

Decent work and tourism workers in the age of intelligent automation and digital surveillance

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Abstract

Technology is shifting not only how the tourism industry is run but also the nature of work, working conditions and management control. This article examines the potential implications of technology-driven transformations on lower-paid lower-skilled tourism workers. With tourism expected to be the sector most affected by intelligent automation, greater attention needs to be given to the variegated impact on the workforce. Drawing on the concepts of surveillance capitalism, disruptive innovation and techno-solutionism, the article problematises these transformations and unpacks the rhetoric used by tourism and technology companies. Situating the discussion within UN Sustainable Development Goal 8 (SDG8), the article explores how – without proactive regulatory measures and worker-centric approaches – the expansion of intelligent automation in tourism workplaces risks exacerbating inequalities and precarisation of lower-skilled workers, exposing them to job losses and dislocation, dehumanising their role and gradually automating them out. Additionally, digital surveillance may shift power further towards employers, reducing worker agency and impacting on worker wellbeing. Overall, despite clear benefits, unfettered intelligent automation and digital surveillance risk disrupting established worker rights and protections and inadvertently moving the tourism sector away from the ideals of decent work for all.

Keywords

Automation; COVID-19 pandemic; Decent Work; Digital Surveillance; Sustainable Development Goals; Social Inequalities; Tourism Work.

Introduction

The advent of the Fourth Industrial Revolution (Schwab, 2017) – a term used to characterise change driven by artificial intelligence (AI), machine learning, robotics, automation and digitisation – has amplified debates among scholars and policymakers about the changing nature of work and the future of work (Council of Europe, 2020, Harari, 2018; US House Budget Committee, 2020). On the one hand, technology-driven transformations bring opportunities, such as the creation of new jobs, increased competitiveness and productivity, automation of tedious and dangerous tasks, and increased

workplace safety (OECD, 2019), as well as responding to the needs of an increasingly digitally fluent workforce (Colbert et al., 2016). On the other hand, these transformations can also lead to significant challenges and disruptions to labour markets (McKinsey, 2017) as well as erosion of worker rights (Council of Europe, 2020), resulting in greater worker surveillance (Graham and Wood, 2003), job losses, job churn and job dislocation across various sectors (Soltau, 2016; US House Budget Committee, 2020), in particular affecting lower-skilled workers (OECD, 2019). McKinsey's (2017) modelling of the likely jobs lost due to the rapid technological advances predicts that up to 30% of jobs globally would be displaced (800 million) and 375 million workers would need to change occupation by 2030. Most recent reports show that the long-term transformations triggered by the Fourth Industrial Revolution have been accelerated by disruptions of the COVID-19 pandemic (Commission on Workers and Technology, 2020; World Economic Forum (WEF), 2020), augmenting these by 'velocity and depth' and creating a "'double-disruption" scenario for workers', which is likely to deepen existing inequalities, affecting mostly jobs held by lower-wage workers, women and young workers (WEF, 2020: 5-9). In the brief to the UN's Global Sustainable Development Report, Soltau (2016: 2) argues that lower-skilled workers are 'in a race against technology' – a race they are set to lose if proactive policy mitigations are not applied – and will continue being automated-out and experiencing 'downward pressure' on wages, which poses 'challenges for social and political systems in order to ensure that the benefits to society do not exacerbate existing levels of inequality'.

With tourism embracing radical technological innovations (Gretzel, 2011) and 'facing a more automated future' (Tussyadiah, 2020: 1), these debates are also timely when considering the implications for the tourism workforce, in particularly lower-skilled lower-paid workers. This is particularly relevant to recent discussions around tourism employment and decent work (Winchenbach et al., 2019, Baum, 2018; Baum et al., 2016a) in the context of achieving UN Sustainable Development Goal 8 (SDG8) which promotes 'sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all' (UN, 2019) as well as the International Labour Organisation's (ILO) Decent Work Agenda which aims to 'promote opportunities for women and men to obtain decent and productive work, in conditions of freedom, equity, security and human dignity' (ILO, 1999: 3). The 2019 SDG8 review report acknowledges that 'more progress is needed to create decent work for all', particularly through creating jobs for young people, reducing informal employment and inequalities at work (UN, 2019: 1). This paper explores this in the context of technology-driven transformations and their implications for lower-skilled lower-paid tourism workers.

To date, research into technological advances in tourism has been predominantly conducted from the innovation, management or tourist perspectives (Gretzel et al., 2015; Ivanov, 2020; Sigala, 2018; Tuomi et al., 2020; Weaver, 2011), and the worker perspective is limited. From management and operational perspectives, the benefits of intelligent automation – an overarching term used to encompass robotics, AI and internet-of-things (see Tussyadiah (2020) for a comprehensive review) – in tourism include increased efficiency and value creation (Gretzel, 2011), robots' 24/7 availability and ability to improve service quality and communication (Park, 2020); and enhanced workplace safety, operational transparency and better talent management (Tuomi et al., 2020). While there have been calls for more conceptual papers 'driving theory development and critique' (Gretzel, 2011: 758) and assessing impacts of AI (Tussyadiah, 2020: 1), to date, scant regard has been directed to exploring the variegated implications of intelligent automation and digitisation on lower-skilled lower-paid tourism workers, a gap this article seeks to re-dress by exploring potential socio-economic implications and providing possible future directions.

