Quality of jobs and Innovation generated Employment outcomes

QuInnE.eu

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Fast Frock Fashion Logistics: the Impact of New Technologies on Warehouse Workers

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QuInnE - ***Qu****ality of jobs and* ***Inn****ovation generated* ***E****mployment outcomes* - was an interdisciplinary project investigating how job quality and innovation mutually impact each other, and the effects this has on job creation and the quality of these jobs.

Drawing on the Oslo Manual, both technological and non-technological innovation were investigated. Through quantitative analyses and qualitative organization-level case studies, the factors, as well as the mechanisms and processes by which job quality and innovation impact each other were identified.

The QuInnE project brought together a multidisciplinary team of experts from nine partner institutions across seven European countries.

QuInnE Project Member Institutions:

- *Lund University, Sweden*
- *The University of Warwick, UK*
- *Universitaet Duisberg-Essen, Germany*
- *Centre Pour La Recherche Economique Et Ses Applications (CEPREMAP), France*
- *Magyar Tudomanyos Akademia Tarsadalomtudomanyi Kutatokozpont, Hungary*
- *Universiteit van Amsterdam, The Netherlands*
- *Erasmus Universiteit Rotterdam, The Netherlands*
- *Universidad de Salamanca, Spain*
- *Malmö University, Sweden*

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The QuInnE teaching cases and teaching notes are based on the confidential field research conducted in the context of the QuInnE project. They are written to provide material for training and class discussion rather than to illustrate either effective or ineffective handling of a management situation. Personal names and identifying information from the research cases have been altered for the purpose of confidentiality. The case studies and teaching notes have been developed in cooperation with RSM Case Development Centre of Rotterdam School of Management, Erasmus University (www.rsm.nl/cdc).

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Fast Frock Fashion Logistics: the Impact of New Technologies on Warehouse Workers

Introduction

In November, 2016, Martin Fischer, CEO of Fast Frock Fashion Logistics, was preparing for a meeting that would likely be heated and could possibly turn sour. Seven years ago, his employees had made significant wage concessions to allow the company to invest in automation and new technologies to build its future. But the company had never made the expected investments, and now, some employee groups were clamouring for payback and threatening a strike.

Fischer had spent ten years leading his company in a rapidly-evolving, fiercely competitive industry. Fast Frock, which had initially been the internal logistics unit of a large European retail fashion holding, had been spun off in the mid 2000's as a separate, wholly-owned, third-party logistics (3PL) subsidiary. By 2010, the new logistics company had restructured its operations, consolidating the warehouses of its multiple internal online fashion retail clients into two main distribution centres. Automation had become prevalent in this industry, primarily to increase throughput speed and traceability, and to reduce error rates; but demands for customized services from Fast Frock's fashion retail customers, as well as high costs of investment, meant that Fast Frock, as many of its competitors, was still highly reliant on manpower. Employees were indeed a principal concern.

As a long-time CEO and advocate of his employees' rights -- 'our best protector', according to employee representatives -- Fischer wanted to ensure satisfactory working conditions and a living wage for his employees. However, following the competitive developments in the industry, warehouse workers now often faced unpredictable schedules of highly variable hours doing repetitive tasks for low wages. Automation had, to some extent, further impoverished working conditions. Fast Frock's employee performance bonus system was scheduled for an update next week with the input of employee representatives; but with the increasingly demanding industry environment and current employee unrest, employee groups would likely bring up all employee-related topics at the meeting. To prepare, Fischer was currently reassessing employee motivation schemes, manpower planning options and possibilities for further investment in new technologies. The threat of an employee strike, which would jeopardise the company's future, was looming. Fischer had to propose some credible options for a decent way forward before it was too late.

Industry Snapshot[4]

With the rapid growth of online retailing, the logistics industry had changed dramatically. Among competitors, the vertically-integrated, innovative giants, such as Amazon, boasted fully-automated warehousing centers and controversial methods of management. But the majority of retail logistics companies still used conventional or semi-automated warehouses to accomplish the basic warehousing tasks of receiving, sorting, storing, retrieving, picking and packing items. The amount of implemented automation such as conveyor belts and sorting carousels, IT systems such as WMS (warehouse management systems) and ERP (enterprise resource planning), and robotics such as sensor-based autonomous robots used for transporting or picking products, defined a warehouse as automated, semi-automated or conventional.

