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Productive employment and decent work: The impact of AI adoption on psychological contracts, job engagement and employee trust

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ABSTRACT

This research examines the tension between the aims of the United Nations' Sustainable Development Goal 8 (SDG 8), to promote productive employment and decent work, and the adoption of Artificial Intelligence (AI). Our findings are based on the analysis of 232 survey results, where we tested the effects of AI adoption on workers' psychological contract, engagement and trust. We find that psychological contracts had a significant, positive effect on job engagement and on trust. Yet, with AI adoption, the positive effect of psychological contracts fell significantly. A further re-examination of the extant literature leads us to posit that AI adoption fosters the creation of a third type of psychological contract, which we term "Alienational". Whereas SDG 8 is premised on strengthening relational contracts between an organization and its employees, the adoption of AI has the opposite effect, detracting from the very nature of decent work.

1. Introduction

The United Nations (U.N.) is currently pursuing an ambitious global agenda (Economist, 2015), consisting of 17 goals to support sustainable development. These goals, known collectively as the U.N.'s Sustainable Development Goals (SDGs), cover a range of social, economic and environmental issues (U.N., 2019) relevant to governments and private institutions worldwide (Madsbjerg, 2017). Given the role of work and employment in people's lives, and as an enabler of economic development, it is not surprising to see that one of the SDGs deals specifically with work. Namely, Goal 8, which aims to "promote inclusive and sustainable economic growth, employment and decent work for all," where workers have access to "safe and secure working environments," and there is a reduction in precarious employment (U.N., 2019).

The concept of decent work has been championed by the International Labour Organization (see ILO, 1999), and draws attention to the quality of employment or work, and the sense of security or social protection felt by the worker (ILO, 2001). Specifically, decent work is defined as a paid occupation where the work is meaningful, the income is good and the job meets the workers' expectations and aspirations (Nizami & Prasad, 2017). Hence, by focusing on decent work, the U.N. is moving away from a by-dimensional goal for work and employment (i.e., working or not working; employed or unemployed), to a multi-dimensional one, concerned with quantitative rewards (e.g. income), as well as qualitative ones (e.g., job satisfaction).

One issue that remains unresolved in the employment literature is the extent to which emerging work practices, increased worker autonomy and responsibilities, and the shift from employers to employees impact on qualitative aspects of work and employment. On the one hand, this trend leads to greater levels of insecurity and additional pressure on workers (Baruch, 2006; Baruch & Rosenstein, 1992; Greenhaus & Kossek, 2014; Sullivan & Baruch, 2009). On the other hand, it leads to more autonomy, increased productivity (Doucouliagos, 1995), job satisfaction, commitment and trust (Timming, 2012). This trend is intrinsically linked to the ability to move towards decent work for all, or not, as stated in the U.N.'s SDG 8.

Artificial intelligence (AI) is challenging the foundations of businesses and changing the ways people work globally (Murray, 2015). It affects jobs and tasks while potentially increasing organizational efficiency. Some manifestations of AI already in use in today's business world include machine learning and chatbots (Holzinger et al., 2018). With these advances in technologies, the growth of AI is expected to reach $47 billion by 2020 (Montes & Goertzel, 2019).

The automation of tasks enabled by AI is expected to improve

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productivity at work with an augmented labor force and increase demand for personalized product and services and higher quality outputs (PwC, 2018). The ubiquitous adoption of AI in the workplace is likely to accelerate current trends for increasingly-autonomous work practices. For that reason, it is urgent to resolve the questions of whether increased worker autonomy improves qualitative employment outcomes for workers and AI's role in that. The purpose of this paper is to solve this gap. Specifically, we investigate the research question: *"How does AI interact with the drivers of worker engagement with the employing organization, job satisfaction and job trust?"*

There is agreement that work and workers will be affected by AI and allied technologies. In order to understand which work will begin to disappear, some research has been done on types of jobs most prone to automation. Huang and Rust (2018), for instance, identify four categories of work-related intelligence and discuss how AI may be more or less suited to replace humans in related tasks. First, mechanical intelligence concerns the ability to perform routine, repeated tasks. Second, analytical intelligence is the ability to process information for problem-solving and learn from it. Third, intuitive intelligence is the ability to think creatively and adjust effectively to novel situations. The last intelligence type is empathetic intelligence, which is the ability to recognize and understand other peoples' emotions, respond appropriately emotionally, and influence others. AI-based automation represents technologies that effectively selects data, converts information and makes decisions or controls processes (Hengstler et al., 2016; Lee & See, 2004). Therefore, there is higher potential for AI to be deployed – and replace workers – in tasks that require mechanical and analytical intelligence, and limited potential in tasks that require intuitive or empathetic intelligence.

In a study which set out to determine the impact of automation on employment and wages in different industries, Frey and Osborne (2015) point out that transportation, logistics, office and administrative works are under high risk of automation and will cause unemployment. Companies such as Amazon, Uber, Facebook and Google are leading the way in developing AI applications such as autonomous vehicles, recommendations based on personal activities and interests and big data (Eitel-Porter, 2018). It is estimated that, globally, 326 million mostly-low-skilled jobs will be adversely affected by AI within 10 years (PwC, 2018). AI-driven technological changes and developments invariably create concerns that workers will be displaced and generate higher levels of unemployment (Arntz, Gregory, & Zierahn, 2016; Mokyr, Vickers, & Ziebarth, 2015), particularly among vulnerable groups such as disabled workers (Lillywhite & Wolbring, 2020), which runs against Goal 8 of the U.N.'s SDGs.

