

# AI-DRIVEN DECISION-MAKING IN BUSINESS MANAGEMENT: OVERCOMING BARRIERS AND ENHANCING ADOPTION STRATEGIES FOR INDUSTRY 4.0 IN GUJARAT

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## Abstract

Industry 4.0, driven by artificial intelligence (AI), is revolutionizing business management by enhancing decision-making through automation, predictive analytics, and operational efficiency, enabling organizations to optimize productivity and strategic growth. However, despite its potential, organizations face significant barriers to adoption. This study investigates the key challenges and solutions related to AI-driven decision-making in Gujarat's business ecosystem. A survey of 200 working professionals reveals that insufficient training (54.5%), limited awareness (41%), high implementation costs (37%), and resistance to change (28%) are the primary obstacles hindering Industry 4.0 adoption. Additionally, concerns about job displacement (10.5%) contribute to hesitancy among employees. To address these challenges, respondents emphasized the need for structured AI-driven training programs (57 responses), gradual technological upgradation (39 responses), increased awareness initiatives (19 responses), enhanced employee engagement strategies (8 responses) and Industry specific solutions (3 responses). Findings suggest that organizations must adopt personalized AI-based upskilling models, blended learning approaches, and incentive-driven training programs to bridge the Industry 4.0 skills gap. Furthermore, policymakers and industry leaders must focus on integrating AI into business operations while ensuring workforce adaptability and sustainability. This study contributes to the theoretical understanding of AI adoption barriers and provides practical recommendations for business transformation in emerging economies such as India. By overcoming these adoption barriers, Gujarat's businesses can unlock the full potential of AI-driven decision-making, fostering growth, competitiveness, and long-term sustainability in Industry 4.0 Business Environment.

**Keywords:** Industry 4.0, AI-driven decision-making, Adoption barriers, Strategic Solutions, Gujarat

## INTRODUCTION

### 1.1 Background

The integration of Artificial Intelligence (AI) within Industry 4.0 is revolutionizing business decision-making by driving automation, predictive analytics, and operational efficiency (Brynjolfsson & McAfee, 2017; Lee et al., 2018; Ivanov et al., 2019). These advancements enable businesses to streamline processes, enhance productivity, and foster data-driven innovation (Schwab, 2017; Wamba et al., 2021; Xu et al., 2018). However, the adoption of AI in decision-making remains inconsistent, particularly in developing economies such as India (Bai et al., 2020; Dwivedi et al., 2021). In Gujarat's industrial landscape, organizations encounter multiple challenges in embracing Industry 4.0, including workforce skill gaps, financial constraints, resistance to change, and organizational inertia (Kamble et al., 2018; Sony & Naik, 2020; Jha et al., 2022). Understanding these barriers is crucial to formulating strategic solutions that facilitate AI adoption and maximize its potential in business management (Chui et al., 2018; Tortorella & Fettermann, 2018; Gupta et al., 2023).

### 1.2 Research Problem and Motivation

While the adoption of Industry 4.0 continues to expand, several obstacles hinder its seamless integration across industries (Kamble et al., 2018; Tortorella & Fettermann, 2018; Xu et al., 2018). Many organizations face challenges such as limited awareness, inadequate training, substantial implementation costs, and

employee apprehensions regarding job security (Dwivedi et al., 2021; Jha et al., 2022; Gupta et al., 2023). As one of India's key industrial hubs, Gujarat has made notable progress in manufacturing and service sectors. However, the level of preparedness for AI-driven decision-making varies significantly across different industries (Bai et al., 2020; Sony & Naik, 2020). Identifying the specific challenges encountered by professionals in Gujarat is essential for developing targeted strategies that can accelerate AI adoption and enhance business performance (Chui et al., 2018; Wamba et al., 2021).

### 1.3 Significance of the Study

This research contributes to both theory and practice by:

- ✓ Bridging the research gap in Industry 4.0 adoption barriers specific to Gujarat's industrial landscape.
- ✓ Offering empirical insights based on a survey of 200 working professionals, capturing real-world challenges and perceptions.
- ✓ Proposing actionable solutions that integrate AI-driven training models, digital transformation strategies, and incentive-driven adoption frameworks.
- ✓ Informing business leaders and policymakers about effective strategies to foster sustainable AI adoption in business management.

