

Bisaschi, Luca; Calderoni, Paolo; Garces, Inazio; Lechardoy, Lucie; Nardoni, Sara

Working Paper

Algorithmic management in the logistics sector in France

JRC Working Papers Series on Labour, Education and Technology, No. 2025/04

Provided in Cooperation with:

Joint Research Centre (JRC), European Commission

Suggested Citation: Bisaschi, Luca; Calderoni, Paolo; Garces, Inazio; Lechardoy, Lucie; Nardoni, Sara (2025) : Algorithmic management in the logistics sector in France, JRC Working Papers Series on Labour, Education and Technology, No. 2025/04, European Commission, Joint Research Centre (JRC), Seville

This Version is available at:

<https://hdl.handle.net/10419/322091>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by/4.0/>



Algorithmic Management in the Logistics Sector in France

JRC Working Papers Series on
Labour, Education and Technology
2025/04

L. Bisaschi, P. Calderoni, I. Garces,
L. Lechardoy, S. Nardoni

LABOUR

EDUCATION

TECHNOLOGY

Joint
Research
Centre

This publication is part of a working paper series on Labour, Education and Technology by the Joint Research Centre (JRC). The JRC is the European Commission's science and knowledge service.

It aims to provide evidence-based scientific support to the European policymaking process. The contents of this publication do not necessarily reflect the position or opinion of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of this publication. For information on the methodology and quality underlying the data used in this publication for which the source is neither Eurostat nor other Commission services, users should contact the referenced source. The designations employed and the presentation of material on the maps do not imply the expression of any opinion whatsoever on the part of the European Union concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Contact information

Name: Ignacio González Vázquez

Address: Joint Research Centre, European Commission (Seville, Spain)

Email: ignacio.gonzalez-vazquez @ec.europa.eu

EU Science Hub

<https://joint-research-centre.ec.europa.eu>

JRC142292

Seville: European Commission, 2025

© European Union, 2025



The reuse policy of the European Commission is implemented by the Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39). Except otherwise noted, the reuse of this document is authorised under the Creative Commons Attribution 4.0 International (CC BY 4.0) licence (<https://creativecommons.org/licenses/by/4.0/>). This means that reuse is allowed provided appropriate credit is given and any changes are indicated. For any use or reproduction of photos or other material that is not owned by the EU, permission must be sought directly from the copyright holders.

All content © European Union 2025

How to cite this report: Bisaschi, L., Calderoni, P., Garces, I., Lechardoy, L. and Nardoni, S., *Algorithmic Management in the Logistic Sector in France*, European Commission, Seville, 2025, JRC142292.

Contents

Abstract.....	2
Executive summary	3
1 Introduction.....	4
2 Methodology.....	5
3 Applications of algorithmic management tools in the logistics sector in France and its possible impacts.....	6
3.1 French strategy for Artificial Intelligence.....	6
3.2 Algorithmic management tools in the logistics sector	7
4 Business model and work organisation	9
4.1 Business model and the delivery of services.....	9
4.2 Organisation and coordination of work processes.....	14
4.3 Occupation, tasks and skills	15
5 Working conditions.....	16
5.1 Work intensification.....	16
5.2 Autonomy	17
5.3 Social interaction.....	17
6 Ethics of AI.....	17
7 Surveillance and data privacy issues in the era of algorithmic management	18
8 Conclusions.....	24
References.....	26
List of figures.....	28
List of boxes	29
Appendix	30
1. Distribution of interviews	30

Abstract

This working paper provides an assessment of the impacts of algorithmic management (AM) tools on working conditions, job quality, and industrial relations in the logistics sector of France. It analyses the different ways algorithmic management technologies affect coordination, distribution and content of tasks, employee autonomy, job profiles, and industrial relations in logistics companies. The report presents a comprehensive study conducted through desk research, stakeholder consultation, and interviews with French start-ups, industry associations, public regulatory bodies, academia, and large companies. The French Strategy for Artificial Intelligence and the recent expansion of AI in French companies are discussed, along with some key applications of algorithmic tools. While algorithmic management tools offer several benefits for logistics companies, including optimizing operations and enhancing customer satisfaction, there are also concerns about the ethical and legal implications of rising technologies, particularly regarding worker privacy and the potential for bias or discrimination. Recent regulations and guidelines are presented to ensure the fair and transparent use of these tools. The paper concludes by discussing the need to balance the benefits of algorithmic tools with the potential risks and ethical concerns, and the role of the market and public policy in the coordination of economic activities in the logistics sector.

Keywords: Algorithmic Management, Logistics, Working Conditions, Job Quality

Joint Research Centre reference number: JRC142292

Executive summary

The report presents a selection of case studies of algorithmic management technologies (AMT) in the logistics sector in France. Specifically, the case studies examine the use of various AMTs, including AI tools, which are increasingly deployed to manage workers in the sector.

France is home to some of the world's major logistics players, including shipping companies, parcel deliveries, freights deliveries, or terminal operators, and many of the largest logistics companies in the world operate on French soil. French governments have tried to foster the development of new start-ups, some of which operate in the development of AMTs and AI technologies to manage physical and informational flows. The logistics industry is a significant contributor to the French economy, accounting for 10% of GDP, 150,000 firms, and 1.8 million jobs. The French government has invested over 1.5 billion euros in AI development, and private co-financing has added an additional 500 million euros.

While algorithmic management tools have benefited the logistics industry, it has also created questions about ethical applications and technological use in data protection and privacy. Interviewees explained that algorithms have enabled machines to sense, comprehend, learn, and act at human-like levels, raising concerns about their implications for employees, such as loss of autonomy, increased surveillance, and biased decision-making. Moreover, workers, especially platform workers, have mobilised against algorithmic management, contesting its impact on their working conditions, as France has historically been a land for workers' mobilisation in the logistics sector. For example, French civil society has engaged with non-profit experiments in the urban biking delivery sector, and trade unions have opened a debate on the impact of new digital technologies on working conditions.

The stakeholder consultation presented in this report suggests that the increasing adoption of AMTs in the logistics sector in France has both positive and negative impacts. While it has enabled companies to automate and streamline processes, predict demand, and reduce operational costs, it has also created questions about ethical applications and technological use in data protection and privacy. This has raised concerns about AMTs' impact on workers' autonomy, increased surveillance, and biased decision-making. Therefore, stakeholders should consider the implications of AMT on working conditions in the logistics sector, and design measures to mitigate the negative impacts of algorithmic management.

Main findings

The findings reveal that AMT adoption has become widespread in the French logistics industry in recent years, offering competitive advantages to companies that invest in it. Many logistics companies have invested in AMT to automate and streamline processes and to predict and forecast demand, resulting in lower operational costs and higher revenues. For example, Smart Warehouse Systems are used to recognise patterns and dependencies from unstructured data using IoT, AI, and cloud computing. These appliances can adapt independently and dynamically to new circumstances throughout the entire logistics system, making monotonous jobs simpler, and operations more efficient and cost-effective. However, this has also made certain warehouse jobs redundant and increased the importance of engineering and managerial jobs.

Quick guide

The first part of this report introduces the topic and its relevance. Section 2 describes the methodology followed throughout the study, while Section 3 presents a description of the logistics sector in France and the technologies used there. Section 4 lays the groundwork for the evidence collected throughout the stakeholder consultations with first-hand data and responses on the different impacts of algorithmic management tools on business model and the delivery of services, Section 5 on working conditions, Section 6 on the ethics of AI, and Section 7 on surveillance and data privacy issues. Finally, Section 8 concludes the report with a recapitulation of the data collected and its different impacts.

1 Introduction

The rapid advancement of the digital revolution and the growing connectivity in the workplace are reshaping the world of work. Digital tools and algorithmic management practices are now being adopted in traditional workplaces as mechanisms for work coordination. The digitalisation of work, along with digital monitoring and algorithmic management – defined as the use of computer-programmed processes to coordinate labour within an organisation – creates new business opportunities, enhances efficiency, and optimizes workflows. However, this shift also raises concerns about working conditions, the potential decline in job quality, and the increased risk of worker surveillance¹.

Over the past few decades, the use of algorithms across industries has quickly spread throughout the world. Especially impacting the most industrialised countries, algorithms have transformed our societies, how companies and markets operate, and how humans interact with machines: from academia to business practices, and from operations to human management. Algorithmic management refers to the use of AI and other algorithmic techniques to manage and supervise workers and business processes. Essentially, it involves automating certain managerial tasks that would normally be carried out by human managers. In practice, algorithmic management technologies (AMT) can take many different forms. For example, they can involve using machine learning (ML) algorithms to analyse employee performance data and make decisions about promotions, bonuses, and other forms of compensation. They can also involve using chatbots or other automated tools to communicate with employees and answer their questions or using predictive analytics to forecast future business needs and adjust staffing levels accordingly.

Digital labour platforms have been pioneers in adopting surveillance technologies and algorithmic management practices^{2,3}. This has been facilitated both by their inherently digital operating environment and by the informal nature of their working relationships, which has often allowed them to bypass many of the restrictions typically found in traditional workplaces. However, algorithmic management and digital surveillance are now increasingly permeating conventional work settings as well, prompting broader concerns about their impact on labour processes, the organisation of work, and the balance of power in the workplace⁴. For example, there are concerns about algorithmic bias, where algorithms may inadvertently discriminate against certain groups of workers or perpetuate existing inequalities. There are also concerns about worker privacy and autonomy, as well as potential legal liability if algorithmic decisions lead to negative outcomes for workers. Therefore, it is important for organisations to carefully consider the implications of algorithmic management and ensure that they have robust policies and procedures in place to address these issues.

The case studies presented in this report were conducted at the end of 2022 in the frame of a broader research study commissioned by the Joint Research Centre (JRC) to Open Evidence, investigating the impact of algorithmic management tools (AMT) on work organisation. The research study was part of a broader project carried out jointly by the JRC and the International Labour Organisation (ILO) focusing on country-sector analyses in the logistics and healthcare

¹ Rani, U., Pesole, A. and Gonzalez Vazquez, I., Algorithmic Management practices in regular workplaces: case studies in logistics and healthcare, Publications Office of the European Union, Luxembourg, 2024, doi:10.2760/712475, JRC136063.

² Pesole, A., Urzi Brancati, M.C., Fernandez Macias, E., Biagi, F. and Gonzalez Vazquez, I. 2018. Platform Workers in Europe Evidence from the COLLEEM Survey, EUR 29275 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-87996-8, doi:10.2760/742789, JRC112157.

³ ILO. 2021. World Employment and Social Outlook 2021: The Role of Digital Labour Platforms in Transforming the World of Work. International Labour Organization.

