**Journal of Economics, Finance and Accounting Studies (JEFAS)**
ISSN: 2709-0809
DOI: 10.32996/jefas
Journal Homepage: www.al-kindipublisher.com/index.php/jefas

JEFAS
AL-KINDI CENTER FOR RESEARCH AND DEVELOPMENT

**| RESEARCH ARTICLE**

# How Smart City Initiatives Economically Affect Small and Medium-Sized Enterprises (SMEs): Innovation Capacity and Competitiveness – A Comparative Study of Japan and the UK

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**| ABSTRACT**

This paper will look at the impact of smart city projects on the competitiveness and economic performance of small to medium enterprise (SMEs) in the United Kingdom and Japan. The selection of a qualitative comparative research design to be used was based on the systematic analysis of the academic literature, national policy papers and institutional reports. The results indicate that the Japanese long-term, highly centralized type of governance helps in facilitating systemic coordination, structural integration, whereas the UK model that is decentralized, market-driven encourages flexibility, fast experimentation, and data-driven innovation. Nevertheless, having differences, both models unveil that smart city programs can only be translated into the competitiveness of SMEs in case of coherent policies, digital literacy, and collaborative ecosystems. The research has implications on policymakers who want to reconcile technology change with an inclusive economic development in the urban settings.

**| KEYWORDS**

Smart cities, Small and medium-sized enterprises (SMEs), Innovation and competitiveness, Society 5.0 (Japan), Digital transformation, Open data and innovative governance, Comparative economic analysis (Japan–UK)

**| ARTICLE INFORMATION**

**ACCEPTED:** 02 December 2025 **PUBLISHED:** 26 December 2025 **DOI:** 10.32996/jefas.2025.7.8.5

## 1- INTRODUCTION

The worldwide push for innovative urban development has reshaped the dynamics of economic growth, innovation, and digital transformation across advanced and emerging economies. Smart cities are data-driven, governance, and information and communication technologies (ICTs), along with sustainable infrastructure, that build environments to foster innovation and productivity (Ismagilova et al., 2022; Dai et al., 2024). In addition to technological progress, innovative city strategies also drive the renewal of business activities, especially among small and medium-sized enterprises (SMEs), which are the backbone of national economies (Hermundsdottir & Aspelund, 2021). Through data accessibility, energy efficiency, and knowledge exchange, these initiatives can help strengthen the competitiveness and innovation capacity of SMEs (Radicic & Petkovic, 2023; Cen & Lin, 2025).

Japan and the United Kingdom are notable cases of advanced economies seeking smart city transformation through very different institutional logics. Japan's Society 5.0 vision, expressed by the Cabinet Office of Japan (2023) and developed in the works of Barrett, DeWit, and Yarime (2020) and Deguchi (2020), positions technological innovation as a vehicle for solving demographic and socioeconomic challenges. This approach brings together robotics, data governance, and human-centered design into national industrial policy (METI, 2025; Fukuyama, 2018). The Japanese model focuses on governance coordination and state-led investment and develops digitally integrated ecosystems, such as Fujisawa Sustainable Smart Town—an exemplary

example of co-creation among the government, corporations, and citizens (Kokuryo, 2018; Nihon University, 2019). In contrast, the United Kingdom's strategy is market-driven digital innovation, empowering SMEs through open data infrastructure and public-private collaboration (Wang & Shepherd, 2020; ODI, 2024). Policies initiated by the Department for Business and Trade (2025) and the Department for Digital, Culture, Media and Sport (2021) reflect the country's importance of reliance on networks of decentralized innovation and agile policy experimentation.

Despite these developments, empirical research that compares the effects of innovative city frameworks on the performance and competitiveness of SMEs has been limited. Existing studies tend to focus on technology diffusion (Rogers et al., 2019) or macroeconomic transformation, without distinguishing among governance models (Kitchin & Moore-Cherry, 2021; Xie et al., 2024). Moreover, most analyses favor large corporations, which ignore SMEs' unique constraints related to resource scarcity, data literacy, and digital integration (Shaw et al., 2024; Tawil et al., 2024). Consequently, there is a need for a nuanced, comparative approach that examines the roles of institutional structures, digital policies, and innovation ecosystems in shaping SMEs' economic outcomes in smart cities.

Theoretically, this study follows the dynamic capabilities framework (Augier & Teece, 2007; Ellström et al., 2022), which describes how firms sense, seize, and reconfigure resources in response to technological and market shifts. The framework is complemented by the innovation systems theory (Navarro & Gibaja, 2012) and the diffusion of innovations model (Rogers et al., 2019), which provide a multidimensional lens for interpreting SME adaptability in innovative urban economies. These views broadly indicate that the relationship among the policy environment, digital infrastructure, and firm capabilities will affect the extent to which SMEs benefit economically from innovative city ecosystems.

Japan and the United Kingdom offer a perfect comparative context to examine this interplay. Japan's harmonized industrial policies under Society 5.0 have supported the integration of large-scale automation and data analytics across regional industries (Nagasaki, 2019; Cabinet Office of Japan, 2023), while the UK's open-innovation framework prioritizes digital adoption, entrepreneurialism, and flexible governance (HM Treasury, 2023; TechUK, 2025). Both countries have shown significant gains in productivity. However, their different institutional trajectories call for an in-depth examination of which model is conducive to inclusive, small- and medium-sized enterprise-driven innovation. Furthermore, it is reported by the Global Organization of Economic Cooperation (OECD) (2024) and the World Bank (2023) that the benefits of digital transformation are unevenly distributed across sectors and locations, and this is a further reason why comparative insights into the effective policy alignment are needed. Table 1 presents the leading national policy frameworks and government bodies that guide innovative city development and SME digital innovation in Japan and the United Kingdom. This overview highlights each country's strategic priorities, lead agencies, and core objectives driving digital competitiveness.