In contrast, some scholars predict that AI technology at work will affect the nature of tasks not jobs (Arntz et al., 2016). Those technological advancements in the organization lead to the acceleration of changes (van den Heuvel, Freese, Schalk, & van Assen, 2017). Those AI-driven technological advancements or accelerations in the organization "*improve organizational capacity and cause numerous changes in the behaviors and expectations of employees, customers and other market players*" (Pluta & Rudawska, 2016, p. 294). This has brought attention to the idea that AI is improving work efficiency on one hand and might also reduce employee engagement and weaken the relational aspects of psychological contracts on the other hand. Therefore, our study intends to investigate the impact of AI-driven technological advancement on the relations among psychological contract, employee engagement and trust.

Briefly, the paper is structured as follows. In the next section, we develop the framework and hypotheses. We move on to explaining the methods used for our analysis. Next, we provide our results, which leads to a discussion and implications of our findings. We close with our conclusions, limitations of our study and trajectories for further research.

2. Framework development

2.1. Psychological contract, employee engagement and AI adoption

Rousseau (1995) refers to psychological contracts as employees' perceptions about the nature of the relationship with their employer. Psychological contracts can assume two forms: transactional or relational contracts. Transactional contracts are characterized by a short-term, monetary scope, with little mutual involvement in the lives and activities of each other, focusing on purely materialistic outcomes. In effect, employees only work to collect their wages. In contrast, relational contracts are based on mutual agreement with exchanges of both socio-emotional and monetary elements. The relationship between employees and employers is predicated on longer-term, open-ended engagement that enables workers to develop and grow with that employer (Bal, Kooij, & De Jong, 2013b).

Because of this focus, relational contracts are associated with mutually positive outcomes for both employers and workers; whereas transactional contracts, because of the materialistic and short-term focus, are associated with more negative outcomes, including lower engagement and commitment (Raja, Johns, & Ntalianis, 2004; Rousseau, 1995). Millward and Hopkins (1998) suggest that reducing transactional aspects of psychological contracts is beneficial for organizations, as employees with these contracts are less committed to the goals of their organization (Raja et al., 2004).

Developing and reshaping relational psychological contracts enables employees to become more committed to organizations and engaged with their work (Bal, De Cooman, & Mol, 2013a). Table 1 summarizes the comparison between transactional and relational psychological contracts.

Breaching psychological contracts or organizations' promises leads to negative effects, poorer behavioral standards and lower cognitive work outputs, such as decreases in job engagement (Bal et al., 2013a), job satisfaction (Conway et al., 2011; Tomprou et al., 2012) and job trust (Pate et al., 2000). Psychological contract breaches are manifested in disappointing employees' perceptions by not fulfilling these properly (Rousseau, 1995). Violations of psychological contracts decrease levels of trust between employee and employer (Robinson & Rousseau, 1994; Rousseau, 1995). Since job trust relies on the relationship between employee and employer (Guest, 2004), psychological contract breaches can damage employees' well-being, which leads to detrimental effects on company performance (van den Heuvel et al., 2017).

Robinson (1996) examined relationships between employees' trust and employees' psychological contract breach with employers in a longitudinal study with 125 managers. Their findings show that there is a strong relationship between trust and psychological contract

Table 1
The features of transactional and relational psychological contract.

Dimensions	Transactional Contract	Relational Contract	Source
Focus	Specific	Open-ended	Jensen, Oplan and Ryan (2010), Shore and Tetrick (1994), Rousseau and McLean Parks (1993), Blau (2017), Rousseau (1990), Aggarwal and Bhargava (2009)
Scope	Economically oriented	Socially oriented	
Time-period	Specific	Longer-term/ Ongoing	
Underpinning Theory	Economic Exchange	Social Exchange Theory (contingent and reciprocal exchanges)	
Breach/ violation cause to	Cohesion	Civic virtue, trust	
Practices	Wages Monitoring employee performance	Employee training and development, Job security, Allocation of responsibility and power to employees	

fulfillment. Positive psychological contract fulfillment helps organizations to have employee commitment and satisfaction. Therefore, it is expected to find positive relationships between psychological contract fulfillment and employee engagement (Chambel & Oliveira-Cruz, 2010). In previous research examining employee trust, constructive psychological contract has been suggested as an antecedent in the workplace (Morrison & Robinson, 1997; Robinson & Wolfe Morrison, 2000; Robinson, 1996).