Competition among logistics players was based on price and service levels. Services could include anything from specialized packaging, to express delivery, to setting up a dedicated call center for a particular client. Logistics customers in the retail fashion segment included many new online entrants, with uncertain futures, who required fast delivery at low cost. The linchpins of the industry were the logistics employees -- the actual people behind the packages brought to your door -- whose repetitive, often physically straining, low-skilled jobs had been further de-skilled -- and whose already low wages had been further decreased -- with the introduction of automated and digitalized warehousing.

The warehouse labour markets were tight. The large amount of space required for warehouses meant that they were often not located in expensive city centres, but in remote areas, where space was cheap. In these areas, labour was not always easily found. The remote locations combined with low wages and strong economic growth in Germany over the past years meant that warehouses in some particularly rural regions were faced with labour shortages.

Company History

When Fast Frock was spun off in the mid 2000s, it was forced to transform itself from a holding company's internal logistics department into an independent 'third-party' logistics (3PL) provider, marketing its services not only to its internal clients, but to the open online fashion retail market as well.

The transformation proved challenging. The retail logistics industry was in the throes of the online shopping revolution. Online and vertically-integrated retailers, which dealt directly with the end customer, were increasingly outsourcing their logistics and warehousing needs to 3PL's, and competition among these was fierce. To meet increasing industry demands, logistics companies had begun implementing lean techniques, in processes and warehousing. Finally, just when the fashion retail industry was coming to grips

[4] See Appendix A: Warehouse Industry Snapshot for a more detailed overview of the industry

with these changes, retailers like Zara and H&M began a new trend, 'fast fashion', increasing the number of collections released throughout the year, and forcing the acceleration of production and distribution times. All four trends in fashion retailing had significant impacts on Fast Frock's emergence as an independent player in the retail logistics industry.

According to Fischer, the company had been required to fundamentally alter its mindset: 'It was about [changing] the view of our employees on the market....Watch out...What's out there? Where do we have to go...? We are not operating in the planned economy any longer and there are now also customers who can leave.'

To ensure cost-effective, market-oriented operations, Fast Frock made a joint decision with its internal clients in 2009 to consolidate its capacities. As a result, all of Fast Frock's activities were concentrated at just two distribution centres (DC's): one main centre for purchased and outgoing products and one main returns centre. The consolidations had a significant impact on employees, involving several hundred redundancies as well as a negotiated 'social plan' between employee representatives (works councils) and management. The restructuring plan had included wage concessions by the remaining employees to allow Fast Frock to invest in new technologies and to strengthen its the competitiveness in the market.

Aware that it was too dependent on the ups and downs of its internal clients, Fast Frock slowly began developing business with external clients. By 2016, external customers comprised only 20% of sales, not yet sufficient to fully compensate for the fluctuations from Fast Frock's large internal clients, but Fischer aimed to increase Fast Frock's share of external customers to 40% by 2020.

Growth and profitability objectives were matched by efforts to increase productivity and reduce costs. Throughput times, in particular, were a key concern, in line with 'lean' principles that had been adopted by many industries in the late 1990's. When it had spun off and consolidated its warehouses, Fast Frock had made significant investments in automation technologies, including a new sorting machine in the returns centre. The head of the returns centre explained:

> It was really about...working cost-effectively, to secure throughput times as short as possible. A return item we receive today in the incoming goods department will be out within an hour. In the past, it lay around half a day. And you have to consider, if many articles are lying around, they cannot be in the distribution centre. So a higher stock is necessary. This means higher costs for the purchasing department and for the inventory. So this was the primary goal, to handle articles as quickly as possible, as cheaply as possible, fully automated.

With a throughput time of one hour, Fast Frock's returns centre was soon hailed as 'one of the most innovative...in Europe'.

