

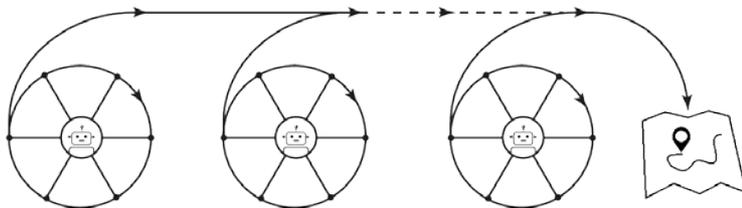


# REELER Findings relating to meaningful work life with robotics

Robots have the potential to radically alter human societies as they are expected to increasingly coexist with or replace humans. While there is a growing amount of literature predicting the economic and social impacts of robots, few empirical studies have considered how roboticists' visions of a robotic future may differ from users/affected stakeholders' own needs and concerns, and how these ideas come through in roboticists' design practices and ultimately affect our future with robots. The REELER project has taken on the task of studying these processes.

## About REELER

REELER is a Horizon 2020 project, funded by the European Union, consisting of four European partners: anthropologists and social scientists from Aarhus University, Danish School of Education (DPU) (Denmark), roboticists and engineers from Ab.Acus (Italy); anthropologists and ethicists from De Montfort University (UK), and economists from University of Hohenheim (Germany). We share the common goal of aligning future robot designs with empirically identified societal needs and concerns.



In 2020, REELER will produce the REELER Roadmap, which includes recommendations and tools for aligning designs with human needs and values, to ensure a more ethical future with robots.

This Roadmap will be built upon the findings from our empirical research and our outreach activities such as annual Robot Expert Panels with sociodrama and annual mini-publics. At the second mini-public, we discussed:

*Who is responsible for ensuring a meaningful worklife with robots?  
What type of competences will we be needing in the future?*

The following is a short presentation of some of REELER's anonymized ethnographic data relating to the topics of work, replacement, reskilling, and relief.

## **How do workers react to implementation of robots in their workplace?**

Implementation can go smoothly, but sometimes workers react negatively to the changes to their work lives and resist implementation through non-use, misuse, or even destructive forms of **sabotage**.

*"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. [Have they done that? Users?] Yeah, definitely." (Roboticist)*

*"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 hallway where you have users who don't understand why it's standing there. Or, even worse, they drive into them with their transportation vehicles that they have in the buildings. [Why would they do that?] 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." (Roboticist)*

## **What are workers protesting when they resist new technologies?**

**Replacement** is one of the most prevalent fears surrounding robots. 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...I could be designing chairs, or tables, or whatever. 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." (Robotist)*

A common argument in Denmark's robotic hub 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. In a case on collaborative robots, which are meant to be used *by a human worker*, the robots were actually being used *in place of the human worker*. A common phrase heard in this case was "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.

## **How is work changing in response to automation and digitalization?**

Although industrial workers have known robots for decades, new applications – digitalizing work processes, for example – have brought robots to the forefront of their minds.

*"The classic robot that is using a gripper, that was like 1989, 1990...Yes, I mean we had the first robot before the first mobile phones or the first Personal Computer at all desks...That wasn't a revolution back then. The first bigger movement started in the offices with the [ERP systems] for example. That's when it started." (Affected stakeholder)*

Here, it was not the robots themselves that caused discord among the workers, but software brought in to manage the robots (and by extension, the humans), tracking all labour tasks – machine *and* manual. The discourse of digitalization and Industry 4.0 translated into real innovations and real company decisions, resulting in actual ethical and practical challenges. This is especially important because workers also feel the weight of the discourse. The hospital cleaners, for example, explained that the cloths and cleansers they use are already advanced technologies, but these aren't recognized in the same way that robots are.

*"The more of this new technology that we can put into our field, the more respect, strangely enough, the more respect we will get for this field of work." (Affected stakeholder)*

Still, many roboticists and stakeholders fear automation, however attractive, may result in a redundant or simplified workforce, resulting in changes to the worker and to society.

*"I'm worried that, by getting robotics into final assembly, it won't make jobs more interesting. So, it used to be automobile welds. It's cool that humans do not need to weld the car together anymore, that's ok. But if robots come into the cognitive as well, that's where the humans are really good. Then humans are just doing weird things." (Robotist)*

*"I am aware of it, especially at [the car factory], that jobs are really disappearing one after another... It makes you realize that this is an absolute two-class society. There are huge cars around, and when you get into a bus, there are quite a few [homeless people], or there are a lot of homeless people in the streets. And then you can see that some are doing really well, and some just do not have anything. And in these situations, I see the danger a bit." (Robotist)*

## **How is the worker expected to change?**

Thus, automation is changing the nature of work and the worker. Both roboticists and affected stakeholders feel it is absolutely necessary for the worker to change and adapt in order to stay relevant.