Taking a worker-centric perspective, this article critically examines technology-driven transformations in tourism workplaces in the context of the sector's ambitions of meeting the UN's decent work agenda (UN, 2019). The focus is on workplace changes occurring as a consequence of digitalisation and automation, and specifically the potential implications for workers on the bottom end of the employment ladder, who may already experience poor working conditions. As Ivanov (2020: 211) points out, while new jobs will be created, 'automation technologies will decrease the entry-level jobs in tourism and hospitality, hence providing fewer entry-level career opportunities for people with lower education'. Methodologically, this paper takes a 'theory-based adaptation' approach (Jaakkola, 2020: 23) where new frames of reference are used to create a shift of perspective. To achieve this, we utilise 'problematization' (Sandberg and Alvesson, 2011). As Sandberg and Alvesson (2011: 33) argue, '[w]hen some important assumptions are problematized, this becomes an opportunity for critical insights and new ideas of a more radical character'. In this article, we situate technology-driven transformations within dominant neoliberal discourses, and deploy the concepts of surveillance capitalism (Zuboff, 2019), disruptive innovation (Christensen et al., 2018) and techno-solutionism (Morozov, 2013) to problematise and re-frame how these transformations sit with global tourism's commitment to SDG8, where fissures may occur in the years ahead and where the potential solutions are. Examples of twelve intelligent automation products and their promotional materials are used throughout to give insight into the rhetoric and framing of these products. Applying this conceptual framing, we examine emergent workforce issues through the following research question: What are the potential implications of intelligent automation and digital surveillance on lower-skilled lower-paid tourism workers in the context of the sector's progress towards achieving SDG8's decent work for all?

The article comprises three sections. The first introduces the theoretical framework by conceptualising the neoliberalisation of sustainability, tourism and technology as well as discussing the wider socio-political context which forms the backdrop to the technological changes in tourism workplaces, working conditions and employer-employee power relations. The second focuses on intelligent automation's implications for lower-skilled tourism workers to problematise wider changes to the tourism labour market. The third explores the implications of digital surveillance on the changing nature of work, power relations and worker autonomy. These two sections explore how business and tourist-focused technology-driven changes can impact on working conditions and are linked to two UN SDG8 recommendations for policy and action: '[a]dopt a human-centred approach to embracing new technologies' and '[s]hape the impacts of digitalisation with public policies' (UN, 2019: 2). In the conclusion, we propose directions for future research as well as highlighting proactive measures that can be taken.

Neoliberalisation of tourism, sustainability and technology

Contemporary tourism, sustainability and technological innovation all function within neoliberal ideology. Tourism is inherently a neoliberal project (Duffy, 2015; Higgins-Desbiolles, 2006) driven by business logic, with the rhetoric that workers benefit via trickle-down economics. Modern tourism can be understood as a neoliberal project in how it commodifies the previously uncommodified for tourist-generated income (Duffy, 2015). Within neoliberal economies, priority is given to minimising costs and increasing business and worker productivity, rather than improving working conditions, providing decent pay, reducing inequalities and improving work-life balance. Tourism labour research has been critiqued for not sufficiently contributing to decent work (Winchenbach et al., 2019) and focusing

largely on the employer and industry perspectives, with managerial approaches predominating over sociological critiques (Baum et al., 2016b; Ladkin, 2011). Yet, the latter are key to examining outcomes from neoliberal policies in tourism employment, such as widespread worker precarisation, gender and migrant division of labour, and other labour inequalities (see Adib and Guerrier, 2003; McDowell, Batnitzky and Dyer, 2009; Mooney, 2016; Rydzik and Anitha, 2020), and can bring key sustainability-related workforce issues to the fore of academic and practitioner attention. Despite being largely neglected, workers are core to debates on sustainable tourism (Baum, 2018; Baum et al., 2016a; Baum et al., 2016b) and adopting a worker-centric perspective to examine the implications of technology-driven developments in tourism can help problematise these and allow for a more proactive and future-oriented approach to protect worker rights and achieve the decent work for all ideals of SDG8.

Sustainability is increasingly critiqued as having been co-opted by neoliberal capitalism. Tulloch and Neilson (2014) argue the ascendancy of sustainability ideas ought not to be equated with a victory for the original sustainability movement, as radical sustainability discourses have been neutralised by their integration within capitalism. What was once radical sustainability discourse has been co-opted, subordinated and nullified, with neoliberal articulations of sustainability becoming dominant (Tulloch and Neilson, 2014). In early radical sustainability discourse, capitalism was seen to 'threaten ecological sustainability' and to undermine 'viable human society by generating poverty and inequality' (Tulloch and Neilson, 2014: 27). Neoliberalism has since reframed the relationship between ecology and economy as equally important and mutually interdependent dimensions, with capitalism pivoting to become the means to achieve sustainability (i.e. to protect nature and eradicate poverty). As a result, a mainstreamed version of sustainability discourse is incorporated positively into the neoliberal project, instead of implicating 'neoliberal capitalism in the process of planetary destruction, and in the deepening precarity, instability and inequality of everyday life' (Tulloch and Neilson, 2014: 35). The tangled roots of the concept are evident in how SDG8 appears to contain certain contradictions. For example, combining economic growth with decent work and full employment in SDG8 can be seen as inherently problematic in the context of uneven employment relations and power structures in neoliberal organisations (Winchenbach et al., 2019), albeit useful rhetorically.

As tourism enters the 2020s and an age of technological acceleration, surveillance capitalism (Zuboff, 2019) is emerging. Zuboff (2019: 54) argues that surveillance capitalism was 'inconceivable outside the digital milieu, but neoliberal ideology and policy also provided the habitat in which surveillance capitalism could flourish'. Two aspects of surveillance capitalism hold explanatory power for understanding the potential direction of the worker condition and are drawn upon throughout this paper: first, worker freedom is replaced with digital monitoring, behavioural manipulation and other forms of worker performance management through *instrumentarian power*; and second, production mechanisms shift to create *certainty of outcome* through reducing (or replacing) worker autonomy (Zuboff, 2019). Zuboff (2019: 351) deploys the concept of instrumentarian power to explicate the nature of power relations in the emerging economy where '[m]achine processes replace human relationships so that certainty can replace trust'. This move towards total certainty is explored further on to illustrate how technological developments in tourism can move the sector beyond McDonald's style standardisation of products and services (dependent on employee compliance), and instead take steps towards *guaranteeing* certainty of outcome (less dependent on employee compliance) through automation. Zuboff (2019: 360) argues that instrumentarian power is 'camouflaged by technology and technical complexity, and obfuscated by endearing rhetoric', which can make the implications for lower-paid workers difficult to comprehend or resist, let alone navigate with agency, as 'we are prone to undervalue its effects and lower our guard' (p. 378). Driven by increasing efficiency and

guaranteeing of outcomes, its power increases and worker freedom decreases through ‘self-authorisation, rhetorical misdirection, euphemism’ (Zuboff, 2019: 381). Instrumentarian power is thus a useful lens to apply when examining implications of technology-driven workplace transformations for tourism workers (be it intelligent automation or algorithms on worker performance management platforms).