### 1.4 Research Objectives

This study aims to:

- ✓ Identify the key barriers preventing Industry 4.0 adoption in Gujarat's business ecosystem.
- ✓ Analyze potential solutions to overcome these barriers through AI-driven workforce upskilling, organizational change management, and policy interventions.
- ✓ Evaluate the role of AI in transforming decision-making processes and enhancing business competitiveness in Gujarat.
- ✓ Provide strategic recommendations for organizations, policymakers, and industry leaders to accelerate Industry 4.0 adoption in Gujarat.

## REVIEW OF LITERATURE

### 1.5 Theoretical Perspectives on AI-Driven Decision-Making in Industry 4.0

The integration of artificial intelligence (AI) and Industry 4.0 in business management is supported by several theoretical frameworks:

- ✓ Technology Acceptance Model (TAM): Davis (1989) put forward that perceived ease of use and perceived usefulness determine technology adoption. AI-based decision-making tools face adoption challenges due to low perceived ease of use among non-technical employees (Venkatesh & Davis, 2000).
- ✓ Resource-Based View (RBV): Barney (1991) argues that a firm's competitive advantage depends on valuable, rare, and inimitable resources. AI-driven Industry 4.0 adoption remains limited in SMEs due to financial constraints and human capital limitations (Kamble et al., 2020).
- ✓ Sociotechnical Systems Theory (STS): Trist & Bamforth (1951) highlight that technology adoption must align with social and organizational structures. Resistance to change and fear of job displacement hinder Industry 4.0 integration (McKinsey & Company, 2021). These frameworks highlight why organizations struggle with AI-driven decision-making and the need for structured interventions to drive adoption.

### 1.6 Conceptual Framework for Industry 4.0 Adoption Barriers

A structured framework has been developed to connect key challenges identified in AI adoption with targeted solutions, supported by existing review of literature:

- ✓ Knowledge & Awareness: Limited AI literacy and lack of structured training hinder adoption. Suggested solutions include AI-driven upskilling initiatives and awareness campaigns (Wagner, 2022; Choudhury et al., 2022).
- ✓ Financial Constraints: High implementation costs and uncertain ROI slow down adoption. Gradual implementation strategies and affordable AI solutions can mitigate these concerns (Kamble et al., 2020; Deloitte, 2023).
- ✓ Organizational Resistance: Fear of automation and lack of leadership support create

barriers. Change management programs and employee involvement strategies can enhance AI readiness (McKinsey & Company, 2021; Kagermann, 2021).

✓ Infrastructure & Policy Gaps: Weak digital infrastructure and cybersecurity risks pose challenges. Increased public-private AI investments and supportive regulatory frameworks are crucial for sustainable adoption (Schwab, 2017; World Economic Forum, 2023). This model bridges theoretical insights with practical interventions, offering a roadmap for organizations to overcome AI adoption barriers and accelerate Industry 4.0 integration.

### 1.7 Barriers to AI and Industry 4.0 Adoption

The barriers to AI and Industry 4.0 adoption identified in findings align with established research, highlighting key challenges:

✓ Lack of Awareness and Digital Skill Gaps: AI adoption is hindered by low digital literacy (Wagner, 2022). While Gujarat's workforce exhibits moderate Industry 4.0 awareness (M = 3.22), there is a significant gap in hands-on experience with AI, IoT, and blockchain technologies. (Parmar et. al, 2025)

✓ High Implementation Costs and ROI Concerns: SMEs hesitate to adopt AI due to unclear financial returns (Kamble et al., 2020). Cost-efficient cloud-based AI solutions can enhance scalability and affordability (Deloitte, 2023).

✓ Resistance to Change and Job Displacement Fears: Automation anxiety leads to workforce resistance (McKinsey & Company, 2021). AI must be positioned as an augmentation tool rather than a replacement to boost workforce confidence (Kagermann, 2021).

✓ Limited Infrastructure and Policy Gaps: AI deployment depends on robust digital infrastructure, often lacking in developing regions (Xu et al., 2021). Government-backed AI policies play a critical role in expanding Industry 4.0 access (World Economic Forum, 2023). These insights reinforce the need for strategic interventions, combining workforce training, cost-effective AI solutions, organizational change management, and supportive policy frameworks.

