

## ARTIFICIAL INTELLIGENCE AND DIGITAL LABOUR PLATFORMS – THE NATURE OF THE RELATIONSHIP AND ITS EFFECTS ON HUMAN WORK

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**Purpose:** The article aims to identify the relationships between artificial intelligence and digital labour platforms and how these relationships are potentially significant for human labour in the light of the labour reinstatement effect.

**Design/methodology/approach:** The theoretical part drew on the reinstatement effect hypothesis, while the empirical part used Online Labour Observatory data. The analysis concerned the changes that occurred in the “clerical and data entry” category as the most strongly related to AI creation.

**Findings:** The reinstatement effect hypothesis suggests that new technologies replacing human labour may be accompanied by an effect of increased labour demand that may arise in the area of these technologies. The examination of mutual links between AI and DLP revealed the emergence of new types of tasks, engaging “crowds of people”, that include algorithmically managed delivery of services in the field coordinated by DLP. It was found that the period of the recent rapid developments in AI, which required a radical rise in the number of AI-related parameters, was characterised by a dramatically increased demand for “clerical and data entry” services. This may point to a reinstatement effect as one possible relationship.

**Research limitations/implications:** The main limitation of the study is the relatively short observation period and the fact that these phenomena are new and not yet well explored. They therefore require confirmation using more advanced methods. Further research should be focused on an in-depth assessment of the balance of demand growth and its possible decline in various groups of online platform services in subsequent phases of AI development.

**Social implications:** The key implication of the identified effects is the reinstatement of labour demand as separate unstable jobs generated as a result of interaction between new technological solutions, AI and DLP.

**Originality/value:** The likelihood of the reinstatement effect in the area of new technologies was demonstrated, but these new jobs tend to be relatively simple, or even partly physical. This constitutes an important contribution to the verification of the reinstatement effect hypothesis.

**Keywords:** artificial intelligence, digital labour platforms, Online Labour Index, reinstatement effect.

**Category of the paper:** research paper.

## 1. Introduction

The dramatic acceleration in the development of artificial intelligence (AI) in recent years has intensified the discussion about the impact that AI may have on human labour, as well as its links to other aspects of digitisation, such as the growth of digital labour platforms (DLPs) (Acemoglu, Restrepo, 2019; Deranty, Corbin, 2022; WEF, 2023). As in the case of other revolutionary technologies, the discussion moves between two extreme viewpoints: a vision of its breakthrough impact on labour efficiency and productivity (technodeterminism) and an approach that questions the actual significance of the impact of digital technologies for human labour (technoscepticism), which is the approach particularly wary of artificial intelligence (Leonard, Tyers, 2023). AI tends to be sometimes perceived as a driver of positive economic and social transformation, facilitating the alleviation of a variety of social problems (Mason, 2015). Simultaneously, people have started to experience fear of losing their jobs as they are replaced by robots and AI, which creates new challenges in terms of social and business choices (Acemoglu, Author et al., 2022). These are accompanied by attempts to identify processes that might confirm the reinstatement effect.

The article aims to identify the relationships between AI and DLPs that may have potential significance for human labour in the light of the hypothesis of the reinstatement effect attributable to new technologies. It provides arguments in support of the thesis that AI does not have to be used exclusively to replace human labour, since – as a result of its relationship with DLPs – the conditions conducive to increased labour demand are created. However, this applies to separate tasks (not full-time jobs), precarious in nature. The article uses the method of critical literature review, analysis of the Online Labour Observatory data, and a review of the websites of selected DLPs. The article sets out with the summary of theoretical findings concerning the emergence of the reinstatement effect as a result of technological change, next it introduces the concepts of AI and DLPs as contemporary aspects of technological change, and outlines the possible mechanisms of how AI and DLPs can impact the growth of labour demand, with the analysis accounting for visible and invisible tasks. Further research focused exclusively on so-called invisible crowdwork (micro-tasks). The research method was characterised and data sources that formed the basis for the findings and conclusions were presented.

