Organising Emerging Intelligent Technologies: The Case of Autonomous AI-Coordinated Drone Ecosystems

Stavros Polykarpou
Stavros.polykarpou@rhul.ac.uk

Nisreen Ameen
Nisreen.Ameen@rhul.ac.uk

Najmeh Hafezieh
Najmeh.Hafezieh@rhul.ac.uk

Vera Hoelscher
Vera.Hoelscher@rhul.ac.uk

Royal Holloway
University of London
School of Business and Management
Digital Organisation and Society Research Centre

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Introduction

Emerging technologies such as chatbots, 3D printing, data analytics, and robotics are not just evolving; they are becoming intelligent, interconnected, and constitutive elements of organising practices. These innovative technologies, powered by artificial intelligence (AI), hold immense potential for organisations across industries and society. What sets them apart is their constant evolution and adaptability, both in their uncertain design, use, and effects, which are always in flux. They are constantly acquiring, sharing, and analysing vast real-time unstructured datasets to operate autonomously or collaborate with humans in ways that seem intentional (Bailey et al., 2022). This paper unpacks the black box of socio-material agencies constitutive of artificial intelligences through performing specific organising methods. To do so, we build on longitudinal ethnographic empirical data gathered over two years on an exemplary case: a modularised ecosystem of AI-coordinated drones. In this ecosystem, drones are designed to work flexibly and adaptably, with each drone performing a specific task based on the system's needs. These drones collect, analyse, and mobilise complex real-time data sets to "intelligently" coordinate logistical commercial parcel deliveries through embedded sensors. The paper contributes to the underexplored scholarly debates on intelligent automation's broader societal and ethical implications (Burton-Jones, Butler, Scott, & Xu, 2021; Li & Marabelli, 2021; Young, Majchrzak, & Kane, 2021) by exploring *how autonomously coordinated technologies guided by AI perform intelligent decision-making practices?*

Theoretical Framework: A Relational Perspective of Organizing Responsible Intelligent Emerging Technologies

We adopt a relational perspective (Bailey et al., 2022; Leonardi, 2011; Orlikowski & Scott, 2015) to study this emerging and constantly evolving empirical phenomenon. We build upon recent contributions on theorising emerging technologies (Pentland, Yoo, Recker, & Kim, 2022) that acknowledge combining multiple different technologies, such as robotics (Sergeeva, Huysman, & Faraj, 2018), data analytics (Pachidi, Berends, Faraj, & Huysman, 2020) , 3D printing (Polykarpou, Barrett, & Oborn, 2020) and algorithmic management tools (Faraj, Pachidi, & Sayegh, 2018). This view of intelligent technologies captures the socio-material agencies of distributed actors increasingly performing tasks such as collecting and processing information, dividing, assigning, and integrating tasks, allocating resources, and making decisions through inscribed machine learning capabilities. We focus on the significant challenges of integrating responsible AI practices that account for ethical considerations, privacy concerns, safety, and security issues. A review of AI-related papers in the IS scholarly community underscores the need for a practice-based approach to study the emergent and unpredictable uses of intelligent automation technologies in everyday practices. Our empirical case examines a novel, patented autonomous air-ground payload transfer drone platform for a precise, safe, and quiet drone delivery ecosystem. The technology was developed by a leading global design, engineering, and consulting services organisation in over 25 countries.