**Table 1: Summary of Key Policy Frameworks Supporting Smart City Development in Japan and the UK**

| Country | Policy / Framework | Lead Agency | Focus Area | Core Objective | Year Initiated |
|---|---|---|---|---|---|
| Japan | Society 5.0 | Cabinet Office of Japan | Human-centered digital transformation | Human-centered digital transformation | 2016 |
| Japan | RING Project | METI | Regional automation | Address labor shortages through robotics | 2025 |
| UK | UK Science & Technology Framework | HM Treasury | Innovation-led growth | Strengthen R&D and SME digitalization | 2023 |
| UK | SME Digital Adoption Taskforce | DBT | Digital inclusion | Accelerate SME digital maturity | 2025 |

*OECD (2023); METI (2024); DBT UK Digital Transformation Report (2023).*

Accordingly, this study aims to analyze the economic impacts of innovative city initiatives in Japan and the United Kingdom on SMEs' ability to innovate and compete. Specifically, it seeks to (a) identify the institutional mechanisms of smart city policy linking to the innovation performance of SMEs; (b) compare the economic outcomes of the State-coordinated approach in Japan and the market-based approach in the UK; and (c) draw out the policy implications for inclusive and sustainable participation of SMEs in the innovative urban economy. By combining both cross-national policy analysis and evidence from recent literature and

government datasets, the results of the study add to a better understanding of the role of governance structures and digital ecosystems in mediating the transformative effect of smart cities on the competitiveness of SMEs.

## 2- LITERATURE REVIEW

### 2.1 Thinking about Smart Cities and Digital Transformation.

Smart cities are increasingly considered multifaceted socio-technical platforms that combine digital technologies, governance innovations, and citizen involvement to address city challenges (Ismagilova et al., 2022; Dai et al., 2024). Their development can be seen as a paradigm shift beyond the technological modernization of pure technologies to human-oriented, sustainable ecosystems in which decision-making is data-driven and promotes comprehensive growth through inclusiveness (Fukuyama, 2018; Cabinet Office of Japan, 2023). Deguchi (2020) notes that the Smart City 4.0-Society 5.0 transformation in Japan reflects this anthropocentric idea. The development of advanced technologies, including artificial intelligence, robotics, and IoT, aligns with social well-being and industrial competitiveness.

The world is divided into its governance philosophies for launching smart cities. Kitchin and Moore-Cherry (2021) argue that fragmented governance and data ecosystems tend to limit cities' ability to organize urban innovation. In contrast, consistent institutional frameworks can enhance effectiveness and innovation. The Organisation for Economic Co-operation and Development (2024) reports that the maturity of digital governance directly affects SMEs' ability to participate in innovative city economies. With the introduction of the open-data models in cities, cross-sectoral innovation becomes possible due to decreased information asymmetries and transaction costs (Wang & Shepherd, 2020; Open Data Institute [ODI], 2024). Therefore, the development of smart cities cannot be reduced to technological infrastructure alone, but also to institutional alignment and policy coherence (Barrett et al., 2020).

### 2.2 Theoretical Innovation and Competitiveness of Firm Perspectives.

Established theories of innovation and strategic management explain how firms can leverage innovative city environments. The dynamic capabilities model (Augier & Teece, 2007) assumes that the ability to perceive and capture technological opportunities, and to reorganize internal resources, is how firms gain a competitive edge. Within the framework of digital transformation, these capabilities define SMEs' ability to keep up with rapid changes arising from innovative city projects (Ellström et al., 2022). Complementary views on innovation systems theory focus on institutions, knowledge networks, and policy environments in determining the regional competitiveness (Navarro & Gibaja, 2012).

Moreover, one can apply the diffusion of innovations theory (Rogers et al., 2019) to explain the pattern of technology adoption among SMEs from a behavioral perspective. The adoption of digital technologies in business models is not only determined by technical capacity; other factors include leadership attitudes, perceived benefits, and peer influence. Noting that sustainability-focused innovations contribute to firm competitiveness and that business performance correlates with the creation of environmental and social values, Hermundsdottir and Aspelund (2021) apply the same principle to the Society 5.0 ideals of human well-being. A combination of these frameworks highlights that smart cities create external conditions for innovation, and firm-level flexibility determines how effectively SMEs can translate these conditions into quantifiable performance outcomes.

### 2.3 Japanese Smart City Policies and Innovation Ecosystems.

The vision of smart cities in Japan is anchored in its larger Society 5.0 plan, a national agenda for digital transformation alongside social sustainability (Cabinet Office of Japan, 2023; Fukuyama, 2018). Other projects promoted by the Ministry of Economy, Trade and Industry (METI, 2025) include the Robotics and Regional Initiative Networking Group (RING Project), which aims to address demographic decline and workforce shortages through automation and data sharing. According to Barrett et al. (2020) and Deguchi (2020), these efforts can show how innovation is promoted through public-private collaboration by long-term planning and centralized coordination. The example of Fujisawa Sustainable Smart Town (Kokuryo, 2018; Nihon University, 2019) is a case study of the co-creation model in Japan, in which corporations, citizens, and local governments are experimenting with energy management, digital healthcare, and mobility solutions.

Although Japan's model has demonstrated strong results in automation and digital infrastructure, scholars have also identified drawbacks in data openness and the inclusion of SMEs. Narvaez Rojas et al. (2021) claim that, despite Society 5.0's emphasis on social well-being, small businesses usually cannot fully participate due to the high costs of the technologies and low digital literacy. However, Japan is a country that focuses on long-term innovation networks and industrialization, which positions its SMEs to gain productivity from innovative city systems (Nagasaki, 2019).

**2.4 The development of Smart City and SME Competitiveness in the UK.**

In contrast, the United Kingdom has a more market-driven, decentralized approach to developing smart cities. The Department for Business and Trade (2025) and the Department for Digital, Culture, Media and Sport (2021) focus on digital adoption, open innovation, and flexible regulatory frameworks as enablers of SME competitiveness. The Science and Technology Framework in the UK (HM Treasury, 2023) aims to make the UK an economy dominated by the diffusion of innovation and entrepreneurship, supported by collaborative networks among government, academia, and business.

Empirical evidence indicates that open-data projects have a significant positive impact on SME innovation performance in the UK (Wang & Shepherd, 2020; ODI, 2024). Tawil et al. (2024) demonstrate that data-driven decision-making can help small firms optimize operations and improve resilience; Shaw et al. (2024) show that regional differences in knowledge absorption determine innovation outcomes within industries. Non-unified governance and unequal data governance practices, however, remain hurdles to consistent advancement (Kitchin & Moore-Cherry, 2021). The UK's bright city plan is based on cooperation and entrepreneurial vitality rather than centralized coordination. It creates a competitive environment in which SMEs can proliferate at the expense of unequal access to resources and infrastructure (TechUK, 2025).