## 2. Literature review

### 2.1. Theoretical foundations of the labour reinstatement effect

The previous industrial revolutions, preceding the current, fourth one, involved changes in the structure of labour demand and resultant reinstatement effects, giving rise to increased labour demand in the medium and long term (Arendt, 2021). Some contemporary analyses confirm these effects also accompany revolution 4.0, but researchers increasingly raise the issue concerning the nature of new types of jobs (tasks) performed by people for which increasing demand is reported. In consequence, several concepts have been developed in this area. According to the hypothesis of routine-biased technical change, its impact depends on the possibility of programming adequate algorithms that can be used by computers, robots or other devices. As a result, routine jobs (both manual and cognitive), usually performed by low- to medium-skilled workers, become easily replaceable. In contrast, labour demand for non-routine jobs (analytical, interpersonal and manual) increases, leading to the polarisation of the labour market (Goos, Rademakers, Röttger, 2021). This hypothesis was repeatedly verified in the studies conducted in the years 2003-2017, mainly in technologically advanced economies (Arendt, 2021), although dissenting voices also emerged, for example, the revival of the hypothesis of technological progress favouring high skills (Oesch, 2013). It seems, however, that relatively early studies may not yet have sufficiently taken into account the impact of the advanced development of AI and the platformisation of economies, in particular the development of DLPs, which emerged and became more widespread in recent years.

Acemoglu and Restrepo (2020) found that in the USA, the use of one robot per 1000 workers reduced the employment rate by 0.2 percentage points, which links also the displacement effect with AI, which controls robots. However, despite the elimination of many low-skilled jobs, a significant increase in unemployment did not occur. Oesch (2019) linked this to government activity – labour market policy and education, but doubts are raised as to whether the cause lies more in the changing nature and character of labour. Acemoglu and Restrepo (2018, 2019) assumed that the automation of production processes was accompanied by the emergence of new labour intensive tasks, in which human labour had comparative advantage. This created the reinstatement effect. As the researchers emphasised, it did not have to be autonomous, unrelated to automation, AI and robotisation. The new occupations that they mentioned included, for example, AI trainers and explainers (Acemoglu, Restrepo, 2019; Morreale et al., 2023). Other authors even perceive this process as a symbiosis between automation and human labour (Potocka-Sionek, 2022). Observation suggests, however, that new types of jobs may take the form of fragmented tasks rather than full-time jobs (Ostoj, 2023). Additionally, as a result of the development of DLPs, these processes are accompanied by a shift from offering full-time employment towards so-called work on demand and the commissioning of separate tasks (gigs). The next part of the article attempts to identify new

types of tasks performed by man that have been created as a consequence of the integration of AI and DLP.

## **2.2. AI and DLP – working definitions**

Artificial intelligence (AI) has the ability of a computer or computer-controlled robot to make decisions in real time based on pre-installed algorithms and computing technologies constructed based on data analysis to learn and acclimate automatically to offer more refined responses to situations (Rodgers et al., 2023). These systems learn continuously on huge datasets containing relevant information (entries) enabling optimisation. Generative AI includes OpenAI ChatGPT (generative pretrained transformer), popular since March 2023, which has the ability to create a variety of content such as texts, codes, sounds, images and videos (Korzynski et al., 2023). The creation of datasets, critical to the functioning of AI, usually involves a mass of micro-tasks managed through crowd work (Morreale et al., 2023). Thus, the process of developing AI creates many new tasks for people that cannot be replaced by technology (Meijerink, Rogiers, Keegan, 2022). The experiences, biases and ethics of individuals entering or evaluating data are the source of AI's design bias, its major drawback.

