

Masayuki Matsui

Artifacts Versus Nature Body

A Wealth-Additive Scheme of Enterprise,
Economics, and Nature Managing

 Springer

Artifacts Versus Nature Body

Masayuki Matsui

Artifacts Versus Nature Body

A Wealth-Additive Scheme of Enterprise,
Economics, and Nature Managing

 Springer

Masayuki Matsui
Chofu, Tokyo, Japan

ISBN 978-981-99-7698-0 ISBN 978-981-99-7699-7 (eBook)
<https://doi.org/10.1007/978-981-99-7699-7>

© The Editor(s) (if applicable) and The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2023

This work is subject to copyright. All rights are solely and exclusively licensed 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, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd. The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

Paper in this product is recyclable.

Preface

In our *Interdisciplinary Classics*, F. W. Taylor names his trial on shop-type body the “scientific” management (1911) of the so-called artifacts of 3M&I-body systems, in which 3M is the human, material/machine, and money and I is the information. Since one century has already passed, and I was very honored to be awarded the 30th (2021) Production, Robotics, and Integration Software for Manufacturing and Management (PRISM) award at Purdue University for exceptional contributions to innovation in artifacts science and models.

Now, our world is going beyond A. Smith’s era, and the principles of artifacts science could propose and contribute scientifically to the book on the wealth-additive scheme of managing and maximizing (win-win and sharing) the marginal value (eco-entropy) of artifacts by humanizing the artifact’s enterprise and its economics with nature. This scheme originated in the solving of Matsui’s equation and 2-center problem started in 1976 by conveyor theory since 1969. After the pair-map invention in 1983 at 2-center type, the subject of clockwork was achieved by the study of nature versus artifacts and its body at Springer Books since 2008.

Our books are advancing factory science, economics, and artifacts science and play a role in the sandwich theory and its ternary/pair-map microcosm of 3D-type toward the development of body science. Also, they are now been visualizing at the concept and view of e-Management.

This ternary/pair-map shape might be reminiscent of the geodesic dome in R. B. Fuller. Then, the wealth-additive goal of the body is not only similar to the marginal profit, GDP, and value in economics but also, means the marginal diversity (eco-entropy) and its wealth of economics versus reliability (sustainability) world at body. Its wealth-additive discipline, together with the recent digital engine dynamism of wealth, is here originated in the look-ahead physics on conveyor theory.

Since the beginning of human history, people have established and changed rules and regulations primarily based on artificial bodies and the different shapes they take on Earth. Although, historically speaking, most shapes are artificial bodies, there have been repeated contradictions, failures, and compromises that occur artificially, physically, and economically. This book inquires as to whether essential research and learning are sufficient to better understand the individual as a product of their

accumulated experiences. It also clarifies how research can academically pursue the ideal of accumulated form and design, so that we can design a society that draws out mankind's ultimate happiness.

Our world is faced with tough negotiations and a stalemate on how to achieve the Sustainable Development Goals (SDGs) of the United Nations. Hopefully, the outcome of the SDGs will allow us to be more constructive at transforming the traditional 3M&I class as some nano (gene/therblig)-transformation toward eco-entropy (marginal value/diversity) on earth. This semi-visible world is traditionally limited to a molecular size and is too rough to see at the practical rig level. Thus, any unsolved and invisible contradictions left behind on earth are subject to the practicality of SDGs. This approach proposes a visible method that could find and solve these contradictions (angle) by transforming the artifact's body, consisting of the 3M&I gene. The pair-map microcosm and its Matsui's M-equation have been designed based on nature and science books on artifacts (2016 and 2019).

Following these visible methods, the future of our subjective well-being could either have a breakthrough or subside into unsolved contradictions or stalemates in SDGs. Our approach enables the integration of the individual using analogy and isomorphic mathematics to add duality and a sandwich base to Matsui's formula, based on the figure, shape, and pair-map system of artificial and natural bodies. Additionally, this study proposes a scheme based on the microscopic system of pair maps on the spot using a one-leaf hyperboloid design and digital engine to seek eco-entropy/diversity index goal (avoiding the black hole area). This study also proposes a moving individual management method using the physical wave equation, along with the algebraic matrix approach via Matsui's square system, based on the dynamism of the clock model of the pair-map microcosm.

This book will be a useful and available tool to explore and construct a new discipline involving 3M&I-body science versus post-cybernetics. In addition, our book introduces validation cases of convenience stores, self-driving cars, and robotization (individualization) of artificial objects as the realization of the supply–demand system and the ideal form of artificial and natural bodies. In total, the content is about 150 pages spread across six parts, twelve chapters, and two appendices.

The six parts and appendices are here summarized as follows. Part I outlines the debate of artifacts versus nature and introduces new artifacts science as an academic discipline. Next, a wealth-additive economics problem of body goals is given and visually managerial on GDP versus SDG type at the ternary/pair-map type.

Chapter 1: A New Academic Discipline: Advancing Factory Science, Economics and Artifacts Science (Research Outreach, 2020).

Chapter 2: A Wealth-Additive Approach to GDP Versus SDG Body Using Behavioral Relax-Scheduling Policy (TEL 2023).

Part II gives the chameleon's criteria, marginal diversity, and win-win and sharing of nature versus artifacts. Next, the individual/body of one-leaf hyperboloid type is supposed, and its pair-map microcosm and nested economics are outlined. In Part III, this gives the virtual GDP engine of loop-convey type by a method for formalizing Carnot-like dynamism and win-win and sharing. Also, the digital engine of economic and knowledge type is developed by Matsui's progressive approach.