Building on this, Beer’s concepts of metric power (2016) and the data gaze (2018) – the latter concerns how digital data purposefully gathered at work can be used by employers to create a data profile of workers, and the former refers to how this data can be operationalised to create competition and manage performance – are also deployed later in the paper to explicate the increasingly always-monitored nature of tourism processes that are becoming digitalised and data warehoused, and the implications this can have on lower-paid lower-skilled tourism workers and the decent work ideals. These concepts can help problematise the growing digitisation and platformisation of production of food in restaurant kitchens and elements of the service economy in tourism where the digital (or the platform) can profoundly but subtly shape worker behaviour.

Techno-solutionism (Morozov, 2013) and disruptive innovation (Christensen et al., 2018) are also useful concepts to draw insight into the logics of new technologies in tourism workplaces. Techno-solutionism (Morozov, 2013) represents technology companies’ tendency to identify problems (e.g. that processes based on worker trust have the weakness of over-relying on workers), provide technological solutions that privilege the role of technology, empower management and consumers, and design or automate out worker agency. The economic rationality for technology adoption (Morozov, 2013) is built around cost minimisation and organisational effectiveness. Technology is often discursively framed as a tool for achieving sustainability (Gretzel et al., 2015; Tuomi et al., 2020). While there are benefits for workers from technological developments (Ivanov, 2020; Tuomi et al., 2020), in particular for those skilled, educated and digitally fluent, the latter sections of this article focus on the wider socio-economic changes of how technology-driven innovations impact on the broader entangling of digital processes and practices in the management of lower-skilled lower-paid tourism workers.

The final concept – disruptive innovation (Christensen et al., 2018) – refers to a type of technological innovation deliberately intended to disrupt rather than fit within existing norms. The theory broadly refers to new products being developed by new (therefore outsider) companies that break the previously solid status quo. A disruptive product offers a ‘distinct set of benefits, typically focused around being cheaper, more convenient, or simpler’, and has a power to transform a market ‘sometimes to the point of upending previously dominant companies’ (Guttentag, 2015: 1194). In tourism, an example of disruptive innovation is the Airbnb online platform (see Guttentag (2015) for detailed analysis), which at a large scale and initially unregulated disrupted the officially licenced accommodation market by enabling ordinary people to securely (via online payment mechanism, bilateral reviewing) rent out their unlicensed spaces to tourists. In this article, we use the concept of disruptive innovation to examine the potential impacts of similar disruptions on worker wellbeing and job dislocation.

In the following sections, using examples of twelve products and secondary data, we apply these concepts to unpack the nuances of technology-driven workplace transformations and their relation to decent work through examining applications of (1) intelligent automation and (2) digital surveillance in tourism workplaces, and the implications this can have for lower-skilled lower-paid tourism workers, upon whom the sector has relied on to date.

Tourism, job creation and decent work in the age of automation

Tourism jobs at risk of automation

Worldwide, accommodation and food service roles are estimated to be at greatest risk of being automated out (78% risk) by 2030 largely due to the high number of automatable interactions and predictable physical work (McKinsey, 2017). In the UK, the Office for National Statistics (ONS, 2019), categorises the following tourism occupations at high (when probability of automation is above 70%) or medium risk of automation: waiters and waitresses (72.81% of jobs at risk from automation); bar staff (70.66%); kitchen and catering assistants (69.20%); leisure and theme park attendants (66.54%); receptionists (61.83%); housekeepers (58.07%); chefs (53.87%); travel agents (51.97%); air travel assistants (49.37%); and catering and bar managers (47.21%). These occupations are largely lower-paid, lower-skilled, migrant-dense, female-dominated and consumer-facing interactive roles, with irregular contracts common. While often considered undesirable, these represent the types of roles that characterise the sector's societal job-creation role and provide livelihoods to those disadvantaged in the labour market. ONS (2019) data indicates that automation will disadvantage certain demographics, with women (holding 70.2% of the roles at high risk of automation), young workers and those on precarious contracts most affected. Automation is unlikely to affect all tourism occupations and worker demographics equally. For example, some workers, in particular those with more skills, could be retrained (Ivanov, 2020). However, automating more rudimentary tourism roles risks re-positioning the most vulnerable workers into greater precarity, impacting most those with less agency and educational capital, while reinforcing existing power structures and increasing inequalities between the high-earning and the low-earning (WEF, 2020). This is particularly relevant in times of COVID-19 where adoption of automation has been accelerated in order to keep businesses open and the economy functioning (Commission on Workers and Technology, 2020).

Workplace automation is expected to create a tranche of new jobs, and – with adequate staff retraining – make remaining jobs more efficient (McKinsey, 2017; Ivanov, 2020; Tuomi et al., 2020). This follows neoliberal logic that free markets self-regulate macro-economically (Mirowski, 2013). However, from the micro perspective of individual workers (the economy as lived), it has been argued that new human jobs created will require different skills (higher levels and different disciplinary expertise) and it is unrealistic that enough workers can be retrained (Harari, 2018) as, unlike in previous technological transformations, intelligent automation could 'replace humans in more jobs than it could create new ones' (Council of Europe, 2020: 8). Harari (2018: 41) sees the process of automation resulting in 'the rise of a new "useless" class', competing for fewer available jobs and unable to be continuously retrained before the job they retrained for also is replaced. This is particularly applicable to tourism, where jobs are largely lower-skilled, precarious contracts dominate and expectation of employer commitment to worker development is limited (McDowell et al., 2009; Ryzik and Anitha, 2020). Worldwide, embracement of tourism as an economic development activity draws on an inherent commitment to local communities and job creation (Higgins-Desbiolles, 2006). Without governmental adoption of alternative systems of income distribution, strengthening of social protection, investment in education and (re)training of local workers (Council of Europe, 2020; OECD, 2020), tourism's shift towards automation – and the type of job losses inherent in this through lower-skilled jobs being automated-out – may work against the sector's commitment to decent work, local communities and perception of tourism as a social good.

