

Progress in IS

More information about this series at <http://www.springer.com/series/10440>

Ahmed Bounfour

Digital Futures, Digital Transformation

From Lean Production to Acceluction

Ahmed Bounfour
European Chair on Intellectual Capital
University Paris-Sud
Sceaux
France

ISSN 2196-8705

Progress in IS

ISBN 978-3-319-23278-2

DOI 10.1007/978-3-319-23279-9

ISSN 2196-8713 (electronic)

ISBN 978-3-319-23279-9 (eBook)

Library of Congress Control Number: 2015947796

Springer Cham Heidelberg New York Dordrecht London

© Springer International Publishing Switzerland 2016

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made.

Printed on acid-free paper

Springer International Publishing AG Switzerland is part of Springer Science+Business Media
(www.springer.com)

Foreword

The ISD Program: An Example of Collective Intelligence in the Digital World

The CIGREF Foundation, whose mission is to *better understand how the digital world is transforming the way we live and do business*, rolled out the *Information Systems Dynamics (ISD)* international research program in 2010.

At CIGREF, we believe that digital culture is characterized by sharing of information and knowledge between the different stakeholders of an organization so as to build a collective intelligence that acts as a source of value creation for the enterprise. The ISD program is a remarkable example of the construction of a collective intelligence. When we set the project up in 2010, our aim was to create a collaborative, open program, integrating multiple contributions. In other words, a “research program 2.0”.

The program’s goals are ambitious:

- Draw on academic research to provide key insights for understanding a different future in a different world;
- Advise the leaders of major public and private organizations on strategic digital issues, in the light of changes under way in business models and in society at large;
- Define new, explanatory theoretical models that offer innovative approaches to IT and digital management, while also helping managers deal with new risks;
- Organize and promote fruitful dialogue between practitioners and researchers, and between business and academia.

The intention, ultimately, is to understand the digital transformations going on around us, to identify the conceptual building bricks of the 2020 enterprise—characterizing its digital uses, its value creation spaces, and how they are governed—and to understand the paradigm shifts inherent in the modes of production of the digital age.

Thanks to the unflagging and enthusiastic commitment of the scientific community around Professor Bounfour, Bruno Ménard and the members of the Steering

Committee, and Alain Pouyat, the chairman of the Strategic Orientation Committee, who met regularly to discuss new ideas and challenges for the program, and thanks to the support of our sponsor companies (Capgemini—Microsoft—Orange—Société Générale—Altran), we have met the challenge of *better understanding how the digital world is transforming the way we live and do business*.

The results of the CIGREF Foundation and of the ISD program have kept the promise of helping us to “find our way” through this complex digital world by providing us with navigation charts to explore possible routes ahead for business in 2020.

Supporting this program is about more than simply creating the conditions for top-flight research. It is about providing all the right conditions to bring the research findings forward into the international arena, making them available to our businesses and our wider ecosystem, including academia and government institutions.

In the 30 ISD program projects conducted between 2011 and 2014—by some fifty research laboratories in the USA, Europe, China and Japan—many topics relating to the 2020 digital enterprise were addressed in great depth. An understanding of these topics is essential to managing our organizations more effectively: business models and ecosystems, mobility, internal innovation practices and open innovation, knowledge flows, data, ethics, norms and standards, economic performance and organizational design.

All of these themes are covered in Prof. Bounfour’s monograph *Digital Futures, Digital Transformation: From Lean Production to Acceluction*, a work that also outlines the organizational design scenarios for the 2020 enterprise and presents the concept of Acceluction, a new system of production characterized both by the expansion of the field of value creation to multiples spaces, and by the acceleration of the associated links.

These elements will help us, as managers, to take a clear, informed view of the impact that these issues and challenges will have on our businesses between now and 2020. They will help our organizations to better navigate the new digital world by reconciling economic performance with organizational coherence, by learning to harmonize agility, innovation and collective efficiency, and by mobilizing the values of commitment, cooperation and trust.

Pascal Buffard
President of Cigref, President of Axa Technology Services

Acknowledgments

Writing a book based on the results of an international research program with different disciplinary, national, and functional perspectives is always a challenge. In this case, the task for me as scientific leader and general rapporteur of the program was made easy by the uniqueness of the exercise, as well as by the continuous intellectual and material support of the program's governance bodies.