According to Silberman and Jonhston (2020, p. 17), DLP is any digital information system (or interconnected collection of such systems) that connects, or acts an intermediary between, on one hand, parties providing work or the products of work ('platform workers' or 'providers'), and, on the other, parties seeking work or the products of work ('customers'). These services can be performed online or offline (on site), but they are always coordinated through a dedicated digital platform. They range from typical simple tasks, classified as crowd work (platforms such as MTurk, Clickworker), tasks or projects requiring specialist knowledge, classified as freelancing (e.g. Freelancer), but also the work of couriers delivering meals, drivers transporting people or individual people performing minor domestic services (platforms such as Uber or Glovo), often ordered via apps. Customers find contractors quickly and offer contracts for single tasks, which can be completed within hours or even minutes (Meijerink, Arets, 2021). Instantaneous coordination of task execution is made possible with the extensive use of AI. According to the estimates of the European Commission, more than 28 million contractors were engaged to work through various types of DLPs in the EU countries in 2021 and this figure will likely rise to around 43 million in 2025.

The growth of DLPs stems from increased demand for various new types of micro-tasks, related, on the one hand, to the emergence of AI, and on the other hand, to the development of services managed by automated algorithms. Creating and using AI, DLPs cause increased demand for jobs that are not replaceable by technology. Some can be noticed in the surrounding reality, such as DPL coordinated courier or driver services, while of others we may not be aware, as they are hidden in virtual space.

### **2.3. AI in DPL coordinated courier and driver work**

For the last 10 years, DLPs have been growing dynamically in the field of meal and shopping delivery services and passenger transport, creating the conditions for rapid order placement and convenient delivery in the areas within their reach. DLPs aim to engage enough platform workers (couriers, drivers, etc.) to be able to serve customers quickly in various, ever-expanding areas, which gives these services a mass character. Large numbers of orders require excellent coordination. AI is particularly useful for arranging and assigning tasks within fragmented work involving many individual activities performed by different platform workers. In the algorithmic management of platform workers, AI acts as such a manager – it optimises task assignments and puts pressure on prompt service delivery by setting a time, but on the other hand it collects information on task completion or rejection and customer feedback, which allows for the prediction of future worker behaviour, consequently determining the continuation or suspension of cooperation. DLPs also use algorithms to create gamification bonuses, rewarding desirable decisions of workers, for example, to extend their availability, and stimulating competition (Vignola et al., 2023; Tan et al., 2021). They make workers participate in a kind of unpredictable game over which they have limited influence. In contrast, algorithms appraise workers irrespective of context (e.g. weather conditions, traffic jams, etc.) and, in this sense, are imperfect and generate problems (Vignola et al., 2023). In the case of DLP, artificial intelligence replaces human oversight of the execution of tasks. DLP ‘on-location’ services are the so-called visible part of AI’s impact on DLPs. They are expanding worldwide and generate increasing demand for relatively simple tasks.

### **2.4. AI creation through DLP**

A significant proportion of DLPs, mediating platform work for online tasks, are crowdworking platforms, which are basically used to create databases underlying AI. This is referred to as the “human face of artificial intelligence”, the face that is invisible (Deranty, Corbin, 2022; Potocka-Sionek, 2022). Microworkers can perform tasks involving annotation of enormous amounts of data, including audiovisual data, and transcription of short audio files. Such activities entail reviewing, categorising, labelling, giving context to data, etc. AI algorithms learn to perform specific tasks on quantitatively and qualitatively appropriate data sets. Micro-tasks also include, for example, the removal of prohibited content from social networks, the moderation of content, the generation of data used later in machine learning systems, including the creation of images or sound recordings, and the correction of errors arising in the learning process of algorithmic models. Accordingly, micro-tasking DLPs are part and prerequisite of the development of artificial intelligence and provide the supply of most (even more than 80%) of services that make up AI (Altenried, 2020; Potocka-Sionek, 2022). This type of work has been labelled with the term “humans as a service” (Prassl, 2018), referring to the development of a global market for online labour services (Berg, Rani, 2019).

Kassi and Lehdonvirta (2018) proposed a functional division of different groups of tasks performed through DLP. Tasks related to AI development fall mainly into two groups – clerical and data entry (CDE) and software development and technology (SDT) – and, to a certain extent, a third group – writing and translation (WT).

Although microworkers are described as ‘placeless’ in that they can perform their tasks from anywhere, they do work in a specific location (Morgan, Zoonen, Hoeven, 2023), which is important for the countries where platform workers take on tasks to perform online, as this is where the increase in labour demand will ultimately occur.

