



Digital Supply Chains and the Human Factor pp 1–14

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Digital Supply Chains and the Human Factor—A Structured Synopsis

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Chapter | [First Online: 05 January 2021](#)

614 Accesses | **2** Citations | **1** Altmetric

Part of the [Lecture Notes in Logistics](#) book series (LNLO)

Abstract

Digital developments and changes in the production, supply chain and logistics sector as well as specific concepts like automation and Industry 4.0 or the Internet of Things are omnipresent. Especially the human role in such settings experiences important changes, which has not been adequately addressed in research yet. This introduction chapter contains an overview of elements encountered in digitalization processes in order to ensure sustainable work environments and

efficient Human-Computer Interaction settings for the benefit of workers and organizations. Thus, it is the aim of this chapter to provide a structured synopsis to consider the human factor in analyzing digital work processes. This synopsis is aligned with typical workflow developments in digitalization projects and can be transferred to different work settings in supply chains. Finally, we outline the chapter structure of this book within four thematic sections in order to provide a joint storyline on investigating the human factor in digital supply chains.

Keywords

Human factor **Human-Computer Interaction**

Digitalization **Work processes**

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EUR 29.95

Price includes VAT (Germany)

- DOI: 10.1007/978-3-030-58430-6_1
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References

1. Autor DH (2015) Why are there still so many jobs? The history and future of workplace automation. *J Econ Perspect* 29(3):3–30
2. Bakker AB, Demerouti E (2007) The job demands-resources model: state of the art. *J Managerial Psychol* 22(3):309–328
3. Ball K (2010) Workplace surveillance: an overview. *Labor History* 51(1):87–106
4. Bandura A (1977) Self-efficacy: toward a unifying theory of behavioral change. *Psychol Rev* 84(2):191–215
5. Baxter G, Sommerville I (2011) Socio-technical systems: from design methods to systems engineering. *Interact Comput* 23(1):4–17
6. Beer D, Burrows R (2010) Consumption,

prosumption and participatory web cultures: an introduction. *J Consum Culture* 10(1):3–12

7. Carroll JM (1997) Human–computer interaction: psychology as a science of design. *Int J Hum Comput Stud* 46(4):501–522

8. Cummings M, Bruni S (2009) Collaborative human-automation decision making. In: Nof S (ed) *Handbook of automation*. Springer, Berlin, pp 437–447

9. Dale S (2014) Gamification: making work fun, or making fun of work? *Bus Inform Rev* 31(2):82–90

10. Dalenogare LS, Benitez G, Ayal NF, German A (2018) The expected contribution of Industry 4.0 technologies for industrial performance. *Int J Prod Econ* 204(C):383–394

11. Day A, Paquet S, Scott N, Hambley L (2012) Perceived information and communication technology (ICT) demands on employee outcomes: the moderating effect of organizational ICT support. *J Occup Health Psychol* 17(4):473–491

12. De Filippi P, Mannan M, Reijers W (2020) Blockchain as a confidence machine: the

problem of trust & challenges of governance.

Technol Soc 101284

13. Dul J, Bruder R, Buckle P, Carayon P, Falzon P, Marras WS, van der Doelen B (2012) A strategy for human factors/ergonomics: developing the discipline and profession. *Ergonomics* 55(4):377–395

14. Edwards P, Ramirez P (2016) When should workers embrace or resist new technology? *New Technol Work Employment* 31(2):99–113

15. Elbert KK, Kroemer HB, Hoffman ADK (2018) *Ergonomics: how to design for ease and efficiency*. Academic, New York

16. Frey CB, Osborne MA (2013) The future of employment: how susceptible are jobs to computerisation. OMS Working Paper

17. Hackman JR, Oldham GR (1975) Development of the job diagnostic survey. *J Appl Psychol* 60(2):159–179

18. Hansen HK, Flyverbom M (2015) The politics of transparency and the calibration of knowledge in the digital age. *Organization* 22(6):872–889

