it is done after three hours, and after those three hours, I have to reprogram all-new?*

(Karl, SME owner, affected stakeholder, COBOT)

Thus, a particular barrier to full automation is the perceived and real immaturity of existing robotic technologies, and a skepticism toward the ability of emerging technologies to match the qualities of the manual worker. When participants looked beyond the worker's value as a source of labor and instead thought of their whole value, the human worker was not so easily automated, particularly in terms of social skills (in teaching, e.g.), complex work activities (complicated window installations, e.g.), or decision-making (in rehabilitation, e.g.). Wherever a task or job is too complex (picking tomatoes in a hilly area), the environment is too unpredictable (a construction site), or the process is too reliant on distinctly human skills (a classroom) for full automation, there is still the option of partial automation or task automation. Indeed, there is increasing emphasis on task (not job) replacement

in economic predictions (Brynjolfsson and MacAfee 2011; Brynjolfsson and Mitchell 2017). Yet, even task replacement is not that uncomplicated (and not without consequences; see *section 10.5 on transformation of work*).

### 10.2.1 Partial automation or replacement

Partial automation often comes in the form of assistive and labor-saving technologies. These machines can replace or support particular tasks, and often do not eliminate a person's job entirely. Robot makers tend to describe these robots as helpful or collaborative tools that save the worker from arduous labor, and they tend to explain away the instances where assistive automation also results in a reduced need for human workers.

#### STORY FROM THE FIELD:

### Gradual reduction of manual labor(ers)

Many robot makers refer to developments in agriculture as analogous to modern robot developments; a story of machines with a long history of helping to relieve humans of labor. We meet Theo, an university researcher who gives us one example from agriculture.

*"And it starts already there with the plow. It's a very simple thing to automate your hand tool with a tractor and so forth. And this process is going on for a long period already, I think. And, so robotic things are now introduced in the sense of precision agriculture, so that they can precisely manipulate actions in the field on a plant level [individually, as opposed to a whole crop adjustment]."*

Measures of partial automation do not mean a one-to-one substitution of human labor with machine labor, but they eliminate particular manual tasks that accumulate to a consolidation of manual labor and the gradual displacement of workers, as one farm worker, Omar, explains with the recent introduction of a tractor.

*"Before, where I used to work, there were more people. But last year they bought a tractor. This tractor took people's jobs. It takes people's jobs away, because the work that the tractor does now, I am the only one who does it. Before,*

*we had three more people to pick up the tomatoes. The people had a cart and could move them by pushing the cart. But now everything is taken in less than half an hour into the storage room. The work people used to do in a day, I do in less than half an hour. This tractor, yeah, some technologies like this one, just a little tractor with the lifting tool, allows the grower to eliminate two jobs and he is now doing the job of those two people in a couple of hours -- and that's very useful. It's easier for them."*

Undoubtedly, the machine relieved the worker of some labor (pushing carts), but Omar also took on new tasks such as driving the tractor. His experience of work was also significantly altered while three of his co-workers were displaced entirely.

(Based on interviews with Theo, university researcher, robot developer, and Omar, farm worker, distantly affected stakeholder, SANDY)

What comes across in REELER's analysis is that robot developers' and robot buyers primarily think of reduction in the amount (and costs) of labor as an inherent relief, but this is not necessarily a relief to the worker. Furthermore, technologies often relieve workers of more than tasking physical work by eroding the overall amount or sum total of manual labor in the workplace. Automation historian David Noble (1993) ex-

plains the unspoken ambiguity of 'labor-saving' machines: "In short, labor-saving technologies have not been used to save worker's labor—meaning physical and mental effort, but rather to save capital labor—meaning workers (and wages)." (ibid, p. 87) This conflation of both *work* and *worker* as labor is made possible by reducing humans to their productivity.

The point we want to make here is that if robot developers and owners of enterprises see humans as labor sources comparable to machines – and therefore replaceable – they overlook a key REELER finding: There is more to work than the labor that can be performed by a robot. Work can also be meaningful for humans – something we suppose is not the case for robots.

Not surprisingly, replacement due to automation is one of the most prevalent fears in REELER's data. One industrial designer argues that robots will replace most people in the workforce and he has concerns about his own role in creating robots that replace workers:

*It's very difficult to work with robots, because the robots will take most people's jobs. It has very serious implications that these robots are somehow taking the place of humans in the workplace. I'm an industrial designer so I don't necessarily have to work with robots. My colleagues are roboticists, so that's the only thing they are working with. Is it fine to design things that will take people's jobs away? It's very disconcerting how fast the robots will take people's jobs and how little they cannot do. It's a matter of a few years and a lot of money and then very few people will have work – especially construction, or industry, or cleaning. So yeah, it's something that I really think about a lot.*

(Oswaldo, industrial designer, robot developer, SPECTRUS)

A common argument in robotics is that robots create more jobs than they destroy, but the problem is that the same type of jobs are not necessarily created, and those persons whose jobs are taken do not necessarily possess the skills or aptitude for taking the new type of jobs (see 7.0 *Learning in Practice*).

*The bricklayer robots, you know them, right? Yeah. They are good for those who know how to adapt, right? So, there's this thing about being ready to embrace changes. Uh, and good for those people who know how to do other things than just laying bricks. But those who don't know how to do anything else than laying bricks, they will somehow end up as the losers in all of this.*

(Jens, CEO at technical equipment rental business, affected stakeholder, WIPER)

While on a large-scale, replacement may not cause persistent mass unemployment (see 9.0 *Economics of Robotization*), some people may lose their jobs or some aspects of their work due to automation. When relief is offered as justification for these effects on workers, it is important to understand whether relief is real, or just rhetoric.