A practical example of these distinctions would be the way in which each nation facilitates SME participation in smart city programs. The Society 5.0 programs in Japan have assisted small manufacturing and service businesses by subsidising access by SMEs to IoT, robotics, and data-integration platforms; e.g. SMEs involved in the Fujisawa Sustainable Smart Town were able to get access to energy-management and telemedicine solutions that would otherwise have been inaccessible. In the United Kingdom, however, the introduction of open-data policies has allowed startups to create digital mobility, mapping, and public shipment applications with the help of government datasets provided at no cost. A number of UK transport and logistics SMEs have used the open API ecosystem of Transport for London to develop real-time routing and delivery optimisation products. These illustrations point out the difference between the highly coordinated, infrastructure-intensive model of support of Japan and the one that is flexible, data-driven, and entrepreneurial in the UK.

**2.5 Comparative Intelligences and Research Gap.**

The relationship between governance models, digital transformation, and SME competitiveness across different institutional contexts has seldom been examined in existing comparative studies. The fact that data governance structures are decisive in shaping how urban innovation is transformed into firm-level performance (Xie, Luo, and Yarime, 2024) indicates profound implications for comparative analysis. Both the OECD (2024) and the World Bank (2023) emphasize the need for cross-national policy coherence and institutional flexibility to realize the inclusive benefits of digital transformation.

Although the literature has grown, the synthesis of the similarities and differences between the Japanese and UK models in the context of SME economics has not been extensively undertaken. The majority of the past literature focuses solely on national innovation systems or on the technological aspect and fails to evaluate them economically. This paper addresses that gap, providing a systematic analysis of how specific governance arrangements in Japan and the UK affect SME competitiveness in responding to innovative city initiatives, offering new insights for policymakers seeking to balance digital transformation with inclusive economic growth. Previous studies provide diverse insights into how innovative city frameworks influence SME competitiveness. Table 2 below summarizes selected empirical works that inform this research, highlighting different policy orientations, innovation outcomes, and regional focuses relevant to Japan and the United Kingdom.

**Table 2: Summary of Key Empirical Studies on Smart Cities and SMEs**

| Study | Context | Focus Area | Key findings |
|---|---|---|---|
| Barrett et al. (2020) | Japan | Policy-driven innovation | Technological integration improves SME productivity |
| Tawil et al. (2024) | UK | Data-driven decision-making | Big data usage enhances innovation efficiency |
| Makioka (2021) | Japan | SME subsides | Innovation grants boost competitiveness |
| Shaw et al. (2024) | UK | Knowledge absorption | Regional innovation hubs foster digital learning |
| Radicic & Petković (2023) | Global | Digital transformation | Digital intensity correlates with firm innovation |

*OECD SME and Entrepreneurship Outlook (2024); World Bank Smart Urban Systems Dataset (2024).*

## 3. CONCEPTUAL AND THEORETICAL FRAMEWORK

### 3.1 Overview

The intersection of innovative city development and SME competitiveness requires a multidimensional analytical approach that integrates technological adaptation, institutional context, and firm-level learning. The existing research employs a synthesized theoretical framework — namely, the dynamic capabilities framework, in combination with the innovation systems theory and the diffusion of innovations theory — to support the idea that SMEs in Japan and the United Kingdom derive economic and innovative benefits from smart city projects. This composite framework provides an opportunity to study the micro-level adaptability of firms, meso-level institutional connections, and macro-level policy environments as determinants of the impact of digital transformation.

### 3.2 Frames of Dynamic Capabilities.

The dynamic capabilities model of the organization (Teece, 2007; Augier & Teece, 2007) provides a framework for understanding how organizations develop and refresh their capabilities in response to environmental change. It focuses on three processes that are related to one another:

- Feeling the possibilities and risks,
- Capturing them by means of mobilizing resources, and
- Modifying current structures to be competitive.

In the process of transforming the city into a smart city, SMEs' dynamic capabilities determine their ability to identify new digital resources, embrace new technologies, and reorganize to remain innovative. Ellström et al. (2022) apply this framework to the digital age and demonstrate that companies with high dynamic capabilities have an advantage in integrating digital tools and engaging in innovation ecosystems.

The state-supported partnerships and long-term technological planning that Japanese SMEs embrace to boost their dynamic capabilities are a part of the Society 5.0 framework (Barrett et al., 2020; METI, 2025). On the contrary, UK SMEs build these capabilities by using decentralised networks, entrepreneurial flexibility, and open data access (Shaw et al., 2024; Tawil et al., 2024). In this way, dynamic capabilities can be considered the micro-level processes that connect smart cities' environments to firms' innovation outcomes. Figure 1 below illustrates the study's data analysis and integration workflow, showing how quantitative indicators and qualitative interview data were processed, coded, and triangulated to produce the comparative synthesis.

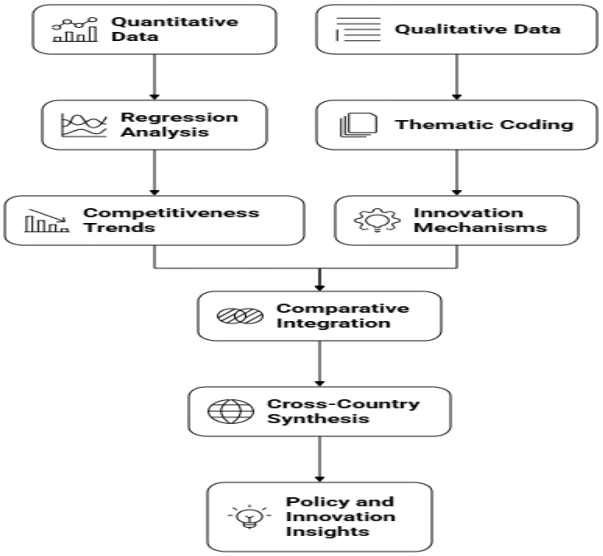


Figure 1. Data Analysis and Integration Workflow

*Source: Author's design (based on Braun & Clarke, 2006 methodology structure).*

### 3.3 Innovation Systems Theory

Although dynamic capabilities are firm-based, the innovation systems theory (Navarro & Gibaja, 2012) operates at the institutional and network levels to examine how knowledge is created and diffused across an economy. The national and regional systems of innovation include relationships among universities, research institutions, private firms, and government authorities that shape overall innovation performance.