Human-robot cooperation and competition

Intelligent systems are increasingly designed to not only replace human labour but also perform better than humans, including on empathetic tasks (Tussyadiah, 2020). Recent developments go beyond automation of jobs simply requiring physical abilities into ‘replacing jobs requiring cognitive abilities and outperforming humans in many cognitive skills including those related to understanding of human emotions’ (Harari, 2018: 30). Promotional materials of intelligent automation tourism products analysed for this article, and discussed below, discursively humanise intelligent automation and frame it as comparatively superior to human workers in some dimensions (e.g. 21 languages, data-informed personalisation), equal to human workers in others (the same abilities, emotions, body language), as well as promoting its potential to both enhance the work of human workers and to, in time, replace them with a view to save labour costs. KLM Royal Dutch Airlines (KLM, 2020) introduced Care-E (a self-driving luggage trolley equipped with microcontrollers, cameras, voice control and digital compasses), while Aloft Hotels reduced human staffing needs with Savioke’s Relay robot butlers (Botlr) that bring deliveries to guest rooms (Markoff, 2014). Care-E is described in promotional materials as ‘cute and approachable’, with a ‘caring personality’, able to express emotions and ‘clearly communicate with passengers’, scan boarding passes, carry luggage and guide passengers through any points at the airport and to their gates (KLM, 2020), while Botlr is framed as going beyond simple delivery tasks to more human-like functions, such as mingling with guests and telling jokes (Miller, 2018).

Unpacking the implications of intelligent systems (such as Botlr and Care-E) for low-wage tourism labour involves seeing beyond the technological complexity and the ‘endearing rhetoric’ (Zuboff, 2019: 360). As customers become more surveilled (Weaver, 2011) – systems become more *knowing* about their needs and constantly gathering data (Zuboff, 2019) – it can become difficult for human workers to compete with intelligent automation. These systems have the potential to reduce the need for lower-skilled tourism roles involving routine and interactive tasks as well as significantly decreasing the tasks required from human workers (Ivanov, 2020), resulting in job churn (characterised by more irregular roles without social protection) (US House Budget Committee, 2020). Tourism managers interviewed by Tuomi and co-authors (2020) saw the future in human-robot cooperation where approximately 70% of tasks would be done by robots and the remaining 30% of non-automatable tasks (e.g. overseeing and residual activities) by human workers. In time, this could reduce the total number of workers needed, which in the longer term may impact on the sector’s commitment to providing decent employment for all. While jobs may be created in technological departments of tourism companies, whether these can be filled by the same workers is uncertain, as training needs are high, fewer such roles are required and significant investment in retraining is needed.

Neoliberal efficiency and decent work for all

In hotels, robots are starting to compete with tourism workers in other service roles. Softbank’s NAO and Pepper humanoids (Softbank Robotics, 2020) are designed to outperform human workers across key dimensions: they apply comprehensive historical data to heavily personalise their service to individual tourists; their messages are always on brand; they provide multilingual guest support in 21 languages and perform multiple algorithmised workplace functions perfectly (check-in/check-out, queue management, cloak room services, ticketing, shopping and collecting, reservation, translation) (Softbank Robotics, 2020). These products are marketed as able to integrate several human roles into

one and allow employers to reduce human resource challenges (workers leaving, motivation) and labour costs. Product marketing accentuates the combination of emotional and aesthetic labour with intellectual capacity and efficiency:

‘Consumers’ emotional engagement is at the core of the strategy for the use of humanoid robots in travel & hospitality. Pepper and NAO easily create an empathetic link with travellers and guests by their eye-catching appearances, moderate sizes and humanoid behaviours ... increasing interactions, optimising utilizations and reducing unnecessary cost. ... They are never tired on repetitive tasks’ (Softbank Robotics, 2020).

While some hotels already implement intelligent automation for customer-facing operations, they can now be almost fully staffed by robots (robot receptionists, concierges, porters, in-room voice assistants). In Japan, Henn na Hotel opened in 2015, with 90% of staff robotic (Rajesh, 2015) and the explicit aim to ‘reduce staffing costs’ (Hertzfeld, 2018). In 2018, another hotel and an automated coffee shop were opened, with plans for eight robot-staffed hotels. The need for more robot hotels was framed as solving ‘societal issues’ and staff shortages (Hertzfeld, 2018). However, in 2019, the hotel cut the robot workforce by more than half after the initiative failed to sufficiently reduce costs or staff workloads and satisfy customers (Newman, 2019). This is representative of the futility aspect associated with techno-solutionism which manifests when a high-promise technology fails to bring in desired outcomes due to the complexity of workplaces (Morozov, 2013: 5).

Although human workers are not yet fully replaceable, this example is indicative of the desire as well as the necessity (skill shortages, high staff turnover) in the industry to automate further (Xu et al., 2020). With time, customer expectations change as they become more accustomed to hospitality-by-robots, hardware production costs reduce and robots improve. In this future workplace, human workers risk being narrowed to performing physical and intellectual tasks beyond robotic capacity (Xu et al., 2020). The adverse implications for tourism workers, while acknowledged (Ivanov, 2020; Tuomi et al., 2020; Tussyadiah, 2020), are rarely the prime focus of scholarly debates as managerial and operational perspectives dominate. For example, Xu and co-authors’ (2020) research into the views of HR managers in UK tourism shows that HR departments are already preparing for the mainstreaming of robot workers and intend to normalise this for staff. However, in an industry with low unionisation, if neither tourism scholars, policymakers, employers nor tourism technology companies sufficiently consider worker interests, the mechanisms for vulnerable workers to advocate their interests and influence the development of their working conditions, rather than be the receivers of decisions made by others, will be limited.

