Open Minds

Internacional Journal

ISSN 2675-5157 vol. 2, n. 3, 2026

ARTICLE 15
Acceptance date: 25/02/2026

TECHNOLOGY, PEOPLE, AND VALUE: A HUMAN APPROACH TO PRODUCTIVE MANAGEMENT

Juana Gabriela Mendoza Ponce
Industrial Engineer in Production from the Veracruz Institute of Technology, Master's Degree in Quality Management from the University of Veracruz, Doctorate in Senior Management from the Free School of Political Science and Public Administration of the East. Undergraduate and postgraduate academic at the University of Veracruz,
ORCID 0009-0001-9400-1797

Juan Daniel Jiménez Cristóbal
Industrial Engineer from the Higher Technological Institute of Poza Rica, Master's Degree in Business Administration in the Area of Quality and Productivity, TecMilenio University. Academic at the University of Veracruz,
ORCID 0000-0002-9289-6806

Juan Manuel Bucio Ballado
Industrial Mechanical Engineer from the Veracruz Institute of Technology, Master's Degree in Mechanical Engineering from the Veracruz Institute of Technology. Academic at the Veracruz Institute of Technology,
ORCID 0009-0001-8701-2113

Susana Sánchez Solís
Bachelor's degree in Industrial Management from the National Polytechnic Institute, Master's degree in Management from the University of Villa Rica, Veracruz, Doctorate in Senior Management from the Free School of Political Science and Public Administration of the East. Undergraduate and postgraduate academic at the University of Veracruz,
ORCID 0000-0002-3884-9590

Abstract: The digital transformation of production systems, framed within the Industry 4.0 paradigm, has redefined production management, the value chain, and decision-making processes in organizations. This article analyzes the evolution of the role of the human factor throughout four historical stages of production management—from artisanal manufacturing to Industry 4.0—highlighting how technology, far from replacing people, has reconfigured their functions toward roles of greater cognitive and strategic complexity. Using a socio-technical approach, human-technological interaction is examined through an applied case study of additive manufacturing (3D printing), showing that the generation of productive value depends on the effective integration of human capabilities, digital tools, and management models. Likewise, a comprehensive learning path is proposed for the successful incorporation of people into intelligent production systems, structured around theoretical, heuristic, and axiological learning. The results of the analysis allow us to conclude that organizational competitiveness and sustainability in Industry 4.0 are conditioned not only by the level of technological adoption

Keywords: Manufacturing, technology, value chain, technology management, production, human approach.

INTRODUCTION

Manufacturing, like other areas of organizational activity, has undergone rapid transformation in recent decades, driven by the incorporation of digital technologies into production systems. This process, framed under the term Industry 4.0, not only represents technological evolution in operational functions, but also transforms the value chain, the way production is managed, and even how decisions are made within organizations (Esparza-González et al., 2017) . In this new context, concepts such as interoperability, virtualization, decentralization, and real-time operation become relevant as they expand the technical capabilities of production systems. However, their true potential is only realized when they are articulated by the human dimension, which is responsible for interpreting information, guiding management, and converting data into strategic decisions that generate value (Solleiro & Castañón, 2004) .

Based on the above, the productive function ceases to be a "set of technical operations" and evolves into a socio-technical system, in which technology acts as an indispensable tool for achieving operational excellence, while people constitute the integrating axis between processes, information, and organizational strategy, as they are responsible for transforming data into useful knowledge for decision-making and organizational innovation (.

In this scenario of digital modernity, value creation is conceived as a fundamental priority of the productive function, based on the fact that technology facilitates automation, real-time monitoring, and process optimization. However, it is the human capacity to manage knowledge, exercise leadership, and make informed decisions that allows these tools to translate into sustainable competitive advantages. In this way, the value chain is redefined not only in terms of technological efficiency, but also in terms of the dynamic interaction between people, processes, and systems, oriented at all times toward continuous improvement and organizational competitiveness. (Rodríguez Calero et al., 2017) .

OBJECTIVE AND RESEARCH QUESTIONS

The objective of this article is to analyze the evolution of the role of human beings in production management from a historical and socio-technical perspective, with an emphasis on Industry 4.0, identifying how human-technological interaction affects value creation, decision-making, and organizational competitiveness, in order to propose a comprehensive learning path that facilitates the effective incorporation of people into digitized production systems, considering theoretical, heuristic, and axiological dimensions.