Many new technologies were available for warehousing services. Although unique technology solutions could be implemented at the request of customers, they could also be initiated by Fast Frock's internal logistics planning department, as had been the case with the returns centre sorting machine. The sorting machine was one example of a technology investment with wide applications that, by increasing throughput times for all articles, could benefit the company rather than just one customer, and that with proper maintenance, could be justified over the long-term. As large-scale investments were financed by the holding company, and not through external banks, they needed approval from the holding company's executive board. To secure this approval, the company had to convince the board that the investment was economically justified, i.e., that there would be a satisfying and safe return on investment, either through the stability and long-term loyalty of the customer requesting the investment, or from increasing workloads that could no longer be handled optimally within the company.

Fischer knew that Fast Frock was currently not positioned to financially justify any large-scale investments. Its largest internal customer had been struggling for several years with decreasing sales volumes, which translated to lower handling requirements at Fast Frock's DCs. There was also uncertainty with external customers, due to the short standard contract duration of three years. The threat of losing these customers was constant, as they could easily switch to another 3PL provider or set up their own warehouses. Also, as some of these customers were new entrants to the online fashion retail market, they could potentially disappear. As many investments could not be financially justified, Fast Frock, like many of its competitors, was still heavily reliant on manpower. The head of the logistics planning department explained:

> Is there a need for flexibility in terms of growth or product range? Then it's a common approach to solve the problem with manual solutions or higher staffing levels. But if this is something I'm sure I can handle in this particular way over many years, the approach would be to step up technological support. An investment is a high cash output...the question is always: when will I have earned my money back?...I must be sure that the machine will remain functional over the same period...It used to be normal to have the same product range year over year; now it's more about being able to respond quickly. We don't know what we will be selling tomorrow.

Competition

With the growth of online shopping, the demand for third-party logistics services exploded. This was fuelled by the market entry of a large number of online retailers that had no in-house logistics capabilities or infrastructure, and to traditional retailers, that had little or no online expertise or home delivery experience. In 2006, when Fast Frock began offering its core services of fashion warehousing and returns management in B2C online retail, there were only a very few direct competitors. But according to Fischer, the competition had increased substantially in the last ten years, so that both larger logistics companies like DHL,

as well as smaller companies, were now offering logistics services tailored to the fashion retail industry.

Competition was based on pricing and service levels. When it was spun off and had to produce its own profit and loss statements, Fast Frock had changed from a cost-based transfer pricing system with its internal clients, to a market-based, highly competitive pricing system for all clients. Additionally, customer service demands varied greatly, from developing logistics solutions for selling products in international markets, to finding reliable partners to develop call center services or web shop solutions. Differentiated service levels were also fundamental; for example, packaging for an up-market fashion retailer required a more appealing look than the standard grey cardboard box. To gain reference customers, the company initially accepted low prices and profit margins: 'in order to show', according to Fischer, 'we are not just able to do "a lot and straight ahead", but we can also do "differentiated and varying". That was very important at the time.'

Customers

Fast Frock's internal clients had started their businesses several decades ago as fashion mail-order companies. They benefited strongly from the German unification since mail-order was quicker than stationary retail in reaching the new consumers in East Germany. The emergence of online shopping strongly increased competition. Fast Frock's internal clients, unlike some of their competitors, had succeeded in staying in the market and transforming themselves from mail-order companies into e-commerce or multi-channel retailers. However, they now competed against market giants such as Amazon, large vertically integrated retailers like H&M, and manufacturers like Adidas or Esprit who sold their products directly to customers online, as well as many smaller, and often more innovative, fashion retailers. The fashion holding's decision to 'outsource' their logistics department, and to establish Fast Frock, was ultimately motivated by the goal to become more independent from the ups and downs in sales volumes of its retail holdings.

For Fast Frock, the highly variable volume of goods that it handled on an extended daily and weekly schedule translated into two requirements: 1) more external clients, to simultaneously dampen the throughput peaks and troughs, as well as provide a separate source of company growth, not tied to the success of the holding's internal fashion retail companies; and even more importantly, 2) a highly flexible workforce.