Worker displacement

Further impacts of techno-solutionism (Morozov, 2013) can also be seen in intelligent automation’s inroads into food preparation. Where once trained kitchen staff utilised equipment towards specific culinary outcomes, with automation tourism is progressing towards reducing the need for human workers, as human physical work is gradually phased out by robotics, and human intellectual capital is becoming increasingly redundant by AI, algorithms and machine learning. Miso Robotics’s Flippy (Miso Robotics, 2020), an AI robo-chef designed to replace chefs, can ‘flip burgers or fry 80 baskets of food an hour, monitor that food and even clean up afterwards’ (Naylor, 2019). As well as having 100,000 hours of uptime (over 11 years) and integrating with till systems, Flippy: ‘[c]ooks perfectly and consistently every time’ (Miso Robotics, 2020). Similarly, to further eliminate human-related mistakes in food preparation (overcooked, undercooked, hygiene compliance, variable chef skills,

tiredness from physical work), Creator (2020) introduced a fully automated burger robot framed ‘to reduce the cost of high-quality food’ and to ‘break the normal cost equation for restaurants’. It achieves this by automating out certain kitchen staff roles and tasks. The disruptive potential of systems such as Creator or Flippy to dislocate existing staff and reduce tourism’s job creation role is potentially large. Ford (2015: 13) argues that fully automated burger robots ‘come at a considerable cost’ as ‘millions hold low-wage, often part-time, jobs in the fast food and beverage industries’. This can have significant implications as traditionally, these lower-wage and high staff turnover jobs were easy to find and offered a ‘safety net for workers with few other options’ (Ford, 2015: 13). Through robotic technologies, restaurants are gradually moving towards *total certainty* (Zuboff, 2019), where burgers are fully standardised and perfectly manufactured, guaranteeing certainty of outcome for customers while dislocating lower-skilled workers who are perceived as less reliable and need to seek their livelihood in new ways.

Robots are also marketed as a solution for reducing worker and restaurant owner stress. Penny (Bear Robotics, 2020) is a self-guiding restaurant robot designed to directly replace many of the physical-labour waiting tasks (it can deliver multiple drinks at once, run food between kitchen and table, collect plates). It is marketed as enabling restaurants to deliver a better dining experience through divorcing the physical labour from the interactive tasks, allowing the remaining human staff to focus on customer interaction (Bear Robotics, 2020). For restaurant owners, Bear Robotics (2020) frames Penny as ‘the employee you can always count on’, providing companies ‘a dependable staff member 24/7’. Analysing this discourse, several things are key. First, that the robot is not designed to be worker-centric technology but rather management-centric. Second, the human workers are compared unfavourably to Penny (Penny is reliable, they are not). Third, automation is seen as a solution to achieve certainty (Zuboff, 2019). Fourth, neoliberal market logic around retaining the ‘best employees’ surfaces in Bear Robotics’ (2020) promotional materials. Unacknowledged is the implication that Penny may fundamentally disrupt existing divisions of labour and working conditions, and the adaption curve may be difficult for existing employees. The mainstreaming of robots like Penny could lead to fewer restaurant jobs for fewer people with a narrower skillset needed as jobs become more fragmented and more irregular, and in pandemic times robots are seen as a safer option.

Towards worker-centric approaches

These examples of intelligent automation illustrate how disruptive innovation products could displace certain types of tourism roles and significantly reduce the need for human worker presence. The likely implications for lower-wage lower-skilled workers – specifically women, young adults, migrant workers and those on precarious contracts – are concerning in the context of tourism’s ambition towards decent work for all. While pre-pandemic, these transformations were small and experimental, these have been accelerated by the COVID-19 pandemic (Commission on Workers and Technology, 2020; WEF, 2020) and are anticipated to scale up with large disruptions to working landscapes (McKinsey, 2017; Xu et al., 2020). Hitherto, robots represent a novelty attraction (a photo opportunity for social media) (Bear Robotics, 2020), which allows tourists to engage easily without considering these robots as potential harbingers of wider workplace changes both negative (job dislocation, disappearance of certain jobs) and positive (more flexible and specialised work). Robots have been designed to outperform human workers through working 24/7, being programmed with

knowledge of multiple languages and the ability to conduct many environment-specific tasks as well as analyse and generate consumer profiling data.

Scholarly priority has to date been given to how consumers and managers perceive the role of intelligent automation, rather than how lower-skilled workers view and respond to their jobs being complemented or replaced by robots. The latter is critical in the context of addressing the potential widening of social inequalities as a result of automation and job losses to COVID-19. Thus, there is a need to problematise euphemistic and techno-solutionist discursive frames that enable the proliferation, normalisation and acceptance of intelligent automation into workplaces. Outside of tourism, policymakers have called for proactive, ethical and worker-centric policies and regulations to better anticipate and mitigate the risk of unrestrained technology-driven transformations (Commission on Workers and Technology, 2020; Council of Europe, 2020; US House Budget Committee, 2020). Some solutions proposed include enhancing 'social protection coverage', extending 'collective bargaining to previously excluded workers', providing adult training that targets disadvantaged workers (OECD, 2019) as well as incentivising technology companies to create worker-augmenting rather worker-replacing solutions (US House Budget Committee, 2020). Within tourism, unregulated intelligent automation risks moving the tourism sector away from improving working conditions for disadvantaged workers, making the ideals of SDG8 less attainable through reinforcing existing social inequalities and impacting on the industry's commitment to supporting local communities and sustaining workers' livelihoods.

Digital surveillance and tourism worker autonomy

Digital systems of worker monitoring

A key element of neoliberalism, surveillance capitalism, and inherent in intelligent automation technologies, is the use of metrics to manage workers through instantaneous performance monitoring and management interventions. Two examples of the use of digital surveillance in workplaces are Dragontail's AI quality control camera and Zulafly's geolocation staff movement monitoring solution. Dragontail's AI quality control camera ecosystem – used by Domino's and Pizza Hut – combines constant worker monitoring (a camera where visual data is processed by AI), speech being captured (the mic), actions being recorded (the video recordings library), and algorithmic decision-making (the AI flags certain behaviours). An AI smart scanner is located above where workers make pizzas to 'recognise, analyse and grade pizzas based on pizza type, correct toppings and even distribution of ingredients' via 'capturing an image of the pizza and using AI to compare this data with a large dataset of correct pizzas, making a quick assessment' (Corner, 2019). Customers are provided 'with a real-time image of their pizza' as it is being made (Corner, 2019). Workers are thus surveilled by both customers and management. The system can also monitor whether workers follow hygiene and safety protocols, features designed post-emergence of COVID-19 to increase customer confidence (Splitter, 2020).

