

# DHL experiments with augmented reality

The logistics services provider DHL is a pioneer in innovative developments in the Netherlands. Employees at two distribution centres have volunteered to take part in a trial of vision picking with smartglasses. Productivity is increasing, employees are satisfied. The Works Council is keeping a close watch. Frank Pot, Professor of Social Innovation of Work and Employment, points to the importance of involving the shop floor in digitalisation.

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**The new-generation smartglasses should "free up" operators using hand scanners.**  
Images: © Pien Heuts (p. 22, 24, 26)



DHL employee Heidi walks at a swift pace along the huge racks of pallets where she picks orders for customers of Nikon, the maker of digital cameras and accessories. According to her step counter, she walks about 12 kilometres on a busy day. In the 10 years she has been working for DHL, she has lost seven kilos in weight, she says with a chuckle. After she has given a command in English, she sees instructions on which items she has to collect displayed in the top right-hand corner of her hip Google Glass smartglasses. And she is given instructions telling her in which box to place the items on the trolley she pulls behind her.

"Look," she says in German-flavoured Dutch, "I see all the information in the top right-hand corner of my glasses. As soon as I have scanned the barcodes with the finger scanner, colours indicate where I have to place the items on the trolley. It's really simple – within 20 minutes, I had mastered vision picking." Site manager Theo Willems points out that, unfortunately, it is not possible to have scanning done through the vision picking glasses. "We use a finger scanner with laser beams, which are harmful if they come close to your head. As soon as there are LED applications, genuine hands-free scanning will become a prospect."

A colleague of Heidi walks into the aisle. He still uses a traditional hand scanner, executing order picking instructions through the text on the screen. And this means that his hands are not free. "My colleague has to perform a lot more scanning actions, says Heidi. Vision picking works faster, and if something does not work, the

system immediately fixes it, sometimes with the aid of the troubleshooter. I very soon got used to having information in the corner of my eye. I can also look around me in the normal way. I really enjoy it." "It works like a navigation system," Willems adds, "simply following instructions."

### **Trial running until 2019**

Heidi is one of around 10 volunteers who are taking part in a vision picking trial that will run until March 2019 at the DHL site at Beringe in the southern Netherlands. A trial is also taking place at Bergen op Zoom, as well as in Ireland, the United Kingdom and the United States. Privacy laws do not allow this way of working in all countries. Traditional, manual order picking is being compared with vision picking during this pilot project.

The DHL warehouse, close to the German border and one of the largest in western Europe with 120 000 square metres of floor space, collects, adds value (VAL) and distributes goods for some 13 customers, including Nikon. "Nikon used to have several distribution centres in Europe," says Theo Willems, walking through one of the halls in the distribution centre. "For the past few years, distribution and storage have been centred here in Beringe. For us, this means that there are far more actions, and often smaller orders have to be sent to all parts of Europe. An innovation like vision picking enables us to work faster, fewer errors occur, employees are more involved, and the work situation is safer. And the induction of new staff is easier."

Willems explains that innovations of this kind are always introduced in consultation with the customer. Customers want innovation and keen prices. There is a constant need to work more smartly. "Customers want to make savings on the fee structure every year. Then you join them in looking at how the work can be done more efficiently and how costs can be saved. With vision picking, we achieve an average productivity gain of 10%."

DHL (a subsidiary of Deutsche Post) is a pioneer in technological innovations. Willems knows that you have to be so if you want to stay in the race. "Innovations are constantly taking place – it's a never-ending process. Vision picking is, in fact, an application of augmented reality. We're really just at the start of advance applications of intelligent glasses in a logistic environment."

Last year, DHL chief Markus Kückelhaus predicted at an international conference that logistics will end up being completely different over the next 5 to 15 years as a result of innovations, for example with big data, sensors, augmented reality, 3D printing, robots and drones, which DHL has also been experimenting with in recent years. He says that 80% of warehouse operations are still performed manually.

### **A good feeling**

"I have a good feeling about it." Gino Hauzer, Chairman of the Central Works Council of DHL Supply Chain Benelux and a member of the European Works Council, is clear

about how the vision picking pilot project has gone so far, both in Beringe and at Bergen op Zoom in West Brabant. Hauzer's good feeling is mostly to do with the transparent cooperation with the DHL top management and the scope the Works Council has in order to carry out its statutory task properly.

The Netherlands Trade Union Confederation (FNV) is also involved in the project. "It's up to us, as the Works Council, to set conditions when new technological innovations are introduced, so that the work can be done in a safe and healthy way. We have right of consent, and the senior management has accepted our conditions one by one. As far as we are concerned, the trial has been successful if productivity rises and employees and customers are satisfied."