### 10.3. Robot makers' perceptions of relief

The robot makers in our REELER data are in general very concerned with 'doing good' (as described in 4.0 *Ethics Beyond Safety*), particularly when making robots for humans' work lives. They want to relieve humans of tedious work and heavy lifts. However, REELER research indicate they may build their conception of the 'good work life' on assumptions which are not the same as those shared by users and affected stakeholders. Relief is, in robotics, the central notion of doing good, but sometimes it becomes what we call a 'shadow' motivation. A lot of the rhetoric around automation has to do with relieving the worker. Yet, instead of really putting themselves in the workers' place, what drives the development of robots and automation may be an interest in the machines themselves – and the relief is presented after the fact as a post-hoc motive. In REELER, we see that though robots can relieve workers, the whole notion of relief – i.e. who is relieved of what, and when it is relief – is much more complex. Sometimes this is a relief of certain aspects of the worker's labor, particular tasks, or of the job entirely. Yet, it may also relieve them of meaning in their work, when it deprives them of their pride, identity, collegiality, human connection (see section 10.4).

Automation decisions are sometimes tied to imaginaries around work (and the future of work). How we perceive relief depends on the type of labor we value. Many of REELER's participants anticipated full automation of certain sectors at some point in the near future – cars, chief among them.

*Certainly deliveries, delivering goods (...) some emergency services, perhaps (...). So, the people who actually drive for a living are going to be the worst affected because you wouldn't need them. Like driverless lorries – my mate, Scot, he's a lorry driver – if you've got three driverless lorries, all of a sudden, you've got three lorry drivers that are out of work. So that's who it will affect. But would it speed things up? Don't know.*

(Benny, mechanic at family-owned garage, affected stakeholder, HERBIE)



Others felt that certain jobs or labor classes were at greatest risk for technological displacement (i.e., 'low-skilled' workers) (Ford 2015).

*Well I suppose they think, okay it's going to put these lower skilled people out of work, but then if you're thinking like me, it's going to also create more jobs for the high skilled, but I still don't think – okay maybe they think on the periphery that it's going to create more jobs than lose more jobs, but do they care? I don't think so, because at the end of the day they're probably in it for themselves and they're creating this new ideology.*

(Rohit, car salesman, affected stakeholder, HERBIE)

On the other hand, the issue of 'skill shortages' arose, where skilled labor is harder to come by, sometimes due to negative attitudes toward trade or craft work.

*It [skill-shortage] won't be in the future, it's already happening now. I'd say, full employment, everyone's dream, is, in my view, the greatest economic loss that could happen. Because, what happens? You can't get any skilled worker anymore. Already today, I can't find any unskilled workers anymore. We do have an advantage, actually, the number of skilled workers that we need isn't that high. We have a lot, where we can deploy many workers, who, I'd say, do subtasks and menial tasks. In the lot, it's not like the robot could take over. Now, we have five-six asylum seekers. We have three-four Spaniards, who do a good job, since one skilled worker adjusts three machines. And there are three unskilled workers, and after three hours, they're done. Then, he readjusts the machines. Then he does his job. But even those unskilled workers are more and more difficult to find.*

(Karl, SME owner, affected stakeholder, COBOT)

Robot makers have their own role to play in reproducing perceptions of manual work as undesirable; mundane, arduous, and repetitive – *something one needs relief from*. Relief rhetoric builds on assumptions (often explicitly stated) that manual labor is simple, monotonous, repetitive, low-skill, menial, or otherwise undesirable.

*We want to help people to spend less time on boring and repetitive work.*

(Alph, robotics start-up founder & CEO, Robot developer, WAREHOUSE)

*Why do we have to continue to perform heavy repetitive task, why do we have to consume our time for stupid tasks?!... [The human worker] just has to delegate some repetitive tasks to the robot.*

*Interviewer: And do you use robots on your own, in your life?*

*No. Maybe because I see too much of the technology, including the working. And I prefer to use the manual stuff."*

(Alessio, robotics start-up founder, robot developer, COOP)

While some of these claims may be true some of the time, the normative approaches to relief ignore the real experience of workers. Further, REELER's data challenge relief as a primary motivation for automation – second to efficiency, which is tied to the driving motivation of most work today: money (see *2.0 Collaboration in the Inner Circle*).

Sometimes, new technologies or new applications of existing technologies actually do provide some form of relief for workers, often involving physically challenging or even dangerous tasks. However, promised relief from one poor working condition (back pain from heavy lifting, e.g.) might also be extended as justification for assistive automation, even when such an intervention introduces a number of new negative consequences for workers (transitioning from a lift team to working alone with an assistive device. See *section 10.4* for more concrete examples of how robotization changes work). Further, relief can be put forth as a post-hoc motive.

Many technological aids, for heavy lifting or strenuous work tasks, have been developed for construction work. However, construction companies do not always make use of such devices. The use of robotics is at the end of the day most often driven by economics, and not just benevolent motives.

” So, local, unionized workmen, they have to get paid more than Romanian workmen. Therefore, those people who employ the foreign men, they probably don't really care about using technological aids because then they're just eight people carrying these things and that's it. It's the same hourly rate as the local bricklayer. The incentive for using technological aids is just less depending on how low your hourly wage is.

(Viggo, worksite inspector, affected stakeholder, WIPER)

” All ideas for the technological aids that have been developed in the field of carpentry, they come from when [we] started to issue commands about the ergonomics on the construction sites. The industry was forced to find solutions. Because one thing is that you can try to get it done because of people's good intentions and their good will and all those lovely things, but if you suddenly start getting warnings and commands and maybe fines and stuff, --like, most companies want to avoid that, right?