Employee Overview

In 2016, Fast Frock had more than 2000 employees. 63% of employees were women, and 70% of jobs were low-skilled. Among employees, over 50% were aged 50 or above, with 25% over age 55. Regarding type of employment, only 5% of employees were full-time. 84% were part-time, and 11% were temporary agency workers. The high usage of part-time and temp workers was Fast Frock's

response to the high fluctuations in customer demand, based on constantly changing yearly, monthly, weekly, and even daily staffing requirements. Employment levels had been stable for the past 5 years, but were currently increasing. At the distribution centre, the company had already recruited 140 employees over the last year and was recruiting an additional 200 employees, as a response to the annual sales forecast provided by one customer. The new employees would receive a one-year, fixed-term contract; like most logistics companies, Fast Frock was wary of faulty customer forecasts and recruited as guardedly as possible.

Warehouse Employee Job Description

Warehousing focused on several basic, low-skilled processes: receiving, sorting, storing, retrieving, picking and packing items. Warehouse jobs tended to be monotonous and repetitive. According to one warehouse employee:

> When you look at the warehouse worker job description, you see a lot of tasks that the warehouse worker needs to know: how to receive a driver, how to prepare an order... [But] when I arrive at my post, it is a single task: I take products that are hanging from a bin, I take a bin, I put the product in the machine and I push... and I do that 7 hours a day.

The introduction of new technologies had reinforced the monotony and repetitiveness of low-skilled jobs. One of the most widely implemented technological innovations used by most retail warehouse facilities was pick-by-voice. Basic company requirements for the use of pick-by-voice technology were a Warehouse Management System (WMS) and check digits placed on a label positioned at each pick location. As for basic employee skill requirements, there weren't any, anymore. The information and instructions provided by the WMS replaced the manifest knowledge previously required for these jobs. Older warehouse employees familiar with warehousing techniques prior to the introduction of these new technologies experienced a loss of pride and meaning in their work. As several warehouse employees commented:

> ...even a person who can't read and write could work here. Before...we had what was called 'product knowledge', with training to be able to process [the product]. Today...no more training knowledge of the product is necessary; a beep or no beep tells me if it's the right barcode or not. Before [the introduction of pick-by-voice], you had to be an expert in your trade. Now you just have to know how to use the tool...In fact, it is not even a trade anymore: you are plugged in when you start, unplugged at the end of the day, that's it.

The introduction of pick-by-voice benefitted the company in that the amount of training necessary for a new employee to be fully operational in the warehouse decreased dramatically: from two weeks to only three days. Additionally, pick-by-voice and warehouse management systems helped monitor employees and manage the warehouse throughput.

Warehouse jobs had been further de-skilled with the introduction of automation to increase productivity. As the head of one department in the returns DC explained, the introduction of the automated sorter allowed a better distribution

of different types of returned goods to different workplaces. Employees were previously required to assess the state of different types of goods (shoes, textiles, jewelry), depending on what was in the returned parcel. With the automated sorter, employees were now focused on one specific product type: 'That was also the reason at the time [to introduce the sorter], to be able to allocate only one type of product to each employee, in order to increase productivity.'

The changes caused by automation rendered employee tasks more monotonous and repetitive, thereby also increasing physical requirements. With certain manual tasks continuously repeated throughout the day, muscle strain could quickly develop. However, especially in recent years, Fast Frock had stepped up initiatives to improve the ergonomic design of its workspaces. This was not only in the interest of employees, but also in the interest of the company: the high strain nature of these manual jobs was increasingly clashing with an aging workforce, and labour shortages underscored the company's need to support the well-being of its older employees in order to retain them.

Motivating Employee Performance

Within logistics in general, and warehousing in particular, motivating employees to maintain high productivity levels was a growing challenge, especially as jobs were increasingly low-paid, de-skilled and repetitive. Key performance indicators (KPI) were usually outlined in contracts with retailers and could be tracked using performance monitoring and measurement systems. The indicator with the most immediate impact on work intensity was the number of items to be processed every hour in the warehouse and the resources required to do that. Performance measurement systems transposed this overall rate into performance standards at the team or individual level, thus defining the number of items to be received, stored, picked, packed or put out per capita, either per hour or per shift. Performance levels were then established in customer service level agreements (SLA), with penalties imposed if they were not met.