⁴ Baiocco, S., Fernández-Macías, E., Rani, U. and Pesole, A., 2022. The Algorithmic Management of work and its implications in different contexts, Seville: European Commission, JRC129749.

sectors in two European countries (France and Italy) and two non-EU countries (India and South Africa) allowing for a comparative analysis across countries with different levels of development⁵.

The aim of the overall project was to assess applications of algorithms in the workplace and examine their impacts on the coordination of work and working conditions, together with the role of social dialogue in the adoption and implementation of these technologies. The logistics sector was chosen as an example of a highly digitalised sector in which the use of digital monitoring and algorithmic management technologies has been widely documented in the literature. In contrast, in the healthcare sector the use of algorithmic management as part of digital health platforms is more recent and less well documented. This report focuses on the logistics sector in France.

2 Methodology

Each case study considered in the project was conceived to include a number of qualitative, in-depth, semi-structured interviews and field visits in an establishment using algorithmic management for the coordination of work processes, to be complemented by desk research as appropriate⁶. Specifically, the case studies involved interviews with individuals in different functions and roles in each establishment including managers at different levels, union and worker representatives, technology specialists, and workers affected by the technology. A semi-structured interview guide was designed and organised around a set of core themes and questions intended to investigate the impact of algorithms and digital solutions on work organisation and working conditions. All interviews were recorded and later transcribed. A content analysis of each interview was carried out: interviews' transcripts were individually studied and developed from generalised contents towards robust analyses progressively crystallising on the key dimensions covered. The main topics covered in the interviews include: (i) impacts on business model and the delivery of services; (ii) impacts on organisation and coordination of work processes; (iii) impacts on occupations, tasks and skills; (iv) impacts on work intensification; (v) impacts on autonomy; (vi), impacts on social interaction; (vii) ethical concerns surrounding the use of AI; (viii) impacts on monitoring and surveillance; and (ix) impacts on data privacy issues.

The participation and involvement of different stakeholders in the research allows to provide a balanced understanding of the implementation of the digital solution, the level of algorithmisation of the technology in place, and its impacts in the workplace. In addition to the qualitative interviews, the case studies are supplemented with information and documentation provided by the interviewees and other working papers.

Outreach activities for the selection of the establishments to be used as case studies in the French logistics sector involved accessing logistics companies of all sizes across France, including multinationals and start-ups. However, from the beginning of the project, French logistics companies were particularly reluctant to participate in the study. The main reasons for companies declining participation as a case study at the establishment-level included concerns on the legislative process of the EU, time constraints, lack of interest, and unavailability due to lack of resources. Moreover, the topic of algorithmic management in the logistics sector has become particularly sensitive in France due to recent scandals and ongoing worker protests. Concerns over precarious working conditions, surveillance, and the perceived lack of transparency in algorithmic decision-making have fueled criticism. As a result, companies may be reluctant to expose themselves to public scrutiny or regulatory attention, making them hesitant to participate in the study. In total, around 50 different companies using algorithmic management tools were contacted to participate as a case study at the establishment-level. Consequently, the methodology of the research study for the French logistics was modified to overcome the concerns raised by companies and to collect sufficient data whilst maintaining the overarching scope of the research project. In

⁵ Rani, U., Pesole, A. and Gonzalez Vazquez, I., Algorithmic Management practices in regular workplaces: case studies in logistics and healthcare, Publications Office of the European Union, Luxembourg, 2024, doi:10.2760/712475, JRC136063.

⁶ Ibid.

the end, a total of 25 stakeholders from diverse backgrounds in logistics were interviewed across 14 different organisations or enterprises. This enabled to gain a better understanding of the impact of algorithmic management tools in the workplace. Stakeholders included French start-ups and large logistics companies, industry associations, academia and public regulatory bodies. All interviews, desk research, data collection and reporting were carried out between December and March 2023. Interviews were conducted online via MS Teams with a pre-established questionnaire sent in advance (see appendix for more details).

3 Applications of algorithmic management tools in the logistics sector in France and its possible impacts

3.1 French strategy for Artificial Intelligence

According to the French government, the logistics industry in France accounts for 10% of the GDP, 150,000 firms, and 1,8 million jobs (four times as much as the automobile industry)⁷. Moreover, between the years 2018-2023, the French government has dedicated more than 1.5 billion euros to the development of AI in the country⁸, and an additional 500 million euros coming from private co-financing has been poured into the tech industry⁹.

The French National Strategy on AI (*Stratégie nationale pour l'intelligence artificielle*), labelled 'AI for Humanity', was launched in 2018 and aims at implementing the recommendations of Cédric Villani's report on AI launched that same year (Villani et al., 2018). The report builds on four axes¹⁰.

Axis 1: To enhance the French research ecosystem on AI through additional financial resources, new infrastructures, and more links with the industry. **Axis 2:** To accelerate AI dissemination in the economy, public administration, and society. **Axis 3:** To encourage the development of a 'Trustworthy AI', both at the national and international levels. **Axis 4:** To develop and reinforce AI educational programmes to increase AI content across universities. All stakeholders interviewed agreed that the National Strategy has played an **important role** in the adoption of new AI tools in the industry, as well as algorithmic management technologies across different sectors. Through the aid of state financing and the pooling together of talent, interviewees agreed that a new push in the use of AI in small and medium enterprises was growing, including new AI tools being invented in France.

The Villani report highlights the need to build a data-focused economic policy to catapult Europe into becoming a world leader in AI. The report suggests that France and Europe must design a tailored model to capitalize on high protection standards through the European General Data Protection Regulation (GDPR)¹¹. To achieve this, public authorities must introduce new ways of **producing, sharing** and **governing** data by making data a common good. The State is a key driver in these various areas of transformation, and public authorities must ensure that they adopt the necessary material and human resources to factor AI into the way they address public policy, with the aim of both pursuing modernization and acting as an example to be followed (Villani et al., 2018).

Additionally, the report suggests setting up shared sector platforms that provide secure and tailored access to different participants in these ecosystems, including researchers, companies, and public authorities. Moreover, these shared platforms would enable sharing of useful data for the development of AI, as well as foster resources and extensive computing infrastructure (Villani et al.,

⁷ Ministère de la Transition écologique et de la Cohésion des territoires (2021). <https://www.ecologie.gouv.fr/logistique-en-france#:~:text=La%20logistique%20est%20%C3%A0%20ce.%2C8%20million%20d'emplois>

⁸ France AI Strategy Report (2021). https://ai-watch.ec.europa.eu/countries/france/france-ai-strategy-report_en

⁹ French AI Strategy (2018). <https://www.euractiv.com/section/digital/news/french-ai-strategy-tech-sector-to-receive-over-e2-bl-in-next-5-years/>

¹⁰ OECD.AI Policy Observatory (2021). <https://oecd.ai/en/dashboards/policy-initiatives/http:%2F%2Faipo.oecd.org%2F2021-data-policyInitiatives-25374>

¹¹ AI For Humanity (2018). <https://www.aiforhumanity.fr/>

2018). Some examples of these platforms which are facilitated by French technology and AI associations include **Hub FranceIA**, **Aleia**, **AI Cargo Foundation**, **France Digitale**, **La French Tech**, **French National Artificial Intelligence Research Program**, **French Association for Artificial Intelligence (Afla)** and **Artificial Intelligence for Science Center (AISSAI)**.

On another note, French civil society has engaged with non-profit experiments in the urban biking delivery sector¹². For example, over recent years, French regulatory authorities have put the diffusion of algorithmic management under scrutiny, while trade unions have opened a debate on the impact of new digital technologies on working conditions^{13,14}. Historically, France has been a land for the mobilisation of workers, especially platform workers, contesting the role of algorithmic management and its downside impacts on their working conditions¹⁵, and in the logistics sector (broadly intended), these mobilisations have been particularly relevant^{16,17,18}.

Overall, the logistics sector in France has a relatively high degree of unionisation, with several large unions representing workers in the sector (CGT, CFDT, FO, CFTC – CGC). These unions have expressed concerns about the potential impact of algorithmic management tools on workers, particularly in terms of increased surveillance and potential job losses. In recent years, social partners in the French logistics sector have been engaging in discussions and negotiations around the adoption and use of these tools across the sector. Some unions have been advocating for greater transparency and worker participation in the design and implementation of these tools, while others have called for outright bans or restrictions on their use. In 2020, the French government introduced a new law on the "duty of vigilance" for large companies, which requires them to identify and prevent human rights and environmental risks in their operations, including those related to the use of algorithmic management tools. This law has been welcomed by some unions as a step towards greater accountability and transparency in the use of new technologies. Overall, while the degree of unionisation in the French logistics sector may provide some leverage for workers in negotiating the use of algorithmic management tools, the sector is also highly competitive and subject to cost pressures, which may limit the ability of social partners to influence company decisions.

3.2 Algorithmic management tools in the logistics sector

France is home to some of the world's major players in the logistics sector, including shipping companies (**CMA-CGM**), parcel deliveries (**Geopost-DPD**), freights deliveries (**Geodis**), or terminal operators (**Bolloré**), and some of these actors are directly or indirectly state-owned (Geopost and Geodis). Moreover, many of the largest logistics companies in the world operate on French soil, from **UPS** to **Amazon**, from **DHL** to **FedEx**, as well as the most important logistics service digital platforms, from **Deliveroo** to **Just Eat**. Throughout recent years, French governments have tried to

¹² Acosta Alvarado, Ana Sofia, Laura Aufrère, and Cynthia Srnec. 2021. 'CoopCycle, Un Projet de Plateforme Socialisée et de Régulation de La Livraison à Vélo'. Working Paper. HAL. <https://econpapers.repec.org/paper/halpaper/hal-03364001.htm>.

¹³ CNIL. 2017. 'Comment permettre à l'Homme de garder la main ? Rapport sur les enjeux éthiques des algorithmes et de l'intelligence artificielle'. <https://www.cnil.fr/fr/comment-permettre-lhomme-de-garder-la-main-rapport-sur-les-enjeux-ethiques-des-algorithmes-et-de>.

¹⁴ Salis-Madinier, Franca. 2021. *Le guide de l'intelligence artificielle au travail: vos droits face aux algorithmes*. Paris: Éditions Eyrolles.

¹⁵ Abdelnour, Sarah, and Sophie Bernard. 2018. 'Vers un capitalisme de plateforme? Mobiliser le travail, contourner les régulations'. *La nouvelle revue du travail*, no. 13 (November). <https://doi.org/10.4000/nrt.3797>.

¹⁶ Dirringer, Josépha, and Cristina Nizzoli. 2022. 'Action collective et syndicalisme à l'épreuve du travail de plateforme en France et en Italie'. *La Revue de l'Ires* 106 (1): 3–12. <https://doi.org/10.3917/rdli.106.0003>.