(Viggo, worksite inspector, affected stakeholder, WIPER)

Often, companies have no interest in protecting the health of the workers, unless they are pressured by regulatory agencies.

#### STORY FROM THE FIELD:

### Relief as a shadow motivation

In one particular case, construction workers had been injuring their backs for many years, and these injuries were tolerated by both the workers and the company, until the company faced heavy fines for work health & safety violations and was given a command to mitigate the risks by a worksite inspector. The construction company helped to develop a robotic device to assist construction workers with the regulated heavy-lifting tasks.

Like Alexander, who is a university robotics researcher, many robot makers cite relief for workers as the motivation or purpose for developing robotic devices:

*“If you look at the fact that they instead [without assistive robotics] have to stop when they're, yeah, 50 or 40 years old, then I think it makes up for it, yes. They know they will wear themselves out.”*

But efficiency often seems to take priority among the motives, and Alexander continues:

*“Well it's supposed to make it faster. You cut away one of the workers, and the time from when you pick up the door till it's erected is also shortened. (...) It is a matter of a business case. It also has to do with the fact that robots can do some of the tiresome work for us.”*

Likewise, Liva, a production technologist from the construction company and customer that defined the need for the robot, acknowledges the motive to increase efficiency (i.e., replace human laborers), but justifies the automation decision because it saves the workers from injury:

*“I remember I went to visit [a parts and equipment manufacturer] during my studies to see their really nice robot, which could handle so and so many pipes every second and had replaced 200 people or something like that, right? The thing about efficiency happening at the expense of 200 jobs. And which effect that has in the end. And I think this robot is different in that respect, because these construction workers, you know, these materials weigh about 90-110 kilos, that's standard, and these construction workers are worn out after two-three years, so of course the robot can go in and replace two or three workers, but it also prevents them from breaking their backs, so that's a bit different,”* Liva says.

(Based on interviews with Alexander, university robotics researcher, robot maker, and Liva, production technologist, robot developer, WIPER)

This, a posteriori ethical justification of automation decisions, is what Luciano Floridi calls 'ethics shopping' (2019, 186). Relief is sometimes used in a similar way – as shadow

motivation. The primary motivation is efficiency or increased productivity, but relief is more palatable and is offered as an appeasement for job or task replacement.

“These communities and teams and the thing about also going to work because you are happy with your colleagues and things like that, clearly that is eh. On all those parameters, the robots probably do not score high. No. But, that is part of what we have to figure out along the way, how we can incorporate that into our method of working. It is not a good thing that these workers have a bad back as 35-year-olds.

(Villads, CEO of robotics company, robot maker, WIPER)

Though we only have a few cases to draw on, it is prominent in these cases that when machine labor is found to be no more efficient or profitable than human labor, relief is *not* the driving motivation; the mission of relief is not enough to carry a project forward. As one participant said:

“Interviewer: “So, it takes more time for an assembler to install the material when they use the robot. What do you think when I tell you that?”

Jens: “I think uh that it’s a sinking ship. I think that if it takes more time, then why put money into it? So, then it would have to be some kind of Florence Nightingale because we wanted to make sure that we never put more than 4 kg on someone’s spine, even though you are allowed to put 20 kg on it. It’s not going to happen. No, no. No one is going to be the frontrunners and say, right, we want to be an entrepreneur or a company that a responsible entrepreneur isn’t a philanthropist. That’s in another forum.”

(Jens, CEO at technical equipment rental business, affected stakeholder, WIPER)

This is not to say that robot makers do not care about doing good in the world. In fact, most of the developers REELER interview express genuine interest in improving life, work, or society with their technologies.

“The robot does not replace the human but replaces the evaluation of the human –which is a different thing. It does not do the human’s job. It helps the human to do his job.

(Giovanni, metro company, head of unit and application expert, robot maker, OTTO)



Robotization can transform a person’s experience of work when it interrupts co-operation and socialization with colleagues or results in the loss of a coworker.

The majority of the robot developers interviewed by REELER express sentiments in line with the quotation above. They build robots to help people in their work by handling the repetitive, dangerous or work-unrelated tasks that take up part of a work day, such as lifting heavy objects, driving wares around in a warehouse or filling out paperwork. The intention is that robots create better, more fulfilling jobs (even if sometimes eliminating other jobs).

Central to this argument are perceptions of relief: What constitutes help? Who is in need of help? How best to provide it? In practice, this is rarely done by approaching end-users directly, to inquire about what they think would be helpful in their day-to-day work lives. Instead, such perceptions are developed in the inner circles of robotics, where intermediaries function as spokespersons for users (see *the Human Proximity Model in 1.0 Introduction*). Even when robots are designed specifically to alleviate end-users’ burdens, intermediaries, rather than the end-users, are consulted. This means the robots may fail to address the problems they set out to solve. In some cases, robot makers and end-users disagree about what constitutes help. For instance, robots built with the purpose of reducing or eliminating routine tasks, sometimes fail to consider that end-users might take great pleasure in this type of work.

The point here is not to diminish the good work that robot makers do, but to acknowledge that doing good may not be the driving motivation, and to suggest that closer proximity with those they aim to help may result in more concordant experiences of relief.

#### 10.4. Workers’ perceptions of work

When we look into REELER’s data for the affected stakeholders’ perceptions of work, we find clashes where what robot makers perceive as tedious, some workers perceive as meaningful. Some workers are skeptical of relief, while others are simply content with the type of work they do and the conditions under which they do it. The need for relief is not simply a personal matter, it is cultural and situated. Take, for example, cleaners. REELER interviewed women cleaning hospitals

in Denmark and women cleaning hotels in Portugal. In the Danish hospitals, working conditions and pay are reasonable. The hospital cleaners and their manager (who also began as a cleaner) did not talk about needing relief, but instead talked about how much they enjoyed their work – including the physical aspects.