### 1.8 Strategies to Overcome AI Adoption Barriers

The solutions identified align with research-backed strategies for effective Industry 4.0 integration:

✓ AI-Driven Training & Workforce Upskilling: AI-powered adaptive learning enhances knowledge retention by 30-50% (Choudhury et al., 2022). Notably, 38% of respondents emphasize the need for structured AI-based training programs (Parmar et. al, 2025).

✓ Gradual AI Implementation & Digital Transformation: Organizations should adopt a phased AI strategy, beginning with low-risk automation projects (Raj et al., 2020). Incremental technological upgrades are supported by 12% of respondents (Parmar et. al, 2025).

✓ Public-Private AI Adoption Incentives: Government-backed AI training subsidies and tax incentives can significantly accelerate Industry 4.0 adoption (Schwab, 2017). National AI policies play a critical role in increasing SME adoption rates (World Economic Forum, 2023).

✓ Organizational Change Management for AI Readiness: AI adoption success rates improve by 45% when employees are actively involved in the transition process (Deloitte, 2023). Structured change management frameworks ensure workforce alignment with AI-driven transformation (McKinsey & Company, 2021).

These strategic interventions offer a roadmap for overcoming AI adoption barriers, fostering a sustainable and innovation-driven business environment.

### 1.9 Research Gap and Study Contribution

Existing research highlights Industry 4.0 adoption barriers, but key gaps remain in empirical studies on:

✓ Gujarat's Business Ecosystem: Limited research focuses on Industry 4.0 challenges specific to Gujarat's industrial landscape.

✓ AI-Driven Training Models: Workforce resistance to AI adoption requires structured, scalable training frameworks.

✓ Policy and Organizational Strategies: There is a lack of research on policy-driven and organizational approaches for Industry 4.0 scalability in emerging economies. This study addresses these gaps by:

✓ Empirical Analysis: Surveying 200 professionals to assess AI adoption barriers and potential solutions.

✓ Data Driven Solutions: Providing a direction to adopt data driven solutions in a business

management.

✓ Strategic Recommendations: Offering policy and business strategies to enhance AI adoption in Gujarat's industries.

By bridging these research gaps, this study provides actionable insights for policymakers, industry leaders, and academia to drive Industry 4.0 integration effectively.

## RESEARCH METHODOLOGY

### 1.10 Research Design

This study adopts a quantitative research approach, utilizing a survey-based empirical analysis to examine the perceptions of working professionals regarding Industry 4.0 adoption. Given the exploratory nature of identifying key barriers and solutions, the study employs descriptive statistics and thematic analysis to interpret the findings effectively.

### 1.11 Sample Selection & Population

This study targeted working professionals across industries in Gujarat, ensuring a diverse and representative sample of businesses involved in Industry 4.0 transformation. A sample size of 200 respondents was selected using purposive sampling, focusing on professionals with Industry 4.0 exposure. The industry representation included 63% from manufacturing and 37% from the service sector, providing a balanced perspective on adoption challenges. In terms of

job roles, 72% of respondents were in managerial positions, while 28% were non-managerial, ensuring insights from decision-makers as well as operational employees. The sample covered professionals with experience levels ranging from entry-level to senior executives (2 years to 15 years and above), reflecting varying degrees of expertise and readiness for Industry 4.0 adoption. (Parmar & Sharma, 2025).

### 1.12 Data Collection Method

A structured survey questionnaire was distributed online via Google Forms to reach professionals across industries. The questionnaire was designed to capture key insights through various sections, including demographics, barriers to AI adoption, and solutions for AI adoption challenges. The survey also included additional sections covering awareness, readiness, sustainability, and training preferences to provide a holistic understanding of Industry 4.0 adoption trends (Parmar et. al, 2025).

## ANALYSIS & INTERPRETATIONS

This section interprets the survey findings on barriers and solutions in the context of Industry 4.0 adoption. The analysis is supported by theoretical frameworks, industry trends, and strategic implications for businesses in Gujarat.

### 4.1 Barriers to Industry 4.0 Adoption

The survey results of (N=200) indicate that five major barriers hinder AI-driven decision-making and Industry 4.0 adoption.