In 2014, DHL Netherlands, with the consent of the Works Council, conducted a 10-week trial of vision picking. It turned out that productivity rose by 25%, and volunteers did not appear to suffer any health problems. "To obtain a clearer picture, we agreed to extend the pilot project, which is now running from March 2017 to March 2019," says Hauzer. "In so doing, we set a number of conditions such as a three-monthly evaluation with the management, an agreement that no permanent jobs would be lost during the trial, that employees would take part on a voluntary basis, a maximum of six hours per day of vision picking with breaks, that an independent agency would provide medical support and report every three months, and that the European Works Council would also be involved."

### Lagging behind the facts

The trouble with new digital applications on the shop floor, employment experts say, is that impacts on health and well-being become apparent only as the years go by. Naima van Willigenburg, an expert in working conditions with the FNV trade union federation, also finds saying anything about the effects of employee's health complicated.

"Research always lags behind the facts, she says. But you can assume that some employees will experience more stress or work pressure, that targets will be raised, that people will have less autonomy because the software dictates, that uncertainty about losing

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**"With vision picking, we achieve an average productivity gain of 10%."**

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your work due to automation will increase and that not every distribution worker will learn how to cope with new technology such as vision picking. On the other hand, technology can also make the work safer and lighter." Van Willigenburg emphasises that the trend towards digitalisation cannot be halted. It is clear, however, that trade unions have a role to play in preventing any adverse consequences, not just in terms of health but also in relation to employment and quality of work (see box). "As a trade union, it is also our task to support the Works Council. They are on the front line when it comes to giving consent for innovations of this kind and including possible risks to health and safety in the company's mandatory risk inventory and evaluation (RI&E)." According to the FNV, the risks must be surveyed as early as possible, ideally before a trial begins. It soon becomes clear how the risks must be monitored.

**1.** Companies in the Netherlands are obliged to survey the health and safety risks through what is known as a Risk Inventory and Evaluation (RI&E). There is also an action plan associated with the RI&E, describing measures to counteract the risks as far as possible.

### Largely positive

A first study by HumanCapitalCare, a consultancy in the field of work and health, showed that participants in the vision picking trial are largely positive and that there does not appear to be any impact on physical strain and the musculoskeletal system.

After working for more than four hours, eyesight and visual comfort do, however,

decline, and a whole day of vision picking can cause headaches. There is no evidence of radio-frequency radiation having harmful effects on health. HumanCapitalCare also comes to the conclusion that a separate hand scanner is more ergonomically sound than a finger scanner.

"One of our conditions under which we gave our consent," says Gino Hauzer, "was therefore that workers should pick with the glasses for no more than six hours a day and that they should switch to other activities for one hour every two hours. And we are also keeping a close watch on the wearer comfort of the glasses."

Theo Willems, the manager, had already said it, while Heidi was picking with the Google Glass smartglasses: "We're in regular discussion with the supplier of glasses and software about adjustments. The glasses are vulnerable in a warehouse setting. The sturdy Vuzix M100 units we are trialling do not break so quickly. But they are also heavier on the side where all the technology is located, so the glasses hang crooked. They are not comfortable to wear. We are now going to try out the Vuzix M300."

### Software dictates

Frank Pot is Emeritus Professor of Social Innovation and Chair of the Advisory Board of the European Workplace Innovation Network (EUWIN). He has not made a specific detailed analysis of the DHL pilot project with vision picking, but in general he takes a positive view of the opportunities and consequences of digitalisation. Pot was the Director of TNO Work and Employment, the research agency that makes scientific research applicable in order to boost the innovative capacity of industry and government.

His expertise in the field of digitalisation and the consequences of psychosocial workload, well-being at work, stress, job content and skills development extends far beyond national boundaries. He too, nevertheless, says that the consequences of innovations such as vision picking are impossible to predict. "It can take years. What are the effects on physical health? How much information can people take in and process? What happens to your autonomy when the software dictates the order of tasks and method of

work? Will the pressure of work rise? Stress? What will people think about being constantly monitored?"

Pot points out that any health effects of digitalisation must not be foisted onto employees. "If people become stressed, for example, you should not look at those people but at the source: their work. There is a tendency in the Netherlands for it to be the responsibility of the employee whether he or she can deal with it. Unjustly. Further digitalisation must not lead to us ending up with a kind of super-workers: people being selected, for example, on the basis of their information processing of resilience to stress."