” So, I actually came out here and started to clean at the hospital while I was still studying, and the year before I finished studying, they asked me, if I would be interested in being part of the team. I said: “Okay, I can try it.” I just kind of found out that I loved it! Well, I really like my work out here. I always liked the physical part of the work out here.

(Inge, hospital cleaning department manager, affected stakeholder, SPECTRUS)

The workers’ satisfaction in their work relates to government and managerial policies/practices. In fact, one of the Danish hospital cleaners came to a point in her life where she could no longer fulfill some of the more physically challenging tasks, such as cleaning windows. Rather than retire her from the workforce, the municipality paid for her to have an assistant to perform those tasks that she was no longer able to perform. This social welfare support provided the relief that automation might have provided, and did so without depriving the worker of purpose at work, socialization, or her role in her community. Improved working conditions, including better management, effective tools for cleaning, more autonomy and respect, better pay and working hours, had an impact on how work was experienced by the workers.

” I have been here for 13 years – as my other home. I have gotten very used to it, and I am very fond of my work. Because we are many people here, and we have the perfect manager who understands us, and I am very fond of the ward, and the nurses and everything. And the working hours I am very content with. And in terms of ergonomics, it is also very nice. We aren’t straining our bodies, if we use the right cleaning appliances and cleaning methods; if we know it, then we are not ruining our bodies in that way. So, I am very fond of it all. We can ask for days off, and almost every time, we are given the off days that we have asked for. Yes. I am fond of it all.

(Elif, hospital cleaning staff, affected stakeholder, SPECTRUS)

Besides an income, the service workers are seeking a meaningful work life, a job that provides them with:

- *Accomplishment: work that you finish every day.*
- *Human connection: workers are very satisfied because they get a lot of compliments, they feel, when they talk to the patients, they can feel that they also make a difference for them, actually.*
- *A good team: [a] pretty open-minded and also interesting, interested [team].*
- *Respect: What I think, however, and that’s really important that I say it. It’s very hard to get respect for this type of work, because it’s something that everybody thinks they know about, because they clean at home.*

(Inge, hospital cleaning department manager, affected stakeholder, SPECTRUS)

Women cleaning hotels in Portugal do not express similar experiences with their work conditions when interviewed by REELER researchers. Their work hours were long, their tasks demanding, their pay poor, and did not receive the same social supports while working under tougher conditions. These social conditions contributed to their need or desire for relief.

” If the company buys a robot to assist my work, and if they see that they spend less money with the working robot, they will put me on the street and put the robot to do the ironing. I will be without a job, that’s what I think. That’s why I say that I do not want it to do the ironing, I want it to fold the towels. I like ironing. I need to work.

(Ninea, hotel cleaning staff, affected stakeholder, SPECTRUS)

However, as seen in these statements, the cleaners made it clear that it was aspects of the job, but not the job itself, that they would like relieved. As difficult as the work was in Portugal, the workers generally did not want to give up work itself, even for a basic income.

Funnily enough, the robot developers (mostly male) in REELER’s data were especially concerned with automating housework and laundry – ‘invisible labor’ traditionally more often done by women, but more recently increasingly shared with men (Hatton 2017).

“It could do a lot more jobs around the house. I can see them doing the ironing, menial chores around the house. If you could make one that does the ironing yeah, we’d all have one of them. Yeah, I think just the stuff that people don’t enjoy doing, like housework, which is now degrading to the robot. It’s probably far cleverer than I’ll ever be, but it would certainly take the pain out of the weekly chores of Hoovering, cleaning, washing, ironing, kicking the cat out at two in the morning, all those kinds of things so you can actually get on and enjoy your weekend for what weekends are meant to be.

(Jerry, mechanic at family-owned garage, affected stakeholder, HERBIE)

Here, we can see how ironing has become a chief example of menial, tedious work – undesirable. Yet, our affected stakeholders counter these claims, finding meaning in the work that they do and performing complex and highly skilled work that robots still struggle to emulate.

“I do not think that [universal basic income] will prevail here in Germany. In Germany, I would rather say people can also distinguish themselves by their work, because they also identify strongly with the work they are doing. And accordingly, you want to be able to differ within certain salaries, like performance for money or money for performance.

(Marc, university researcher, affected stakeholder, COBOT)

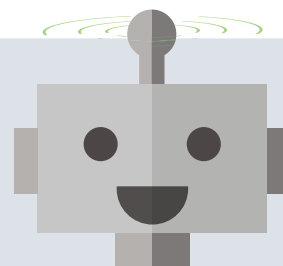
### STORY FROM THE FIELD: Meaningful vs. menial work (ironing)

Paloma lives in Portugal and irons for a living. Though ironing is often looked down upon as tedious and one of the many chores many people would like a robot to do for them, Paloma really enjoys ironing; so much she wouldn’t even give it up for a guaranteed basic income.

“Look I will be honest, I like the work that I am doing! I am an ironer [person who irons clothes] and I actually like it. I love my work; therefore, I don’t think I would want anything else.” Paloma started working at the hotel as a maid fixing the rooms, but “I didn’t like it, what I liked was to iron”. Nine years ago, she started working in the hotel laundry where she runs the “washing machines, I dry clothes, fold, iron, fold towels. I iron the sheets, the towels, cushion covers, I do a lot of things”.

To some, Paloma’s work sounds repetitive or boring, but Paloma has developed particular routines and practices through experience that makes work social and complex. Sometimes another girl is helping out in the laundry.