This is a unique program, where executives and scholars meet together to discuss a scientific and business object: the design of the 2020 enterprise.

As always, the success of a collective endeavor depends upon the willingness and support of various bodies and individuals. I would like to warmly thank CIGREF for initiating and supporting the program. The CIGREF Foundation's Board provided guidance and support, particularly in the early stages of the program when no results were available. I would like to express my deep gratitude to Pascal Buffard, President of CIGREF and President of Axa Technologies Services, who continuously supported the programme's agenda in terms of content, deliverables, and dissemination; Bruno Ménard, Vice-President of CIGREF, and CIO at Sanofi, who greatly ensured the consistency of the dialogue between the programme's deliverables and its sponsors' expectations, and also ensured the dissemination of its main results; to Bruno Brocheton, Vice-President of CIGREF, and CIO at Euro Disney Group, Bernard Duverneuil, Vice-President of CIGREF, and CIO of the ESSILOR Group, Georges Epinette, Vice-President of CIGREF, and CIO at the MOUSQUETAIRES Group, Jean-Marc Lagoutte, Vice-President of CIGREF, and CIO at the DANONE Group, Pierre Laffitte, Honorary Senator, and President of the Foundation Sophia Antipolis, and Alain Pouyat, Executive Vice-president IT and New Technologies, BOUYGUES Group, who, as members of the Board, constantly gave feedback and encouragements to this collective effort.

I wish especially to warmly thank Jean-François Pépin, the *Délégué Général* of CIGREF who worked tirelessly to bridge the research and executive agendas, and who continuously supported and facilitated the program's implementation in terms of its objectives, resources allocation, and dissemination.

Warm thanks also go to the members of the Strategic Committee, who discussed the agenda and the interim results in various arenas and formats, including ad-hoc workshops: to his president, Alain Pouyat, Bouygues Group, as well as to Cyril François, Cap Gemini, Bernard Ourghanlian, Microsoft, Pierre-Louis Biaggi, Orange, Françoise Mercadal Delasalles, Société Générale, and Corinne Jouanny, Altran.

Naturally, this program would have not been possible without the committed support of its Scientific Committee, representing different disciplines (informatics, management information systems, geography, management science, business history, innovation policy, etc.), cultures and locations (Europe, the United States, Brazil, India, China, and Japan). Thank you to those colleagues who made the program feasible through their contribution to the research agenda, reviewing proposals, discussing interim and final results, and interacting with CIOs and sponsors of the program. I would like to express my deep gratitude to colleagues who participated in the different stages of the program: Jean-Eric Aubert, international consultant and former lead specialist at the World Bank, Surinder Batra, Institute of Management Technology, Ghaziabad, Michel Beadouin-Lafon, University Paris-Sud, Pierre-Jean Benghozi, Ecole Polytechnique, Marcos Cavalcanti, Federal University of Rio Janeiro, Leif Edvinsson, University of Lund, Patrick Fridenson, Ecole des Hautes Etudes en Sciences Sociales, Dominique Guellec, OECD, Thomas Housel, Naval Post-Graduate School, Junichi Iijima, Tokyo Institute of Technology, Moez Limayem, University of Florida, Rik Maes, University of Amsterdam, M. Lynne Markus, Bentley University, Peter Meusburger, Heidelberg University, Ian Miles, University of Manchester, Yves Pigneur, University of Lausanne, Frantz Rowe, University of Nantes, Gérald Santucci, European Commission, DG Connect, Pirjo Stahle, Aalto University, and Eric Tsui, Hong Kong Polytechnic University.

Thank you also to the 50 teams around the world who contributed to the program's workpackages and other activities.

I wish especially to thank Anne-Sophie Boisard, Mission Director, CIGREF, the linchpin of the whole program, who patiently managed its tasks and deliverables on a daily basis.

Finally, warm thanks to my editor, Christian Rauscher, who kindly and constantly supports ISD program publications, especially via SpringerBriefs in Digital Spaces, as well as to Barbara Bethke who, as usual, took care professionally of the organizational tasks related to our collective editorial effort.