¹⁷ Massimo, Francesco S. 2020a. 'Burocrazie Algoritmiche. Limiti e Astuzie Della Razionalizzazione Digitale in Due Stabilimenti Amazon'. *Etnografia e Ricerca Qualitativa*, no. 1/2020: 53–78. <https://doi.org/10.3240/96824>.

¹⁸ Massimo, Francesco S. 2020b. 'Chapter 8. A Struggle for Bodies and Souls: Amazon Management and Union Strategies in France and Italy'. In *The Cost of Free Shipping: Amazon in the Global Economy*, 129–45. Wildcat: Workers' Movements and Global Capitalism. London: Pluto Press.

foster the development of new start-ups, some of them operating in the development of algorithmic management and AI technologies to manage physical and informational flows^{19,20}.

AI has seen high adoption in the French logistics industry in recent years due to new developments in the fields of ML, computing, and big data. The impacts of this increasing adoption have become widespread and constitute the basis for this paper. French global logistics players are increasingly investing in AI technologies and transitioning from traditional systems to computerised ones, gaining competitive advantages over counterparts. On the one hand, AI has benefited the logistics industry by enabling it to automate and streamline processes. On the other hand, it has created new questions about its ethical applications and the boundaries of technological use in ensuring data protection and data privacy. This is because AI enables machines to sense, comprehend, learn, and act at human-like levels, through experience via iterative processing and algorithmic training.

Many AI features such as **prediction, intelligent workflow automation, robotics and vision recognition** have demonstrated significant advantages in many logistics companies²¹. Transport logistics companies operating in France, such as FedEx, UPS, and DHL have invested heavily in AI to maintain their competitive advantage. Some examples of these technologies, such as the **Predictive Capabilities of AI**, have made demand forecasting easier. Others like network planning and demand planning are becoming more efficient thanks to AI, which has enabled merchandisers to be more proactive²².

A recurrent theme during stakeholder interviews was the use of predicative algorithmic tools to assist companies to predict their client flows, stock needs, staff planning or peak activity during the day and the following week. Knowing what to anticipate at all times allows companies to modify their stock levels and guide inventory to areas where they expect the most demand, resulting in lower operational costs and higher revenues. The key factors driving the uptake and deployment of algorithmic management within the logistics industry are strongly tied to competitive demands concerning cost reduction, punctual shipments, and the heightened consolidation of oversight and regulation through corporate governance frameworks. Among these, the dominant force behind the adoption of algorithmic solutions appears to be increased centralization of supervision and decision-making. Technologies employed for surveillance and operational tracking include **wearable devices** worn by employees, **sensors**, and **radiofrequency identification (RFID) tags** applied to products. Additionally, algorithmic management platforms are implemented to monitor manufacturing workflows and assess workforce productivity. In logistics, algorithms have also been applied to hiring processes and the organization of tasks within storage facilities. Their integration seeks to automate labour administration, covering task assignment, performance assessment, and disciplinary measures²³.

Another algorithmic management tool mentioned during stakeholder interviews was **Smart Warehouse Systems**, which can recognize patterns, regularities, and dependencies from unstructured data by using the Internet of Things (IoT), artificial intelligence and cloud computing²⁴. Such appliances can adapt independently and dynamically to new circumstances throughout the entire logistics system, for example to new pathways in a warehouse. Examples include automated guided vehicles (AGV), RFID, 5G, automated storage and retrieval systems (AS/RS), or IoT. Consequently, monotonous jobs become simpler, and operations become more efficient and cost-

¹⁹ Bellon, Anne. 2022. *L'État et la Toile. Du développement de l'internet à la numérisation de l'action publique*. Vulaines-sur-Seine : Éditions du Croquant.

²⁰ Englebert, Philippe. 2021. 'Chapitre V. Les politiques publiques de soutien aux startups'. In , 98–121. Que sais-je? Paris cedex 14: Presses Universitaires de France. <https://www.cairn.info/les-startups-en-france--9782715406810-p-98.htm>.

²¹ GEP (2022). <https://www.gep.com/blog/mind/artificial-intelligence-in-logistics>

²² GEP (2022). <https://www.gep.com/blog/mind/artificial-intelligence-in-logistics>

²³ Rani, U., Pesole, A. and Gonzalez Vazquez, I., Algorithmic Management practices in regular workplaces: case studies in logistics and healthcare, Publications Office of the European Union, Luxembourg, 2024, doi:10.2760/712475, JRC136063.

²⁴ GEP (2022). <https://www.gep.com/blog/mind/artificial-intelligence-in-logistics>

effective. The use of Smart Warehouse Systems has disrupted the workplace by making certain warehouse jobs redundant and other engineering and managerial jobs more important. Warehouse work is increasingly becoming a managing and coordination task, with fewer workers and more machines. Machines are increasingly doing the labours' tasks and humans doing the coordination tasks through AM software.

Furthermore, stakeholders interviewed mentioned **AI-Powered Route Planning tools** as another emerging technology with algorithmic management elements. Such tools can help the transport and logistics industries integrate data from various sources and make intelligent judgments regarding travel routes. One famous example is 'UPS Dynamic On-Road Integrated Optimization and Navigation technology' (ORION) which uses advanced algorithms, artificial intelligence, and machine learning to offer precise delivery time estimates, dependability, and responsiveness. ORION was part of a broader effort by UPS to use data and predictive models to increase efficiency, thereby reducing both costs and environmental impacts. Although increasing efficiency, the use of ORION may reduce employee autonomy since their delivery routes are predestined and occasionally sound counterintuitive, such as passing a house on an initial visit to the neighbourhood only to revisit it to deliver a package later²⁵. The increasing use of these technologies risks alienating the worker from their decisions, by reducing their flexibility and independence in deciding how to achieve their tasks. Delivery drivers no longer choose their preferred delivery route but should follow the path set out by the algorithm.

Finally, the rise of **chatbots** as an alternative AI tool in Logistics was mentioned throughout stakeholder consultations. Chatbots' technology mimics human interactions by identifying speech and text inputs and translating their contents into other languages using massive amounts of data, ML, and natural language processing. Chatbots provide companies with regular updates and relevant information about delays and disruptions. For shipping companies, this allows comprehensive visibility of the shipment. Additionally, by providing a 24/7 conversational interface, conversational AI is always available to provide users with the information they require. Although not strictly algorithmic management technology, chatbots are being integrated alongside other AMTs in the logistics sector to increase the management of work and client relations.

Thus, the technologies considered in the case studies span a wide range of categories. However, although the tools described below are not strictly algorithmic management (e.g., involving automation of managerial control and decision-making), they are nonetheless used for the coordination and allocation of work. In this case, they are relevant insofar as to influence work organisation, job quality and worker relations.

4 Business model and work organisation

4.1 Business model and the delivery of services

Algorithmic management tools can have the potential to increase economic activity by cutting costs, saving time, and increasing productivity. A logistics company interviewed, one of the world's largest container shipping companies, uses several AI tools in their operations to boost economic activity. A data scientist interviewed said that AI predictive models are used in all departments of the company: for business planning, team budgeting, company size for the following year, or even fleet sizing for the next 4-5 years. With the help of these algorithmic management tools, if a specific trade is predicted to grow or contract, or if the company sees new trade volumes in a country, they will try to position upstream, to make commercial approaches locally, or even to increase the capacity of vessels serving a trade or a region.

There are applications for the short, medium, and long term, he said. For example, in the long term, the company use AI tools for capital expenditure (CAPEX), in the medium term for fleet and asset

²⁵ BSR (2016). <https://www.bsr.org/en/case-studies/center-for-technology-and-sustainability-orion-technology-ups>

optimisation, and in the short term, it allows them to decide whether to divert a vessel or how to price its content.

When we have a shortage, prices are impacted so we try and avoid this. If we can predict shortages, we can react beforehand and increase our economic activity. Based on predictions, we can add or remove a ship in the short-term depending on demand.

Container shipping company, Data scientist

Nonetheless, the data scientist explained that algorithms and AMTs cannot predict everything. Some line disruptions are not necessarily only due to demand and supply, and sometimes there are strikes or, for example, a few years ago a ship blocked the Suez Canal, he said. However, he said that the strategic benefits of using AI tools are immense, and help the company forecast industry growth, maritime flows, and volume of freights between a point of departure and arrival. In essence, AMTs have become decisive in the day-to-day running of the company.

To create decision support tools, add ships, make CAPEX decisions etc., AI tools help in strategic decision-making. For example, the data scientist said AI tools are used for operations, finance, business planning, and commercial strategy planning and there are quite a few cross-functional applications in the group. Ultimately, although the company is in the shipping industry, the data scientist said the heart of their job is not the maritime but organising all these flows - which line they propose, what frequency and how they manage all this with external disruptions. This illustrates the power and importance of AMTs in the logistics industry. Another interviewee from the shipping company said that each AI project has a qualitative or quantitative return on investment (ROI) - it can save time or help in the decision-making process.

We understand the ROI in terms of market intelligence. If we improve our purchasing strategies with our models, we save money in euros. We have to convince the company's department managers that the algorithm is of value to them. If the project is successful, we use it and if not we rework the algorithm. Generally, we can predict what we want.

Container shipping company , Data scientist

At another software and consulting firm interviewed, one worker explained that they employ algorithmic software to provide data in the freight transport and mobility of goods and services. The tool helps in the planning of the week and allows them to internalise costs by not having to outsource their technology needs. The worker stated that data analysis is widespread in the logistics sector, including through the use of frequent surveys and real-time traffic analysis to manage internal work. With so much data, management tools are necessary to aid in the coordination of work. However, the worker explained that every project must have a business notion behind it. Every new tool we make must improve something and somewhere - the algorithm must help with time, decision, management, finance, purchasing or strategy, said the worker.

For another shipping and supply chain management company interviewed, the relevant AMTs used are mostly those of the "last mile" - systems that quickly and easily display information on the delivery status. These include an overview of the status of delivery parcels, delivery information, delays, changes in routes etc. The Social Relations manager interviewed explained that before adopting AMTs, drivers would sign the parcels for the customers on paper when delivering, keeping a physical inventory. Nowadays, the customer signs for the parcel through software which creates a history of their past orders and shares key data with drivers allowing them to know each customer's optimal delivery times, delivery dates, purchasing trends etc. to facilitate the process. This process is done to increase the efficiency of the route for drivers who had no prior knowledge or experience with specific customers. On the one hand, these benefits both customers by decreasing delivery time, and drivers by increasing route flows. On the other hand, the personal data shared by customers create new challenges for data privacy.