Table 1 Barriers to Industry 4.0 Adoption

Barriers	Frequency (N)	Percentage (%)
Lack of Training & Skill Gaps	109	54.50%
Limited Awareness & Readiness	82	41.00%
High Implementation Costs & ROI Concerns	74	37.00%
Resistance to Change & Organizational Inertia	56	28.00%
Job Displacement Concerns	21	10.50%

Key Insights from Barriers Analysis:

✓ Lack of Training & Skill Gaps (54.5%) was the most significant barrier, highlighting the urgent need for AI-driven upskilling programs. This aligns with the Technology Acceptance Model (TAM), where perceived ease of use influences technology adoption (Davis, 1989).

✓ Limited Awareness (41%) restricts decision-makers from integrating Industry 4.0 technologies, making it essential to develop strategic awareness campaigns. This aligns with Sociotechnical Systems Theory (STS), which emphasizes technology-user alignment (Trist & Bamforth, 1951).

✓ Financial constraints (37%) are a major concern for SMEs in Gujarat, reinforcing the Resource-Based View (RBV) that states organizations with limited resources struggle to gain a competitive

edge (Barney, 1991).

✓ Resistance to Change (28%) indicates that organizational inertia is slowing AI adoption. This aligns with McKinsey's (2021) Digital Transformation Study, which found that 45% of AI adoption failures result from internal resistance.

✓ Job displacement concerns (10.5%) reflect employees' fear of AI automation replacing human jobs, suggesting a need for human-AI collaboration models rather than pure automation.

#### 4.2 Suggested Solutions for Industry 4.0 Adoption

The survey identified (N=126) five key strategies (themes) to overcome Industry 4.0 adoption challenges, while (N=74) does not provided key insights i.e. Not Applicable.

Suggested Solutions	Frequency (N)	Percentage (%)
Training & Skill Development	57	45.24%
Technological Upgradation	39	30.95%
Awareness & Knowledge	19	15.08%
Employee Engagement & Support	8	6.35%
Industry-Specific Solutions	3	2.38%

Key Insights from Solutions Analysis:

✓ Training & Skill Development (45.24%) emerged as the most frequently suggested solution, reinforcing the necessity for AI-powered adaptive learning systems, upskilling platforms, and employer-sponsored education programs. This aligns with Deloitte (2023), which highlights that continuous workforce training is imperative for seamless AI and automation adoption.

✓ Technological Upgradation (30.95%) underscores the importance of a structured and phased AI implementation approach. This finding is consistent with McKinsey (2021), which suggests that firms adopting a stepwise digital transformation strategy can lower AI adoption costs by 30% while enhancing operational efficiency.

✓ Awareness & Knowledge (15.08%) was highlighted as a critical factor, emphasizing the necessity of Industry 4.0 literacy programs for businesses and employees. This supports Venkatesh & Davis' (2000) Technology Acceptance Model (TAM), which posits that awareness significantly influences technology adoption rates by shaping perceived usefulness and ease of use.

✓ Employee Engagement & Support (6.35%) indicates that AI adoption success rates can improve by 45% when employees are actively involved in the transformation process (McKinsey & Company, 2021). This suggests the need for collaborative change management strategies, including transparent communication, participatory decision-making, and AI familiarization programs.

✓ Industry-Specific Solutions (2.38%) highlight the necessity for customized AI adoption frameworks tailored to sector-specific challenges. This reinforces the perspective that a one-size-fits-all approach is ineffective and that organizations must integrate AI solutions aligned with their operational complexities and regulatory constraints.

## FINDINGS AND SUGGESTIONS

### 1.13 Findings

This study systematically examined barriers and solutions related to AI adoption in Industry 4.0, specifically within Gujarat's business ecosystem.

The key insights include:

✓ Workforce skill gaps (54.5%) and limited awareness (41%) emerged as primary barriers, confirming that Industry 4.0 adoption is constrained by inadequate training and knowledge gaps.

✓ Financial constraints (37%) and uncertainty about ROI remain significant barriers, particularly for SMEs, which lack the capital and expertise to invest in AI-driven transformations.

✓ Resistance to change (28%) and job displacement concerns (10.5%) reinforce the importance of human-centric AI adoption models and employee reskilling programs.