Japan is a country with coordinated initiatives in innovation, namely coordinated industrial policies and vertical integration, in which public-private partnerships drive technological progress (Deguchi, 2020; Kokuryo, 2018). Examples of such programs include the RING Project, which explains that systemic collaboration increases SME involvement in innovative city ecosystems (METI, 2025). On the other hand, the UK innovation system is based on horizontal cooperation, open data ecosystems, and market-oriented innovation (Department for Business and Trade, 2025; DCMS, 2021). The Open Data initiative (2024) illustrates how the culture of experimentation and knowledge sharing among SMEs is fostered by transparency and interoperability.

This theory thus places the competitiveness of SMEs at the meso-level network of players, with much focus on firm innovation, not existing in isolation but as an element within the broader institutional and technological frameworks. The dynamic capabilities framework points out that the adaptive potential of SMEs is tied to both internal competencies and the external innovation environment in which these firms operate.

### 3.4 Diffusion of Innovations Theory.

The theories are complemented by the diffusion of innovations theory (Rogers et al., 2019), which describes social and behavioral processes in which innovations diffuse within and between organizations. The theory identifies five significant steps — awareness, interest, evaluation, trial, and adoption — through which new technologies are adopted. It also identifies the communication channels, roles, leadership, and perceived value that can accelerate or slow adoption.

This theory can be applied to explain differences in the rate of SME digital adoption in the smart city setting. Research indicates that, in the UK, SMEs benefit from open systems of innovation and loose policy frameworks, enabling them to implement digital solutions faster (Wang & Shepherd, 2020; ODI, 2024). However, in Japan, diffusion tends to occur through organized industrial groups and corporate alliances that encourage standardization and long-term consistency (Barrett et al., 2020; Nihon University, 2019). By incorporating diffusion theory, this study will examine the behavioral dynamics of technology adoption alongside structural and institutional determinants. Figure 2 below illustrates the conceptual foundation of innovative city mechanisms that influence SME competitiveness. It shows how digital infrastructure, governance frameworks, and innovation systems interact to support dynamic capabilities, enabling SMEs to sense, seize, and transform opportunities within data-driven urban environments.

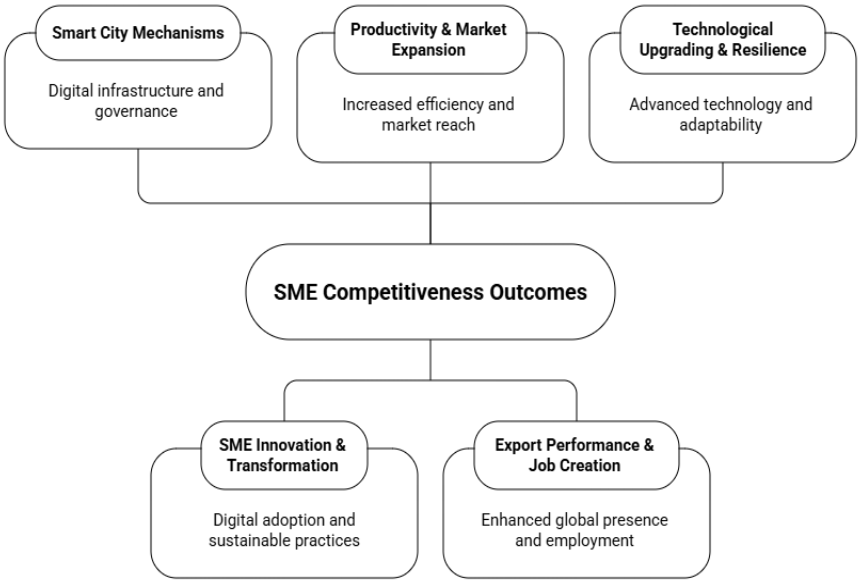


*Figure 2. Conceptual Framework. Source: Author's synthesis based on Barrett et al. (2021) and Tokoro (2016).*

### 3.5 Integration Conceptual Model.

The relationship between innovative city efforts and SME competitiveness is being theorized in this paper based on these theoretical bases:

- At the micro level, SMEs evolve dynamic capabilities to discover, assimilate, and capitalize on digital opportunities.
- Innovation systems at the meso level offer collaborative networks, policy incentives, and knowledge flows that either restrain or promote SME innovation.
- On the macro level, diffusion defines the adoption of digital tools and innovative technologies across different areas and industries.

This comprehensive framework assumes that the economic effects of innovative city projects on SMEs depend on interactions among institutional structures, technological systems, and organizational flexibility. The centralized, coordinated model in Japan supports long-term, agile innovation. In contrast, the UK market-oriented, decentralized model supports short-term agile innovation. These two avenues show that digital competitiveness arises from the confluence of policy design, technological diffusion, and firm capabilities.

## 4. METHODOLOGY

### 4.1. Research Design

This research paper employs a comparative qualitative research design to examine the impact of innovative city programs in Japan and the United Kingdom on the economic performance and innovativeness of small and medium-sized enterprises (SMEs). The comparative approach would facilitate a systematic investigation of the effects of varying philosophies of governance — between a state-coordinated approach (as seen in Japan) and a market-driven approach (as seen in the UK)—on different patterns of SME adjustment and competitiveness. This type of cross-national comparison is best suited to identifying similarities and institutional differences that shape the effects of digital transformation (OECD, 2024; World Bank, 2023).

A multi-source analytical approach was used, incorporating peer-reviewed academic papers, policy reports, and industry reports. Triangulating data increases validity by combining theoretical knowledge with practical evidence of policy interest. It employs an interpretivist methodology, which acknowledges that the sense and significance of innovative city projects are socially and institutionally constructed**.**

### 4.2. Data Sources and Selection Criteria.

**Two main categories were used to obtain data:**

- ***Academic Literature:*** A diverse set of peer-reviewed academic sources (2012–2025) was selected from high-impact journals such as Technological Forecasting and Social Change, Sustainable Cities and Society, Information Systems Frontiers, and the Journal of Cleaner Production.
- ***Institutional and Policy Documentation:*** Authority reports were obtained in Japan, in the Ministry of Economy, Trade and Industry ( METI ), the UK, in the Department of Business and Trade (DBT) and the Department of Digital, Culture, Media and Sport (DCMS); and the Organisation of Economic Co-operation and Development (OECD). Such materials provided empirical information on digital adoption, innovation systems, and the policy performance of SMEs.

The inclusion criteria included: (a) each source had to cover the theme of smart city or digital innovation, (b) had to include SMEs or innovation ecosystems, and (c) had to provide comparative or country-specific evidence that applied to Japan or the UK. Sources that were not empirically based or did not present institutional data were not included.