Moreover, the manager said the company have other algorithms for predicting volume inventory, which impacts staff. For example, before the introduction of this tool, walkie-talkies were used for work organisation within the warehouses, and now algorithms that help staff planning tell each worker where to go and when at all times. The Social Relations manager said the expansion of AI will generally reduce the need for workers, although they will still be needed. A distinction has to be made between AI and other technological tools, he said, predicting the future of our jobs and which jobs will be destroyed, or which ones will require re-skilling is key for the industry.

Box 1. Case study on *French Logistics 1*

Predictive algorithmic management tools such as those created by *French Logistics 1*, a start-up providing software to retail and logistics companies, have helped boost its client's business activities.

One issue was how to accurately forecast small retail sales, stock requirements, staffing needs and the number of customers. We realised there was no real way to accurately forecast important data (for example, how much stock I need to order) for small businesses

***French Logistics 1*, Co-founder and CEO**

The co-founder and partner explained that most small retailers plan their stock needs on 'gut feeling'. For instance, depending on the weather and their experience, bakeries make predictions about how many customers will enter that day and how much they will sell. Before the development of the tool, there was no solution for predicting such things, because small businesses were simply not computerised and did not have the technological infrastructure necessary to increase their productivity. By making random stock forecasts, small companies could accumulate hundreds of euros in material losses per establishment. The losses were mainly driven by a poor prediction of stock needs per day, which was especially heightened at the weekends and public holidays. Therefore, the tool was envisioned for short-term predictions, like how much should small companies supply in the next 2 or 3 days, and predict the flow of clients, hour by hour, with a peak activity to help in the planning of staff.

Consequently, the tool reduces waste and saves time and money for companies. Firstly, the solution avoids stock-outs so that businesses do not miss customers. Secondly, it helps to avoid losses by forecasting the right stock quantities, so that customers are satisfied and there is hardly anything left over, which has an impact on turnover. Thirdly, the tool helps optimise other processes (e.g., ordering from the supplier, alerting users about a product that will go off), freeing up small companies' time in unproductive tasks and instead focusing on other key business developments that they might have.

For example, a small logistics company can save time by predicting the quantity of stock needed for the following day, or by calling a staff reinforcement in advance if they know they will have more activity during a specific day. Instead, with this free time, the company can dedicate more resources to the growth strategy of its business. Furthermore, with hour-by-hour turnover figures for the next 7 days, companies can have a better overview of their schedules and better adapt to their needs. A key indirect impact of using this tool is assisting in schedule organization and changes by freeing up time to focus on other needs.

The tool has become like a weather forecast for small companies, including logistics, said its co-founder. In the morning the user logs on and checks to see what they must do during the day. In the morning the user downloads a sheet that indicates how much to produce for the following afternoon. As the day progresses, he can connect again to see if the production is still optimal until the evening and adapt the forecasts more and more precisely. In the evening, he connects again to know what to order from the suppliers for the next day. Soon we will add a button to allow them to send all their orders directly to all their suppliers, commented the co-founder.

At the establishment level, AMTs have the potential to be disruptive in the organisation and coordination of work. Two French industry associations were interviewed as part of the data collection phase. **French Logistics 2** is a platform to promote AI and digital sovereignty in France, aimed at creating AI projects in all sectors. **French logistics foundation** is an association founded in the framework of an open ecosystem dedicated to transport and logistics seeking to expand AI technologies and support the ecological transition. The goal of the *Foundation* is to decarbonise the logistics sector by creating a common structure with Data and AI projects. An expert at *French Logistics 2* and President of *French Logistics Foundation* said their goal was to decarbonise long-distance logistics (with modal shift), decarbonise urban logistics, and decarbonise the overall logistics footprint of companies (with action levers on vehicle fleets).

The *Foundation* has created a Data Fabric platform for Logistics, where companies have access to an open and secure solution to accelerate AI and data-sharing projects. Through the use of an application programming interface (API), the *Foundation* ensures access to IT solutions to accelerate decarbonisation (product licences) and benefits from a fast data connection solution with Plug & Play Data Connectors. The *Foundation* enables users to access specific industrial and public programmes, interact with working groups, follow training, increase visibility, and ensure continuous support.

The ecosystem includes major economic players (such as SNCF, La Poste, L'Oréal, and Michelin) and data start-ups, all of which are using technologies such as connected warehouses, exoskeletons, etc. Likewise, the ecosystem is well structured with ministerial players such as the AIT (*Agence Innovation Transport*) which leads the ecosystem of start-ups in the French transport world. For example, the interviewee said that the French financial tool called 'energy savings certificates', which is a mechanism that requires energy companies (Total, Engie, EDF etc.) to dedicate part of their income to financing projects to reduce energy consumption, has proven effective in creating new technologies to reduce companies' carbon footprint. Furthermore, the demand for these energy savings certificates has significantly increased since their adoption, creating incentives for companies and individuals to reduce energy consumption²⁶.

This financing tool has led to the emergence of major programmes designed to support the energy transition, including many in the logistics and transport sectors. The application of AI in logistics is mainly linked to the subject of flow optimisation. It is a question of playing on the components of logistics and in particular of transport between each stage, said the president of the *Foundation*. The logistics chain has become more complex and new intermediaries have appeared.

Luckily, said the interviewee, the players in the sector already use AI at several levels. For example, most 'shippers' (producers at the beginning of the chain) use AI at several points in their value chain to optimise industrial processes and trades. Some examples given by the *Foundation* included:

- **La Poste** uses AI tools to predict vehicle needs and to optimise processes such as parking locations for loading trucks to speed up turnaround.
- **Amazon** uses ML and predictive AI tools for scheduling the dispatching of its last-mile deliveries.
- **Michelin** has AI tools on tyre optimisation processes to reduce its environmental impact, as well as GPS tools in vehicles to predict accident-prone areas, and to improve driver behaviour to reduce fuel consumption.
- Several start-Ups put IoT in vehicles for tracking and predicting arrival times or optimising truck filling, mobile apps for augmented driver assistance that help drivers respect the procedures on hazardous materials, and apps for parking assistance.

The interviewee then proceeded to list some examples of how algorithmic management tools impact tasks in the French logistics sector:

²⁶ ADEME (2019). <https://www.odyssee-mure.eu/events/workshops/berlin/33-evaluation-white-certificate-scheme-france-dec-2019.pdf>

- **Routing and scheduling:** With the use of algorithms, logistics companies can optimize routes and schedules to improve delivery times and reduce costs. These tools can analyse data on traffic patterns, weather conditions, and delivery destinations to determine the most efficient routes.
- **Inventory management:** Algorithms can monitor inventory levels in real-time and make recommendations on when and how much to reorder. These tools can help logistics companies avoid stockouts and minimize waste.
- **Quality control:** Algorithms can be used to monitor and analyse data from sensors and other sources to identify quality control issues in real-time. This can help logistics companies identify and address problems before they lead to customer complaints or product recalls.
- **Predictive maintenance:** Algorithms can also analyse data from sensors and other sources to predict when equipment is likely to fail. These tools help logistics companies schedule maintenance proactively, reducing downtime and extending the lifespan of equipment.
- **Customer service:** Finally, algorithms can be used to analyse data on customer preferences and behaviours as to personalize customer service interactions. This can involve recommending products or services, providing tailored offers or discounts, and responding to customer inquiries in real-time.

Box 2. Case study on *French Logistics 3*

A major programme within the *Foundation* is a last-mile logistics platform for the optimisation of delivery flows, traffic prediction, and mobility transition of delivery vehicle fleets. One algorithmic management tool within platform allows management of the organisation of delivery areas by adapting its needs and developing the roadway according to the requirements of drivers. Thanks to the tool, drivers have easy access to important information before and throughout deriving goods and when planning future routes. This includes information on road traffic and delivery areas, the number and location of delivery areas, the availability of delivery areas, the typology of parked vehicles, the duration of parking zones, and the nature of parking areas. The tool shares similarities with another algorithm used by Amazon as a last-mile solution for faster delivery, lower costs, and a better customer experience – quickly and easily managing its logistics in a few clicks²⁷.

In essence, the tool developed by *French Logistics 3* enables digitalising commercial vehicles' *disc parking* in France (a system of allowing time-restricted free parking through the display of a parking disc showing the time at which the vehicle was parked). The first step in using the tool is a simplified parking declaration, with information on parking time, location, and alerts, via self-geolocation of delivery spaces. The second step is to monitor and inform the driver to know where they can park, with geolocation of delivery areas and the availability level for each; broken down between free, available for 5mins and unavailable. The third step is to 'consult and adapt', with drivers being able to reserve parking spaces and delivery areas in advance. Figure 1 illustrates the tool's dashboard. On the left-hand side, we see the mobile interface showing the parking time limit, location, and other key information for drivers, and on the right-hand side, we see a heatmap with parking availability broken down into the three aforementioned levels.

Figure 1: Example of dashboard

²⁷ AWS (2023). <https://aws.amazon.com/blogs/supply-chain/aws-last-mile-solution-for-faster-delivery-lower-costs-and-a-better-customer-experience/>



Source: Material provided by French Logistics 3

The operating principles of the tool are simplicity and confidentiality, with a declaration of parking under a simple click, a geolocation only at the time of parking (inactive when the vehicle is moving to limit data privacy issues), and phone alerts on the remaining parking time. Moreover, the algorithm allows for managing the evolution of the driver's needs by simulating the impacts on traffic. The algorithm predicts traffic and free parking spaces using data from public cameras and sensors to recognise cars, motorbikes, and bicycles on the street. By using this tool, companies can centralise the different delivery routes of vehicle fleets and easily manage their logistics from one space. With live updates of the delivery status, position and parking time, companies can manage the available resources at all times and better organise themselves around peak activities. Using the tool helps increase flow optimisation and increase route efficiency.

4.2 Organisation and coordination of work processes

Algorithmic management tools can change the way work is organized and managed. Managers may rely more heavily on data and analytics to make decisions about how work is assigned and performed. This can result in workers being assigned tasks based on data-driven metrics, such as productivity or efficiency, rather than their own preferences or skills. For example, in a call centre, an algorithmic management tool may assign calls to workers based on their previous call performance, rather than allowing workers to choose which calls they take based on their own preferences or skills.

One example of how algorithmic management tools impact work organization in the French logistics sector is through the use of route optimization algorithms for delivery drivers. These algorithms use real-time traffic data to calculate the most efficient routes for drivers to take to complete their deliveries, reducing travel time and increasing productivity.

Another example is the use of predictive analytics tools to forecast demand and optimize inventory levels in warehouses. This can help to reduce overstocking and understocking of goods, which can improve efficiency and reduce waste.

Additionally, the use of algorithmic management tools may require new skills and training for workers, particularly in the use of data analytics and technology. This can lead to changes in job roles and responsibilities and may require additional investment in training and development programs.