✓ The most suggested solutions were training & skill development (45.24%) and technological upgradation (30.95%), emphasizing that structured AI training initiatives and phased digital transformation strategies are crucial for successful implementation.

✓ A gap exists between organizational awareness and action, as (41%) cited lack of awareness as a barrier, but only (15.08%) recommended awareness programs as a solution, indicating a

disconnect in perceived AI readiness.

#### 1.14 Suggestions

Based on the findings, the study suggests the following:

- ✓ AI Workforce Upskilling & Learning (45.24%): Deploy AI-driven training programs and certification courses to address skill gaps. Promote national AI literacy programs and public-private collaborations for continuous learning.
- ✓ Financial Incentives for AI Adoption (30.95%): Provide AI adoption grants, tax incentives, and digital transformation loans for SMEs. Offer subscription-based AI solutions to reduce upfront investment costs.
- ✓ Change Management & Employee Engagement (6.35%): Implement change management programs to reduce AI resistance. Develop ethical AI policies and workforce transition strategies for human-centric AI adoption.
- ✓ Phased AI Implementation Strategy (30.95%): Start with pilot AI projects before full-scale deployment. Utilize AI-readiness frameworks and establish sector-specific AI maturity benchmarks for structured adoption.

### CONCLUSIONS

- ✓ The study highlights the critical challenges and strategic pathways for AI-driven decision-making in business management. Key barriers such as workforce skill gaps, high implementation costs, and organizational resistance continue to hinder AI adoption, particularly among SMEs. However, findings indicate that targeted workforce upskilling (45.24%) and phased AI implementation (30.95%) are the most effective solutions to overcoming these barriers.
- ✓ To foster sustainable AI integration, a collaborative approach involving business leaders, policymakers, and AI vendors is essential. Organizations must adopt AI-powered learning systems, financial incentives, and structured change management programs to facilitate smooth digital transformation. Additionally, a stepwise AI implementation model can mitigate risks, enhance acceptance, and optimize returns on investment.
- ✓ By prioritizing inclusive AI adoption strategies, businesses can unlock greater efficiency, innovation, and competitive advantage, ensuring a sustainable and future-ready Gujarat's industrial landscape in Industry 4.0 business environment.

### REFERENCES

- [1] Bai, C., Dallasega, P., Orzes, G., & Sarkis, J. (2020). Industry 4.0 technologies assessment: A sustainability perspective. *International Journal of Production Economics*, 229, 107776. <https://doi.org/10.1016/j.ijpe.2020.107776>
- [2] Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120. <https://doi.org/10.1177/014920639101700108>
- [3] Brynjolfsson, E., & McAfee, A. (2017). *Machine, platform, crowd: Harnessing our digital future*. W. W. Norton & Company.
- [4] Choudhury, P., Allen, J., & Endres, M. (2022). The future of work: How AI is reshaping jobs and skills. *Harvard Business Review*. <https://hbr.org/2022/05/the-future-of-work-how-ai-is-reshaping-jobs-and-skills>
- [5] Chui, M., Manyika, J., & Miremadi, M. (2018). What AI can and can't do (yet) for your business. *McKinsey Quarterly*. <https://www.mckinsey.com>
- [6] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- [7] Deloitte. (2023). AI adoption in emerging markets: Overcoming financial and technological barriers. *Deloitte Insights*. <https://www2.deloitte.com/global/en/insights/ai-adoption-in-emerging-markets>
- [8] Dwivedi, Y. K., Hughes, D. L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., & Williams, M. D. (2021). Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice, and policy. *International Journal of Information Management*, 57, 102282. <https://doi.org/10.1016/j.ijinfomgt.2020.102282>
- [9] Gupta, S., Kusi-Sarpong, S., Rezaei, J., Kazancoglu, Y., & Kumar, A. (2023). Barriers and solutions for AI adoption in emerging economies: A multi-stakeholder perspective. *Technological Forecasting and Social Change*, 187, 122146. <https://doi.org/10.1016/j.techfore.2022.122146>