Based on this general objective, the study is guided by the following research questions:

1. How has the role of the human factor in production management evolved throughout the different stages of industrial development?
2. How does Industry 4.0 redefine the relationship between technology, productive function, and human decision-making?
3. What skills, values, and learning models are critical for effective human integration into intelligent production systems?

These questions allow us to structure the analysis and delimit the theoretical contribution of the work within the field of production management and industrial engineering.

METHODOLOGY

This study adopts a qualitative theoretical-analytical approach, based on a critical review of specialized literature and the development of a conceptual case study applied to an additive manufacturing workshop using 3D printing. This approach is relevant for exploring complex phenomena where technical, human, and organizational dimensions converge, and where the main interest is focused on a deep understanding of interactions rather than statistical generalization.

The literature review was conducted using indexed academic sources, institutional reports, and specialized literature on production management, Industry 4.0, the human factor, and organizational learning, prioritizing works published in recent years. The case of the 3D printing workshop is used as an analytical resource to illustrate human-technological integration in a contemporary production context, allowing theoretical frameworks to be linked to a representative practical application.

The scope of the study is exploratory and explanatory, and its results are aimed at generating conceptual reflection and proposals for improvement in talent management and the productive function. Among its main limitations is the absence of primary empirical data, which opens up the possibility of future research with quantitative or mixed approaches that validate and expand on the approaches presented here.

VALUE CHAIN AND MANAGEMENT IN TRADITIONAL COMPANIES.

In a major Mexican city, a group of engineers and designers founded a workshop specializing in transforming ideas into physical products using 3D printing, an additive manufacturing technology that allows three-dimensional objects to be manufactured by accumulating successive layers of material (which can vary between plastic, resin, or metal) following a digital model. The economic purpose is to offer on-demand production, rapid prototyping, and customized parts, manufactured without the need for traditional tools.

Since the beginning of operations, this organization has stood out for serving niche markets that demand customized products, from functional parts for industrial prototypes to specific accessories for various sectors, including education and advertising. Unlike traditional production lines, 3D printing opens up a range of possibilities, allowing each order to be unique and tailored to specific requirements, which requires diverse and precise human decisions at each stage of the process.

The workflow begins with a customer order (from an automotive design company, for example), which requires a certain prototype of an interchangeable part for performance testing.

At this stage, the human element—with the necessary digital skills, of course—translates the customer's requirements into a digital model using appropriate software. This stage is essential because, although the 3D printer physically "executes" the part, decisions about form, function, tolerances, and materials depend on the expert judgment of individuals.

After the model has been generated, preparing the print requires defining technical parameters such as object orientation, fill density, extrusion speed, and temperature—variables that very few automated systems can determine without human assistance (Longo et al., 2017) . During printing, operators monitor the processes, adjust variables in real time (in case of any deviation), and evaluate the quality of the first layers, a process that requires attention, interpretation of material behavior, and practical experience.

Additionally, the workshop has implemented human-machine interaction mechanisms that enrich the production experience, such as advanced interfaces and intelligent platforms that combine augmented reality to monitor multiple printers simultaneously, reducing errors and improving decision-making (Nguyen Ngoc et al., 2022) but it also affects the entire value chain. In this sense, human-centred factors play a core role in transitioning to sustainable manufacturing processes and consumption. The awareness of human roles in Industry 4.0 is increasing, as evidenced by active work in developing methods, exploring influencing factors, and proving the effectiveness of design oriented to humans. However, numerous studies have been brought into existence but then disconnected from other studies. As a consequence, these studies in industry and research alike are not regularly adopted, and the network of studies is seemingly broad and expands without forming a coherent structure. This study is a unique attempt to bridge the gap through the literature characteristics and lessons learnt derived from a collection of case studies regarding human-centred design (HCD .

Throughout the entire process, there is human interaction, advising customers, translating needs into productive solutions, and adjusting them to requirements. In this way, technology becomes an indispensable tool for bringing ideas to life, but the distinctive value of this business remains the human ability to interpret, decide, and solve complex problems, which allows this workshop to differentiate itself in the market.

This human-technological approach (where technology enables, but people decide, adjust, and manage) has amplified human capabilities and created productive value that sets an organization apart from its competition.