-
19. Hartson R, Pyla PS (2012) *The UX book: process and guidelines for ensuring a quality user experience*. Elsevier, Amsterdam
-
20. Holford WD (2019) The future of human creative knowledge work within the digital economy. *Futures* 105:143–154
-
21. Jafari P, Mohamed E, Lee S, Abourizk S (2020) Social network analysis of change management processes for communication assessment. *Autom Construct* 118:103292
-
22. Jeske D, Santuzzi AM (2015) Monitoring what and how: psychological implications of electronic performance monitoring. *New Technol Work Employment* 30(1):62–78
-
23. Kirchner S, Schüßler E (2019) The organization of digital marketplaces: unmasking the role of internet platforms in the sharing economy. In: Ahrne G, Brunsson N (eds) *Organization outside organizations: the abundance of partial organization in social life*. Cambridge University Press, Cambridge, pp 131–154
-
24. Kitchen PJ, Daly F (2002) Internal

communication during change management.

Corp Commun Int J 7(1):46–53

25. Klumpp M (2018) Automation and artificial intelligence in business logistics systems: human reactions and collaboration requirements. *Int J Logistics Res Appl* 21(3):224–242

26. Klumpp M, Ruiner C (2018) Digitalization and work organization in new urban food delivery systems. *Int J Food Syst Dyn* 9(5):399–408

27. Klumpp M, Ruiner C (2019) Human role in digital logistics: relevance of intuition in interacting with AI. In: Bierwirth C, Kirschstein T, Sackmann D (eds) *Logistics management. Lecture notes in logistics*. Springer, Cham, pp 32–44

28. Klumpp M, Zijm H (2019) Logistics innovation and social sustainability: how to prevent an artificial divide in human-computer interaction. *J Bus Logistics* 40(3):265–278

29. Kong XTR, Zhong RY, Zhao Z, Shao S, Li M, Lin P, Chen Y, Wu W, Shen L, Yu Y, Huang GQ (2020) *Cyber physical ecommerce logistics*

system: an implementation case in Hong Kong.
Comput Ind Eng 139:106170

30. Land F (2000) Evaluation in a socio-technical context. In: Baskerville R, Stage J, DeGross JI (eds) Organizational and social perspectives on information technology. Springer, Boston, pp 115–126

31. Larjovuori RL, Bordi L, Mäkinieni JP, Heikkilä-Tammi K (2016) The role of leadership and employee well-being in organizational digitalization. Paper presented at the 26th Annual RESER Conference, Naples

32. Lee J, Seppelt B (2009) Human factors in automation design. In: Nof S (ed) Handbook of automation. Springer, Berlin, pp 417–436

33. Lee JD, Lee KA (2004) Trust in automation: designing for appropriate reliance. Human Factors J Human Factors Ergon Soc 46(1):50–80

34. Lee MK, Kusbit D, Metsky E, Dabbish L (2015) Working with machines: the impact of algorithmic and data-driven management on human workers. Paper presented at the ACM, Soul

35. Legenvre H, Henke M, Herbert R (2020) Making sense of the impact of the internet of things on purchasing and supply management: a tension perspective. *J Purchas Supply Manage* 26(1):100596

36. Lindgaard G, Dudek C (2003) What is this evasive beast we call user satisfaction? *Interact Comput* 15(3):429–452

37. Manavalan E, Jayakrishna K (2019) A review of internet of things (IoT) embedded sustainable supply chain for industry 4.0 requirements. *Comput Ind Eng* 127:925–953

38. Mohlmann M, Zalmanson L (2017) Hands on the wheel: Navigating algorithmic management and Uber drivers' autonomy. Paper presented at the proceedings of the international conference on information systems (ICIS 2017), Seoul, South Korea

39. Montreuil B (2011) Towards a physical internet: meeting the global logistics sustainability grand challenge. *Logistics Res* 3(2):71–87

40. Moore PV, Upchurch M, Whittaker X (2018) Humans and machines at work: monitoring,

surveillance and automation in contemporary capitalism. In: Moore PV, Upchurch M, Whittaker X (eds) *Humans and machines at work: monitoring, surveillance and automation in contemporary capitalism*. Springer International Publishing, Cham, pp 1–16

41. Mumford E (2000) A socio-technical approach to systems design. *Requirements Eng* 5(2):125–133

42. Norman DA, Stappers PJ (2015) DesignX: complex sociotechnical systems. *She Ji J Design Econ Innov* 1(2):83–106

43. Orlikowski W (2016) Digital work: a research agenda. In: Czarniawska B (ed) *A research agenda for management and organization studies*. Edward Elgar Publishing, Northampton, pp 88–96