The Fourth Industrial Revolution and AI-driven technologies offer both opportunities and challenges to employees (Nam, 2019). New online platforms help employees and organizations to find more opportunities in the global marketplace (Ashford, Caza, & Reid, 2018). Nam (2019) examined technology usage, expected job sustainability and security with 2001 survey data in the U.S. and found that there is a significant relationship between technology usage and perceptions of job insecurity. Since technological changes trigger uncertainty at work, adoption of AI and related technologies weakens relationships between employees' psychological contract with employers (Conway & Briner, 2005; Østhus, 2007; Nam, 2019)

Hence, we propose that:

H1: Psychological contract has positive impact on employees' job engagement
H1m: Adoption of AI weakens the positive relation between psychological contract and employees' job engagement

2.2. The impact of AI adoption on employee engagement and job trust

Employee engagement has received significant attention from academic researchers, practitioners and governments (Bal et al., 2013; Lin, 2010; Rayton, Dodge, &, D'Analeze, 2012; Saks, 2006). Employee engagement and job engagement are interchangeably-used terms, generally defined as employee outcomes that enhance organizational success with better financial gains (Bates, 2004; Richman, 2006).

Saks (2006, p.602) defines the engagement as *"a distinct and unique construct that consists of cognitive, emotional and behavioral components that are associated with individual role performance*". Some scholars define engagement as the opposite of burnout at work (Bailey, Madden, Alfes, & Fletcher, 2017; Schaufeli & Bakker, 2004). Employees who are highly engaged with their work tend to be more deeply connected to organizations and work with greater intensity (Schaufeli & Salanova, 2007).

There are few empirical investigations into antecedents and consequences of engagement (Bailey et al., 2017; Macey & Schneider, 2008; Rayton & Yalabik, 2014), particularly in changing work environments, which is arguably under-explored. It is important to understand both antecedent and consequences of employee engagement because disengaged employees increase costs to organizations (Rayton et al., 2012). There is some consensus among management scholars that employee engagement has significant impact on employee commitment, satisfaction and performance outcomes (Suhartanto, Dean, Nansuri, & Triyuni, 2018). Employees with higher engagement levels have more satisfaction with self-actualization to their organization (Eldor & Vigoda-Gadot, 2017). van den Heuvel et al. (2016) analyzed data from 669 technology service organizations to understand the role of engagement, psychological contract fulfillment and trust in relationships between change, information and employees' attitude to change. Their study concluded that there is a positive relation between engagement and trust.

Trust widely refers to confidence in the other side's reliability and integrity (Morgan & Hunt, 1994). Robinson (1996, p.576) defined trust as *"one's expectations, assumptions, or beliefs about the likelihood that another's future actions will be beneficial, favorable or at least not detrimental to one's interests.*" Job trust is at the core of relationships and contracts that influence behaviors of two parties towards each other in a relationship (Zand, 1972). In an organizational context, trust refers to employees' positive expectations from employers, based on capability and fairness (Vanhala, Puumalainen, & Blomqvist, 2011; Nedkovski, Guerci, De Battisti, & Siletti, 2017). Trust is essential to prevent employees from breaches of contract. As Blau (1964, p. 94) emphasized, *"since there is no way to assure an appropriate return for a favor, a social exchange requires trusting others to discharge their obligations"*.

Due to global disruptions and technological advancements, organizations are reacting quickly to survive in the market; as a result, organizational or job trust has become even more important to achieve positive company outcomes (Ugwu, Onyishi, & Rodríguez-Sánchez, 2014). Higher levels of job trust have beneficial effects upon quality of communication and problem-solving between employees and between employees and employers (Gillespie & Mann (2004), cooperative behavior (Shockley-Zalabak, Ellis & Winograd, 2000), organizational commitment (Aryee, Budhwar & Chen, 2002) and employee loyalty (Costigan, Iiter, & Berman, 1998). Previous scholars found positive relationships between employee engagement and job trust (Agarwal, 2014; Ertürk & Vurgun, 2015; Mulki, Jaramillo & Locander, 2006).

Drawing on the above discussion, the following relations are hypothesized:

H2: Employee engagement has positive impact on employees' job trust
H2m: Adoption of AI weakens the positive relation between employees' job engagement and job trust
H3: Psychological contract has positive impact on employees' job trust
H3m: Adoption of AI weakens the positive relation between psychological contract and employees' job trust.

Together, these hypotheses lead us to propose the conceptual model depicted in Fig. 1.

3. Methods

We developed an online survey questionnaire to collect data in this study. The survey instrument was distributed to individuals in West London, UK, which has large companies including Heathrow, Canon Inc., Sharp Corporation, Marks and Spencer and GlaxoSmithKline as well as numerous small-and-medium-sized employers. Our data were collected by asking participants to scan a QR code on their smartphones that linked to the online survey. Before collecting the main survey data, full ethical approval was received and a pilot study was conducted to improve questionnaire design and to test the robustness of validity and reliability measurement items.

This research collected data from 232 responses. The demographic profiles of participants are detailed in Table 2, which presents the gender, age group, education level, working experiences and their existing organization type and size. The results show that the large

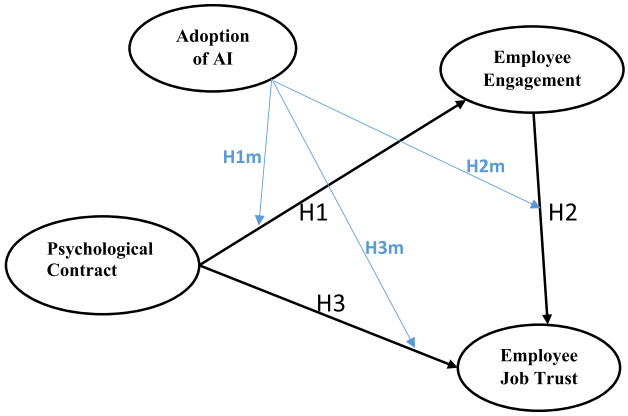

Fig. 1. Conceptual model.