Evolution of production management and the role of the human factor

Stage 1. Artisanal production and traditional manufacturing: humans as expert executors.

In traditional production systems, prior to industrialization, production was based mainly on manual skills, tactical knowledge, and accumulated experience. Workers played simultaneous roles as designers, executors, and evaluators of the product, placing the human factor at the absolute center of the production function. Value creation depended directly on individual skill and empirical learning, with little technological support and minimal standardization (Bellgran & Säfsten, 2010) .

The operational tools used were rudimentary, while management was based on direct observation and visual control. The system was highly flexible, but scalability and efficiency were limited, which drove the transition to more structured industrial models.

Stage 2. Industrialization and mass production: humans as specialized operators.

With industrialization and the consolidation of mass production, the productive function was restructured under the principles of specialization, standardization, and division of labor. Methodologies such as scientific management and, later, Taylorist and Fordist systems of " " redefined the human role, focusing it on the execution of specific and repetitive tasks (Womack, 2007) .

At this stage, decision-making gradually shifted to administrative levels, separating operations from strategic management. Work lost decision-making autonomy, while tools such as assembly lines, time and motion studies, and basic statistical control began to dominate production management. Although these approaches increased efficiency and reduced costs, they also led to operational rigidity and a disconnect between process knowledge and decision-making.

Stage 3. Lean production and continuous improvement: humans as agents of improvement.

From the second half of the 20th century onwards, mass production migrated to more flexible models, including lean manufacturing. In this approach, the human role regained relevance as an identifier (and classifier) of waste, a problem solver, and a promoter of continuous improvement (Liker, 2013a) .

Similarly, methodologies such as Kaizen, Just in Time, Kanban, 5S, and work standardization place people at the center of the production system, recognizing that operational excellence depends not only on technology but also on the active involvement of staff. The human factor acts as a bridge between processes and strategic objectives, although technological support remains limited and analog.

DOI https://doi.org/10.22533/at.ed.5157326050215

Stage 4. Industry 4.0: humans as cognitive integrators and strategic decision-makers.

With the advent of Industry 4.0, the productive function was transformed with the incorporation of sensors, cyber-physical systems, the Internet of Things (IoT), big data analysis, and advanced automation. These elements allow real-time visibility of production processes, as well as the continuous optimization of operational parameters (Kagermann et al., 2013) .

Under this premise, the human role shifts away from physical execution as such, focusing instead on interpretation, supervision, decision-making, and knowledge management functions. Figures such as the 4.0 operator emerge, whose expertise is oriented towards the use of digital tools, intelligent interfaces, decision support systems, and data analytics, which amplify their cognitive abilities without replacing their professional judgment (Romero et al., 2016) .

With the support of operational methodologies and the use of digital tools, human-technological integration is reinforced, in which value is generated from informed and timely human decisions.

The role of humans in Industry 4.0: technical, technological, and human-collaborative integration

Industry 4.0 represents not only a technological evolution of production systems, but also a structural transformation in the way organizations conceive of work, decision-making, value creation, and their behavior in the market. In this fourth stage of productive evolution, humans do not disappear or are replaced by automation; on the contrary, their role is redefined and becomes more complex, as they become the link between technology, information, and organizational strategy.

Technical dimension: from operational executor to production system manager

From a technical perspective, the role of humans is shifting from the direct execution of physical tasks to functions of supervision, analysis, and process optimization. Advanced automation, collaborative robots, and cyber-physical systems take on repetitive and high-precision tasks; however, they require operators capable of understanding the overall functioning of the system, interpreting deviations, and making timely corrective decisions (Romero et al., 2016) .

In this context, workers become 4.0 operators, whose technical contribution lies not in their labor, but in their cognitive abilities, professional judgment, and contextual experience to ensure the stability, quality, and efficiency of the production process.

Technological dimension: humans as data interpreters and strategic decision-makers

The technological dimension of Industry 4.0 is characterized by the massive generation of data from interconnected sensors, IoT platforms, MES, and ERP systems. Although these technologies allow for unprecedented visibility of operations, data alone does not generate value; it is humans who interpret, contextualize, and transform it into useful knowledge for strategic decision-making (Kagermann et al., 2013) .