Products such as this show characteristics of techno-solutionism (solving issue of imperfect pizzas) and can disrupt established norms around trust and worker freedom. In the context of decent work, even before such technologies become prevalent, working in restaurant kitchens was considered highly pressurised, and worker surveillance technologies may significantly exacerbate this, putting more pressure on workers. Another technology that illustrates possible subtle changes to working conditions is Zulafly's (2020) Real Time Location Service and Global Positioning Solution, a solution to track all 'assets' in a hotel, from people to vehicles. Zulafly's (2020) marketing materials

promote the product as allowing managers to ‘know everything’, and discursively frame workers as ‘business assets’ which can be located, monitored and effectively managed: ‘locating assets for use immediately, knowing where they are and when they are in use will save time and money’. For such technologies to work, humans need to be objectified and rhetorically framed as manipulatable employer-controlled assets (Zuboff, 2019). In practice, use of AI cameras and geolocation devices, while making workplaces safer, can simultaneously result in workers feeling constantly surveilled, and experience reduction of autonomy (Van Oort, 2019).

Normalisation of surveillance, intensification of work and redefining of roles

As increasing levels of technology-driven quantification in non-work life become normalised (e.g. wearable fitness devices), when such practices appear at work, workers often perceive it uncritically (Beer, 2016). With tourism workers largely non-unionised and on precarious contracts, employees may have few resistance mechanisms and limited awareness of implications. New digital workplace technologies can now allow new means of stimulating competition between workers (Beer, 2016). Manifested through rankings, these managerial instruments of control can shape worker behaviour. For example, SmartTask’s (2020) workforce optimisation management tool is promoted as giving management complete visibility of housekeeper performance versus planned activities. It collects data for employee performance reviews and creates trend analysis of activities, such as room turnaround time and cleaning duration (SmartTask, 2020). Housekeepers (often women, migrants, on irregular contracts) are already subject to stressful time pressure and are under-valued and vulnerable (Adib and Guerrier, 2003; Rydzik and Anitha, 2020). The addition of performance metrics for housekeepers can further intensify existing workplace pressure and increase management control through minimising worker agency and potential for resistance in the face of metrics presented as objective and undisputable. Indeed, a key function of metrics is to stimulate worker competition through emotional manipulation that draws on comparative frames that flatter or unflatter (Beer, 2016). Worker autonomy and dignity are core to decent work (Winchenbach et al., 2019), and instrumentarian power exercised through customer- and management-centric digital systems that surveil workers can invisibly undermine worker autonomy through new incentives (Zuboff, 2019), leading to behaviours in line with the logic of organisation-friendly algorithms.

The move towards quantifying human actions into analysable data to drive well-intentioned (from a business mindset) interventions, is a form of techno-solutionism (Morozov, 2013). Approached sociologically, recent technology-driven innovations in tourism reflect the *move fast and break things* (Taplin, 2017) ideology associated with 21st century Silicon Valley. Within this worldview, it becomes possible to frame ‘all complex social situations either as neatly defined problems with definite, computable solutions or as transparent and self-evident processes that can be easily optimized’ (Morozov, 2013: 5). From the worker perspective, however, these managerial solutions may manifest in negative real-world impacts. First, *perversity* which occurs when the solution worsens the problem trying to be solved, sometimes in unexpected ways (e.g. more robot cleaners can lead to human cleaners allocated dirtier tasks not possible for robots or previously not done). Second, *jeopardy* when the designed techno-solution may undermine previous accomplishments without consultations with workers and unions (e.g. deterioration in working conditions and intensification of work). Morozov (2013: 6) details solutionism as an obsession with ‘narrow-minded solutions ... to problems that are extremely complex, fluid, and contentious’.

Pre-pandemic, companies such as UK pub and hotel chain Wetherspoon had deployed mobile apps to allow customers ‘to order food and drinks to their table, without leaving their seat... enabling patrons to pay without queuing or interacting with human staff’ (Wetherspoon, 2020). Such solutions have become more commonplace during the COVID-19 pandemic as they help minimise human contact and increase customer confidence. From the decent work perspective, the implications (both surveillance and non-surveillance) of these are many. Seemingly innocuous applications can redefine bar work, leading to reductions in workers needed (causing worker stress about job security), and deskilling existing roles (as autonomy reduces). For example, with the app, instead of the bartender taking orders, preparing drinks and engaging in interaction, the bartender’s role moves to being more robotic (making drinks non-stop) or more based on physical labour (running with drinks), depending on how bars set up their division of labour through decoupling the existing role (in essence, human workers are being automated). This can impact on job satisfaction (as the role becomes more factory-like), lead to physical ailments (repetitive strain injuries), new hazards (greater risks of staff slipping over), and fewer hours (as the uncoupled jobs require less human time resource) plus greater employee digital surveillance (the time between drinks order being made and being delivered can now be logged accurately, metricised and rated on the app). Ball (2010: 101) argues that ‘surveillance extends into the bodies and minds of workers, rather than simply their performance’. For lower-skilled tourism workers, workplace power relations can encourage erring towards normalising surveillance and invasions of privacy in order to keep jobs, as options for protest and alternative jobs may be limited (Ball, 2010).

Algorithmic control and trust

What Morozov (2013: 6) considers problematic with techno-solutionism – particularly from the decent work and worker surveillance perspectives – is how the problem to be solved is framed from the perspective of those designing and implementing the solutions (e.g. technology solution providers and tourism companies) as ‘how problems are composed matters every bit as much as how problems are solved’. In restaurants, the AI-powered bin solution from Winnow (2020) uses a motion sensitive camera and smart scales to identify and surveil food kitchen staff are binning. The product is promoted as saving restaurants money and reducing environmental footprint:

‘Winnow Vision is the first time that AI has entered the professional kitchen at scale. This is a breakthrough product in the fight against food waste. ... Winnow Vision offers improved data accuracy by validating each food waste entry, providing richer insight to help teams reduce waste. ... Eventually, full automation will not require an input from the team’ (Winnow, 2020).