Table 2
Descriptive statistics.

Variables	Sample (n = 232)	Percentage (%)
Gender (subordinate)		
Male	112	48.2
Female	118	50.9
Prefer not to say	2	0.9
Age		
18–24 years	87	37.5
25–34 years	99	42.7
35–44 years	32	13.8
45–54 years	8	3.4
55 years and above	6	2.6
Education		
Secondary/High school	10	4.3
GCSEs/A-Levels	39	16.9
College Apprenticeship	7	3.0
Undergraduate Degree	68	29.4
Postgraduate degree (Masters)	69	29.9
Doctorate	35	15.2
Other	3	1.3
Work Experience		
Less than a year	30	12.9
1 to 2 years	49	21.0
3 to 5 years	70	30.2
6 to 10 years	43	18.5
11 to 15 years	14	6.0
16 to 20 years	12	5.2
Over 20 years	14	6.0
Organization Type		
Private sector organization	100	43.1
Public sector organization	104	44.8
Charity	11	4.7
Social Enterprise	14	14
Other	18	7.8
Organization Size		
250 + employees	109	47.0
50–249 employees	33	14.2
10–49 employees	41	17.7
1–9 employees	49	21.1

portion of participants are between 18 and 34 years old. The majority of participants (74.5%) are highly educated, having a university degree or above. Furthermore, 33.9% of participants have less than two years work experience, 48.7% have three to 10 years work experience and 17.2% have more than 10 years work experience. The frequencies show that the majority of participants (42.7%) have a full-time job and 36.6% of participants have part-time jobs. Results show that 43.1% of participants are currently working in the private sector and 44.8% work in the public sector. Most of the participants (47.0%) are working in organizations with more than 250 employees, and 31.9% are in an organizations with between 10 and 249 employees at the time of data collection.

3.1. Measures

All research measures were carried out by a five-point Likert scale (where 1 = Strongly Disagree and 5 = Strongly Agree) for each item: AI adoption, psychological contract, job engagement and job satisfaction scales. Questions for AI adoption and psychological contract were derived from the existing literature. Employee engagement was assessed by five-item scales which were adapted from the study by Saks (2006). Similarly, the job trust scale has six items adapted from previous research (Gleim, Johnson, & Lawson, 2019; Netemeyer, Maxham, & Lichtenstein, 2010; Saks, 2006).

Furthermore, our study has reverse questions to ensure respondents read and answer the survey questions carefully. Initially, exploratory factor analysis (EFA) was conducted with pilot study data to reduce items and define construct patterns in the dataset (De Vaus, 2002). The decision to remove items was made using two criteria: items were deleted if factor loading was <0.5 and items were deleted if factor loading was on two or more factors (Hair, Black, Babin, & Anderson, 2010). Then, Cronbach's Coefficient Alpha was used to control the reliability of internal consistency items (Hair et al., 2010).

Next, this research employed confirmatory factor analysis to test significance of items' factor loading and to ensure that items were not loading onto other constructs. Tables 3 and 4 set out our empirical results in detail.

The Composite Reliability (CR) of all the constructs is more than 0.7, suggesting adequate level of reliability. In terms of Convergent Validity, Average Variance Extracted (AVE) are all above 0.5. All the square roots of AVE are also greater than inter-construct correlations. Table 4 below suggests good validity of the measurement model.

4. Results

We developed a theoretical framework that examined the impact of AI adoption on relationships among psychological contract, job engagement and employees trust. We theorized that AI adoption would have a negative effect on those relationships. Partial least squares structural equation modeling (PLS-SEM) is widely applied in the business management, management information systems and marketing fields with smaller sample sizes and the use of formative indicators. According to Ringle, Sarstedt and Straub (2012), the most frequently cited reasons of adopting PLS-SEM are related to small sample sizes,

Table 3
Constructs, measures and factor loadings.

	Indicators	Loading	AVE	CR
AI Adoption (α = 0.810)	Could be completed by a zero-hours contractor	0.699	0.564	0.868
	Can be completed by someone on variable pay rates	0.736		
	Payment can be based on completion of pre-agreed deliverables	0.798		
	Can be completed by someone paid on time-based rates (hourly, daily, weekly)	0.782		
	Can be completed at a lower rate of pay	735		
Psychological Contract (α = 0.698)	Can be completed by a freelancer	0.730	0.514	0.816
	Varies in terms of when and where it's done	0.857		
	My job is independent of specified career paths	0.672		
	Involves limited communication to the organization I am working with	0.582		
Job Engagement (α = 0.895)	Being a member of my organization is very fulfilling	0.857	0.705	0.923
	I am able to get involved with activities happening in my organization	0.823		
	Being a member of this organization makes me feel valued	0.899		
	I feel I am part of a social community working in my organization	0.800		
	I am highly engaged in this organization	0.818		
Job Trust (α = 0.900)	I believe my organization can be depended on to do what is right	0.797	0.714	0.926
	I feel my organization is competent	0.845		
	My organization can be trusted at all times	0.868		
	I think my organization treats me fairly	0.866		
	My organization is open and upfront with me	0.846		

Table 4
Convergent validity.