Thus, the human role shifts toward information management, analytics, and the use of decision support systems, where skills such as critical thinking, digital literacy, and systemic understanding of the process are

DOI https://doi.org/10.22533/at.ed.5157326050215

indispensable. Technology amplifies human capabilities, but it does not replace the judgment, ethics, or responsibility associated with productive management.

Human-collaborative dimension: the central axis of Industry 4.0

The human-collaborative dimension is at the core of Industry 4.0, recognizing that the sustainability and competitiveness of production systems depend on people who are able to learn, adapt, and collaborate with technology and with each other. This dimension has both individual and collective implications that redefine talent management and organizational culture. It should be noted that this dimension will be considered from two aspects: the individual and the collective, both of which are necessary in organizations:

Individual implications

At the individual level, human beings in Industry 4.0 face the need to develop new skills and attitudes:

- Distributed leadership, geared toward decentralized decision-making and working in highly dynamic environments.
- Technical and digital skills, combined with soft skills such as communication, problem solving, and systemic thinking.
- Resilience and adaptability in the face of constant technological evolution and the redefinition of job roles.
- Knowledge management, understood as the ability to transform experience and information into continuous learning and performance improvement (Nonaka & Takeuchi, 1995) .

These capabilities allow individuals to be more than mere users of technology, but active agents of innovation and continuous improvement within the productive system (Sony & Naik, 2019) .

Collective implications

From a collective perspective, Industry 4.0 requires profound transformations in organizations:

- An organizational culture oriented toward learning, where error is conceived as a source of improvement and innovation as a continuous process.
- Organizational learning, based on interdisciplinary collaboration, knowledge sharing, and the strategic use of digital platforms.
- Job retraining, through training and retraining programs that enable the transition from traditional roles to higher value-added functions, reducing the risk of job exclusion (European Commission. Directorate General for Research and Innovation., 2021) .

In this sense, the organization acts as a living system, in which technology enables new ways of working, but it is the collective action of human capital that defines the real impact of digital transformation.

DOI https://doi.org/10.22533/at.ed.5157326050215

Learning path for human incorporation into Industry 4.0 production systems

The successful incorporation of people into Industry 4.0 production systems requires a comprehensive learning path that transcends traditional technical training. This path should be conceived as a progressive and continuous process, aimed not only at the acquisition of formal knowledge, but also at the development of practical skills and the formation of values that enable conscious, responsible, and sustainable interaction with technology. In this sense, learning in Industry 4.0 is structured in three interdependent dimensions: theoretical, heuristic, and axiological learning, which articulate knowledge, know-how, and interpersonal skills within contemporary production systems (Romero et al., 2016) .

Theoretical learning: systemic understanding and digital literacy

The first stage of the learning path focuses on theoretical learning, whose main objective is to provide people with a systemic understanding of Industry 4.0 and the fundamentals that underpin its operation. This includes knowledge of key concepts such as cyber-physical systems, the Internet of Things, data analytics, advanced automation, vertical and horizontal integration, and production management models based on real-time information. This learning allows individuals to understand not only how technologies operate, but also why they are implemented and how they impact the value chain (Kagermann et al., 2013) .

Likewise, digital and analytical literacy becomes an indispensable requirement, since decision-making in highly digitized environments requires the ability to interpret data, understand performance indicators, and recognize the limitations of automated systems. From this perspective, theoretical learning lays the cognitive foundations for informed and critical human participation in intelligent production systems (Sony & Naik, 2019).

Heuristic learning: experience, problem solving, and continuous improvement

The second stage corresponds to heuristic learning, understood as learning that is built on experience, reflective practice, and real-world problem solving. In Industry 4.0, learning does not only take place in formal training spaces, but constantly in daily interaction with automated systems, digital interfaces, and multidisciplinary teams. Here, humans develop the ability to learn by doing, adjusting parameters, interpreting system behaviors, and making decisions in uncertain contexts (Liker, 2013) . This type of learning is supported by methodologies such as continuous improvement, problem-based learning, digital simulation, the use of digital twins, and controlled experimentation environments. Through these tools, people strengthen their critical thinking, adaptability, and professional judgment, which are essential elements for performing as operators, analysts, or managers in intelligent production systems. At this level, mistakes are no longer penalized and become a valuable source of organizational knowledge (Longo et al., 2017) .