*"I do not think that safe workplaces exist anymore. You just have to constantly stay updated...Our knowledge and our durability of knowledge changes much faster. Things really change a lot. Especially in the field of programming and technology. If you do not educate yourself and keep up with the times, you will be left behind. So, this working model*

*'Okay, I'm at [a very established company], my life is now secured', it will not exist anymore, for now.'* (Affected stakeholder)

Some recognize that to remain relevant requires a particular way of defining human labour as something different from machine labour – a craft, or a creative, cognitive job, such as design – while others stress that soft skills that will matter.

*"I believe that communication is also very important. How do I talk to people? How do I deal with people? Social contact, as it is always postulated, will be more important and not less important as it is postulated, I believe. With these soft skills one can see how someone is dealing with people?! Also, to make a certain reflection and self-assessment."* (Affected stakeholder)

*"The educational standards need to change, because the tasks, which humans now do, they do not exist anymore. Which means that humans now do higher quality tasks."* (Robotist)

Most roboticists are eager to defend against replacement issues, usually by citing reskilling as a solution.

*"We have had robots that were taking over people's tasks. So the way that we try to deal with those users is to try to get them on the train where they become users of the robot...Because in the end, the people who are cleaning now are the ones who have the knowledge of how to clean. And that is very important for the robot to perform in the best possible way. So that is how we deal with the users: we try to teach them as much as possible, we give them that opportunity, and they can grab it or not."* (Robotist)

This roboticist means that those most *willing and able* to align with the technology might be retained. This argument shifts the burden of reskilling onto the worker to accept the robot – the same robot that depends on their expertise to function and that will replace them or their colleagues.

### **Who can be reskilled? Who is responsible for preparing workers for reskilling?**

Indeed, there are some workers who are **motivated and willing** to use new technologies and others who shy away from them (cf. Technucation project). But many affected stakeholders, eager or hesitant, will expect or require some help from management or the government, in the form of education or training.

*[Would you like to learn more in this area? The technological part?] "Yes, I love everything that has anything to do with science, I like it a lot. For an example this device [audio recorder] is here, it's recording, but how was it made to record? A person is always curious."* (Affected stakeholder)

*"I am entirely sure that there are some who won't use it, because they don't dare...So it might be information is very important, and some courses maybe. How can one protect oneself? It is actually very, very important."* [Do you dare to use it?] *"Well, of course I do! Yes, but, I would rather have the information: How should I use it? What should I do? Instruction is very, very good."* (Affected stakeholder)

*"I can see, definitely, when I look at the staff as a whole, it comes so much easier to some than to others...So, I think there will be some that have this kind of: 'No, I can't. I will never be able to.' They just can't, you know, see themselves doing it, and they will never get around to it."* (Affected stakeholder)

*"For us, as a team to go out and convince the staff or teach the staff to use this kind of technology, we have to be very convincing. And you can't do that, if you don't know the product well enough. And the only one, who knows that well enough, to be able to also answer all the questions that would arise, would actually be the ones that are manufacturing the thing. So it would definitely be with the help from whoever is manufacturing the product."* (Affected stakeholder)

### **If a worker is willing to be reskilled, what kinds of aptitudes and abilities make it possible/impossible?**

Besides willingness, language, cognitive and physical abilities, technical aptitudes, and culture affect a worker's chances of being reskilled. Some manual labourers are not entirely literate, and thus may not have the same aptitudes for acquiring new technical competencies that are based in literacy or academic skills.

*"We also have ethnically Danish people, employees that have very big difficulties reading or writing – we have a lot of e-learning programs, and that can be a little difficult for those 30%, I should say maybe more. But that is due to dyslexia? Most of them, all of them I guess, have been to school. I don't think everybody has a level of high school but they, definitely all of them, more or less have levels of junior high."* (Affected stakeholder)

It may be that certain jobs attract people who are less competent or confident in the local language, or who have less education. Many of those working as cleaners in Denmark, for example, were immigrants or descendants, and/or Danes who struggled with literacy. In Portugal, most of the cleaners did not study beyond 8th grade or fell into cleaning because of some difficult life situations.