	AVE	CR	AI Adoption	Psychological Contract	Job Engagement	Trust
AI Adoption	0.564	0.868	**0.751**			
Psychological Contract	0.514	0.816	0.660	**0.717**		
Job Engagement	0.705	0.923	0.322	0.364	**0.840**	
Trust	0.714	0.926	0.356	0.407	0.770	**0.845**

non-normal data and the use of formatively measured latent variables. Our research has developed formative measurements and indicators for our research constructs, including psychological contract, job engagement and employees trust. The research sample size (232) we have collected for this study is also relatively small. Thus, we posit that PLS-SEM is better than other tests as an appropriate method to examine this study's research hypotheses Our data analysis results from the PLS-SEM model evaluation show that two hypotheses we developed are supported as shown in Table 5 below.

The results show that psychological contracts have significant positive impact on job engagement as predicted (H1: $\beta = 0.505$; $t = 3.050$, $p < 0.01$), which suggests that employees with positive psychological contracts are more engaged with their jobs. This finding reinforces knowledge about psychological contracts already established in the literature. Psychological contract fulfilment has a positive impact on employee engagement (Chambel & Oliveira-Cruz, 2010).

H2 ($\beta = 0.758$; $t = 5.820$, $p < 0.01$) is accepted as our results confirm that employee engagement has positive significant impact on job trust. This is consistent with Mulki, Jaramillo, and Locander (2006), Ertürk and Vurgun (2015) and Agarwal (2014), who argue that employees trust the organization they are working with when they are more engaged with their jobs.

Our study reveals that psychological contracts have no significant impact on employees' trust (H3: $\beta = 0.201$; $t = 1.049$, ns). This result suggests the full mediation effect of job engagement on relationships between psychological contract and job trust. Our research indicates that without sufficient engagement with their jobs, employees are less likely to develop trust based on their psychological contracts.

When testing the moderating effects of AI adoption on relationships among psychological contract, job engagement and employees trust, our study exposes AI adoption weakens the positive relationship between psychological contract and job engagement (H1m: $\beta = -0.472$; - $t = 1.640$, $p < 0.1$). This is depicted in Fig. 2.

This result confirms negative effects of AI on job engagement, perhaps because it causes uncertainty at work as suggested by previous scholars (Conway & Briner, 2005; Østhus, 2007; Nam, 2019). Our study finds that AI has no significant impact on employees' trust of the company they are working for and has no notable effects on AI Adoption*Job Engagement -> Trust (H2m: not significant) and AI Adoption*Psychological Contract -> Trust (H3m: not significant) relationships.

Table 5
Hypotheses tests results.

Relationships	Estimate	*t*-value	Sig. level	Hypothesis testing
AI Adoption -> Job Engagement	0.413	2.260	**	
AI Adoption -> Trust	0.218	1.460	ns	
Psychological Contract -> Job Engagement	0.505	3.050	***	H1 Accepted
Job Engagement -> Trust	0.758	5.820	***	H2 Accepted
Psychological Contract -> Trust	0.201	1.490	ns	H3 Rejected
AI Adoption*Psychological Contract -> Job Engagement	−0.472	−1.640	*	H1m Accepted
AI Adoption*Job Engagement -> Trust	−0.100	−0.425	ns	H2m Rejected
AI Adoption*Psychological Contract -> Trust	−0.171	−0.711	ns	H3m Rejected

Notes: * $p < 0.1$; **$p < 0.05$; ***$p < 0.01$; ns (not significant).

5. Discussion and implications

The United Nations emerged out of the destruction of the Second World War. Leaders across the globe recognized that social, economic, political and technological developments were essential to avoid the mistakes of the past (U.N., 2019). Yet these developments over the past 70 or so years have been unequal. Some countries, societies, groups and individuals benefited while others were left behind. Moreover, the rush to maximize developments meant that some generations gained in the shorter term at the expense of future generations in the longer term. The use of the word 'sustainable' in the title of the U.N.'s Sustainable Development Goals (SDGs) is important. The notion of sustainability forces leaders, of countries and organizations, to acknowledge that SDGs meet immediate needs and concurrently safeguard and preserve core aspects of life for future generations. Our study focuses on SDG 8 - Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