Axiological learning: values, ethics, and socio-technical responsibility

The third stage of the learning path, which is often underestimated, corresponds to axiological learning, which guides human action from an ethical, social, and organizational perspective. In Industry 4.0, where decisions can be mediated by algorithms and automated systems, it is essential that people develop values associated with responsibility, professional ethics, collaboration, and commitment to collective well-being.

This learning involves strengthening attitudes such as openness to change, resilience in the face of job retraining, and a willingness to engage in lifelong learning. It also promotes a critical view of the use of technology, recognizing its benefits but also its risks in terms of job exclusion, misuse of information, or dehumanization of work. From an organizational perspective, axiological learning contributes to the construction of cultures oriented towards learning, responsible innovation, and sustainability, where technology is conceived as a means and not as an end in itself (European Commission. Directorate General for Research and Innovation., 2021) .

Integration of the learning path

Taken together, this learning path allows people to transition from being passive users of technology to active agents of value creation, capable of understanding, operating, and guiding complex production systems. The articulation of theoretical, heuristic, and axiological learning ensures a balanced integration of human beings into Industry 4.0, reinforcing their role as the axis between the productive function and technology, and ensuring that digital transformation translates into competitiveness, sustainability, and human development.

DISCUSSION

The results of the analysis reveal a significant convergence with contemporary literature that raises the need to move towards human-centered production models, in which technology acts as an enabler rather than a substitute for human labor. In agreement with authors such as Romero et al. (2016) and Longo et al. (2017), it is confirmed that Industry 4.0 redefines the role of the worker towards functions with greater cognitive, strategic, and collaborative content.

However, the study also highlights persistent tensions between technological efficiency and human development. While automation and data analysis promise substantial improvements in productivity and process control, their implementation without a clear human capital development strategy can lead to resistance to change, loss of tacit knowledge, and risks of labor exclusion. In this sense, an exclusively technocratic approach is insufficient to guarantee sustainable competitive advantages.

The discussion suggests that the true potential of Industry 4.0 is achieved when organizations coherently integrate technology, people, and values, moving toward models closer to the approaches of Industry 5.0, where sustainability, resilience, and human well-being take on a central role. The proposed learning path is thus positioned as a coordinating mechanism that allows this transition to be managed in a structured and conscious manner.

PROPOSAL

The main contribution of this article lies in the conceptual integration of the hu-

DOI https://doi.org/10.22533/at.ed.5157326050215

man factor as the articulating axis between the productive function and technology in the context of Industry 4.0. Unlike studies focused exclusively on technological adoption, this work proposes a socio-technical vision that emphasizes the generation of value from the interaction between people, processes, and digital systems.

From a theoretical point of view, this document contributes to the literature on production management by systematizing the historical evolution of the human role into four clearly defined stages, offering an analytical framework that facilitates understanding of the organizational changes associated with digitization. In practical terms, the proposed learning path provides a useful guide for organizations and managers interested in designing training, retraining, and talent management strategies aligned with the challenges of Industry 4.0.

As mentioned above, the evolution that has taken place in industry must go hand in hand with the updating and strengthening of human beings from their perspective as professionals, because this implies the growth and development of companies and their competitive status in a context that requires joint training, including both theoretical and attitudinal aspects that enable efficiency and productivity.

Finally, the study provides a conceptual basis for future empirical research aimed at evaluating the impact of human-centered learning models on productive performance, innovation, and organizational sustainability, consolidating the human factor as a key element in the digital transformation of industry.

CONCLUSIONS

The analysis developed throughout the article confirms that Industry 4.0 should not be interpreted solely as a technological advance, but as a profound transformation in the way the productive function and the role of the human factor within organizations are conceived. The historical evolution of production management shows that, although technologies have progressively taken on operational and repetitive tasks, humans have moved towards functions of cognitive integration, information interpretation, and strategic decision-making, consolidating themselves as the articulating axis between processes, technology, and value generation.

The case study of the 3D printing workshop illustrates in a concrete way how technology acts as an enabler of productive capacities, while differential value is built on the knowledge, experience, and professional judgment of individuals. This human-technological interaction demonstrates that competitiveness in digitized production environments depends on the ability to translate data into useful knowledge and to transform that knowledge into timely decisions aimed at continuous improvement.