“Sometimes, she helps me. She folds the towels, and only I iron them. I put it on the washing machine and afterwards, I take everything and put it to hang over the washing machine. For example, the cushion cover I don’t like to dry in the dryer, that’s why I dry it naturally. So, I leave it for today to dry, and iron it tomorrow. What I dry in the dryer is the sheets, covers and towels. The towels I only dry in the afternoon, because at the end of the day, I prefer to



handle the drying of the sheets and the linens to be able to always guarantee me something to do at work. Later in the afternoon, I dry the towels, and if I have time, I leave at 16h30, if there is time, I fold it, if not she helps or I leave it for tomorrow and do it the next day.”

A new robot company is eager to automate the work in the laundry, particularly the ironing, which is typically an unpopular task. The robot company presents their idea to the hotel staff, including Paloma, who responds:

“I would like to have a robot in the laundry but I wouldn’t like it to iron. I will iron because I like it, I don’t like folding towels though. You cannot imagine the quantity of towels that has to be ironed and folded! When the house is full, I can’t even breathe! 100, 200, 300, 400 towels. That’s a lot of towels.”

This story from the field serves to illustrate that normative thinking about work and labor may lead to undervaluing certain types of work, denying the skill, complexity, and meaning involved in even the most ‘menial’ work one can envision.

(Based on an interview with Paloma, cleaning staff, affected stakeholder, SPECTRUS)



REELER has looked into industrial, farming and construction robotics, where one may expect to find a range of repetitive tasks; however, many of the interviewed affected stakeholders find their work to be meaningful, enjoyable, and valuable. This goes against the rhetoric around automation as a relief to the manual. It is not necessarily the labor that burdens the worker, but the circumstances around the work itself – which suggests that social interventions, rather than automation, may be the solution in some cases.

Relief and arduous labor are thus relative notions, because for humans all types of work can be meaningful, and it matters who is being relieved of what and by what means. Normative notions of good work mask the human talent for finding meaning in all types of work. The following section addresses what happens to some of the values that bring work its meaning, when work is automated.

## 10.5. How robotization transforms work

Even when relief is genuine, partial replacement affects work and workers. A common phrase in REELER's case on industrial robots is *"Robots as the destruction of jobs"*, referring not just to a loss of jobs, but also a destruction of the nature of work humans do.

The **transformation of work** may alter existing roles.

**Transformation of work:** *The experienced changes to work and workers as a result of automation and digitalization.*

*"In any field, a human is not replaced by a robot. It's the role of the person that's changed. If a robot makes a part of your job, you may do better at other things. But it's not a substitution, for sure. If there is a substitution, probably it's because it's some dangerous field, where it's better that it's a machine and not a person.*

(Angus, CEO of robotics company, robot developer, REGAIN)

Through extensive ethnographic research, REELER has gotten close to workers' everyday experiences to find what it is that makes their work meaningful. We find that transformation of work by robotization not only affects the targeted task, but also a range of aspects related to work.

Collegiality is a value tied to one's identity and role within a **community of practice** (see 7.0 *Learning in Practice*). Colleagues bring to work a sharing of experience, expertise, commiseration, history. Colleagues are particularly important to manual labor which often requires the close cooperation of

a team or a pair because of the sheer physicality of manual labor. Two construction site workers might share the burden of lifting and positioning a door. Two cleaners might help with each other's tasks to finish a day of cleaning. Teams of farmworkers typically walk parallel down rows to harvest fruit or systematically prune the 'suckers' from an orchard's trees.

In one of REELER's cases, we meet a number of hotel cleaning staff members (all women) who explain how they work in pairs. One woman would, for instance, wash and iron towels for the bathrooms and another woman would fold them. The women help each other and build systems of skilled practice together. To give an example, one woman cleans kitchen tables before the next vacuum cleans underneath them. If she is late, the woman with the vacuum cleaner does other tasks until the tables have been cleaned and she can vacuum clean under the kitchen table. The cleaning staff have a very established and personalized system, particular to them, but inclusive and dependent upon collegial relations. Her system is also highly dynamic – flexibly incorporating her colleague when necessary or desirable. Robots are not especially flexible. Moreover, the loss of a colleague would entail more than a change in work processes, but a disruption of the social life in the workplace.

*"Because it is not that when we borrow the machine from each other, we ask the machine: 'Have you had a nice weekend?' 'Well, have you had a nice holiday?' 'Where were you?' 'Have you had your break?'. It actually means a lot at work to talk to one another, because sometimes one can share something with one another, then you get peace of mind. It might be that they have some ideas, that they comfort you, or they have some experience. But with robots, no. There are no persons to talk to, and one shuts oneself entirely off. One can no longer find solutions to problems, so, it becomes very, very difficult.*

(Elif, hospital cleaning staff, affected stakeholder, SPECTRUS)

Similarly, one leader of a construction robot project recognizes that construction work is social, not solitary, work. It may be that not only does the robot subtract an existing human-human social dynamic, but it might add a new human-robot social dynamic (for better or for worse).

**”** Interviewer: “What about the fact that he’s going to be working alone now? Could that get boring?”

Villads: “Yes, of course it could. I suppose it could. Because right now they are two or three people working together in that porta cabin. I mean, there are obviously other people on the construction site. But I think, yeah it probably would, but I don’t know if that’s a problem.”

(Villads, CEO of robotics company, robot maker, WIPER)

The emergence of ‘collaborative robots’ has even come with promises of new robot colleagues, however, REELER researchers remain skeptical of robots’ ability to interact, socialize, or collaborate with the same quality and at the same level as a human colleague.