Contents

1	Introduction	1
1.1	ISD as an International Research Program	2
1.2	Business Models and Digitality	5
1.3	ISD and Organisational Design	6
1.3.1	Organizational Design: An Issue for Renewal	7
1.3.2	The Future of Organizing—Beyond Web 2.0 Organizations	8
1.3.3	Organizational Architecture	8
1.3.4	Open Innovation	8
1.3.5	Digital Space and Data	9
1.4	Organizational Design: Questions and Dimensions	10
2	From IT to Digital Transformation: A Long Term Perspective	11
2.1	Historical Perspective	11
2.1.1	The Harvard MIS History Project	11
2.1.2	The Work of Chandler and Cortada	13
2.1.3	The Japanese Initiatives	15
2.1.4	Research in France and the ISD Research Program	15
2.1.5	The ISD Program	16
2.2	The Long-Term Perspective	19
2.3	Digital Transformation	20
2.3.1	The Transformational Nature of Digitality	21
2.3.2	Digital Transformation: Its Scope, Scale and Sources	22
2.4	Some Insights from Recent Foresight Programs	23
2.4.1	Macro and Innovation Foresights	24
2.4.2	Digital Foresights	27
2.4.3	Digital Enterprises Foresights	28
2.4.4	A Synthesis	29

- 3 Key Topics, Emergencies.** 31
 - 3.1 The Key Themes of the ISD Program 31
 - 3.1.1 Thematic Positioning of Each Project 31
 - 3.1.2 Thematic Clustering 34
 - 3.2 Digital Emergencies 40
 - 3.2.1 Innovation and Business Modelling Ecosystems 40
 - 3.2.2 Entrepreneurship 41
 - 3.2.3 Abundant Data 41
 - 3.2.4 Work in Digital Worlds 41
 - 3.2.5 Regional Specificities 41

- 4 25 Major Trends** 43
 - 4.1 Transformation Factors: ISD’s 25 Propositions 43
 - 4.1.1 Emerging Business Models 44
 - 4.1.2 Work, Coordination and Digital Uses 45
 - 4.1.3 Internal Innovation Practices 46
 - 4.1.4 Open (External) Innovation Practices. 47
 - 4.1.5 Enterprise Space and Knowledge Flows. 48
 - 4.1.6 The Social and Ethical Dimensions of Use. 49
 - 4.1.7 Data, Intellectual Property, and the Specificity of Digital. 50

- 5 The Emerging Production System** 53
 - 5.1 Thematic Analysis of the Propositions. 53
 - 5.2 An Expansion of Value Production Spaces. 54
 - 5.3 The Space-Time Dimension 60
 - 5.3.1 Time and Space in Digital Worlds 61
 - 5.3.2 The Acceleration of Everything: An Analytical Approach. 62
 - 5.4 The Articulation Between “Enterprise Production Space” and “Social Production Space” 63
 - 5.4.1 The Importance of the Equivalence of Norms. 63
 - 5.5 Postmodern Condition and Digitality. 63
 - 5.6 The Emergence of the Community Regime 65
 - 5.6.1 Two Regimes. 66
 - 5.6.2 The Transaction Regime 66
 - 5.6.3 The Community Regime 66
 - 5.6.4 Communities, Digitality and Intangibles. 67
 - 5.7 The Ethics of Use. 68
 - 5.8 The Data Ecosystem 69
 - 5.9 A Synthesis: Five Key Dimensions 70
 - 5.9.1 The Expansion and Plurality of Value Creation Spaces... and the Transformation of Modes of Value Production 70

- 5.9.2 The Articulation Between Transactional Links and Organic Links 71
- 5.9.3 The Management of Space-Time. 72
- 5.9.4 Organizational Liquidity 72
- 5.9.5 The Acceleration of Links 72