Logistics companies used differing methods to motivate employees. One online retail giant, for instance, was notorious among its employees for using surveillance technologies to exert pressure on employee performance. It also made use of peer pressure in teams, linking absentee rates to a group bonus system. Another large e-commerce player systematically recruited former military members as team and group leaders.

But performance targets could also be linked to performance pay schemes, in order to positively incentivise workers to meet or exceed the expected level. Depending on how these incentive systems were used, there were concerns that employees would speed up their work pace to a degree detrimental to health and safety. There were also concerns that employees would favour speed over quality and thereby increase error rates. But Fast Frock used a performance measurement and pay system, the REFA method, developed nearly a century ago that in principle was suited to keep everything in balance. The company and the works council were jointly involved in its application and continuous evolution, and the employees overwhelmingly approved of its use. The REFA method

prescribed regular updates for the time-measurement indicators as well as updates whenever important technological or organisational changes to the work process had been introduced.

With the REFA method, employees who exceeded a determined standard performance level were rewarded with bonus pay. Generally, 90% of Fast Frock's employees received some amount of performance bonus, and average performances exceeded standard levels by 12% - 15%. The impact of the incentive scheme had even been quantified: during those times when bonus pay had been temporarily suspended due to technical difficulties -- i.e., the IT monitoring systems were temporarily disabled -- performance levels had dropped by at least 15%. This posed a problem with respect to the service level agreements established in customer contracts, which defined monetary fines if the agreed service levels -- in particular, the delivery lead times -- were not met.

However, high performance levels prompted by the incentive scheme increasingly clashed with an aging workforce, and employee representatives as well as company management feared that older employees might actually harm themselves, at least in the long-term, to receive the bonus pay. In an attempt to address this issue, Fischer, with approval from the Works Council, had fixed lower performance targets for employees aged 50+ which entitled them to begin receiving bonus pay when they achieved just 90% of the standard performance level.

Fast Frock's two warehouses and two separate works councils had differing ideas on the application of the performance pay system. The returns centre works council sought to enforce individual rights to opt out of the system, as it was voluntary, and there were no penalties if targets were not met. Dieter Schulz, chairman of the returns centre works council, felt that supervisors sometimes exerted too much detrimental pressure on employees to exceed performance targets, and that removing the monetary incentive solved the issue: 'A few supervisors had to learn that it's a voluntary incentive scheme, and if I want an employee to achieve higher levels than he normally does, then I have to motivate him and not oppress him.' However, the works council from the main DC deliberately abstained from making known among employees that the performance pay system was voluntary; they shared management's view that without the performance pay system, the DC probably wouldn't be able to meet the service levels agreed in the SLA with its customers, and they realized that this posed an even bigger threat. As the works council chairman from the main DC summarised: 'We need to make sure, on the one hand, that we continuously improve conditions for our employees and on the other hand...we also need to look to it that the company survives.'

However, despite the performance pay incentive system, many employees were still opting for fewer working hours in their monthly schedules, prinicipally, it appeared, due to job strain. But at already such low wage levels, monthly incomes for part-time jobs were close to poverty thresholds. The trade-offs were increasingly stark, and Fischer felt that between the increasing age of his

workforce and the increasing job strain, the performance pay system might be reaching its limits. He had to consider other options.

Some logistics companies had developed performance incentive schemes linked to teamwork, for example, comparing individual performances to the average for the team as a whole. Other incentive systems were directly linked to customer satisfaction, both upstream retailers as well as individual online end customers. These new 'quality' indicators of customer satisfaction were based on regular surveys. As one warehouse director who used such a system noted: 'Putting client satisfaction in all indicators...and initiatives, including profit-sharing, has the virtue of reminding employees that contribution goes hand-in-hand with compensation.' Fischer was also thinking about reviewing the KPIs used to monitor employee performance levels in the company's REFA system. Perhaps they could implement new KPIs -- Fischer was thinking about qualitative vs. quantitative metrics -- or look at internal vs. external performance metrics, to devise a better, and more flexible, performance pay system.