For example, when a plate of frozen chips is thrown away, the AI-bin displays the cost per year of frozen chips purchased by the restaurant, the smart scale identifies how many portions of chips have been thrown away and associate a numerical cost with the wastage. The back-end of the system works as a data warehouse where more complex management queries can be run and, if triangulated with the staff roster software, periods of high food wastage can be combined with staff working patterns to ascertain correlations between kitchen staff and average food wastage per shift. Winnow (2020) state they helped one restaurant cut food waste by 45% and can bring in a 1,000% return on investment. From the decent work perspective, such solutions can lead to higher workplace surveillance (often associated with lower job satisfaction), diminishing employer trust, more instrumental ways of working (as the cost of food waste is very explicit) and perverse incentives leading to undesired consequences (staff reluctance to throw away food that ought to be binned).

Graham and Wood (2003) detail how advances in sensing and recording technology have led to expansions in surveillance. These technological developments extract worker data that is often visible to managers but not always workers, and this power asymmetry means the data can be mined for pro-managerial, pro-business insights that can work against employee interests. Data can be collected on individual worker speed and accuracy, with adherence to process serving as proxy for ability (Beer, 2018). When the data from multiple identified workers is combined, ranking workers to different performance categories becomes possible. Metrics can impact on workers *affectively* and as important as what is measured is the physical and emotional experience of measurement (Beer, 2016). For surveilled lower-paid workers, such systems can impact on the meanings derived from work and on worker wellbeing.

The food delivery company Deliveroo changed *where* restaurant food is consumed on a mass scale (like many disruptive technologies, the scale of impact is important). As more restaurants move into home-delivery at scale, a move accelerated by restrictions related to the COVID-19 pandemic, tourism work is being brought into the digital gig economy. Gig work is characterised by platform-based algorithmic control which offers workers high flexibility and autonomy but results in drifting to overwork, long irregular hours for low overall pay, low-job satisfaction, minimal social interaction with colleagues, and stress from the income uncertainty (Wood et al., 2019). Deliveroo's worker surveillance is high and trust is limited, with all worker platform interactions monitored and mined through time-stamps, geolocation, reviews and process-driven workflows that tabulate and rank worker performance (e.g. delivery speed, customer ratings, deliveries per shift). The work is precarious (pay is per delivery, constantly performance monitored with delivery time a key KPI) and extremely customer-centric (customers can track their order and directly contact their deliverer). To further efficiency, companies in this space are also experimenting with replacing human workers with self-driving autonomous delivery robots (Starship, 2020), which can further dislocate human workers as the robots are designed to integrate frictionlessly with food ordering apps and be faster, cheaper, more energy-efficient and trackable than human workers.

Worker agency and decent work

As research that addresses negative impacts of technology in tourism largely centres on highlighting tourist privacy violations (Gretzel, 2011; Weaver, 2011) rather than implications of digital surveillance for workers, there is an urgent need to reflect on worker surveillance, particularly lower-skilled workers, as workers on the bottom – largely young, female and foreign-born on insecure contracts and non-unionised – are rarely afforded trust in their abilities, and often normalise surveillance to keep jobs, with few outlets for protest, which can result in further precarisation and job insecurities. Indeed, adopting an intersectional perspective, Van Oort's (2019) study on experiences of digital control among low-wage retail workers, draws out some of the wellbeing impacts for the worker: intensification of anxiety and insecurity, performance of an emotional labour of surveillance, showing how the hegemony of digital surveillance widens social inequalities and reinforces gender and race inequality at work. As systems of control have shifted to digital, workers devise new coping strategies to adjust to these new regimes of control (Van Oort, 2019). Nonetheless, their precariousness remains unchanged as structures of oppression persist and the systems of control adapt with further surveillance brought in, highlighting increasing levels of distrust towards workers (Van Oort, 2019).

The use of digital surveillance intrinsic in new technological developments in tourism can, on the one hand, help address long standing industry issues (reducing workplace violence and protecting

individual workers from some of the risks associated with working in the industry, such as sexual harassment) but, on the other hand, simultaneously displace trust in workers, re-arrange the notion of worker autonomy, affect worker wellbeing and consequentially work against the ideals of decent work. The speed of change, particularly in the era of COVID-19 where lower-skilled and lower-paid tourism workers are particularly affected by job losses (Commission on Workers and Technology, 2020; Gössling et al., 2021), can lead to workers finding ‘themselves overwhelmed by a force that they could neither fathom nor resist’ (Zuboff, 2019: 352).

Conclusion

This article examined the nuances of how technology-driven innovations can impact on the working conditions of precarious tourism workers. The conceptual framework adopted – underpinned by surveillance capitalism (Zuboff, 2019), disruptive innovation (Christensen et al., 2018) and techno-solutionism (Morozov, 2013) – provided the analytical lens for problematising these transformations and unpacking the rhetoric used by tourism and technology companies. These transformations are often wrapped in positive neoliberal discourses of efficiency and progress, and rarely explicitly interrogated as potentially impinging on worker rights and quality of employment.

Situating the discussion within SDG8 and using tourism-related examples, the article showed how, firstly, without sustainable management of the impacts, the expansion of intelligent automation in tourism workplaces could exacerbate inequalities and further precarisation of lower-skilled workers – in particular women, young adults, migrant workers and workers on insecure contracts – exposing them to job losses, job churn and job dislocation, dehumanising their role, and gradually automating them out. Tourism’s trajectory towards techno-solutions and disruptive innovation, while providing innovation, supporting cost savings and improving workplace safety, can impact on the industry’s commitment to supporting local communities, sustaining workers’ livelihoods and being a refuge for precarious workers, making the ideals of SDG8 less attainable. Secondly, the article demonstrated how, often obscured by the discourse of supporting workers, increasing digital surveillance can shift power relations further towards employers, reducing trust and worker agency through constant monitoring and control. While job creation and quality of employment are central to SDG8, intelligent automation and digital surveillance could profoundly disrupt established worker rights and protections, and jar with the sustainability ideals of decent work for all. Driven by techno-solutionism discourses, these often difficult to discern changes to working conditions risk eroding past worker protection achievements and ‘policy makers face serious problems in simply understanding the esoteric and technical worlds of the new surveillance’ (Graham and Wood, 2003: 242).