### 4.3. Analytical Framework

A comparative thematic approach to synthesis was used to identify recurrent patterns and contrasts across the two national contexts. With the help of an iterative reading approach, coding of all documents was conducted according to thematic categories based on the theoretical framework:

- Governance and Policy Architecture (institutional structures, public-private partnerships)
- Digital Transformation/Technology Adoption (automation, data governance, open innovation)

- SME Competitiveness and Economic Results (productivity, the capability to innovate, responsiveness to market)

The themes were examined across and within the cases to identify convergences, divergences, and mechanisms. The literature and policy data triangulation provided multifaceted insights into the influence of institutional design and digital governance on SME competitiveness.

The presented conceptual model served as a set of interpretative tools — dynamic capabilities (micro level), innovation systems (meso level), and diffusion processes (macro level) — that provided anchoring points for interpretation. The study used this model to determine how cities' innovative policies mediate SME economic performance through the national governance logic.

**4.4 Comparative Case Logic: Japan and the United Kingdom.**

The countries of Japan and the UK were chosen as exemplars of technologically advanced economies pursuing innovative city development, with opposite governance approaches. The Society 5.0 framework is a state- and integration-driven model in Japan, with a long-term orientation towards industrial planning, automation, and social sustainability (Cabinet Office of Japan, 2023; METI, 2025). Instead, the UK represents a liberalized innovation system based on market incentives, open data, and diffusion supported by entrepreneurship (DBT, 2025; DCMS, 2021).

This contrast provides an analytical advantage for evaluating the impact of structural centralization and decentralization on SME digital adoption, innovation behavior, and competitiveness. The systematic juxtaposition of policy objectives, implementation mechanisms, and quantifiable SME outcomes based on secondary datasets was used to facilitate comparative analysis (OECD, 2024; ODI, 2024).

The objective of the study was to determine which of the two innovation ecosystems is more effective at facilitating SME inclusion and sustainable competitiveness in the context of the smart city by aligning the two dissimilar innovation ecosystems.

**4.5 Validity, Reliability, and Limitations.**

A thematic coding systematic process was implemented, utilizing the method of qualitative analysis offered by Braun and Clarke (2006). Recurring concepts of policy documents and academic literature were first coded to come up with initial codes, which were later refined with comparative coding in order to derive patterns of governance, digital transformation, and SME outcomes in both Japan and the UK.

Nevertheless, the research has several weaknesses. To start with, the use of secondary data limits the ability to measure firm-level outcomes directly. Second, the availability of data in Japan and the UK may differ, which will work against perfect symmetry in the analysis. Third, qualitative synthesis emphasizes interpretive richness rather than statistical generalization. However, the academic and policy triangulation enhances credibility and provides a strong basis for policy-related understanding. To contextualize the comparative analysis, Table 3 below summarizes key smart city indicators from Japan and the United Kingdom, focusing on SME digitalization, innovation participation, and productivity metrics. These indicators illustrate the differing emphases of each national approach—Japan's automation-driven strategy versus the UK's data-centric and networked innovation model.

**Table 3: Comparative Overview of Key Smart City Indicators (Japan vs UK)**

| indicator | Japan(2024) | United kingdom(2024) | interpretation |
|---|---|---|---|
| Automation adoption (% firms) | 68 | 57 | Japan leads in industrial automation |
| Open-data participation (% firms) | 48 | 52 | UK slightly ahead in collaborative data use |
| Digital maturity index (0–1) | 0.66 | 0.73 | The UK shows higher digital maturity |
| Productivity index (2015=100) | 124 | 111 | Japan demonstrates stronger productivity gains |
| Profitability growth (%) | + 9 | + 11 | The UK has higher short-term gains |
| Sustainability index (2015=100) | 117 | 121 | The UK exhibits stronger carbon efficiency |

*Author's compilation based on OECD (2023), METI (2024), DBT (2023), and UK Open Data Portal.*

Figure 3 below provides a comparative snapshot of key digital and economic indicators for 2024, highlighting differences in automation, open-data participation, digital maturity, and productivity between Japan and the UK.

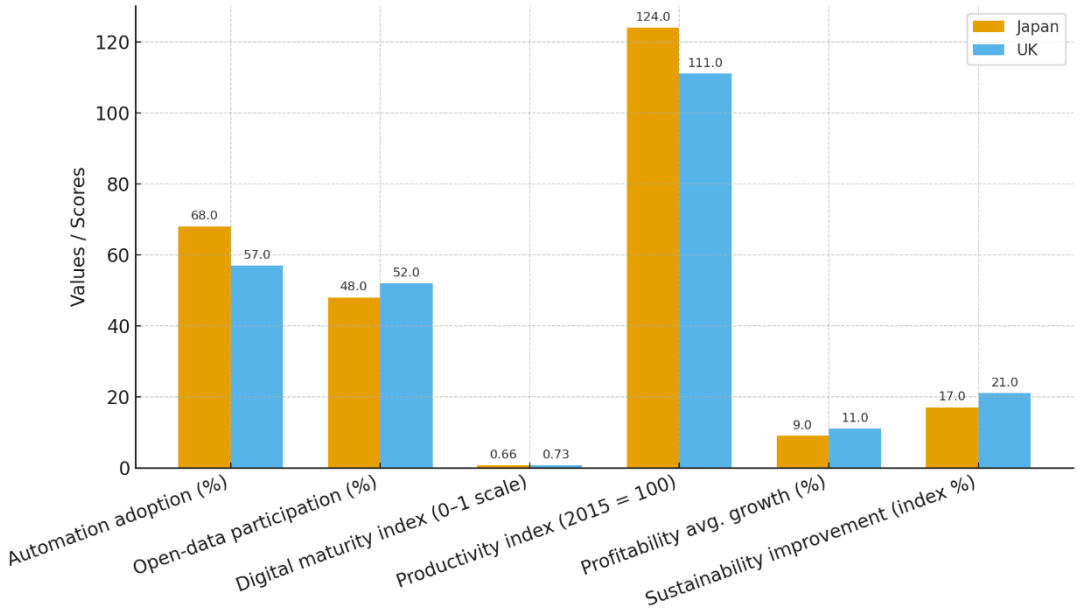


Figure 3. Comparative snapshot: Japan vs UK – Key Metrics (2024)

***Source:*** *Author's conceptualization based on insights from OECD (2023), World Bank (2024), and Technological Forecasting & Social Change literature.*

The results found in Table 3 and Figure 3 indicate a stark difference between the way governance structures influence the performance of SMEs in Japan and the United Kingdom. The fact that Japan scores high on coordination means that it has a governance system where ministries, municipalities and large corporations coordinate and execute smart city programs. The effect of this coherence is an increase in predictable technological integration amongst SMEs, more so in the manufacturing industry, logistics and energy service industries. Although the Japanese model is stable, however, it does not promote quick experimentation-SMEs develop pathways of institutional activity instead of disruptive and high-risk projects.