To collect information on the impacts of AMTs on work coordination, organisation and workflows, French AI associations and non-profit technology organisations were interviewed. The co-founder of a French AI association founded following the Villani Report that helps start-ups raise funds, share ideas, and pool talent together. **French logistics association** has several working groups on AI, including one on HR focusing on the reorganisation of teams, the replacement of humans, and the questions of reassigning employees. Other working groups involve the transport and delivery sector, supply chain, stock management, flow optimisation, and reducing dangers in warehouses. The

founder explained that the objective is to have French digital sovereignty to not depend on other countries and be able to compete with Silicon Valley.

For the founder, the goal of AI applications is generally to lower costs, decrease the time needed to complete tasks and increase the frequency, reactivity, and profitability of teams. Several case studies within the association include new standards on the respectful use of drones in the industry. The interest is based on the increasing use of drones in warehouse storage areas to coordinate employees and manage workers in factories. Likewise, drones are used for safety, flow optimisation, and risk reduction. Another example discussed was the increasing use of drones to transport goods between remote areas and islands around the world. Whilst before human-piloted helicopters were widely employed to transport essential goods in remote areas, such as medicine across short distances and between islands, nowadays drones are being used for deliveries. One example discussed with the association was the use of drones in rural Canada to deliver medical supplies to remote areas and indigenous communities²⁸. Many technology experts realised that they could automate logistics by sending unmanned drones that are more fuel efficient, faster, and more environmentally friendly, said the interviewee. Furthermore, he stated that drones were being used across French companies for airlifts – location, air capture, radar, camera etc.

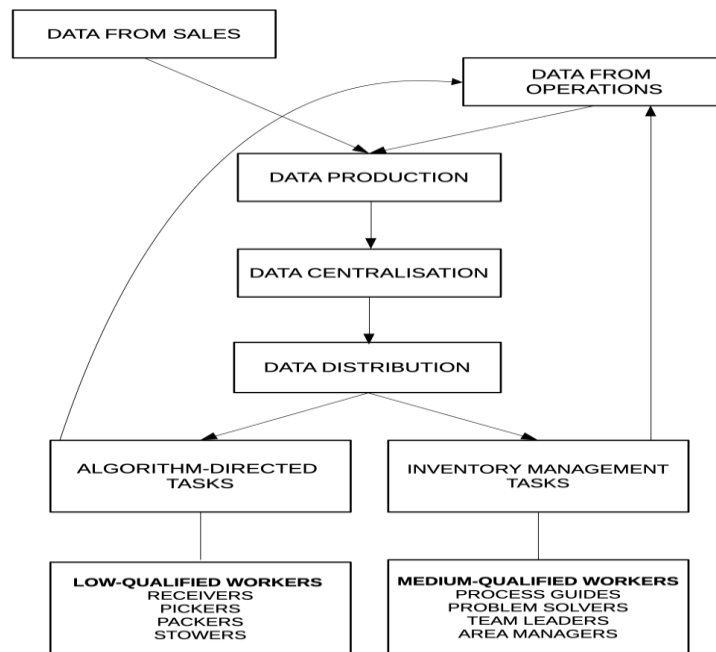
Another French supply chain association interviewed explained that AI management tools were mainly being used in Warehouse Management Systems (WMS) and Transport Management Systems (TMS). Across the transport and warehouse applications, digital technologies are rapidly expanding to manage employees and increase work organization, the interviewee said.

4.3 Occupation, tasks and skills

Algorithmic management tools can require workers to develop new technical skills to use and interact with the algorithms. Workers may need to be trained in how to use digital devices or how to interpret the data they generate. Often, these two tasks are assigned to different categories of workers: low-rank workers mainly produce information, while medium-high rank workers mainly interpret and manipulate information.

²⁸ The University of British Columbia (2022). <https://beyond.ubc.ca/forward-happens-here-rural-health/>

Figure 2: Task distribution and job hierarchisation according to margins of data manipulation at Amazon.com warehouses



Source: Massimo 2020a

In addition, workers may need to be comfortable with technology and data analysis in order to effectively use the algorithmic tools. For example, a customer service representative may need to learn how to use a chatbot to respond to customer inquiries, or how to analyse customer data to identify patterns and trends. Some examples of how AMT are impacting skills in the French Logistics sector include:

- **Technical skills:** The use of AMT requires employees to have technical skills to operate and interpret the data generated by these tools. For example, workers need to be proficient in using warehouse management systems, inventory management software, and other similar tools to manage and optimize their work.
- **Analytical skills:** The data generated by AMT provides valuable insights into the performance of logistics operations. Consequently, logistics workers need to have analytical skills to interpret this data and make informed decisions based on the insights gained.
- **Communication skills:** Algorithmic management tools are changing the way logistics workers communicate with each other and with their superiors. For example, some logistics companies are using chatbots to talk with their employees and provide them with real-time updates on their work.
- **Adaptability:** The use of AMT requires logistics workers to be adaptable and flexible. They need to be able to quickly learn and adapt to new tools and processes as they are implemented.
- **Multitasking:** Algorithmic management tools are helping logistics workers to become more efficient and productive by automating routine tasks. As a result, workers need to be able to multitask and handle multiple tasks simultaneously to maximize their productivity.

5 Working conditions

5.1 Work intensification

Algorithmic management tools can increase work intensity for logistics workers, because workers may be required to complete tasks more quickly or with greater accuracy, as the tool prioritizes

speed and efficiency. This can lead to increased stress and burnout among workers. Moreover, algorithmic management tools can disrupt working conditions for logistics workers. For example, workers guided by AI-powered route planning tools may be required to work longer hours or on a more flexible schedule in order to meet the demands of the tool.

5.2 Autonomy

The use of AMT can reduce the autonomy of logistics workers, since workers may be given less control over their schedules and tasks, as the algorithm determines the most efficient way to complete the work. This can happen, for example, when workforce direction and task allocation are managed through instructions delivered via handheld or wearable digital devices. Workers use scanners to transmit real-time operational updates, while their devices simultaneously track metrics such as task completion speed and efficiency. This data feeds into central algorithms that analyse variables like location, movement, and timing to streamline workflows and assign tasks accordingly. As a result, workers have minimal flexibility to challenge or modify instructions, as algorithmic decisions are predetermined to optimize efficiency²⁹. This can also lead to workers feeling less engaged and less satisfied with their jobs, and, as a consequence, to a loss of flexibility for the organization³⁰.

5.3 Social interaction

Algorithmic management tools can impact interactions between logistics workers and their colleagues, supervisors, and customers. For instance, workers may be required to communicate more frequently and more quickly in order to meet the demands of the tool. On the other hand, workers may interact less with their colleagues, as they are focused on completing their individual tasks as efficiently as possible. This can lead to a more isolated and impersonal work environment^{31,32}.

6 Ethics of AI

The ethical issues of algorithmic management tools were further discussed with a university professor at Paris-Sorbonne University specialised in AI and ethics. She affirmed that companies using AMTs must invest resources in acquiring experts in quality of work. This is to ensure the recommended methodologies for understanding ethical risks in a multi-agent, human-machine system are met. Once a moral mapping of the situation is made, this allows those who build solutions to do so 'ethically by design' to control a certain number of ethical characteristics and then monitor cooperation between humans and machines. Ultimately, external stakeholders must recommend audits with set criteria, and humans to check the causes of bias, the professor said. We cannot underestimate the risks of AI, she said, we have to accept them, but also be more creative.

The EU AI Act has characterised the classification of risks, so we must not minimise the risks nor infringe on the creativity of companies. We are working on the issue of 'trustworthy AI' and linguistic nudges. These are mechanisms that we describe to observe ethical tensions. The digital giants used to have ethics committees, but they are in the process of firing them as part of their recent redundancy plans.

AI and Ethics Professor, Paris-Sorbonne University

²⁹ Rani, U., Pesole, A. and Gonzalez Vazquez, I., Algorithmic Management practices in regular workplaces: case studies in logistics and healthcare, Publications Office of the European Union, Luxembourg, 2024, doi:10.2760/712475, JRC136063.

³⁰ Friedman, Andrew. 1977. 'Responsible Autonomy Versus Direct Control Over the Labour Process'. *Capital & Class*, 1(1): 43–57. <https://doi.org/10.1177/030981687700100104>.

³¹ Gaborieau, David. 2012. '« Le nez dans le micro ». Répercussions du travail sous commande vocale dans les entrepôts de la grande distribution alimentaire'. *La nouvelle revue du travail*, no. 1 (December). <https://doi.org/10.4000/nrt.240>.

³² Massimo, Francesco S. 2020a. 'Burocrazie Algoritmiche. Limiti e Astuzie Della Razionalizzazione Digitale in Due Stabilimenti Amazon'. *Etnografia e Ricerca Qualitativa*, no. 1/2020: 53–78. <https://doi.org/10.3240/96824>.

The professor stressed the point that an emergence of a dynamic Europe to address ‘trustworthy AI’ was growing, with increasing research. We need to create fundamental and applied research positions within the industry to rediscover the link with the general public because we see gaps being made, she mentioned.

Similarly, following an interview with a French lawyer who co-founded a firm specialised in AI technologies, he explained that the legal world is slowly integrating algorithmic management into their activities for tasks that can be automated. These include administrative tasks, contracts, forecasting and client relations.

Until recently we had an old way of doing advocacy and now we are starting to make new moves to make it more technological, and more modern. This allows small law firms like my own to limit low value-added interactions and use machines to increase efficiency instead.

Law firm specialized in AI technologies, Lawyer

Although the firm’s main customer cases are on data privacy and blockchain, these topics were found to be relevant to the logistics industry. Indeed, there are many legal problems with AI tools and algorithmic management, such as questions on data use and privacy or questions surrounding responsibility and liability. For example, the lawyer described the dilemma of responsibility referring to the human behind a specific algorithmic management tool, the manufacturer of the product, and the designer of the algorithm. The lawyer said there has been a growing concern about the liability of algorithmic management tools across the logistics sector. He said that if a technological problem arises from the use of an AMT that has been outsourced to another company, the responsibility will not always be clear. There are important legal and ethical issues, whether the original company or the outsourcing company is accountable.

7 Surveillance and data privacy issues in the era of algorithmic management

AMT may track workers’ movements and behaviours, leading to increased surveillance, and, as a consequence, increased pressure, and stress among the workforces. For example, some companies have reported that the use of algorithmic management tools such as handheld and wearable devices has led to increased surveillance of workers, with GPS tracking and real-time monitoring of performance. This can create stress and anxiety for workers and may lead to a more rigid and tightly controlled work environment. Similarly, AI-powered route planning tools can also lead to extensive monitoring and surveillance of drivers.