Based on the above considerations, research questions were formulated:

- 1) Was the development of AI associated with an increase in demand for specific groups of services offered through DLPs?
- 2) Are tasks related to AI development visible in the services offered by DLPs?

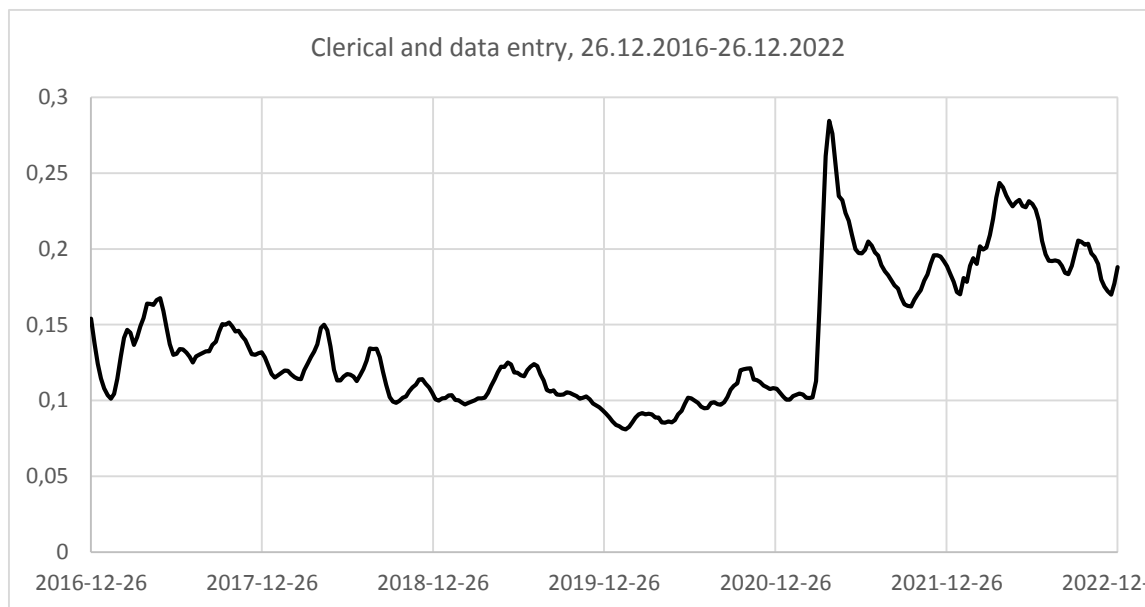
### 3. Method

An estimate concerning the change in the size of demand for DLP mediated online services resulting from the creation of AI was conducted based on the observation of changes in the Online Labour Index 2020 (OLI2020), developed by the Oxford Internet Institute (Kassi, Lehdonvirta, 2018), currently calculated by the Online Labour Observatory (OLO) in collaboration with the International Labour Organisation. In 2016, it started to measure the number of online work service orders ordered and offered through DLP, based on five representative English-language platforms, and in 2020 – its expanded version additionally embraced six non-English language platforms. The index is relative, as the number of orders in the first month of measurement (May 2016) was adopted as 100. Different types of services are classified into six groups, which include SDT, CDE and WT. The analysis comprised the period of dynamic developments related to the creation of the OpenAI GPT, with the first version released in 2018 and an exponential growth in the available parameters for this tool from 117 mld in 2018 to over 1 bln in 2023 (ochatgpt.pl). In addition, selected micro-tasks offered to customers by DLPs were reviewed as to whether they contained AI creation services.

### 4. Findings

Within the OLI2020 framework, SDT and CDE accounted for around 35% and 19% of the demand for services delivered through DLP respectively (data as of 26.12.2022). A radical increase in the share of CDE (Figure 1) was observed from 19.4.2021 (the share rose from 10.2% to 28.4%, almost threefold, and did not fall below 16% after this date). During the same

period, there was a slight decrease in the share of orders for SDT work (from 42% to around 35%), which means that, in addition to the absolute increase in demand for online services, some displacement occurred towards relatively simpler and routine jobs. In 2022, the share of orders for WT services increased markedly. The increase in OLI2020 was mainly due to strong growth in the demand for CDE services.