The previous examples demonstrate social aspects of work, and how human contact at work is part of the sense of collegiality and community. Loss of human connection is one fear that has already been realized with the replacement of one’s colleagues. Manual work is often social, and communication with each other is an important aspect of the job – one that workers feel automation (even partial or assistive automation) may threaten.

**”** I smile and greet the patients, when I start, and also smile. The people there are in a lot of pain and many of them are young, not very old, and they are in need of a smiling face. And I will help them if they ask me for a cup of coffee or a glass of water. So that I do as well, without doubt. And I don’t disturb them if they are sleeping or relaxing. I always ask them if I should close the door, or if it is okay that I come in and clean.

(Elif, hospital cleaning staff, affected stakeholder, SPECTRUS)

In service work, it is often the human connection with e.g. patients or clients that is important to the workers. Service workers tend to place a high value on the service they provide, and the benefit for themselves, when they interact with the people they serve, which ties into their professional pride and identity.

Pride in work is a value tied to learning and identity. Many workers express pride with regard to the skills they have developed in their work. They may have a particular technique for installing doors that they have learned from hands-on experience. Or they may be more effective in harvesting fruit or cleaning the bed handles in a hospital, because of their contextual knowledge of the work task. Or, they may take pride in the care and precision they put into their ironing for clients in service work. When machines are inserted into work processes, some level of control over this technique, efficacy, precision, or care is taken from them.

**”** There is still this aspect of the delicate touch. I still think you need to be skilled, and you will still have the opportunity to kick ass with that thing, you know, be the best and stuff like that. Like with that guy, man was he fast, and they really appreciated him and stuff.

(Liva, production technologist, robot developer, WIPER)

Closely tied to pride, professional achievement can provide a person with a new identity. People tend to attach an identity to their jobs. An identity built on achievement may also include some sort of pride, status, or value that comes from earning a particular position or salary. Achievement can also be a way of distinguishing oneself from one’s peers.

**”** Now I am in charge. Before, I worked much harder than now. Now my work here is very thin. Work is very good because I just received my diploma. My diploma, I got it last year from the greenhouse. I just got this diploma as agriculturist to lead the whole greenhouse. But what I take care of, everything I am in charge of: to water the bush, to hold, to control all the labor. I do it all and that’s it.

(Omar, farm worker, affected stakeholder, SANDY)

If a person’s particular skills are changed, their work made less complex, or even replaced by a basic unemployment income, the measures by which their identity is forged may be altered and thus the person may experience a loss of identity or reduced professional pride.

” It helps lifting, it helps handling these heavy lifts, and it helps mounting. Is there something it can't do or shouldn't do? I mean, what is left for the man today, the construction worker? What should he do now? He's just supposed to operate it, right? So, it has pretty much taken over everything he used to do. I don't think his job has become more or less boring or exciting or interesting, I think it's equally interesting. It still requires a human being to get those panes into those frames, because sometimes they're a bit crooked and sometimes they're a bit, I don't know, popping them into the frame takes a delicate touch, and I think that's exciting whether it's with your hands or with a robot and I don't think that's going to change. So, I don't think he's going to get a crappy job all of a sudden. I think it's just as much fun, if the robot worked. It's not going to be boring or anything. But it's not like at a factory or something.

(Liva, production technologist, robot developer, WIPER)

The consequences of widespread use of technologies might include a collective loss of skill (navigation by charts) or even a change in our physiology (weaker hands) or social relations (colleagues).

One of the most basic changes automation introduces is the reduction of complexity in the performance of manual labor. However, from the perspective of workers in REELER (e.g. WIPER, SANDY, SPECTRUS) it may be both faster and 'better' work when done manually. It becomes difficult for the worker to envision the robot as an assistive device when the robot interferes with the quality and efficacy of their work.

” Samuel: “Nobody wants to use the damn thing. It's too slow. That is because, you see, today there are two workmen and they do it in these, between four to five minutes, so we want to be faster than the workmen.”

Interviewer: “Ah, okay. Because, then, if not, they can't be bothered, then they will just do it manually?”

Samuel: “That is exactly it, then they will think, ‘Then we might as well do it manually, because that's faster.’ Had it been sold in that state, those construction workers would have just left it in the corner and used their hands instead because it simply took too long.”

(Samuel, product innovation manager, robot developer, SPECTRUS)

One reason that performance is so important is that it relates to professional pride, but also to one's income and job security.

Further, there are significant effects of partial automation that may be perceived as negative for human workers and which could lead to resistance. It could be that non-robotic solutions, like better working conditions, might provide relief without resistance.

” Emanuel: “I remember the industrial revolution and there was a lot of resistance to the machines but it's impossible to stop that. What's important and I think it's the experience we should remember, is that we should create the social opinion and the political myriad to avoid the negative consequence of that change.”

Interviewer: “What would be negative consequences?”

Emanuel: “The negative if we translate this metaphor from the beginning of the industrial revolution workers should work harder, should organise in labor associations, etcetera, to limit the number of hours, to create the social conditions of the welfare state.”

(Emanuel, exhibition coordinator, affected stakeholder, BUDDY)

## 10.6 Consequences of perceptions

When we move close to our affected stakeholders' everyday lives and their experiences and conceptions of work, we also get a better understanding why humans sometimes surprise the robot makers by resisting or even sabotaging the robots that robot makers envisioned as welcomed relief. Humans often have concerns from anticipated effects of automation (real fears) and from actual experiences with automation (realized fears).

” It [fear] can occur, perhaps with well-educated patients who work in the field of technology, which is why they know that technologies may have limitations. If we take the patients who may have a bit less technological knowledge instead, then they are a bit more prone to be positive about technology.