The paper makes three main contributions. First, by problematising how intelligent automation and digital surveillance could shape the sustainability ideals of decent work, and unpacking the nuances of SDG8 in the techno-political context of rapid technological advances in tourism workplaces, the article furthers scholarly debates on decent work in tourism (Winchenbach et al., 2019) and supports calls for making the tourism workforce more central to sustainability debates (Baum, 2018; Baum et al., 2016a). Second, the article brings sociological critiques of technology-driven transformations into tourism research on intelligent automation (Gretzel, 2011; Tussyadiah, 2020; Park, 2020; Tuomi et al., 2020; Xu et al., 2020), problematising these transformations, unpacking their nuances from the perspective of tourism workers – a lens largely absent from tourism scholarly debates on intelligent automation, which lean towards business, consumer and operational aspects – and critiquing the normative neoliberal discourses of technology-

driven innovations as advancing sustainable tourism. Third, it adds to the body of scholarship that highlights the implications of technological transformations on workers and the nature of work (Ball, 2010; Beer, 2016, 2018; Ford, 2015; Van Oort, 2019; Wood et al., 2019) by examining these changes in the sector anticipated to be most impacted by intelligent automation (McKinsey, 2017; ONS, 2019) and situating these within sustainable development discourses.

Recognising the socio-political conditions that shape implementation of new technologies (Graham and Wood, 2003), this paper identified several core challenges. First, in a sector with a reputation for poor working conditions, automation appears to solve the problem through displacing lower-paid roles rather than addressing workplace culture. In essence, the solution serves management needs and ignores the ethics of making redundant occupations that support millions of lower-paid lower-skilled workers and their families worldwide (Ford, 2015). Automation can also be seen as a solution to address the continuous skills shortages in the industry and high staff turnover. In the UK context, it could alleviate anticipated worker shortages post leaving the EU and losing access to migrant labour. This can however have serious implications for precarious workers. Another consideration is how the COVID-19 pandemic impacts on the future of tourism work. An anticipated consequence is that the current pandemic will speed adoption of digital monitoring resulting in normalisation of extreme surveillance systems (Harari, 2020; Klein, 2020) and quicken the introduction of automation in workplaces to make these more resilient to future pandemics (Commission on Workers and Technology, 2020). Indeed, as tourism was the hardest hit industry, to increase customer trust and allow business to continue, there has been an uptake in delivery bots in hotels (Aratani, 2020) and Intelligent Sterilization Robots for cleaning in airports (Asaf, 2020). As robots are seen as a solution to issues of safety and physical distancing, it is key that safety discourses are not used as a justification to automate-out the lower-skilled workers who over-rely on these jobs in post-COVID 19 workplaces. Instead of focusing on human-replacing technological solutions, improvements to working conditions, better social protection mechanisms and human-augmenting solutions should be considered to better anticipate changes to labour markets and implications for the most disadvantaged workers post-pandemic (Commission on Workers and Technology, 2020; Council of Europe, 2020; US House Budget Committee, 2020).

To sustain the tourism sector's focus on the decent work agenda, this paper makes the following calls to academics, industry and governmental organisations. To academics, we call for more worker-centric empirical research into the impact of the technological changes in tourism workplaces and for deeper consideration of the tourism worker voice in management and technology-focused papers. As the tourism workforce is over-represented by workers at risk of automation, discussions on implementations of intelligent automation in tourism must move beyond the benefits of disruptive innovation for business, the need for productivity-driven techno-solutionism and high-tech enhancements of the consumer experience, into ethical conversations about tourism's role as a social good (Higgins-Desbiolles, 2006) for regional economic development and individual economic empowerment in line with the SDG8 recommendations for policy and practice (UN, 2019). This can start with re-balancing debates by bringing in sociological exploration of the lived worker perspective and anticipating how the lower-paid tourism work that sustains these workers could become scarce. We also call for academics to critically interrogate the 'endearing rhetoric' (Zuboff, 2019) associated with technological developments that can obscure their negative social impacts, and to use their positionality to hold the industry to account over technology that can displace workers, deteriorate working conditions and exacerbate social inequalities. Finally, we call for tourism workforce scholars

to collaborate with industry and workers to develop a worker manifesto that is apt for the likely challenges of the next few decades.

For industry, we make two calls. First, for the sector to embrace the idea of the Minimum Virtuous Product (MVP) (Taneja, 2019). A contributory factor to the potential harm of new technologies is the ethos of 'move fast and break things' (Taplin, 2017) and disruptive innovation that does not pause to consider societal impact. To challenge this, Taneja's (2019) idea of MVP asks companies to consider unintended societal consequences of introducing new technologies and ways to mitigate these. This is similar to the ethics by design approach that aims to preserve the social value of work (Council of Europe, 2020). For example, how surveillance technologies are used and what they cannot be used for could be negotiated with workers. Second, we call for large tourism companies to conduct worker-centric impact assessments before trialling and implementing new technologies, and to make these publicly available, as well as developing re-skilling programmes and introducing AI literacy to increase understanding of the implications of AI among managers as well as workers. Finally, on governmental and policy levels, there is a need for exploration of alternative development models (Tulloch and Neilson, 2014) that move beyond neoliberal efficiency-driven market logic and support displaced workers, such as the moral economy, universal basic income, substantial investment in life-long learning, an automation tax, the four-day working week and sustainable implementations of intelligent automation (e.g. regulations to sustainably manage the speed of change). These measures along with taking a more holistic approach can help achieve 'a new equilibrium in the division of labour between human workers, robots and algorithms' (WEF, 2020: 49). Echoing Coyne (2020), to better anticipate the transformative effects of AI on the future of human work, the question for tourism scholars and professionals 'is not whether we are "for" or "against" technology: the former is thoughtless and the latter impossible [but] *which* technologies we are for, to what ends, and how they can be democratically managed, with a view to the kind of society we wish to be'.

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