Employee Flexibility and Manpower Planning Options

Increased product variety, including seasonal products and shorter product life cycles such as the fast fashion trend, as well as coordinated marketing campaigns, such as 'Black Friday' or 'Cyber Monday', all contributed to the peaks and troughs in demand for Fast Frock's logistics services. Retailers provided forecasts, annually, monthly, weekly, but deviations of 10% were not uncommon. Additionally, even sophisticated, forecasting ERP software was only of limited use in accurately predicting demand. As a result, local managers in the DCs commented that their planning activity could be compared to reading a 'crystal ball'.

Shift schemes had been adapted to seasonal fluctuations already since decades. Working hours had also been annualised for full-time workers for the last twenty years, meaning that working hours for an employee could vary considerably from one week to the next to meet changes in demand, as long as total working hours over the course of one year matched those of a yearly contract. In this case, overtime hours in one week would not be compensated with pay, but rather, with time off at some later point. There had also been attempts at balancing the workloads, so that one part of the warehouse would not be hit with a windfall while employees in other parts stood around waiting. Workload balancing involved trying to shift some of the required flexibility to other parts of the logistics supply chain or back upstream to the customer. For example, specific docking times for unloading trucks could be assigned to specific customers to ensure the smooth, continuous reception of goods; or the packaging and shipping of products in urgent demand could be balanced by products with longer lead times, so that all workers could be kept productive at all times. But a logistics supplier had to have leverage with his customers to impose such demands, and Fast Frock was not yet that imposing. Besides, the fast fashion trend did not lend itself well to long lead times.

Over the last decade, Fast Frock had extended both daily and weekly operating hours -- to 18 hours per day and 6 days a week -- and also modified daily staffing levels, to better match fluctuations in demands over the week; for example, Mondays and Tuesdays were typically peak days. Employees were informed of their weekly schedule at the end of the previous week, based on retailer forecasts. But forecasts were often modified until the final update, one day prior. In Fast Frock's home country, companies were legally obliged to inform their employees about their work schedule at least four days in advance, which meant that with such drastic fluctuations, Fast Frock could not rely on forecasts to correctly staff its facilities. Instead, the company would regularly overstaff the planning schedule, then when it received the final planning requirements from retailers, it would ask employees to voluntarily remain at home, if necessary, with 20% pay.

This was neither efficient nor satisfactory for either the company or its employees, and was currently Fast Frock's biggest organisational challenge Fischer was considering various organisational options that he had heard or read about.

One current option currently being exploited in many retail warehouses was job rotation. This meant that employees would come to the warehouse in the morning and be assigned to those tasks that were most needed, whether receiving, sorting, storing, retrieving, picking or packing goods. Some organisations presented this option as a win-win for both employees and the company. Employees would gain experience in many warehousing tasks, would have greater chance of a full-time, permanent contract, and could also avoid doing the same repetitive task throughout the day or week, leading to job-related strain. Companies would have a multi-skilled, highly flexible workforce that could be relied on to do a multitude of tasks: 'Without multi-skilling, you have to split the employment contract, doing part-time here and part-time there, and that does not work,' explained one warehouse manager.

But employees, including those of Fast Frock, were reluctant to embrace multi-tasking. As one experienced warehouse employee explained: 'When you arrive every morning, you don't know to what tasks and what sector in the warehouse you are going to be allocated.' In addition to the apprehension of a new daily job, workers were also reluctant to be rotated to more difficult jobs. In the more conventional warehouses, job rotation could be at odds with horizontal career trajectories from more to less physically demanding jobs. Senior workers especially, whose physical fitness could not match those of younger colleagues, did not necessarily wish to return to the more demanding jobs from which they had been 'promoted' years earlier. Workers were also sometimes reluctant to change from teams in which they knew and appreciated colleagues. Finally, some companies who imposed job rotation also used this as a negative incentive: employees who 'underperformed' could be 'allocated to the most painful jobs', according to one employee representative.