There are deep tensions between development and preservation. For our purposes, these tensions play out in the development and implementation of AI technologies, on the one hand, and preserving and enhancing 'decent work' on the other. The inexorable implementation of AI-technologies is being driven by a number of factors (Androutsopoulou, Karacapilidis, Loukis, & Charalabidis, 2019; Brown, 2018; Makridakis, 2017). One, is the need for productivity improvements, which are measured by the amount produced for each hour worked. Productivity is widely accepted as a key driver of economic development and higher standards of living. According to the Office of National Statistics, UK productivity has languished, and, as a consequence, average market sector wages are £5,000 lower for the average worker (Kent, 2019). In the same report, the ONS have identified that the most productive industries are capital-intensive and the least productive are mainly labor-intensive in services sectors. This suggests that greater productivity improvements can be gained by applying AI technologies to labor-intensive jobs, with consequential effects of job losses in various services sectors. Two, increased competition to provide customized products and services. Organizations such as Amazon, Uber and similar multi-platform companies have demonstrated significant economic benefits to be gained from catering to consumers' expectations of faster delivery times, ease of purchasing and returning products and tailoring recommendations. The fallout from greater levels of customization, driven by machine learning and smart algorithms, can be seen on the high street retail sector with some of the UK's oldest, well-established brands going out of business. Three, governments and public sector organizations are turning to AI technologies to support a wide range of public policies. For instance, analysis of track and trace data gathered due to the COVID-19 pandemic, facial recognition technologies to help police forces reduce crime rates as well as other applications in defense, border controls and social services.

The U.N.'s SDG 8 defines decent work as the opportunity to gain work that is productive, provides a fair income, and delivers security in workplaces and social protection for families as well as room for personal development and social integration (U.N., 2018). The International Labour Organization puts it succulently when they state: '*Decent work puts money in the pockets of individuals and families that they can spend*' (ILO, 2018, p.2) In addition to creating new jobs, it is essential that current full-time jobs that meet the criteria of decent work are preserved. SDG 8 lays some emphasis on enabling workers to develop

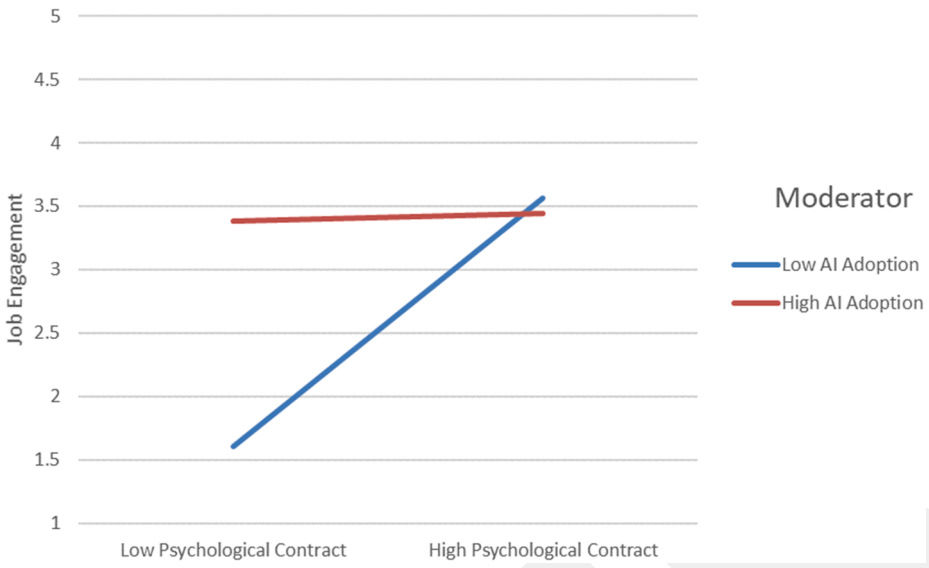

Fig. 2. Interaction: AI Adoption*Psychological Contract -> Job Engagement (H1m: AI Adoption weakens the positive relationship between Psychological Contract and Job Engagement).

their skills and abilities such that they can sustain employability over time. This suggests decent work requires closer working relationships between employers and workers. It also requires an in-depth understanding of workers and their context (Cowls, King, Taddeo, & Floridi, 2019), particularly those with disabilities and other special needs (Lillywhite & Wolbring, 2020).

Embedded in SDG 8 are the elements of psychological contracts between employers and employees. Using the dimensions to differentiate transactional and relational contracts set out in Table 1, the focus of SDG 8 is open-ended rather than specific. Its scope is socially oriented, and the U.N. expect employers to sustain decent work standards on an ongoing basis. SDG 8 goes beyond economic exchange theory, working instead at the level of mutual trust and civic responsibility. Employers, be they small or large, public, private or third sector, are expected to place job security, worker development and distribution of power to workers as part of their standard operating practices. When examined through the lens of psychological contracts, SDG 8 appears to be founded on employers developing relational, rather than transactional, contracts with their workers.

