

Progress in IS

Ahmed Bounfour

# Digital Futures, Digital Transformation

From Lean Production to Acceluction

  
A network  
for large companies

 Springer

# **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](http://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

<b>1</b>	<b>Introduction</b> . . . . .	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
<b>2</b>	<b>From IT to Digital Transformation: A Long Term Perspective</b> . . . . .	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 Acceluction: Complements or Substitutes? . . . . . 75**
  - 6.1 “Acceluction”: 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 Acceluction: 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 Acceluction . . . . . 81
    - 6.3.4 Acceluction 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 Acceluction: Stakes, Opportunities and Risks . . . . . 87**
  - 8.1 Acceluction 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
<b>Epilogue</b> . . . . .	119
<b>Annexe A: The CIGREF Foundation Governance and Activities</b> . . . . .	121
<b>Annexe B: ISD Projects Presented in Figs. 3.1–3.5</b> . . . . .	139
<b>Annexe C: SpringerBriefs in Digital Spaces Series.</b> . . . . .	145
<b>References.</b> . . . . .	147
<b>List of Final Reports for the ISD Program</b> . . . . .	153

# Chapter 1

## Introduction

This chapter presents the overall rationale for the book and its positioning. It defines the framework for the Information Systems Dynamics (ISD) research program that was sponsored by CIGREF and other large international companies. It establishes the context for digital transformation and organizational design, explains why the program is focused on organizational design, and how it relates to the use of IT in companies and societies.

This book is about the current and future digital transformation of firms and organizations. This is an issue that affects managers around the world, evidenced by the growing number of workshops and seminars that address the inherent risks and potential. While there are clearly risks, expectations are high, particularly with respect to the value to be extracted from one of the major assets of digital transformation: data.

Digital transformation is also an issue for society, as digital ubiquity affects everyone in their daily lives. Not only business models, but also society and families are deeply and constantly challenged by their everyday interactions with technology.

There is a need to go beyond a general discussion and understand the nature of digital transformation, in order to design plausible futures for digitality in firms and organizations. That is the main aim of this book, which takes a broad interdisciplinary approach to a complex phenomenon that is still emerging. In addition to understanding the phenomenon itself, we also need to identify its underlying production mode and governance structure.

This book is based on the results of the international ISD research program led by the CIGREF Foundation. The program ran from 2008 to 2014, and supported around 30 projects and 50 teams worldwide (the United States, Europe, and Asia). It provides an integrated view of key trends in digital transformation from five interrelated perspectives: strategic (business models), societal, organizational, technological and regulatory.