*“Yes. That’s why I say that I feel embarrassed, because if I had studied, I would have had a better job...I would like to work in a school...I consider all positions. For anything, because I am not in a position of choosing. I want a proper wage. Yes, and do you know why? Because of the divorce, and my husband leaving for his land, he is going to Porto and I remain here with all the bills to pay, understand? I’m very afflicted.” (Affected stakeholder)*

This points to a significant problem with offering reskilling as the solution to technological displacement – manual labour often includes last-resort jobs appealing to a particularly vulnerable niche of disadvantaged workers.

### **What are the best solutions for “relieving” the worker? Technological solutions? Policies? Unions?**

The need for relief is cultural and situated. In the Danish hospitals, the working conditions and pay are good. The hospital cleaners and the manager (who also began as a cleaner) did not talk about needing relief.

*“So I actually came out here and started to clean out here at the hospital while I was still studying [laughter] 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.’...and 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.”...“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.” (Affected stakeholders)*

The workers’ satisfaction is related to particular aspects of her work that relate 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 fulfil 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 dignity, purpose, socialization, or a role in her community.

On the contrary, in Portugal where the work was more taxing, the workers *did* seek relief from the heavy work, and did not receive the same social supports while working under tougher conditions. Although they sought relief, they made it clear that it was aspects of the job, *but not the job/livelihood itself*, that they would like relieved.

*“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.”...“It would help! It could help me carry the bags.”...“If they had robot that could make the beds, because one gets really hurting backs due to bending it, due to the low level of the beds.”...“I find it a nice idea, if the robot could take over some functions for the personnel. I think it’s a good idea as long as people are not left without jobs.” (Affected stakeholders)*

As difficult as the work was in Portugal, the workers generally did not want to give up work itself, even for a basic income.

### **Can universal basic income solve the issue of replacement?**

Many affected stakeholders and roboticists in both cases could not envision themselves giving up their work for a basic income.

*“A person can buy a machine but not a person.”...“It is that despite all the work we do here it is not the money that keeps us here. Of course we get money to be here, but I don’t think it’s the money that keeps us here.”...“I can’t stay put.”...“I don’t like staying at home. I like working.”...“You would get tired of sitting there.” (Affected stakeholders)*

Generally, their main concern with regard to being put out of work was losing their livelihood, but even if this was secured by a universal basic income, they would want to continue with an occupation:

*“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.”...“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!...“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...” (Affected stakeholders)

One affected stakeholder pointed to the identity people attach to their jobs, but also that there is some sort of pride, status, or value that comes from *earning* a particular position or salary.

“But I do not think that [universal basic income] will prevail here in Germany. In Germany, I would rather say that 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.” (Affected Stakeholder)

### **What is it about work, paid or unpaid, that workers are unwilling to give up?**

A significant finding is that workers perceive robots as a threat to the social aspects of work. REELER has found that a loss of **human connection** is one fear that has been realized with implementation. For example, the workers in the previous example wanted to continue *helping people* even if they no longer worked under a basic income system. Collegiality is also important. 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.

“Because it is not that when we borrow the machine from each other, we don’t 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.” (Affected stakeholder)

It is also the human connection with patients that concerns the hospital cleaners. They all place a high value on the service they provide, and the benefit for themselves, when they interact with patients.

“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.”

“They do have a lot of interaction with our patients, and that is so very hard to imagine that, that kind of interaction being solved with a robot. I’ve seen programs about this; I’ve seen how they use robots in houses with elder people for company, and they actually [laughter] but, but, that’s you know, where some of those tasks, or where you have this intimate, intermediate contact, that’s very hard to, to imagine actually.”

“I also think that actually a part of the fact our staff are very happy about being here, and happy about their work, and satisfied with it, I also think another part of them 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. And I would hate that that part of the work wouldn’t be available, you know? That would be ‘øv’ [laughter]. So I guess that was situations where it is very difficult to see robots—“ [The human connection?] “Yes, the human connections. But who knows?”

(Affected stakeholders)

### **What makes work meaningful?**

Many affected stakeholders find their work to be **meaningful, enjoyable, and valuable**. This goes against the rhetoric around automation as a relief to the manual labourer (i.e. relieving people of tiresome, monotonous, tedious, repetitive manual labour). It is not necessarily the labour that burdens the worker, but the circumstances around the work itself.

“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.” (Affected stakeholder)

Besides an income, workers are seeking a meaningful worklife, a job that provides them with:

...Accomplishment: *"...work that you finish every day..."*

...Human connection: *"They 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."*

*(Affected stakeholders)*