(Marco, technician, robot developer, REGAIN)

If fear or experience of loss of collegiality, identity, or pride are left unaddressed, the fears or concerns may lead to non-use, misuse, or sabotage. The root of this tension can be attributed to a clash of values, where the workers' values – i.e., what makes work meaningful – are threatened by automation decisions, reflecting the robot developers' and robot buyers' values.

In REELER's ethnographic research, resistance to robots was most prevalent in cases where workplace robots are operated by a worker (i.e., physiotherapists in hospitals and care centers, and construction workers at construction sites), as opposed to other cases where robots are intended for individual use (companion robots, or autonomous cars) and/or are more autonomous and thus not necessarily used in direct collaboration with a worker (autonomous cars, agricultural robots, e.g.). Thus, we define **technology resistance** as the passive or active opposition to a technology, in response to real, lived experiences, where there exists an informed and intentional rejection of the technology. This is in contrast to **technology apprehension** which is based on a lack of experience (as elaborated in 7.0 *Learning in Practice*). Both resistance and apprehension can be mitigated to some extent by training and involvement in the development and implementation processes. However, technology resistance may be more worrying for robot makers, because it involves a direct rejection of their technology in response to realized fears.

**Technology resistance:** *Opposition to an implemented technology, whether by passive non-use, active misuse, or deliberate sabotage.*

*At one point, I heard some negative remarks, sort of 'now there won't be as many of us', and 'why this and why that', right? And we had told them not to run with the machine, but he couldn't help himself. He used it, and the way I saw it, it was like a toy. And if it can't be a toy, then you will see opposition. Then I don't think it's possible. The biggest showstopper is probably if the craftsman refuses to use it. We experience that even today. Because of the environmental regulations that are in place, many sites have machines present, but they aren't being used. They are solely used when [a workers' safety organization] shows up.*

(Valdemar, engineer and CEO, robot developer, WIPER)

### Non-use, misuse, and sabotage

There is a history of resistance to automation that extends at least as far back as the first industrial revolution with the Luddite resistance. Contrary to the popular usage of the term,

**Luddism** was not stemming from technological naïveté. The Luddites were experts in their work and knew that the mechanization of their labor entailed a loss of control over the meaningful nature and products of their labor. Informed technology resistance to these changes may include non-use, misuse, or even destructive forms of sabotage of the robotic technologies.

**Luddism:** *(historical) A movement by English textile workers to oppose the introduction of machines that would diminish their craft and undermine labor practices; (popular) a derogatory term for technological apprehension; (modern, Neo-Luddism) an anti-technology lifestyle/movement.*

### ● Sabotage:

*Mathias: "Some get very offended and they try to sabotage the robot itself. The robots are not bulletproof in any way. You cannot have a robot that could cope with any [every] type of situation. And also, the sensors have flaws. So, once you know the robots just a little bit, you can easily sabotage them."*

*Interviewer: "Have they done that? The users?"*

*Mathias: "Yeah, definitely. Or, even worse than disabling them, they drive into them with their transportation vehicles that they have in the buildings."*

*Interviewer: "Why would they do that?"*

*Mathias: "Frustrations of some kind. That's what we guess, because we don't understand why somebody would drive into a robot and destroy the front of it."*

(Mathias, system integrator, robot maker, SPECTRUS)

*Maybe if all these workers see that the robots are getting inside this workplace, they will get crazy (Laughs).*

*They will get crazy. I mean, maybe they will go and break it [the robot]. Or steal it also. I mean, if you are stealing their food what do you think that they are going to do? You have to eat every day. And if you don't find a job. I mean, this is really hard.*

(Aramis, agricultural engineer at a seed company, affected stakeholder, SANDY)

Such resistance often occurs as a defense of workers' values (collegiality, pride, identity, achievement, etc.) against the degradation of their skills by technologies, as well as loss of income, as was the case with the Luddites.

- **Non-use:**

“The crux of the issue is that it needs to improve the present situation [working conditions]. And if it doesn't do that, both conditions and also efficiency, then the workers immediately put their foot down. If the machine messes with their earnings, then it will be unused. Or if it is perceived as a hassle to use. Hassle can mean a lot of things.

(Valdemar, engineer and CEO, robot developer, WIPER)

The consequences of resistance can be a breakdown of the work process, with financial costs and safety risks

- **Misuse:**

“A simple example is the emergency stops: once you push the physical button, the robot cannot release it itself, it needs to be released by a human. And by that, there could be hours of a robot just standing still in some random [hospital] hallway where you have users who don't understand why it's standing there.

(Mathias, system integrator, robot maker, SPECTRUS)

If such resistance is a defense of the meaningful work life, how do we address these issues? Who should be responsible for the loss of one's colleague? For decreased social interaction at work? For the sabotage of a robot? As robotization becomes more widespread and with recent workers' rights revivals, acts of resistance may become more organized – like the dockworkers recently decrying the automation of the Port of Los Angeles (Smith 2019). These are societal questions that demand a societal response, involving more than robot developers and users, but also robot buyers and policymakers.

### 10.6.1 Universal basic income

Already tested in California and in Finland, the idea of universal basic income has emerged in part as a response to fears and predictions of mass unemployment due to automation (see also Chapter 9, section 9.2.4.). This organized political response would seem a practical solution, but REELER participants who were presented with the idea of universal basic income were sceptical. Many of our participants were concerned with replacement and feared the permanent loss of income, but were nevertheless opposed to universal basic income as an alternative to work.



People do not want to give up their meaningful work for universal basic income.