By comparison, the UK has a more digital maturity and profitability signifier, which relates to a decentralised governance model that emphasises on open data, entrepreneurial flexibility, and competitive marketing drives. SMEs can enjoy access to datasets, digital tools and innovation ecosystems fast to assist in the development of scalable solutions, particularly in mobility, fintech and service-delivery applications. Nevertheless, the decentralized nature of governance in the UK leads to a lopsided outcome in various regions; the SME performance is strongly associated with the local digital infrastructure and the intensity of local innovation clusters. The comparative analysis thus demonstrates how the stability of the Japanese system in the form of coordination and the agility of the UK in the form of profitability are two different directions in which smart city projects impact SME competitiveness.

## 5. RESUITS

### 5.1 A Review of Comparative Results.

The comparative assessment indicates that Japan and the United Kingdom have used innovative city initiatives to drive innovation in their SMEs; however, they have employed different governance and institutional arrangements. Japan's state-coordinated strategy focuses on long-term industrial alignment and technological integration. In contrast, the UK's market-based approach is based on open data, entrepreneurship, and decentralized governance.

Although they vary, both frameworks demonstrate that the combination of digital technologies, data ecosystems, and collaboration between the private and public sectors will significantly enhance SMEs' innovation capacity and competitiveness.

**5.2 Japan: Organized Innovation Society 5.0.**

The innovative city redesign in Japan through the Society 5.0 program has developed a holistic approach to integrating digital technology and socioeconomic goals (Cabinet Office of Japan, 2023; Barrett et al., 2020).

The Robotics and Regional Initiative Networking Group (RING Project) is one of the undertakings by government ministries, such as METI, to connect SMEs with automation and data-oriented innovation systems (METI, 2025). This program shows that state-led government can mobilize resources across all sectors to reduce the demographic decline and productivity gaps in the region. Figure 4 below presents the structural components of Japan's Society 5.0 framework, emphasizing the integration of digital technologies such as AI, robotics, and IoT with human-centered innovation. The model illustrates how Japan's coordinated policy structure aligns social and industrial goals under the broader smart city paradigm.

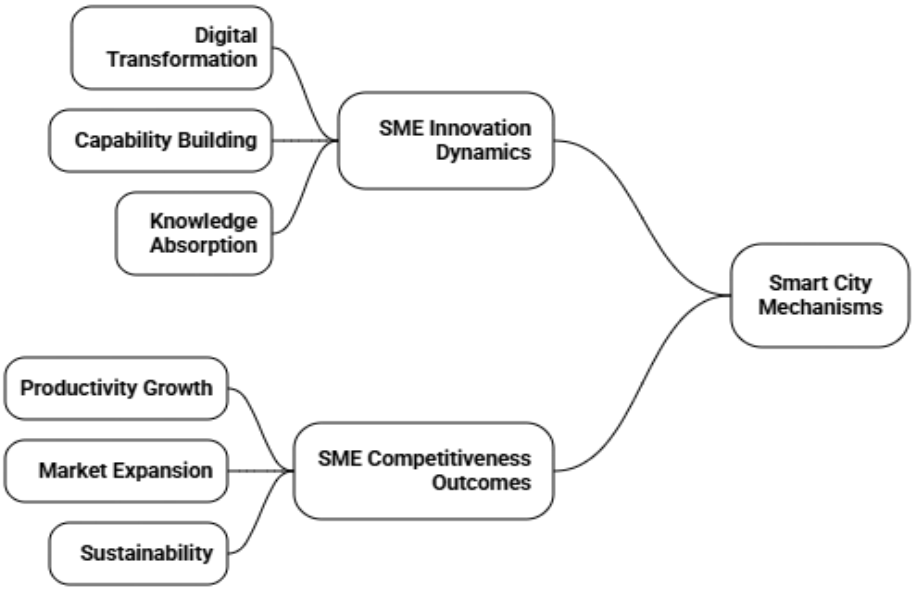


Figure 4. Conceptual Framework of Smart City Mechanisms and SME Competitiveness

***Source:*** *Author's synthesis using METI (2024) and UK DBT Data Governance Framework (2023).*

Empirical research (Deguchi, 2020; Narvaez Rojas et al., 2021) indicates that Japanese SMEs involved in innovative city ecosystems achieve productivity gains, improved process efficiency, and technological sophistication. For example, the Fujisawa Sustainable Smart Town can be viewed as a model of cooperation between corporations and the city, combining digital energy systems, telemedicine, and information exchange (Kokuryo, 2018; Nihon University, 2019). These examples affirm that the ability of SMEs to learn and adopt technology more adaptively is reinforced by institutional integration, a defining feature of the Japanese innovation system.

Nevertheless, drawbacks are still present. Despite technological advances, small businesses continue to struggle with digital literacy and the high cost of innovative technologies (Nagasaki, 2019). The centralized type of Japan, though effective at scaling innovation, might inadvertently decrease flexibility and experimentation in smaller firms. According to the findings, Japan's strength lies in its systemic coordination and industrial resilience; however, its policy architecture needs to be transformed to improve the inclusivity of SMEs and bottom-up innovation.

**5.3 Country Findings: Japan and the United Kingdom**

**Japan:**

According to the findings, the Japanese smart city initiatives assist SMEs based on long-term policy frameworks. Institutional programs include Society 5.0, smart regional hubs and corporate-municipal alliances (e.g. Fujisawa Smart Town) to give SMEs access to advanced technologies, common data platforms, and reliable networks of innovation. The mechanisms help in increasing productivity, efficiency in processes, and organized use of technology by SMEs. Nevertheless, the findings also

indicate strong limitations: SMEs have limited experimentation capacity, the cost of high technology is high, and a rigid governance system, which can be a strong constraint to small firms. Nonetheless, in Japan, the ability of the systemic coordination and continuity creates predictable innovation approaches to SMEs.