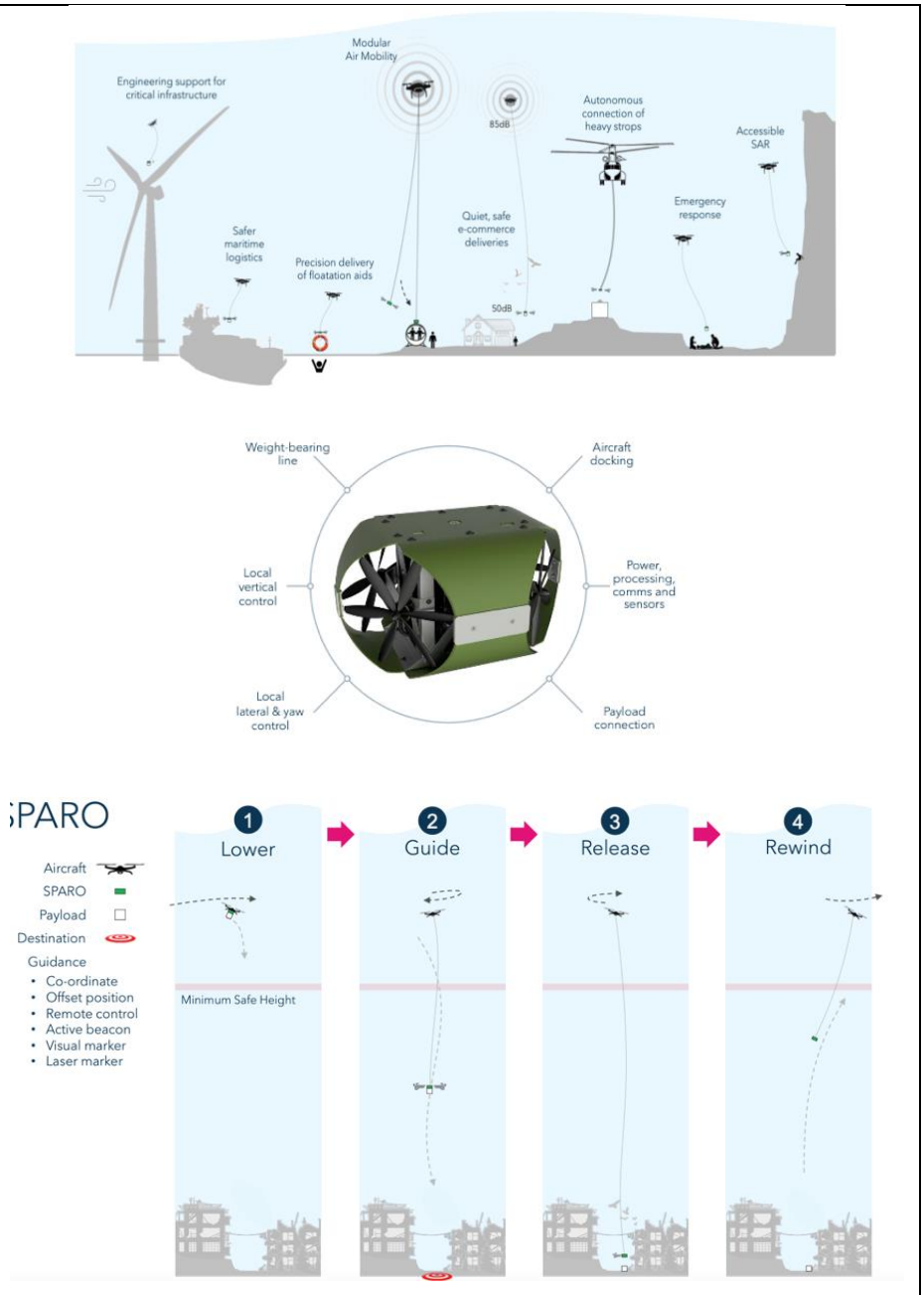

Figure 1. Research Context

Contributions: Theorising for the Future - From Black Boxed Intelligence Towards Responsible AI-Intuitive Agility

The paper contributes to the underexplored scholarly debates on intelligent automation's broader societal and ethical implications (Burton-Jones et al., 2021; Li & Marabelli, 2021; Young et al., 2021). First, by adopting a relational, practice-based approach to studying AI-coordinated modular drone platforms and ecosystems, we uncover the emergent and unpredictable uses of intelligent automation technologies as enacted in everyday practices, emphasising the importance of addressing ethical implications for responsible AI design and

use and building on recent work that highlights the urgent need for studying intelligent automation empirical phenomena responsibly (Li & Marabelli, 2021). Second, weand add to the conversation on challenging the dominance of the information processing perspective that has become pervasive in achieving organisational success (Pachidi & Huysman, 2017). This approach cautions against a deterministic design science approach that may fail to address the root causes of societal problems linked to ML (Machine Learning) and AI by challenging the prominent assumption that data analytics makes organisations more intelligent. As Günther et al. (2023) argued in the context of algorithmic qualitative research, algorithms require researchers' active involvement in several decisions which are consequential to – and potentially a consequence of – the outcome researchers obtain at each stage of research, in the manner of a 'reflexive dance' between the researcher and their algorithmic co-researcher. Similarly, responsible AI use entails unpacking the constitutive between datasets, inscribed ways of analysing data (such as by including or excluding specific data), and how intelligence is performed.

Second, we caution against overreliance on analytics, which can result in the reinforcement of superstitious learning (Pachidi & Huysman, 2017). Exclusive reliance on analytics to comprehend which organisational actions prompted a reaction and then adjust, they may narrow their focus to only actions that have been proven successful. This could strengthen particular behaviours, patterns, and biases ingrained in analytics algorithms while overlooking others. Additionally, analytics may only cover certain environmental factors, potentially leaving out specific patterns not encoded in algorithms. For example, in a Telecom scenario, relying solely on analytics for sales changes might miss uncodified implicit information such as customers' expansion plans.

Finally, we offer an 'artifactual' perspective on data (Jones, 2019), a viewpoint that recognises data as a product of human creation rather than objective facts. Excessive reliance on analytics can lead organisations to limited thinking and self-centeredness and to being overly dependent on the information they generate. This perspective stresses the need to demystify intelligent automation by acknowledging the human origins of machine learning. Appreciating the human-made nature of data is crucial, as it reminds us that data is not just a set of numbers or facts but a product of human decisions, biases, and interpretations. This understanding has significant implications for the responsible design and use of AI, as it highlights the need to consider the human factors that influence data and its use in AI systems. Thus, our research aims to inform policymakers about the safe delivery of drone technology for delivery services and (para)-military activities while examining the potential benefits AI technologies can bring to such endeavours.

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