Box 3. Case study on French Logistics 4

A key application of algorithmic management tools in the logistics sector is concentrated in Transport Management System companies (TMS). **French Logistics 4** is a TMS software company that sells Software as a Service (SAAS) through paying subscriptions available in 4 languages and 6 countries, with its main activity based in France. *French Logistics 4* creates the technology behind a dashboard that other companies use for managing their logistics. Clients include distributors for delivery services, carriers for courier services, or shippers who manage their fleet using the solution, which allows clients to build their logistics platform. The company has developed their own route optimisation engine based on open source.

With the rapid rise of delivery services since 2016, our first clients were demanding a web portal to easily manage their logistics, along with a strong technology experience that many other competitors didn’t have. We thought why keep the technology just for us, but instead make it available to other delivery players? This is how the tool was created, a new company, with more tech efforts to serve people for interregional deliveries.

French Logistics 4, Founder

The tool is purely a logistics management software that allows users to optimise their delivery routes according to the drivers located nearby or other chosen factors. *French Logistics 4* customises the platform to the needs and themes of its customers and acts like an Enterprise Resource Planning (ERP) for delivery and logistics companies, or for non-delivery companies wishing to start delivery services. The first step in using the tool is to choose the delivery times, broken down by day and hour, and delineate the zone of activity, which can be a neighbourhood, an entire city, or a region. Afterwards, the dashboard gives many options for users to decide how to build their services. Customers can choose their desired services, area of interest, the tariffs per km/minute/distance, type of vehicle to be used, availability of services (time window frames) etc. Their prices can be set per km, per base, per volume or weight. Figure 3 illustrates the dashboard for a demo company after having chosen all of the above.

In this window, users can have an overview of what is going on per delivery, the missions accomplished, those done, dispatched, ongoing, cancelled or failed. Users can also see the delivery missions, time and location of deliveries, status, time taken, number of goods delivered, environmental footprint and many other metrics. *French Logistics 4* does not do deliveries but only sells the tool behind the dashboard which allows companies to then plan all these topics. Each company has its dashboard, and the delivery workers have their applications connected to the dashboard.

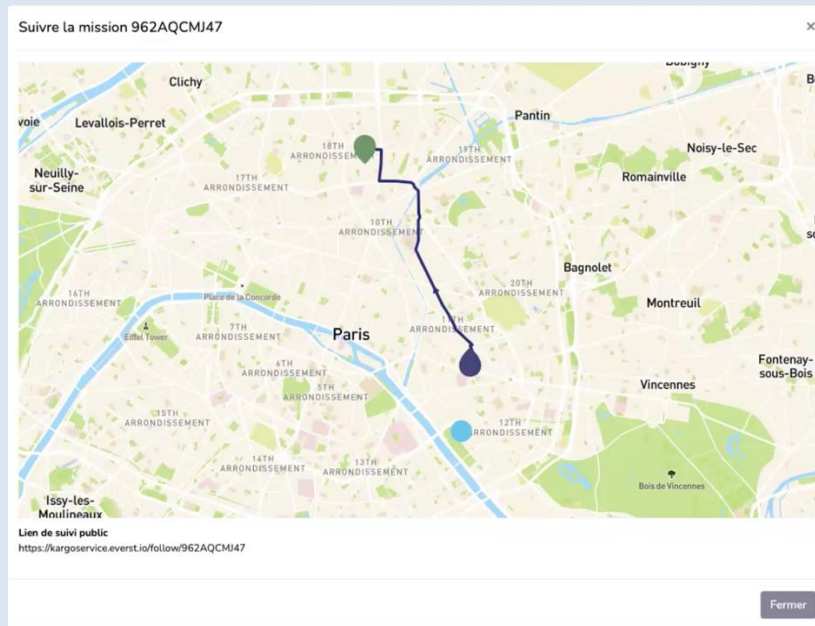
Figure 3: Example of dashboard – list of missions

Date de début	Date de création	Dernière modification	Date du dernier statut	Distance estimée	Temps de trajet estimé								
ACME	THNTQ106B	22/10/2022 - 09:00 > 12:00	75004	93000	11	LIVRAISON 3 HEURE	0 Cols	0g 0cm³	Laurent Jalabert	Mission affectée			
2 MISSION(S) 0 PRODUIT(S) ID : 293													
ACME	IXXDAHJ7FS	22/10/2022 - 09:00 > 12:00	75004	75001	11	LIVRAISON 3 HEURE	0 Cols	0g 0cm³		Terminée			
ACME	9N2AEH9CZ8	22/10/2022 - 09:00 > 12:00	75004	75116	11	LIVRAISON 3 HEURE	0 Cols	0g 0cm³		Terminée			
ACME	LENDH20XN	23/02/2023 - 15:05 > 18:05	75004	75016	20,83	LIVRAISON 3 HEURE	0 Cols	0g 0cm³	Mathieu Lomazzi (MATLO)	Terminée			
ACME	SATWDFH4S1	23/02/2023 - 15:05 > 18:05	75004	75017	20,83	LIVRAISON 3 HEURE	0 Cols	0g 0cm³	Mathieu Lomazzi (MATLO)	Terminée			
6 MISSION(S) 0 PRODUIT(S) ID : 294													
ACME	ZZE42PK967	23/02/2023 - 15:10 > 18:10	75004	92120	1	LIVRAISON 3 HEURE	0 Cols	0g 0cm³	Mathieu Lomazzi (MATLO)	Terminée			
ACME	NH18DU2M80	23/02/2023 - 15:10 > 18:10	75004	92240	1	LIVRAISON 3 HEURE	0 Cols	0g 0cm³	Mathieu Lomazzi (MATLO)	Terminée			
ACME	ZZRRKD105C	23/02/2023 - 15:10 > 18:10	75004	75015	1	LIVRAISON 3 HEURE	0 Cols	0g 0cm³	Mathieu Lomazzi (MATLO)	Terminée			
10 MISSION(S) 0 PRODUIT(S) ID : 300													
ACME	5QA2KX3HNG	23/02/2023 - 15:10 > 18:10	75004	75002	11	LIVRAISON 3 HEURE	0 Cols	0g 0cm³		Mission affectée			
ACME	YWEYH4JN	23/02/2023 - 15:10 > 18:10	75004	75018	11	LIVRAISON 3 HEURE	0 Cols	0g 0cm³		Nouvelle mission			
ACME	WKBS44HUE	23/02/2023 - 15:10 > 18:10	75004	93200	11	LIVRAISON 3 HEURE	0 Cols	0g 0cm³		Nouvelle mission			
ACME	PHUUDONGNH	23/02/2023 - 15:05 > 18:05	75004	75010	11	LIVRAISON 3 HEURE	0 Cols	0g 0cm³		Mission affectée			
10 MISSION(S) 10G 1 PRODUIT(S) ID : 298													
ACME	F29K02FLDB	23/02/2023 - 15:05 > 18:05	75004	75015	11	LIVRAISON 3 HEURE	1 Cols	10g 0cm³		Mission affectée	Optimiser	Action groupe	

Source: Material provided by French Logistics 4

Figure 4 shows the route tracking window in the tool's dashboard that allows customers to track each driver, or all at once, and receive live notifications on their status. This helps clients manage their employees and increase internal communication from a centralised area. For example, in an emergency scenario where a hospital must quickly transfer live organs from one point to another, the tool allows one to visualise the status of the trip and its remaining time. This helps trigger the surgical steps earlier and notify the doctor with fewer resources since all information can be received via a phone app.

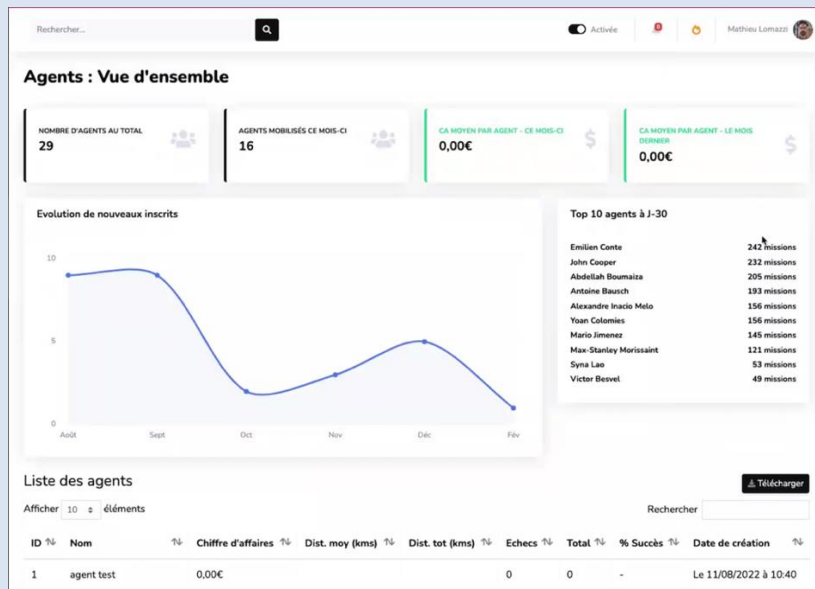
Figure 4: Example of dashboard – route tracking



Source: Material provided by French Logistics 4

Figure 5 shows the tool's performance overview window for all drivers with a subsection for each driver. On top of the window, the customer can visualise the total number of drivers in the company, the drivers mobilised that month, the average turnover per driver that month, and the average turnover per driver the past month. At the centre of the window, the customer can visualise the evolution of new drivers across various months and the top 10 drivers with the most missions completed. At the bottom of the window, the customer can see the list of drivers with each statistic as noted above.

Figure 5: Example of dashboard – performance overview of drivers



Source: Material provided by French Logistics 4

The impacts of using the tool are huge for customers, said the founder. For some retailers, it has allowed them to enter the market and start delivering. Since Covid, many retailers have realised the importance of offering delivery services for their business model, and Covid has boosted customer demand for delivery. For others, it allows them to launch their business faster. The founder noted that their customers can go through them to quickly start their delivery business, which speeds up delivery entrepreneurship.

Furthermore, for other companies, it has enabled a dematerialisation process because, before the introduction of tools like this, delivery was based on a paper with information needing a stamp to return to the office for storing and scanning. Finally, for large logistics companies present in several countries, the software has higher stakes for those wanting to have the capacity to manage all of its flows in a single tool. Most companies want to be able to check the progress of operations in a few clicks.

The main impact of using the tool is saving time on deliveries and therefore improving the organisation of work and people. The tool saves time because customers no longer have to call the deliverymen to receive updates as they can easily locate them on a map. Less time is wasted on the telephone so unproductive roles are eliminated, which is a financial gain that customers can use elsewhere. In terms of work organisation, it allows customers to gain productivity because it requires fewer people to do more things. Likewise, it is supposed to enhance easier communication between the workers and their supervisors.