44. Orlikowski WJ (1992) The duality of technology: rethinking the concept of technology in organizations. *Organ Sci* 3(3):398–427

45. Phan S, Ballot E, Huang GQ, Montreuil B (2017) *Physical internet and interconnected logistics*

services: research and applications. *Int J Prod Res* 55(9):2603–2609

46. Proctor T, Doukakis I (2003) Change management: the role of internal communication and employee development. *Corp Commun Int J* 8(4):268–277

 47. Rappaport J (1981) In praise of paradox: a social policy of empowerment over prevention. *Am J Community Psychol* 9(1):1–25

 48. Ritzer G, Jurgenson N (2010) Production, consumption, prosumption: the nature of capitalism in the age of the digital 'prosumer.' *J Consumer Culture* 10(1):13–36

 49. Rogers EM (2003) *Diffusion of innovations*. Free Press, New York

 50. Rousseau DM (1995) *Psychological contracts in organizations: understanding written and unwritten agreements*. Sage, Thousand Oaks

 51. Ryan RM, Deci EL (2000) Self-determination theory and the facilitation of intrinsic motivation, social development and well-being. *Am Psychol* 55(1):68–78
-

52. Sin J, Munteanu C (2020) An empirically grounded sociotechnical perspective on designing virtual agents for older adults. *Human–Comput Interact* 35(5–6):481–510
-
53. Spreitzer GM (1995) Psychological empowerment in the workplace: dimensions, measurement, and validation. *Acad Manage J* 38(5):1442–1465
-
54. Szalma JL (2014) On the application of motivation theory to human factors/ergonomics: motivational design principles for human–technology interaction. *Human Factors J Human Factors Ergon Soc* 56(8):1453–1471
-
55. Venkatesh V, Bala H (2008) Technology acceptance model 3 and a research agenda on interventions. *Decis Sci* 39(2):273–315
-
56. Vink P, Imada AS, Zink KJ (2008) Defining stakeholder involvement in participatory design processes. *Appl Ergon* 39(4):519–526
-

57. Wickens CD, Gordon SE, Liu Y, Lee J (2004) An introduction to human factors engineering. Prentice Hall, Upper Saddle River
-
58. Wilkesmann M, Wilkesmann U (2018) Industry 4.0—organizing routines or innovations? VINE J Inform Knowl Manage Syst 48:238–254
-
59. Wood AJ, Graham M, Lehdonvirta V, Hjorth I (2018) Good gig, bad gig: autonomy and algorithmic control in the global gig economy. Work Employ Soc 33(1):56–75
-
60. Yadav G, Luthra S, Jakhar SK, Mangla SK, Rai DP (2020) A framework to overcome sustainable supply chain challenges through solution measures of industry 4.0 and circular economy: an automotive case. J Cleaner Prod 254. <https://doi.org/10.1177/0972150920948818>
-
61. Zuboff S (1988) In the age of the smart machine: the future of work and power. Basic Books, New York
-

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About this chapter

Cite this chapter

Klumpp, M., Ruiner, C. (2021). Digital Supply Chains and the Human Factor—A Structured Synopsis. In: Klumpp, M., Ruiner, C. (eds) Digital Supply Chains and the Human Factor. Lecture Notes in Logistics. Springer, Cham.

https://doi.org/10.1007/978-3-030-58430-6_1

[.RIS](#)  [.ENW](#)  [.BIB](#) 

DOI

https://doi.org/10.1007/978-3-030-58430-6_1

Published	Publisher Name	Print ISBN
05 January 2021	Springer, Cham	978-3-030-58429-0

Online ISBN	eBook Packages
978-3-030-58430-6	Engineering
	Engineering_(R0)

Not logged in - 134.76.2.30

CARE-CRUI (3000155420) - Politecnico di Milano (2000297122) - CARE-CRUI NATURE (3003532199) - CARE 2009 & 2010 (3000180852) - CILEA - Academic (3000520733) - CARE-CRUI COMPACT (3004220731)

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