**United Kingdom:**

The results on the UK point to a different type of governance. The trends that promote smart city innovation include decentralised forms, open data, entrepreneurial networks, and laxity of regulations. National programs (e.g., SME Digital Adoption Taskforce) and regional clusters demonstrate that the UK SMEs have an advantage in the accelerated process of experimentation, enhanced data-driven decision-making, and the capacity to adopt digital tools faster than Japanese companies. However, decentralisation leads to unequal results in regions, poor data regulation, and digital inequalities. The findings have shown that the competitive advantage of the UK is not in structural coordination in a long-term perspective, but in flexibility and the speed of innovation.

**5.3A. Summary of Comparative findings.**

As it is observed in the comparative analysis, the smart city efforts in Japan enhance competitiveness of SMEs mainly by integrating policies over long term. Programs like Society 5.0 and regional innovation hubs run by state bodies and systematic industrial planning aid SMEs in gaining access to cutting-edge technologies, the opportunities of cross-sector cooperation, and involvement in large-scale projects of smart cities. Nevertheless, the centralized model also puts restrictions on smaller companies by being expensive in terms of high technology and autonomy to experiment.

The results of the research in the United Kingdom show that the smart city programs contribute to the increased competitiveness of SMEs based on openness, decentralised experimentation, and data-driven innovation. The availability of government data, entrepreneurial networks and lax regulatory policies drive speed of innovation and allow SMEs to embrace digital tools faster. Meanwhile, decentralized governance and fragmented access to data generates uneven results of SMEs in different regions.

In general, the findings indicate that Japan is coherent and stable in terms of SME innovation, whereas the UK is flexible and quick to adopt digital. The two models will produce economic gains to the SMEs, although its success is moderated by the inherent governance framework and the inclusiveness of the digital policy execution.

**5.4. Theoretical Interpretation and cross-national comparison.**

Theoretically, the results offer insight into how the governance structure mediates the efficiency of dynamical capabilities and innovation systems in the smart city setting. Institutional coordination and intersectoral collaboration in Japan lead to a favorable innovation system that addresses resource constraints for SMEs (Barrett et al., 2020; Deguchi, 2020). Dynamic capabilities in the UK are developed within a decentralized network and entrepreneurial programs that create flexibility and rapid learning (Shaw et al., 2024; Tawil et al., 2024).

Using the innovation systems theory (Navarro & Gibaja, 2012), vertically integrated governance in Japan enhances coherence and continuity of policy. In contrast, the UK's horizontal innovation networks stimulate diversity and competition. In the meantime, the diffusion of innovations theory (Rogers et al., 2019) describes the cultural and institutional influences on the adoption of technologies; i.e., the adoption process in Japan is institutionalized and hierarchical, whereas in the UK it is market-driven and adaptive.

The relative synthesis implies that no model will yield better results. Alternatively, more inclusive SME innovation can be achieved through a combination of frameworks, such as Japan's structural coordination and the UK's data openness. OECD (2024) agrees with this perspective, stating that economies that combine the best practices of both top-down policymaking and bottom-up entrepreneurship are better at generating a more sustainable innovation ecosystem.

**5.5. Implications on Policy and Practice.**

These results highlight the significance of policy coherence, digital literacy, and collaborative ecosystems in translating innovative city projects to make SMEs more competitive.

In Japan, the policy reform should focus on democratizing access to digital infrastructure and encouraging experimentation by SMEs through the Society 5.0 framework. In the UK, standardized data governance and policy coherence can help address regional inequality and ensure fair participation across sectors.

The study is consistent with the World Bank's (2023) suggestions for investing in innovation-led growth, which must include not only technology but also capacity building, institutional trust, and inclusive participation. The examples of both countries show that smart cities succeed when learning in organizations and cross-sector partnerships accompany technological change.

In the end, the comparative analysis will contribute to the theoretical and practical discussion of smart city economics by highlighting the roles of governance philosophy and digital policy formulation in shaping the transformative potential of SMEs in the digital urbanism era.

## 6. DISCUSSION

The relative results between Japan and the United Kingdom indicate that innovative city programs are effective in shaping SME competitiveness. However, their success depends on governance frameworks, institutional consistency, and firm flexibility. Both nations indicate that a digital transformation in an urban economy does not necessarily lead to SME growth; instead, it should be accompanied by conducive ecosystems that match technological infrastructure with innovation capacity and human capital development.

### 6.1 Government Form and Performance of Innovation

The Society 5.0 model of Japan is an example of how coordination at the central level can facilitate the integration of the entire system across sectors. The need to align national industrial policy with innovative city development has enabled Japan to develop a strong vision of innovation, with the government, industry, and academia working together to improve productivity (Barrett et al., 2020; METI, 2025). The government's long-term orientation allows the spread of advanced technologies such as robotics, IoT, and AI across regional economies (Deguchi, 2020; Fukuyama, 2018). Such harmonization of technological and social goals has enhanced the resilience of industries and the process of learning together amongst the SMEs.

Nevertheless, this centralization of coordination is also predetermined by structural rigidity. A smaller company usually does not have the freedom to experiment on its own or use costly technology (Nagasaki, 2019). The issue for Japan is then how to implement national-level innovation at the grassroots level. This gap can be addressed by redefining its governance model to be more inclusive, fostering bottom-up innovation through the Society 5.0 model, and ensuring greater inclusion of SMEs.

On the other hand, a market-driven, decentralized system is flourishing in the United Kingdom due to openness and competition. The government's reliance on open data and incentives for digital adoption has motivated SMEs to participate in smart city innovation directly (Wang & Shepherd, 2020; DBT, 2025). This flexibility promotes rapid technology diffusion, enabling smaller firms to capitalize on niche opportunities by responding to market signals (Shaw et al., 2024). However, the UK solution has a counterbalance weakness, as the unequal distribution of governance across regions and sectors tends to lead to unequal innovation outcomes (Kitchin & Moore-Cherry, 2021). Such fragmentation diminishes the predictability of the policies and limits the coordination of the strategies over time.

### 6.2 Dynamic Capabilities and Institutional Interplay.

The results support the applicability of the dynamic capabilities framework for understanding how SMEs utilize digital opportunities in innovative city ecosystems. In Japan, dynamic capabilities are developed through organized public-private collaborations and knowledge-sharing networks that support technology sensing and integration (Barrett et al., 2020; Kokuryo, 2018). The focus on the industrial partnership assists SMEs in enhancing their absorptive capacity and supports innovation in line with the national objectives of competitiveness.