When asked about possible issues surrounding drivers' autonomy, as they are constantly being monitored through the GPS application, the founder said that responsibility was for each customer. Normally, delivery drivers have minimum freedom, he said, but after that, we cannot necessarily know what the concrete application is. When asked about relations between business actors and the interactions between players in the sector, the founder said the following.

In the fluidity of relations between players in the sector, as the dematerialisation of the sector is slow, distributors are somewhat at the mercy of the transporters' tools. If I am a company and I have certain distributors with different levels of digitalisation, I cannot offer the same customer experience everywhere I operate. Thus, we allow them to provide their carrier to use our technology where they work. This allows us to work more uniformly. We connect distributors and carriers who use our software.

French Logistics 4, Founder

Regarding the future of AMTs in the sector, the founder said that these tools will become increasingly essential to keep up with the pace of delivery if companies want to remain competitive. There is a lot of software on the market, some of which is old, he said. The TMS sector is becoming very concentrated with the takeover of start-ups and the use of technologies depends on the way each one operates.

Moreover, to gather data on the regulatory challenges of algorithmic management tools, an interview was conducted with the French National Commission on Informatics and Liberty (CNIL). Three experts were interviewed, including a worker at the CNIL's digital laboratory (LINC), a worker in the solidarity and employment service, which is part of the legal support department, and a sociologist at LINC.

The expert working in the legal department said AI tools are particularly expanding in HR and the hiring processes of all companies. Algorithms are increasingly used for application sorting to assist recruiters in analysing audio or video streams and understanding whether candidates are nervous. The subject is very popular and of interest to stakeholders, even those within Logistics. CNIL has published a guide on recruitment applications with certain sheets on the use of algorithmic management. (<https://www.cnil.fr/fr/le-guide-du-recrutement>; sheet 4 on consent and sheet 13 on algorithmic processing tools).

The notion of algorithmic management is of automated decision-making. In Amazon, we see that the principles of the gig economy becoming more and more used for logistics. We can see how the ‘uberization’ of work applies to more and more sectors, including logistics, where historically this was already present. Often, we are asked about surveillance issues at work, which has become possible with widespread video surveillance tools. These are not only used to monitor a place but also people, and since surveillance tools are inexpensive, even SMEs use them with a lack of knowledge of the legal framework.

CNIL, AI regulatory expert

The issue of worker surveillance remains a central concern, with several high-profile cases drawing public attention. For instance, the CNIL fined SAF Logistics €200,000 for excessive data collection from employees, violating their privacy and failing to cooperate adequately with CNIL services³³. Similarly, Amazon France Logistique received a €32 million fine for implementing an overly intrusive employee monitoring system, as well as for using video surveillance without proper notification or sufficient security measures³⁴. Additionally, during the Covid-19 crisis, the CNIL played a key role in controversies between employers and unions regarding workplace surveillance. One of the most significant cases involves Amazon France (see Box below).

Box 4. A controversy on an AI-based system for social distancing at Amazon France Logistics during the Covid-19 pandemic (2020)

During the Covid pandemic, Amazon developed new AI-assisted monitoring tools. One of these was Proxemic a software for visual recognition installed on cameras, whose task is to enhance social distancing by signalling the crowding of workers in the workspace. This was an artificial intelligence system that analysed images from special security cameras and alerted management of potential social distancing violations. Proxemics was built by AI experts in Amazon robotics division and deployed in mid-March in the US. It was introduced progressively in other European countries (1000 Amazon buildings around the world according to Wired). The system consisted of a television screen, depth sensors and an IA-enabled camera, which are installed in different points of the plants. The camera registered images in real-time, tracking people moving through the warehouse. When they pass in the visual field of the camera workers appear on the screen surrounded by “augmented reality” circles. The IA used the apparent size of people in the frame and the number of pixels between them to calculate distance. If the social distance is respected, circles are green; otherwise, circles are red, a possible violation is flagged, and management is alerted. Reviewers include the details in a regular report sent to building managers that summarizes recent social distancing violations in their facility. These features of Proxemics aim, Amazon says, to provide a quick response to contagion risk and are used only for Covid-19 safety. However, this system raised many concerns about privacy on the part of unions and other independent observers, as well as regulation authorities (for instance in France).

³³ CNIL. 2023. Excessive data collection and lack of cooperation: the CNIL imposed a sanction on the company SAF LOGISTICS. <https://www.cnil.fr/en/excessive-data-collection-and-lack-cooperation-cnil-imposed-sanction-company-saf-logistics>.

³⁴ CNIL. 2024. Employee monitoring: CNIL fined AMAZON FRANCE LOGISTIQUE €32 million. <https://www.cnil.fr/en/employee-monitoring-cnil-fined-amazon-france-logistique-eu32-million>.

On August 20th, with a short delay, AFL announced to the Central CSE the decision to introduce the Proxemics system in its warehouses. Moreover, another system, including real-time control by a camera and an alarm sounds every time two or more people appear closer to each other than two meters. Unions reacted harshly to the announcements, considering that such a system entailed a violation of workers' privacy in violation of labour law. On top of that unions denounced the short delay in communication and the refusal of the company to provide workers' representatives with the necessary information about the storage of data, the location of cameras and other details. Unions stressed that some weeks before the CNIL, the independent administrative body for the regulation of personal data and the protection of privacy, had already alerted about similar surveillance systems introduced during the pandemic crisis to monitor workers' behaviour. Amazon replied to workers' representatives that Proxemics was about to be introduced for "pedagogical reasons" but remained vague about the possible psycho-social impact of such a device on working conditions. Finally, in front of the possibility of resistance coming from multiple fronts, Amazon suspended the introduction of Proxemics. In any case, Amazon had managed to introduce it in the US, UK, Germany, and Spain without any special opposition, while in Italy it was allowed to do by the labour inspector despite unions' dissent. In other words, France was confirmed as a "difficult" country for Amazon's managerial policies and approach, but this was not the case in the USA or other European countries³⁵.

Another problem is the geolocation of workers who have a company car, said another expert at CNIL. The use of GPS systems is only legitimate in the context of organizing work, however many times they remain connected after working hours. This creates several data privacy problems for employees, who feel they are being monitored outside of work, including on weekends. Another CNIL expert said their organization once had to deal with complaints from employees of a logistics company arriving on Monday and receiving comments from their bosses on the places they had been during the weekend.

Additionally, data regulatory issues are present in the management of logistics chains (e.g., cold chains, subject of a complaint received by CNIL) where there are very strong regulatory obligations for monitoring and traceability, the temperature during transport, etc. These steps are managed by software packages alongside workers involved in the chain that scan the products at each stage to verify this traceability. However, there have been several cases of information for post-monitoring of people involved in the chain. Moreover, the CNIL has worked on complaints from algorithmic management software available in the market that are labelled as 'environmentally friendly' but collect sensitive data. For example, the CNIL dealt with software that can be plugged into a car to calculate the speed, intensity of acceleration, braking etc. to sensitize employees to a more virtuous and careful way of driving to reduce fuel costs. However, the software was also being used to monitor the driver in a multitude of ways which violated the GDPR.

As the AI regulatory expert interviewed explained, there are provisions on collective information, on the obligation to negotiate or to inform the representative bodies before the introduction of surveillance mechanisms. The law also imposes a certain level of formality in the way in which these systems are integrated. For instance, companies must adopt internal regulations which are formal documents which must be adopted following information or collective bargaining and verified by the inspection of the general labour inspectorate and the document must be displayed in the company.

The CNIL is currently trying to process requests with the existing legal texts. Trade unions believe that it is less protective of employees than it could have been, and employers' organizations think the opposite. Cases of algorithmic management or monitoring have problems where it goes further than the purpose for which it was set up. There is often a lack of knowledge of the framework which will lead to misuse.

³⁵ Massimo, Francesco S. 2020c. 'Multinational firm, institutional plasticity and collective actors' agency. Amazon industrial relations during the Covid Crisis in France and Italy', V Convegno Società italiana di sociologia economica, Catania (Italy), June 9th-12th 2020.

Finally, a French supply chain association expressed its concern about the EU AI ACT which regulates the use of AI in the industry. The classification of ‘high-risk AI systems’ referred to in Article 6(2) of Annex 3 meant that most clients were not willing to discuss algorithmic management technology for fear of disclosing information that could categorize their technology as a high-risk system, which might also explain the constraints faced by the research team in the outreach phase.

8 Conclusions

In conclusion, algorithmic management tools are becoming increasingly common in the logistics sector in France, as well as in other industries. Many French logistics companies are using algorithmic management tools to optimize their operations and improve efficiency, reduce costs, and enhance customer satisfaction. Some examples of algorithmic management tools commonly used in the French logistics sector include **Route Optimization Algorithms, Warehouse Management Systems (WMS), Predictive Maintenance Algorithms, Automated Fleet Management tools** and **Automated Order Management tools**. However, there has been some concern in France and the EU more broadly about the ethical and legal implications of algorithmic management, particularly regarding worker privacy and the potential for bias or discrimination. As a result, there have been efforts to develop regulations and guidelines to ensure that algorithmic management tools are used fairly and transparently.

For example, in France, the Labor Code has been amended to require companies to inform employees if algorithms are being used to evaluate their work performance. The French Data Protection Authority (CNIL) has also issued guidelines for the use of algorithms in recruitment, performance evaluation, and other HR-related processes, with a focus on transparency, fairness, and respect for worker privacy. Recent research stressed the potential of AMT on working conditions (including physical and psychosocial health) and the labour market. Unfortunately, the difficult objective conditions under which fieldwork was carried on (see methodological section), do not allowed us to produce an exhaustive assessment of these impact.

Overall, while algorithmic management tools are increasingly common in France, there is also a growing awareness of the need to balance the benefits of these tools with the potential risks and ethical concerns. As a result, there will likely continue to be discussion and debate about the appropriate use and regulation of algorithmic management in France and beyond. The use of algorithmic management tools in the French logistics sector is expected to continue to grow, as logistics companies look to improve efficiency, reduce costs, and enhance customer satisfaction. However, it is important to ensure that these tools are used transparently and ethically, with appropriate safeguards in place to protect worker privacy and prevent bias or discrimination.