## STORY FROM THE FIELD:

**Rejecting universal basic income**

*"If the company buys a robot to assist my work, and if they see that they spend less money with the working robot, they will put me on the street and put the robot to do the ironing. I will be without a job, that's what I think. That's why I say that I do not want it to do the ironing, I want it to fold the towels. I like ironing. I need to work."*

Paloma was afraid to be displaced by a robot, despite her level of skill, commitment, and experience. She was particularly concerned that she was too old to be reskilled. REELER has found that a lot of automation affects particularly vulnerable people, who may be in their area of work because their options are limited (by their level of education, their literacy or language limitations, their life circumstances, or by their immigration status).

*Interviewer: "If you had an unemployment salary, would you work in another area or try to finish your studies?"*

*Paloma: "Girl, to study at this age, for the love of God!"*

*Interviewer: "You think you can't study now because you're too old?"*

*Paloma: "Ah yes! I will turn 50 soon, if I go back to school, they will ask why I am there with so many years behind me."*

*Interviewer: "Then, what would you do? If it wasn't anything here in the hotel, as we already know that you like to."*

*Paloma: "What I like is to iron. I used to work inside people's home to iron clothes for them."*

*Interviewer: "Why do you like it so much?"*

*Paloma: "I just like it; I don't know why. I really like to iron."*

*Interviewer: "So, you wouldn't give up even if you had to go for something else to do, you would simply always look for something similar to this area?"*

*Paloma: "Yes, and I wouldn't like myself at home not doing anything, because I really need to work."*

*Interviewer: "But you would receive money from the government."*

*Paloma: "Even so, I like to stay at home when I have days off. In my free time I like it. However, from Monday to Friday I like to leave my house to work. But even if I did receive the unemployment salary, I would go to people's houses. I mean I also have to find people too."*

Paloma appreciates the routine that her Monday-through-Friday job provides her, and she relishes her leisure time. Despite her work being especially taxing, she would prefer to keep working as an ironer, even if she was no longer dependent upon ironing for income.

(Based on an interview with Paloma, cleaning staff, affected stakeholder, SPECTRUS)

Most of REELER's participants (robot developers included) feel the same way as Paloma; they would want to continue with their occupation even if they were offered a guaranteed basic income. Workers find meaning in work that extends beyond the remuneration of their labor. They say things like: "A person can buy a machine but not a person; Despite all the work we do here, it is not the money that keeps us here". And "Of course we get money to be here, but I don't think it's the money that keeps us here; I don't like staying at home". And "I like working; You would get tired of sitting there". Or "I would like to work with elderly and kids. This would be something I would like to do, to help, because there are so many people who need help" and "If I one day came back home, I wouldn't know what to do with myself, but I like to work with children. I would like a job in a kindergarten, something like that. Or take care of the elderly, I also like the elderly!"

(Voices from various affected stakeholders, SPECTRUS)

These statements and the above analysis show that work is much more than labor (Voice 2015) and income; it may also provide a person with skills, a source of pride, some sort of identity, and collegiality. If these aspects of meaningful work are threatened by an automation decision, workers seem ready to resist the implementation.

Besides an income, the affected stakeholders interviewed in REELER are seeking a meaningful work life; a job that provides them with a sense of accomplishment, a social life and respect. Thus, universal basic income is an incomplete answer to technological displacement, solving only the question of Arendt's labor as means of survival, but not providing a viable substitute for meaningful work (see also section 9.4.2 in *Economics of Robotization*).

## 10.7 Concluding remarks on Meaningful Work

Though the REELER study is not a comprehensive quantitative study, it does point to a number of ‘black swans’ (see *Annex 1 Methods and Methodology*),<sup>2</sup> i.e., some questions that have not been thoroughly answered in the previous debate on robots and work. This chapter has explored how the meaningfulness of work can be at odds with robots and automation processes. The purpose of this chapter is to direct attention to these problems and to suggest a distributed-responsibility approach to finding solutions (see *4.0 Ethics Beyond Safety*).

We basically find two understandings: work as labor and work as meaningful. We have discussed how these perceptions affect automation decisions, uptake, resistance, and proposed political solutions like universal basic income. Technological determinism shapes views on automation and the worker for both the workers, owners of enterprises and robot makers. Such viewpoints are wrapped up in the replacement and relief discourse which is cultivated in the inner circle of robotics where robot makers are (as seen in our Human Proximity Model) often so engaged in technology-driven solutions that they fail to see the kind of relief affected stakeholders and end-users might actually seek. Though robot makers may regard work such as cleaning and ironing tedious or hard labor, this work may be meaningfully connected to a worker’s skills, identity, and collegiality. The consequences of an inevitable full-automation approach may be a lost chance for shaping ethical automation that upholds these values, and may risk stakeholders being put off – or even resisting – robotics.

Replacement is the single most prevalent issue related to work and automation, and it reveals underlying ways of thinking about human workers (as commodities) and a rhetoric of relief as a justification for replacement. It also shows that some things about the human may be irreplaceable. When developers frame the human worker as a component alongside the robot in the workflow, they make it easier to consider them interchangeable with machines. If developers see humans as more than a production means, but as rich and complex persons, it may lead to better considerations for where robots and humans are needed respectively, and where robots are inappropriate or harmful.

Robot makers (developers and those they collaborate with to achieve automation) have an opportunity and a responsibility to shape future work towards continued meaningfulness through their automation decisions, by protecting the values workers hold in relation to work.

If robots are to be a part of our future work lives, it is essential that we ground the development and implementation of these machines in a firm understanding of the work and the workers where these robots will be situated (see *7.0 Learning in Practice*). A closer proximity between robot makers and affected stakeholders could provide such understandings, as REELER has endeavored to do with its ethnographic research.

<sup>2</sup> see [responsiblerobotics.eu/annex-1](https://responsiblerobotics.eu/annex-1)