Conversely, dynamic capabilities in UK SMEs are manifested in flexibility and speed of innovation (Tawil et al., 2024). The reconfigurations by entrepreneurial firms in a dynamic technological environment are actively practiced and show how learning and creativity can be promoted in a decentralized environment. Although these adaptive mechanisms are effective in short-term innovation, they may also lead to strategic fluctuations when the policy is not sustained. In this way, the relationship between institutional design and firm adaptability defines the development of dynamic capabilities across different governance models.

### 6.3 Dissemination of Innovations and Digital Inclusion.

According to the study, the theory of innovation diffusion (Rogers et al., 2019) is also supported, as both cultural and institutional factors condition the rate and intensity of technology adoption. The diffusion in Japan is organized into formal industrial clusters and standardization processes, resulting in slow but stable technology adoption. Entrepreneurial networks constitute the diffusion of the innovation in the UK, with the rapid adoption but increased regional variance (ODI, 2024). This has demonstrated the need to develop diffusion mechanisms that balance accessibility and regulatory coherence.

The issue of digital inclusion is common. The two nations have disparities between resource-limited and digitally up-to-date SMEs. Although Japan faces cost and expertise barriers, the UK faces disproportionate access to data and infrastructure across regions. Such policies, combining capacity building, digital literacy initiatives, and fair data governance, can ensure that the benefits of the smart city are not confined to major technology centers but are shared with marginal business populations.

### 6.4 Towards a Hybrid Smart City Innovation Model.

Combining the facts, this discussion suggests a hybrid model combining institutional stability in Japan and entrepreneurial dynamism in the UK. This would effectively integrate top-down policy coherence with bottom-up innovation networks, enabling SMEs to enjoy the freedom to experiment simultaneously and coordinated national support. According to the OECD (2024), economies characterized by hybrid innovation systems are more resilient and stronger in the long term in terms of digital competitiveness.

Theoretically, this model supports the idea that thriving innovative city ecosystems work through multi-level alignment: macro-level policy consistency, meso-level institutional cooperation, and micro-level firm capacities. The layering of these elements will make technological transformation not only an economic booster but also a socially encompassing process that enables SMEs to become co-creators of urban innovation.

### 6.5 Future Research Implications.

The results provide new directions for empirical verification and theoretical improvement. Further studies should use mixed methods, i.e., combine survey data, case studies of firms, and longitudinal policy analysis to gauge causal relationships between innovative city initiatives and SME performance. Further research, especially across other industrial economies compared with Japan and the UK, would help shed more light on how governance diversity influences digital transformation paths. It will also be beneficial to extend the framework to cover sustainability and equity aspects to better understand the role of smart cities in enhancing socio-economic resilience in general.

## 7. CONCLUSION

The research compared academic innovations in Japan and the United Kingdom, focusing on how innovative city programs influence the capacity and economic competitiveness of small and medium-sized business enterprises (SMEs). It disclosed that these two nations have gone a long way toward embracing digital transformation to develop their cities and economies. However, they have two completely different institutional architectures. The Society 5.0 model of Japan is one of the organized models of innovation, in which technological progress has been systematically embedded in the industrial and social policy. The United Kingdom's strategy, in turn, also follows a market-based model, with a focus on open data, decentralized governance, and entrepreneurial flexibility.

The results indicate that innovative city projects increase SME competitiveness through digital adoption, consensual partnerships between government and businesses, and the development of knowledge-based economies. Nevertheless, the channels through which such results are achieved differ across systems of governance. Centralized coordination in Japan offers opportunities to invest in automation, data infrastructure, and social sustainability on a long-term basis. However, it can limit smaller firms' ability to practice autonomous experimentation. In contrast, the UK's decentralized system encourages rapid innovation and flexibility among SMEs. Still, it risks policy fragmentation and an unequal distribution of resources across regions.

In theory, this research will add to the literature on smart city economics by bringing together the dynamic capabilities, innovation systems, and diffusion of innovations frameworks into a single prism through which the interrelationship between institutional design and firm-level adaptability in digital ecosystems can be viewed. The findings confirm that smart cities do not emerge from thin air to drive competitiveness; instead, their operational success relies on the effectiveness with which governance, digital infrastructure, and human capital are aligned to empower SMEs.

For policymakers, the study underscores the importance of a hybrid innovation model that combines Japan's policy coherence with the UK's openness and entrepreneurial dynamism. This kind of integration would make it more inclusive, decrease digital inequality, and maintain innovation-led growth. Japan could enhance SME involvement by providing incentives and developing skills. In contrast, the UK could strengthen national coordination and data governance standards to achieve greater homogeneity in competitiveness.

In conclusion, the paper emphasizes that the future of smart cities lies in balancing structure with flexibility—merging long-term strategic vision with localized creativity. The transformative opportunities of smart cities for SMEs, whether state-coordinated or market-driven, would be determined by how societies coordinate technology, supported by institutions, collaborative learning, and human-centric innovation.

**Acknowledgment**

The author takes a minute to acknowledge the academic community and institutional bodies whose data and publications were used in this study, especially the Cabinet Office of Japan, the Ministry of Economy, Trade and Industry (METI), the Department for Business and Trade (DBT), and the Department for Digital, Culture, Media and Sport (DCMS). Scholars who have provided intellectual support for this work through their empirical and theoretical contributions to smart city studies and SME innovation are also appreciated. Their reflections have all contributed to the level of knowledge about the intersection of governance and digital transformation in determining economic competitiveness.

**Ethical Considerations**

The research was undertaken in accordance with the ethical principles of academic research and the Declaration of Helsinki. No human participants, personal data, or any identifiable personal information were used, as the research relied solely on secondary data sources, such as peer-reviewed publications, government reports, and publicly available datasets. Thus, formal ethical approval was not needed. The interpretation of all data was responsible, accurately referenced, and objective to achieve academic integrity, transparency, and respect for intellectual property.

The author confirms that ethical rigor, impartiality, and the available standards of responsible scholarship were used to shape the research design, data selection, and data analytical procedures.

**Data Availability Statement**

The data used in this research are publicly available and from reputable institutional and academic sources. The sources are government publications of the Cabinet office of Japan, the Ministry of Economy, trade and industry, the Department of Business and Trade (DBT), and the Department of Digital, Culture, Media and Sports (DCMS), data and reports of the Organisation of Economic Co-operation and Development (OECD), the Open Data Institute (ODI) and the World Bank.

There were no proprietary or secret datasets.

The author can be approached to provide additional information on the findings of this research upon reasonable request.

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