- 6 From Lean to Accelucation: Complements or Substitutes? 75**
 - 6.1 “Accelucation”: The Mode of Production of Emerging Digital Uses 75
 - 6.1.1 Lean Production and the Space—Time Dimension . . . 76
 - 6.2 Arguments in Favor of Recognising a New Kind of Mode of Production 79
 - 6.3 Accelucation: The Central Concept that Characterizes the New Mode of Production 79
 - 6.3.1 Transactional Links 80
 - 6.3.2 Organic Links 80
 - 6.3.3 Topography of Accelucation 81
 - 6.3.4 Accelucation and Digital Generativity 81

- 7 The Liquid Enterprise and Digitality 83**
 - 7.1 Congruence and the Preeminence of Societal Changes. 83
 - 7.2 From Liquid Society to Liquid Enterprise 84
 - 7.2.1 Generation Y as an Illustration 84
 - 7.3 The Liquid Enterprise and Digitality 85
 - 7.4 Liquid Enterprise, Liquid Management 85
 - 7.5 The Liquid Enterprise and Organizational Design 85

- 8 Accelucation: Stakes, Opportunities and Risks 87**
 - 8.1 Accelucation and Digital Strategy. 87
 - 8.2 The 2020 Enterprise: Its Underlying Tensions 88
 - 8.2.1 Liquidity-Plasticity/Solidity-Organicity. 88
 - 8.2.2 Mobility/Fixity 89
 - 8.2.3 Market Resources-Platform Resources/Own Resources 90
 - 8.2.4 Unstable Roles, Mobile Resources/Stable Roles, Fixed Resources 90
 - 8.2.5 Short Time-Span, Finite Space/Long Timespan, New Space to Build 91
 - 8.2.6 Horizontality-Collaboration/Verticality-Order-Hierarchy. 91
 - 8.3 The End of the “One Best Way”... and the Regime of Permanent Tension 94

- 9 The Acceluction Regime: Its Governance 95**
 - 9.1 The 2020 Enterprise: Its Value Creation Spaces 95
 - 9.2 Value Spaces and the Governance Issues 96
 - 9.2.1 General Approaches to Governance. 96
 - 9.2.2 Governance-Based Theories and Information Technology 97
 - 9.2.3 Governance-Based Theories of the Accelucted Enterprise 97
 - 9.3 Governance Structures for the Accelucted Enterprise. 98
 - 9.3.1 General Principles of Governance 98
 - 9.3.2 The Governance Agenda 98
 - 9.3.3 Leadership 100
 - 9.3.4 Governance Bodies 101

- 10 From Data to Digital Assets 103**
 - 10.1 Background: The Added-Value of IT Artifacts and Systems. . . 103
 - 10.2 Data-Driven Innovation as a Perspective 104
 - 10.3 Data and Value Creation 104
 - 10.3.1 Why Think in Terms of Digital Assets?. 105
 - 10.3.2 The Issue of Connecting Revenue to Data 105
 - 10.3.3 Next Steps? 106

- 11 The 2020 Enterprise: Six Contrasting Scenarios 107**
 - 11.1 Definition Criteria 107
 - 11.2 Scenarios 108
 - 11.2.1 Six Characteristic Scenarios 108
 - 11.2.2 Scenarios and Profile of the 2020 Enterprise 111

- 12 Beyond 2020: Network Abundance, Data, and the Future of Organizing 113**
 - 12.1 Managerial Issues Related to Post-2020 Digitality. 113
 - 12.1.1 The Question of Decision Making. 114
 - 12.1.2 The Real Time 114
 - 12.1.3 The Need for Specialized Human Skills. 114
 - 12.1.4 The Future Organizational Design. 114
 - 12.2 Societal Issues Related to Post-2020 Digitality 114
 - 12.2.1 Forms of Social Interaction 115
 - 12.2.2 Intangibility and Digitality 115
 - 12.2.3 The Status of Employment and Job Opportunities. . . . 116
 - 12.2.4 The Future of Institutions. 116
 - 12.2.5 The Platformic Issue: China Versus the United States 117
 - 12.2.6 The Status of Large Enterprises 117

Contents	xiii
Epilogue	119
Annexe A: The CIGREF Foundation Governance and Activities	121
Annexe B: ISD Projects Presented in Figs. 3.1–3.5	139
Annexe C: SpringerBriefs in Digital Spaces Series.	145
References.	147
List of Final Reports for the ISD Program	153