Likewise, the characterization of the human role from the technical, technological, and human-collaborative dimensions reveals that the sustainability of Industry 4.0 requires a rethinking of talent management. At the individual level, the development of distributed leadership, digital skills, resilience, and knowledge management becomes essential; while, at the collective level, organizations must foster cultures oriented toward learning, responsible innovation, and permanent job retraining. In this sense,

DOI https://doi.org/10.22533/at.ed.5157326050215

the proposed learning path offers an integrative framework that allows for the articulation of knowledge, know-how, and interpersonal skills, facilitating the conscious and ethical incorporation of people into intelligent production systems.

This means that operational excellence in Industry 4.0 is not achieved solely through the adoption of advanced technologies, but through their effective integration with human capabilities, organizational values, and management models focused on sustainable value creation.

References

Bellgran, M., & Säfsten, K. (2010). *Production Development*. Springer London. https://doi.org/10.1007/978-1-84882-495-9

Esparza-González, M. S., Sánchez-López, C., & Piña, F. J. V.-. (2017). *Diseño e Implementación de un Sistema Electrónico para la Automatización de un Aparato VICAT Convencional.*

European Commission. Directorate General for Research and Innovation. (2021). *Industry 5.0: Towards a sustainable, human centric and resilient European industry.* Publications Office. https://doi.org/10.2777/308407

Kagermann, H., Helbig, J., Wahlster, W., & Hellinger, A. (2013). *Recommendations for Implementing the Strategic Initiative INDUSTRIE 4.0: Securing the Future of German Manufacturing Industry ; Final Report of the Industrie 4.0 Working Group*. Forschungsunion. https://books.google.com.mx/books?id=AsfOoAEACAAJ

Liker, J. K. (2013a). *Toyota way: 14 management principles from the world's greatest manufacturer* (First edition). McGraw-Hill Education.

Liker, J. K. (2013b). *Toyota way: 14 management principles from the world's greatest manufacturer* (First edition). McGraw-Hill Education.

Longo, F., Nicoletti, L., & Padovano, A. (2017). Smart operators in industry 4.0: A human-centered approach to enhance operators' capabilities and competencies within the new smart factory context. *Computers & Industrial Engineering*, *113*, 144-159. https://doi.org/10.1016/j.cie.2017.09.016

Nguyen Ngoc, H., Lasa, G., & Iriarte, I. (2022). Human-centred design in industry 4.0: Case study review and opportunities for future research. *Journal of Intelligent Manufacturing*, *33*(1), 35-76. https://doi.org/10.1007/s10845-021-01796-x

Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. Oxford University PressNew York, NY. https://doi.org/10.1093/oso/9780195092691.001.0001

Ribeiro, V. B., Nakano, D., & Muniz Jr., J. (2024). The human resources and knowledge management integrated role in Industry 4.0/5.0: A Human-Centric Operations Management framework. *Production*, *34*, e20240014. https://doi.org/10.1590/0103-6513.20240014

Rodríguez Calero, L. A., Ochoa Suastes, W. O., Hernández P., K., Ariza García, C., Muñoz Ibáñez, C. A., & Muñoz Ibañez, M. A. (2017). Cadena de valor hexagonal general. *Boletín Científico INVESTIGIUM de la Escuela Superior de Tizayuca*, *2*(4). https://doi.org/10.29057/est.v2i4.2150

Romero, D., Bernus, P., Noran, O., Stahre, J., & Fast-Berglund, Å. (2016). The Operator 4.0: Human Cyber-Physical Systems & Adaptive Automation Towards Human-Automation Symbiosis Work Systems. En I. Nääs, O. Vendrametto, J. Mendes Reis, R. F. Gonçalves, M. T. Silva, G. Von Cieminski, & D. Kiritsis (Eds.), *Advances in Production Management Systems. Initiatives for a Sustainable World* (Vol. 488, pp. 677-686). Springer International Publishing. https://doi.org/10.1007/978-3-319-51133-7_80

Solleiro, J. L., & Castañón, R. (2004). *Gestión del capital intelectual en centros de Innovación y Desarrollo*.

Sony, M., & Naik, S. (2019). 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-09-2018-0284

Womack, J. P. (with Jones, D. T., & Roos, D.). (2007). *The Machine That Changed the World: The Story of Lean Production*. Free Press.