Fischer had looked at other flexible, low-cost staffing options. He had first attempted to recruit, on a very small scale through employment agencies, from a group of refugees. But as this had been insufficient, and temporary workers were increasingly difficult to find, Fast Frock had recently started recruiting temp

workers, through a supervised outplacement arrangement, from neighbouring Poland. A recent, first experiment with three-month contracts had received positive evaluations from managers and employee representatives, and was to be repeated.

With standard industry wages already very low, the pool of workers willing to accept part-time contracts was limited. Fischer had read about employee grouping schemes currently being implemented by localized warehouse clusters in another country. Several warehousing companies created a legal entity which would hire employees on full-time, permanent contracts, then assign them, part-time, to two or more companies in the group. This was an innovation, and gave Fischer food for thought, as it appeared to better balance employees' and employers' interests.

Past Concessions and Current Situation

In a recent discussion, the manager of the returns centre confirmed that there had indeed been very few investments in new technologies since the introduction of the sorting machine. The chairman of the works council at the returns centre, Dieter Schulz, concluded that the executive board's reluctance to further invest in new technologies was motivated by its desire to increase profitability. In his opinion, the company was clawing back the gains derived from employee wage concessions agreed in the social plan during the consolidation of the holding's warehouses seven years earlier. He regarded management's failure to make investments in automation and technology as a breach of the company's agreement to invest in the plant in exchange for the wage concessions. Schulz voiced his misgivings:

> [There were significant] wage losses for the employees concerned...in order to allow the company to invest and implement 24-hour service. Complete rubbish. We still don't even have the IT systems required for this. My colleagues ask me, 'When will we get our pay scheme back?' At that time, we were told that this was to invest in the future. Where is the future? So we have to work always harder, faster and more... and our jobs are not secure. For instance, in the spring of 2016, I had to negotiate whether we wanted to give handling volumes to the Czech Republic because employees are even cheaper there.

Schulz further remarked that innovative ideas by managers, though badly needed, were not prioritized by the executive board, and that investment budgets were left unused. He wanted the company to make the promised technology investments so that the DC's productivity would increase and employees would have a more secure future:

> The returns centre has been handing back its investment budget for years...We don’t think [it's] fair...We think that we can make our site more secure if we increase our performance with the help of technological innovations. Because we’re not without competition, even within the holding. And you can only meet this challenge through productivity increases, because we can’t lower wages any further.

As works council chairman, Schulz was therefore considering the option of terminating the agreement curtailing hourly wages and renegotiating working conditions. The negotiation promised to be intense as lines were clearly drawn: the company would likely urge greater employee flexibility, simply to maintain local employment, without any payback from earlier wage concessions, in which case, the works council would likely support a strike.

Conclusion

Fischer finished reading a report that had been on his desk for a while, 'Logistics 4.0', and shook his head. All these notions of fully-automated warehouses, sensor-based robots, smart containers and shelves, and all sorts of possibilities for human and information exchange, didn't quite fit into his reality of fashion retail logistics at Fast Frock. Did the company's aging workforce, its as yet limited scale and investment possibilities, its retail customers with their fast fashion trends, and its online end customers whose unpredictable fashion demands wreaked havoc with any attempts at predicting or standardising anything, doom Fast Frock to failure? Fischer's head might be abuzz with ideas for positive change, for motivating employees and redesigning his warehouses, but the ever-present pressure for cost-cutting and high customer service levels in the industry kept his enthusiasm in check. And to make matters worse, Schulz now wanted to rediscuss employee compensation and working conditions, with the looming threat of a possible employee strike.

At next week's meeting, Fast Frock's performance measurement and pay system was set to be renegotiated with the works council. But Fischer knew that everything related to employees -- wages, working conditions, automation -- would be on the table for discussion, and that the meeting could well determine the company's future.

So far, the REFA performance bonus scheme had worked well, but it needed adjustment or maybe even, replacement. How could Fast Frock continue to use REFA to motivate its aging employees? Or should Fischer look to other means of keeping performance and productivity levels high? Should he rediscuss job rotation with the works councils? Or were there better options for flexible employee scheduling? What about more investments in new technologies? He had a few days to prepare some answers, but that hardly seemed enough time.