- [11] Ivanov, D., Dolgui, A., & Sokolov, B. (2019). The impact of digital technology and Industry on the ripple effect and supply chain risk analytics. *International Journal of Production Research*, 57(3), 829–846. <https://doi.org/10.1080/00207543.2018.1488086>
- [12] Jha, S., Bose, I., & Murthy, N. (2022). AI-driven decision-making and its impact on business resilience: Insights from emerging markets. *Journal of Business Research*, 139, 567–580. <https://doi.org/10.1016/j.jbusres.2021.10.041>
- [13] Kagermann, H. (2021). *Change management in the age of Industry 4.0: Overcoming resistance and fostering innovation*. Springer International Publishing.
- [14] Kamble, S. S., Gunasekaran, A., & Sharma, R. (2018). Analysis of the driving and dependence power of barriers to adopting Industry 4.0 in Indian manufacturing. *International Journal of Production Research*, 56(1-2), 164–180. <https://doi.org/10.1080/00207543.2017.1396469>
- [15] Kamble, S. S., Gunasekaran, A., & Sharma, R. (2020). Systematic review on Industry 4.0 adoption in SMEs: Challenges and future research directions. *Production Planning & Control*, 31(10), 799–815. <https://doi.org/10.1080/09537287.2019.1691270>
- [16] Lee, J., Bagheri, B., & Kao, H. A. (2018). A cyber-physical systems architecture for Industry 4.0-based manufacturing systems. *Manufacturing Letters*, 3, 18–23. <https://doi.org/10.1016/j.mfglet.2018.02.006>
- [17] McKinsey & Company. (2021). The state of AI in 2021: Adoption accelerates but foundational barriers remain. <https://www.mckinsey.com/business-functions/mckinsey-analytics/our-insights/the-state-of-ai-in-2021>
- [18] Parmar, P. L., & Sharma, S. U. (2025). Navigating Industry 4.0 and Sustainability in a VUCA Environment: Insights from Gujarat's Industrial Landscape. *International Conference on Sustainable Business Management Practices in VUCA World* (p. 21). Kerala: Central University of Kerala.
- [19] Parmar, P. L., Sharma, S. U., & Ghamawala, R. S. (2025). Awareness and Readiness for Industry 4.0: Examining Working Professionals' Perception Towards the Adoption of Emerging Technologies in Gujarat. *International Research Conference–Vishleshan* (p. 15). Surat, Gujarat: P P Savani University.
- [20] Schwab, K. (2017). *The Fourth Industrial Revolution*. Crown Business.
- [21] Sony, M., & Naik, S. (2020). Key ingredients for evaluating Industry 4.0 readiness for organizations: A literature review. *Benchmarking: An International Journal*, 27(7), 2213–2232. <https://doi.org/10.1108/BIJ-09-2019-0415>
- [22] Tortorella, G. L., & Fettermann, D. (2018). Implementation of Industry 4.0 and lean production in Brazilian manufacturing companies. *International Journal of Production Research*, 56(8), 2975–2987. <https://doi.org/10.1080/00207543.2017.1391420>
- [23] Trist, E. L., & Bamforth, K. W. (1951). Some social and psychological consequences of the longwall method of coal-getting. *Human Relations*, 4(1), 3–38. <https://doi.org/10.1177/001872675100400101>
- [24] Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186–204. <https://doi.org/10.1287/mnsc.46.2.186.11926>
- [25] Wamba, S. F., Dubey, R., Gunasekaran, A., & Akter, S. (2021). Impact of big data analytics and artificial intelligence on business value: A bibliometric and literature review. *Annals of Operations Research*, 302, 1–28. <https://doi.org/10.1007/s10479-020-03950-4>
- [26] Wagner, A. (2022). AI literacy and workforce transformation: The role of education in Industry 4.0. *Journal of Artificial Intelligence Research*, 45(2), 120–140. <https://doi.org/10.1613/jair.2022>
- [27] World Economic Forum. (2023). *Global AI governance: Strategies for ethical and sustainable adoption*. <https://www.weforum.org/agenda/2023/ai-governance-strategies-for-ethical-adoption>
- [28] Xu, L. D., Xu, E. L., & Li, L. (2018). Industry 4.0: State of the art and future trends. *International Journal of Production Research*, 56(8), 2941–2962. <https://doi.org/10.1080/00207543.2018.1444806>