A final point deserves to be discussed from a broader perspective on the governmental and business actors. Many of the initiatives and technologies described in the report raise the question of planning public policy and business activities, within and across firms and organisations. At the public policy level, the development of algorithmic management resonates with the with the French planning tradition; indeed, as it was illustrated recent research, the field of public policy has been deeply remoulded by the “digital modernization”, while bringing back the revolutionary ambitions of the Internet under the control of the state’s bureaucratic structures³⁶. At the business level, our findings raise the question of the role of the market in the coordination of economic activities in a similar fashion. As such, the algorithmic management tools analysed in the report aim to make organisations either more reactive to market instability (thanks to better flow mobilization, like in *French Logistics 4*), or less dependent on market instability (see *French Logistics 1* in small businesses). Therefore, we notice a shift in the adjustment of business activity from the supply/demand logic to a more administrative mechanism of algorithmic planning (thereby we

³⁶ Bellon, Anne. 2022. *L'État et la Toile. Du développement de l'internet à la numérisation de l'action publique*. Vulaines-sur-Seine : Éditions du Croquant.

could talk about ‘algorithmic bureaucracies’³⁷ or even about a distinct logic of coordination³⁸). At the same time, as suggested by our case study in the shipping industry, actors linked to the development of algorithmic technologies are not necessarily becoming a dominant player within firms; instead, their logic of action appears *de facto* to be subdued into the business strategy of firms.

Two parallel tendencies across the public action and business sector: on the one hand, the undeniable process of mobilization; on the other hand, their mobilisation into the firms and the state fields.

Finally, some projects presented are still in their embryonic state which constitutes a limit of this research. Another important limit is the lack of unions among interviewees, which is due to a *force majeure*, given the effort of mobilization that unions are carrying on against the pension reform in March and April 2023.

³⁷ Massimo, Francesco S. 2020a. ‘Burocrazie Algoritmiche. Limiti e Astuzie Della Razionalizzazione Digitale in Due Stabilimenti Amazon’. *Etnografia e Ricerca Qualitativa*, no. 1/2020: 53–78. <https://doi.org/10.3240/96824>.

³⁸ Stark, David, and Ivana Pais. 2020. ‘Algorithmic Management in the Platform Economy’. *Sociologica*, 14 (3): 47–72. <https://doi.org/10.6092/issn.1971-8853/12221>.

References

- Abdelnour, Sarah, and Sophie Bernard. 2018. 'Vers un capitalisme de plateforme? Mobiliser le travail, contourner les réglementations'. *La nouvelle revue du travail*, no. 13 (November). <https://doi.org/10.4000/nrt.3797>.
- Acosta Alvarado, Ana Sofia, Laura Aufrère, and Cynthia Srnec. 2021. 'CoopCycle, Un Projet de Plateforme Socialisée et de Régulation de La Livraison à Vélo'. Working Paper. HAL. <https://econpapers.repec.org/paper/halwpaper/hal-03364001.htm>.
- ADEME (2019). <https://www.odyssee-mure.eu/events/workshops/berlin/33-evaluation-white-certificate-scheme-france-dec-2019.pdf>
- AI For Humanity (2018). <https://www.aiforhumanity.fr/>
- AWS (2023). <https://aws.amazon.com/blogs/supply-chain/aws-last-mile-solution-for-faster-delivery-lower-costs-and-a-better-customer-experience/>
- Baiocco, S., Fernández-Macías, E., Rani, U. and Pesole, A., 2022. The Algorithmic Management of work and its implications in different contexts, Seville: European Commission, JRC129749.
- Bellon, Anne. 2022. *L'État et la Toile. Du développement de l'internet à la numérisation de l'action publique*. Vulaines-sur-Seine : Éditions du Croquant.
- BSR (2016). <https://www.bsr.org/en/case-studies/center-for-technology-and-sustainability-orion-technology-ups>
- CNIL. 2017. 'Comment permettre à l'Homme de garder la main ? Rapport sur les enjeux éthiques des algorithmes et de l'intelligence artificielle'. <https://www.cnil.fr/fr/comment-permettre-lhomme-de-garder-la-main-rapport-sur-les-enjeux-ethiques-des-algorithmes-et-de>.
- CNIL. 2023. Excessive data collection and lack of cooperation: the CNIL imposed a sanction on the company SAF LOGISTICS. <https://www.cnil.fr/en/excessive-data-collection-and-lack-cooperation-cnil-imposed-sanction-company-saf-logistics>.
- CNIL. 2024. Employee monitoring: CNIL fined AMAZON FRANCE LOGISTIQUE €32 million. <https://www.cnil.fr/en/employee-monitoring-cnil-fined-amazon-france-logistique-eu32-million>.
- Dirringer, Josépha, and Cristina Nizzoli. 2022. 'Action collective et syndicalisme à l'épreuve du travail de plateforme en France et en Italie'. *La Revue de l'Ires* 106 (1): 3–12. <https://doi.org/10.3917/rlli.106.0003>.
- Englebert, Philippe. 2021. 'Chapitre V. Les politiques publiques de soutien aux startups'. In , 98–121. Que sais-je? Paris cedex 14: Presses Universitaires de France. <https://www.cairn.info/les-startups-en-france--9782715406810-p-98.htm>.
- French AI Strategy (2018). <https://www.euractiv.com/section/digital/news/french-ai-strategy-tech-sector-to-receive-over-e2-blh-in-next-5-years/>
- France AI Strategy Report (2021). https://ai-watch.ec.europa.eu/countries/france/france-ai-strategy-report_en
- Friedman, Andrew. 1977. 'Responsible Autonomy Versus Direct Control Over the Labour Process'. *Capital & Class*, 1(1): 43–57. <https://doi-org/10.1177/030981687700100104>.
- Gaborieau, David. 2012. '« Le nez dans le micro ». Répercussions du travail sous commande vocale dans les entrepôts de la grande distribution alimentaire'. *La nouvelle revue du travail*, no. 1 (December). <https://doi.org/10.4000/nrt.240>.
- GEP (2022). <https://www.gep.com/blog/mind/artificial-intelligence-in-logistics>
- ILO. 2021. World Employment and Social Outlook 2021: The Role of Digital Labour Platforms in Transforming the World of Work. International Labour Organization.

Massimo, Francesco S. 2020a. 'Burocrazie Algoritmiche. Limiti e Astuzie Della Razionalizzazione Digitale in Due Stabilimenti Amazon'. *Etnografia e Ricerca Qualitativa*, no. 1/2020: 53–78. <https://doi.org/10.3240/96824>.

Massimo, Francesco S. 2020b. 'Chapter 8. A Struggle for Bodies and Souls: Amazon Management and Union Strategies in France and Italy'. In *The Cost of Free Shipping: Amazon in the Global Economy*, 129–45. Wildcat: Workers' Movements and Global Capitalism. London: Pluto Press.

Massimo, Francesco S. 2020c. 'Multinational firm, institutional plasticity and collective actors' agency. Amazon industrial relations during the Covid Crisis in France and Italy', V Convegno Società italiana di sociologia economica, Catania (Italy), June 9th–12th 2020.

Ministère de la Transition écologique et de la Cohésion des territoires (2021).

<https://www.ecologie.gouv.fr/logistique-en-france#:~:text=La%20logistique%20est%20%C3%A0%20ce,%2C8%20million%20d'emplois>

OECD.AI Policy Observatory (2021). <https://oecd.ai/en/dashboards/policy-initiatives/http:%2F%2Faipo.oecd.org%2F2021-data-policyInitiatives-25374>

Pesole, A., Urzì Brancati, M.C., Fernandez Macias, E., Biagi, F. and Gonzalez Vazquez, I. 2018. Platform Workers in Europe Evidence from the COLLEEM Survey, EUR 29275 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-87996-8, doi:10.2760/742789, JRC112157.

Rani, U., Pesole, A. and Gonzalez Vazquez, I., Algorithmic Management practices in regular workplaces: case studies in logistics and healthcare, Publications Office of the European Union, Luxembourg, 2024, doi:10.2760/712475, JRC136063.

Salis-Madinier, Franca. 2021. *Le guide de l'intelligence artificielle au travail: vos droits face aux algorithmes*. Paris: Éditions Eyrolles.

Stark, David, and Ivana Pais. 2020. 'Algorithmic Management in the Platform Economy'. *Sociologica*, 14 (3): 47–72. <https://doi.org/10.6092/issn.1971-8853/12221>.

The University of British Columbia (2022). <https://beyond.ubc.ca/forward-happens-here-rural-health/>

List of figures

Figure 1: Example of dashboard	13
Figure 2: Task distribution and job hierarchisation according to margins of data manipulation at Amazon.com warehouses.....	16
Figure 3: Example of dashboard – list of missions.....	19
Figure 4: Example of dashboard – route tracking.....	20
Figure 5: Example of dashboard – performance overview of drivers.....	20

List of boxes

Box 1. Case study on <i>French Logistics 1</i>	11
Box 2. Case study on <i>French Logistics 3</i>	13
Box 3. Case study on <i>French Logistics 4</i>	18
Box 4. A controversy on an AI-based system for social distancing at Amazon France Logistics during the Covid-19 pandemic (2020).....	22

Appendix

1. Distribution of interviews

Table 1: Distribution of interviews.

Interviewee	Role/Organisation	Date
HR and Social Relations Director	Anonymous - multinational shipping & receiving and supply chain management company	01/12/2022
Account and Project Manager	Anonymous - software and consulting firm	01/12/2022
9 different technology experts and project leaders	Anonymous –Independent logistics and supply chain association	02/12/2022
Co-founders and Partners	<i>French Logistics 1</i>	09/02/2023
Lawyer, Professor and Tech expert	<i>French law firm</i>	09/03/2023
Project officer	<i>French logistics foundation</i>	10/03/2023
‘AI Security’ group leader	<i>French logistics association</i>	13/03/2023
CEO	<i>French Logistics 3</i>	13/03/2023
Director and Tech Expert	<i>French Logistics 2</i>	16/03/2023
Data Scientist	Anonymous - multinational container transportation and shipping company	17/03/2023
Computer Science and AI Ethics Professor	Paris-Sorbonne University	13/03/2023
Co-founder	<i>French Logistics 4</i>	24/03/2023
Technology and AI experts	National Commission on Informatics and Liberty (CNIL)	27/03/2023

Source: Authors’ elaboratio

Getting in touch with the EU

In person

All over the European Union there are hundreds of Europe Direct centres. You can find the address of the centre nearest you online (european-union.europa.eu/contact-eu/meet-us_en).

On the phone or in writing

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696,
- via the following form: european-union.europa.eu/contact-eu/write-us_en.

Finding information about the EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website (european-union.europa.eu).

EU publications

You can view or order EU publications at op.europa.eu/en/publications. Multiple copies of free publications can be obtained by contacting Europe Direct or your local documentation centre (european-union.europa.eu/contact-eu/meet-us_en).

EU law and related documents

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex (eur-lex.europa.eu).

EU open data

The portal data.europa.eu provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

Science for policy

The Joint Research Centre (JRC) provides independent, evidence-based knowledge and science, supporting EU policies to positively impact society



EU Science Hub

[Joint-research-centre.ec.europa.eu](https://joint-research-centre.ec.europa.eu)