Appendix A: Warehousing Industry Snapshot

The end of the 20th century saw the majority of industries adopting 'lean' principles to reduce inventory levels, increase productivity, and overall, to reduce costs. In retail and logistics, this translated to an adoption of Just in Time (JIT) processes, enabled through linked software systems and an increased use of automation and digitalisation throughout the supply chain. The advent of e-commerce pushed the need for automation even further, due to the high throughput requirements of shipping rapidly increasing volumes of individual items directly to the end customer. Online shopping, which knew no temporal bounds, also translated into longer, sometimes round-the-clock, operations for retail logistics. In warehousing, innovations in automation and digitalisation focused around the main processes: receiving, sorting, storing, retrieving, picking and packing items. Depending on the industry serviced -- food, fashion, media, etc. -- and the corresponding characteristics of the stock handled -- size, weight, shelf-life, required packaging, diversity -- as well as on a country's employment regulations, logistics companies had to adapt their warehousing services to meet new customer demands.

Three types of warehouses emerged, according to their degree of automation: conventional, semi-automated, and automated warehouses. In conventional warehouses, tasks were mostly performed manually, supported by forklifts and other electric vehicles on which pallets with picked items were mounted. Pickers worked with different order picking technologies: 'paper picking', in which operators picked items based on computer generated lists, had increasingly been replaced by the use of barcode or RF scanners; in the late 1990s, 'pick-by-voice' and 'pick-by-light' technologies had followed, and most recently 'pick-by-vision' (data glasses). Pick-by-voice was currently the most widespread technology in warehouses. Pickers wore headsets and communicated orally with a software system to receive and confirm picking tasks.

There was no clear distinction between semi-automated and automated warehouses, but a common core meaning of 'semi-automated' was that only part of the different process steps in the warehouse were automated, and a high proportion were still performed manually. Technologies used in these warehouses could include man-aboard vehicles, which moved horizontally and vertically in the aisles between high racks, with the item still being picked by a human operator. Other technological solutions involved, for example, 'goods-to-person' systems, where unmanned vehicles, conveying systems, or carousels moved goods to a point where they were collected by human operators. These contrasted with the 'person-to-goods' systems used in conventional warehouses where pickers walked or drove through the warehouse to collect the items. A semi-automated warehouse could also combine fully-automated solutions for certain process steps (e.g. Automated Storing and Retrieval Systems, AS/RS) with conventional solutions for other steps such as picking. In contrast, fully automated warehouses involved technologies that operated with a minimum of manual labour, and where more or less all tasks, including the most labour- intensive tasks of picking and packing, were replaced by a large, interconnected system of conveyor belts, carousels and machines.

To varying degrees, these systems helped increase productivity in warehouses by reducing error rates and/or increasing picking efficiency. By 2017, however, fully-automated and even semi-automated warehouses were far from being the standard in retail DCs. A summary explanation was that customer demands and most retail products were too variable to allow standardisation of warehousing systems.

In the largest online retail firms such as Amazon, robots and other sensor-based, autonomous and decentralised coordinated modules were being introduced. But having so recently and heavily invested in large-scale automation with firmly installed equipment, European logistics companies would not likely be introducing such new alternative technologies in the near term.

Within the logistics industry, companies could position themselves as pure players, that is, logistics coordinators with little to no physical warehousing infrastructure, or as fully-integrated 3PL providers, with in-house transportation, distribution and warehousing capabilities. Fast Frock owned its DCs, and outsourced everything else. But with the high variability of customer demand in fashion retail, Fast Frock was being forced to reconsider its basic footprint and warehousing strategy.

Finally, another important logistics industry trend was the increasing use of information technology, especially 'track-and-trace', advanced warehouse management systems) and Enterprise Resource Planning (ERP) systems, which enabled firms not only to control and monitor the flow of goods both within and across different segments of the supply chain through the collection and exchange of real-time data and the use of predictive analytics, but also had significant implications on internal resource planning.