### Organisational choice

Good introduction of new technology, according to Pot, should fulfil a number of conditions. That was true a hundred years ago and is still true today. An important principle is to organise first, then automate. Otherwise you create chaos, according to Pot.

## **FNV research, technologisation and quality of work**

The emphasis in discussions on robotisation, automation and artificial intelligence is generally on the consequences for employment. However, what the precise effects will be is often a matter of conjecture. Some research indicates that automation and robotisation will lead to mass unemployment, while others conclude that, in the long term, these trends will lead to new employment. But whether technologisation does or does not lead to a decline in employment, one thing is for sure: job content and working conditions will change.

The Netherlands Trade Union Confederation (FNV) is therefore launching a large-scale study on the quality of work as a result of technologisation at the workplace. The FNV wants to develop quality criteria (a checklist) according to which innovations can be tested in the field of safety, robot ergonomics, job

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content and the autonomy of the employee. The FNV also aims to develop a strategy in which the introduction of new technologies is influenced from the perspective of employees (trade unions and works councils) and the quality criteria are significant conditions in the implementation of new technology.

What consequences are there for the quality of work in the professions that remain? What is the situation regarding health and safety, job content and working conditions: are new technologies used to lighten the work of employees or does technologisation instead lead to work becoming more intensive and pressure of work being intensified? And do new technologies make task enrichment possible, or do they lead instead to job content autonomy being eroded, so that employees become an extension of the machine?

\* Ford M. (2015) *Rise of the robots. Technology and the threat of a jobless future*, Basic Books, 334 p.  
Frey C. B. and Osborne M. A. (2013) *The future of employment: how susceptible are jobs to computerisation*, University of Oxford.



says the Emeritus Professor. The two things are complementary.

The European Commission too has included in its policy that "technical innovation should be complemented with workplace innovation". Pot continues: "So it's a matter of new and combined interventions in work organisation and personnel policy in a participatory way in order to improve organisational performance, job quality and industrial relations simultaneously. Particular organisational attainments are work productivity and the innovative capacity of the organisation. Social innovation is crucial. Involvement of the shop floor is, however, sometimes forgotten". He refers to the 'Smart Industry' programme of the Dutch metal employers' federation (FME), supported by the Ministry of Economic Affairs, that was concerned with new technology but forgot about the people. "In the meantime, the FNV trade union federation has managed to get social innovation included in the Smart Industry 2018-2021 implementation agenda."

### Checking, checking, double-checking

Last summer, there were quite a few breakdowns in the vision picking system at DHL in Bergen op Zoom. This might happen, says Willems, before they take the next step up to order packing, because different software systems have to be attuned to each other. That will not happen without a struggle. "The software here is linked to our own warehouse management system. If there is a breakdown, we can therefore deal with it quickly." Willems shows that vision picking does not stand alone. The whole system is based on checking, checking and double-checking. In the order packing department, employees see on the screen what items, such as directions for use, must be added to the boxes of orders. "At first, we were still using paper work instructions: it's faster digitally with two screens, and errors are ruled out – the system dictates." Before the order receives a printed packing list, the system checks whether the order is correct in terms of weight. When the boxes are sealed, there is still one last check based on the code of the country and carrier. The orders, in this case destined for Poland and the Czech Republic, are ready for despatch. ●

## "Further digitalisation must not lead to us ending up with a kind of super-workers."

"Make use of what is called the 'organisational choice'. Organisations have a choice in how to apply technological innovations. This is sometimes forgotten. Do you allow the software to dictate, or does this support the autonomy of the employees? Do you employ technology so that you are left only with 'poor jobs', or does digitalisation ensure high-quality jobs and greater responsibility? It is, in addition, important to involve not just the works council and trade unions but employees too in the process, to take a joint look at how work processes can best be formulated, in order to guarantee quality of work and also achieve efficiency."

A third significant component, according to Pot, is the government, which has a responsibility with regard to limiting and offsetting the adverse consequences of technological developments through legislation, incentive programmes and research.

### Social innovation

The Social and Economic Council of the Netherlands (SER), a government advisory body on which employers, employees and independent members sit, drew up a work agenda. "People and technology: working together" at the request of the government in 2016. This analysed possible consequences of the transition to a digital economy for the labour market, the organisation of work and industrial relations.

It was about time, Pot feels. In Finland and Germany, he believes, they are far ahead in terms of social innovation. In these countries, the government encourages technological innovation on a large scale, but always linked to programmes for improving work and organisation. "It's good that the SER is linking digitalisation to social innovation,"