**Figure 1.** The share of clerical and data entry tasks in total tasks commissioned as presented in OLI2020.

Source: Own elaboration based on data available at the Online Labour Observatory <http://onlinelabourobservatory.org/oli-demand/>, 4.01.202).

The developments discussed above can be linked to OpenAI's work on the popular version of ChatGPT-4 from March 2023 and similar initiatives worldwide. Table 1 shows the lowest and highest OLI 2020 levels for CDE tasks by the end of 2022.

**Table 1.**

*OLI 2020 – the “clerical and data entry” minimum and maximum in the years 2017-2022*

Extreme / Year	2017	2018	2019	2020	2021	2022
Min	65.6 (6.02)	63.9 (8.10)	63.2 (4.03)	52.5 (10.02)	65.2 (18.01)	110.3 (12.12)
Max	108.8 (22.05)	97.4 (7.05)	81.2 (3.06)	78.1 (2.11)	184.6 (19.04)	158 (18.04)

Source: Own elaboration based on data from the Online Labour Observatory.

In the comparable period, the OLI 2020 for SDT decreased from 117.5 points on 27.04.2021 to 87.8 points on 19.04.2021 and to 80.9 points on 25.04.2022. Demand for online platform services was reported mainly from the USA, but also from the UK, India, Canada, and Germany. In contrast, in the years 2017-2023 the global supply of CDE tasks came from India (approx. 22%), Bangladesh (approx. 20%), Pakistan (approx. 13%), as well as the Philippines and the USA (approx. 10%), while from 2021 onwards the supply from Bangladesh began to dominate (21%), closely followed by the supply from India, while the USA slipped to the 4th place (OLI2020, 2024).

In practice, tasks related to AI creation are a leading offer from DLPs, which attract customers (mainly IT companies) with access to a global distributed workforce, 24/7. For example, MTurk, the oldest clickworking platform originating in the USA, reports on its homepage that it has access to contractors for services such as generating data needed to customise models for specific tasks or data specific for a particular company and industry; human evaluation to compare and select the foundation model that is best suited for specified use case; creating high quality training datasets to improve model accuracy with an expert, on-demand workforce; data generation and annotation to model review, customization, and evaluation. Similarly, Clickworker, a germany-based platform, encourages businesses to take advantage of more than 6 million clickworkers (called freelancers) from around the world that can help improve their algorithms by generating, labelling and verifying unique AI datasets. Similar information can be found on the websites of other DLPs.

## 5. Conclusions

The article attempted to demonstrate that DLPs, as a result of AI creation related demand for human labour, create new jobs, which can be interpreted as potential sources of the reinstatement effect. It was proposed to identify the reinstatement effect in the area of online microtasks using OLI 2020 for the ‘clerical and data entry’ jobs. This effect was particularly evident during the period of the rapid development of new AI tools. However, individual workers are contracted on DLPs only to perform separate tasks (online or on location), also managed by algorithms. This corresponds to the findings presented by Acemoglu and Restrepo (2019), who moved away from full-time jobs and occupations to new tasks in their analysis.

The expectations stemming from the development and widespread use of AI, including in the area of DLP coordinated process management, lead to the assumption that AI will continue to be developed and trained, which will involve human labour. As a result, demand for human labour will be growing. If this labour is done online, demand may be directed to countries other than the country where it originates, mainly to the economies with low labour costs. As shown, the supply of online labour services via DLP is dominated by Asian countries. They receive orders mainly from the USA, but only part of them will be performed there. This means that the emergence of new tasks is accompanied by a geographical shift, while the new reinstatement effects and their impact should be analysed on a global scale.

The main limitation of the study is the relatively short observation period and the fact that these phenomena are new and not yet well explored. They therefore require confirmation using more advanced methods. Further research should be focused on an in-depth assessment of the balance of demand growth and its possible decline in various groups of online platform services in subsequent phases of AI development.



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