The extant literature shows that employee engagement is vital to organizational prosperity (Bal et al., 2013; Lin, 2010; Rayton et al., 2012; Saks, 2006). The finding from our extensive survey shows that employee engagement is affected positively by psychological contracts. This result suggests that both relational and transactional psychological contracts engender higher levels of employee engagement. Workers who have transactional relationships with their employer know what to expect in terms of conditions and levels of support. They are aware that their contribution is recognized by way of a financial remuneration with no further commitments or demands to be made (Jensen et al., 2010). They are engaged with the employer for as long as the amount of monetary reward matches their perception of fairness and equity (Rousseau, 1990). For instance, an interim HR director on a short-term contract will be committed to the company that employs her or him for the duration of the contract, knowing that at the end of the contract they will sever ties with the organization as well as with many of the colleagues they worked with. Workers with relational psychological contracts have closer, more long-lasting and deeper ties (Rousseau, 1990; Parks & Schmedemann, 1994). The relationship is multi-faceted. Workers that have relational contracts both influence and are influenced by the environment (Thomas et al., 2003). They contribute to creating the culture and can change culture. They feel able to do so because they perceive that their employer is interested in their development and well-being and they are invested personally in the organization. It is perhaps unsurprising that workers with relational contracts are positively engaged with employers. Moreover, our survey results show that employee engagement has a direct and positive affect on workers' trust in the employer. This is an important finding because prior research suggests that greater levels of trust lead to several benefits including a better working environment, greater levels of team working and more open communication (Jones & George, 1998; Kiffin-Petersen & Cordery, 2003).

Our findings show that the adoption of AI lowers levels of employee engagement. While this effect had been hypothesized in the literature (e.g., Rikakis, Kelliher, Huang, & Sundaram, 2018), to our knowledge, our study is the first to show this effect empirically. This novel result is significant because the fall in employee engagement does not appear to be related to the type of psychological contract. In other words, employee engagement falls due to AI adoption whether or not workers had a transactional or relational contract. We determine that the current categories of transactional and relational contracts are insufficient to explain the reduction employee engagement. To these two forms of psychological contracts, we add "alienational" contracts.

Alienational contracts are focused on ad hoc arrangements between employers and workers. This might take the form of zero-hour contracts or results-based payments. The scope is determined by the technology deployed to mediate relationships between employers and workers. The basis of interactions is with limited or no human intervention. The time period is sporadic, characterized by irregular, erratic instalments of work. According to Fleming (2017), human capital theory provides a framework for individuals taking sole responsibility for their own financial and economic outcomes. Employers and the state play little or no role in whether workers are able to earn a basic standard of living. Organizational practices that may be observable include workers interacting with technological interfaces that determine jobs they do, the amount they earn and quality standards of their work. Employers using machine learning and smart algorithms use data to take objective decisions with little or no human mediation. The key attributes of alienational contracts are set out in Table 6 and Fig. 3.

The literature on psychological contracts has provided deeper insights into relationships between employers and workers. Building upon extant understanding, we suggest that relational. transactional and alienational contracts can be located on a theoretical continuum of employer-employee relationships. The ends of the continuum are characterized by tightly interdependent relationships at one end and wholly

Table 6
The attributes of Alienational psychological contracts vs transactional and relational contracts.

Dimension	Alienational Contract	Transactional Contract	Relational Contract
Focus	Ad-hoc	Specific	Open-ended
Scope	Technologically oriented	Economically oriented	Socially oriented
Time-period	Sporadic	Specific	Longer-term/ Ongoing
Underpinning Theory	Human Capital Theory	Economic Exchange	Social Exchange Theory (contingent and reciprocal exchanges)
Practices	Interactions with algorithms; Data-led decision making	Wages Monitoring employee performance	Employee training and development, Job security, Allocation of responsibility and power to employees

independent relationships at the other. On this continuum, relational contracts are closer to the interdependent end and alienational contracts are closer to the independent end of the continuum, with transactional contracts located between the two.

5.1. Implications for practice

Our study has practical relevance for leaders planning or already in the throes of adopting AI and contributing to fulfilling SDG 8. The pressure to use AI technologies is likely to increase, whether that is due to increased levels of competition, consumer preferences or regulatory requirements (Makridakis, 2017; Pluta and Rudawska, 2016; Zarouali, Van den Broeck, Walrave, & Poels, 2018). Like many previous IT projects, AI implementations garner significant support from senior leadership levels because large budgets may be required. Workers from different levels of organizations will be called upon to support the implementation, not least to ensure that data required by smart algorithms are clean. Workers need to engage positively with AI technologies to exploit the benefits. Yet our study shows that employee engagement falls as a consequence of adopting AI technologies.

Therefore, leaders responsible for the adoption of AI need to begin by recognizing that worker engagement will fall before, during and after AI implementation. They need to prepare workers through effective communications strategies that explain how AI technologies will be implemented and the effects of these technologies on their job.

AI causes significant uncertainties for workers and leaders need to take steps to support and protect the well-being of their employees. AI has the potential to promote inclusion of workers in at risk groups, such as disabled workers (Lillywhite & Wolbring, 2020). However, as AI technologies are implemented, in some cases entire jobs or some tasks may be automated out of existence. Workers who perceive that their jobs may be adversely affected will need to be supported and provided with some level of certainty about their future.

Leaders adopting AI technologies while concurrently targeting achieving SDG 8 need to recognize that there are trade-offs to be made. On the one hand, AI technologies may remove altogether or reduce the numbers of employees already in decent, full-time permanent jobs. It may be that many such decent jobs may be replaced by short-term, gig work that is ad hoc or temporary in nature. Consequently, rather than achieving SDG 8, they may be moving in the opposite direction – replacing decent work with contingency work, replacing certainty of a regular income with volatility of no income in one time to a decent income in another period. Income volatility leaves workers feeling vulnerable, lacking control over their lives and disrupting family and social cohesion. Leaders need to understand and plan the implementation support to be provided to breaching the targets set within SDG 8.

This study has shown the importance of psychological contracts before, during and after the adoption of AI. Specifically, leaders need to ensure that they steer clear of adopting AI technologies in ways that leave their workers experiencing an alienational psychological contract. Although conventional wisdom about psychological contracts suggests that relational contracts are preferable to transactional contracts, our study shows that transactional contracts are significantly better than alienational contracts. Practically, leaders may well target achieving transactional relationships in order to mitigate workers feeling that they have alienational contracts.

6. Conclusions

Drawing upon the literature, primary survey data collection and analysis, findings and our discussion of findings, we conclude the following. One, significant mediating effects of job engagement between psychological contracts and employee trust suggests that employee engagement continues to be a vital factor to gain employee trust. Higher levels of employee engagement and trust lead to positive outcomes in the era of AI technologies. Two, AI adoption weakens positive relationships between psychological contracts and job engagement. This means conventional relational and transactional contracts do not fully explain the interplay between AI technological advancements and psychological contracts. Three, the new concept of alienational psychological contracts, introduced in this paper, will play a bigger role in framing relationships between employers and workers as AI adoption spreads. Four, the implementation of AI that leads to workers perceiving that their contract is alienational will move organizations away from rather than towards the achievement of SDG 8.

A limitation of this study is that it concentrates on one SDG. AI adoption affects several other SDGs including and not limited to SDG 1, ending poverty in all its forms everywhere, SDG 4, inclusive and equitable quality education and promoting lifelong learning and SDG 11, make cities and human settlements inclusive, safe, resilient and sustainable. Further work should be done to examine the adoption of AI in the context of these SDGs.

This study creates a number of opportunities for further research.

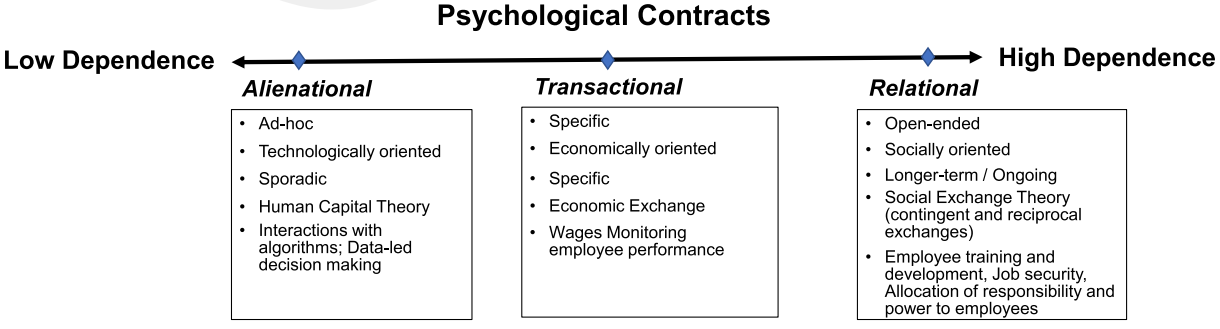

Fig. 3. A conceptual continuum of psychological contracts.

This study contributes to and advances the literature on the impact of AI adoption on relationships among psychological contract, job engagement and employees trust. It is the first to examine changes to psychological contracts due to AI adoption. This area can be studied using qualitative methods to understand from workers' first-hand accounts of how they perceive their own contract has changed, whether changes have been for better or worse and implications on themselves, their family and wider social fabric of which they form a part.

This study proposes alienational as a new type of psychological contract and has theorized its characteristics. Alienational contracts need to be studied in greater depth to elaborate its attributes. Do alienational contracts pervade some industries or sectors more than others? The extent to which some workers cope better with alienational contracts than others needs to be examined. For instance, can older or younger workers deal better with alienational contracts? Does gender play a factor in whether or not alienational contracts cause greater levels of stress? AI has the potential to improve society by addressing issues such as improving worker inclusion (Lillywhite & Wolbring, 2020), eliminating gender discrimination and sexual harassment at work (Cowls et al., 2019) and reducing cyberbullying (Kumari, Singh, Dwivedi, & Rana, 2019). However, for AI to deliver in its social good promise, it is crucial to understand the context in which it is deployed (Cowls et al., 2019).

While a new type of social contract may be emerging as a result of job displacements created by AI, there are also opportunities for AI to be used to develop a more harmonious and productive society, as suggested by Rikakis et al (2018). Future research should explore how AI can or should evolve in partnership with workers' needs, in order to deliver on the vision of all U.N. Sustainable Development Goals. Our work on psychological contracts conjoins with the extensive body of AI and social good literature (Cambria, Chandra, Sharma, & Hussain, 2010; Khatua et al., 2018, 2019). We anticipate that researchers will want to examine the overlaps and links between the two areas. The focal general area of our study is a section of businesses located in West London, UK. We would recommend and encourage researchers to conduct similar analyses in other regions and countries and examine both trends and cross-regional comparisons.

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