Chapter 3: A Chameleon's Harmonic Correlation, Criteria, and Diversity for a Win-Win and Sharing World (TEL 2020).

Chapter 4: Nature Versus Artifacts Body: One-Leaf Hyperboloid Type, Pair-Map Microcosm and Nested Economics (JDL 2022).

Chapter 5: Virtual GDP Engine: The Loop-Conveyor Problem in Sustainable Economics, and a Method for Formalizing Carnot-Like Dynamism and Win-Win and Sharing (TEL 2022).

Chapter 6: AI-Digital Engine of Artificial Economic and Knowledge Type by Matsui's Progressive Loop Approach (TEL 2023).

Part IV gives the Sollen, ternary SW/pair-map, and physics theory of body at post-cybernetics. Next, the generalized microcosm of ternary/pair-map type is developed, and the eco-entropy problem of body goals is formulated and discussed on managerial diversity.

Part V gives the managerial body and approach to the humanized type. First, the new method and time management of convenience robot are showed. Next, the H(heart) = W(waist) = L(lung) type of human-like clock system is discussed.

Chapter 7: Nature Versus Artifact Body II: Sollen, Central Dualism, and Chameleon Criteria (JDL 2023).

Chapter 8: A DX-like Ternary/Pair-Map, its Eco-Entropy Scheme, and Managerial Diversity of Nature Versus Artifacts Type on Sandwich Theory (TEL 2023).

Chapter 9: Humanized Robot of New Method and Time System and its Management: A Digital Transformation Case of Convenience Store Type (ICPR 2021), by Matsui, M., Fujita, E-O, Ishii, N.

Chapter 10: A Digital-Like Scheme of Human Body: A Humanized vs. Managerial Body System of $H(\text{heart}) = W(\text{waist}) = L(\text{lung})$ Type by Artifacts Science (JIMA 2021), by Matsui, M., Fujita, E-O, Ishii, N.

Part VI gives the two challenges toward new body and discipline. First, the following three perspectives are outlined: Individual/body theory, nano x intangible body, and pair-map x moving management. Next, the on-management and self-driving frame of 2-center type is challengeable on relativity at speed-up age and is realized at a managerial automobile car. Finally, the appendices on body totality are added as follows: Enterprise-totality of 3D-dynamic managing, and clock-dynamic scheme of bodies totality.

Chapter 11: Nano x intangible body and its relativity: Individual/body theory, Nano x intangible body, and pair-map x moving management (unfinished).

Chapter 12: An e-Management Method and Self-Driving Frame of on-Demand-to-Supply Robot Type using Ternary/Pair-Map (TEL 2023?).

To conclude, I sincerely acknowledge the contribution of many colleagues and researchers who support my academic activities, especially at Hiroshima University, Tokyo Institute of Technology, UEC Tokyo and Kanagawa University, Japan. Also, Purdue University and University of California at Berkeley are similarly acknowledged at USA. A special appreciation is expressed to Kiyomasa Narita, Emeritus Professor, at Kanagawa University, Yokohama, and related societies, Japan. I also wish to thank the late Jiro Fukuta, old Emeritus Professor at Gifu University, and old Professor Shoichi Isotani, Hiroshima University, Japan. Moreover, I am indeed to

Nobuaki Ishii, Professor at Kanagawa University, Masaaki Ohba, Professor of Nihon University, and their research group with Tetsuo Yamada, Professor of UEC Tokyo, Japan. Finally, for their contribution to editorial supports, thanks are due to Mr. Yutaka Hirachi. Springer, and Mr. Kazuma Sakae, My colleague, Japan. I also wish to thank my wife Kazuko, Japan, who has been supporting my research endeavor for my life work, together with my family.

Tokyo, Japan
August 2023

Masayuki Matsui

Contents

Part I Introductory Nature Versus Artifacts Theory

1	A New Academic Discipline on Artifacts	3
1.1	Introduction	3
1.2	3M&I Body and Post-cybernetics	4
1.2.1	Originating with Archimedes	4
1.2.2	3M&I Science Versus Cybernetics	4
1.3	Black-Box Versus White-Box Approach	5
1.3.1	A Black-Box Approach	5
1.3.2	A White-Box Approach	5
1.4	Sandwich and Balancing Theory	6
1.4.1	Matsui’s Sandwich and Theory	6
1.4.2	Matsui’s Matrix Method	7
1.5	Main Principles and Dynamism	7
1.5.1	Fractal/Harmonic Principles in Artifacts	7
1.5.2	3M&I-Artifacts Dynamism	8
1.6	Broader Implications and Remarks	8
	References	10
2	Wealth-Additive Discipline at GDP Versus SDG	11
2.1	Introduction	11
2.2	A Wealth-Additive Approach to GDP Versus SDG Body	12
2.2.1	Accumulated Form of Wealth-Additive Approach	12
2.2.2	Behavioral Economic Approaches and Mitigation	13
2.3	Eco-entropy and Sustainable Value	14
2.3.1	Ternary SW Approach and Pair-Map Strategy	14
2.3.2	Diversity/Heterogeneity and Its Eco-entropy	16
2.4	Input–Output Mitigation Approach	17
2.4.1	Top GDP Versus SDG Considerations	17
2.4.2	Numerical Example of Fig. 2.5b According to Fig. 2.1	18
2.5	Conclusion and Areas for Future Research	19

References 19

Part II Economics Science and Hyperboloid Body

3 Win–Win and Sharing World of Economics Body 23

3.1 Introduction 23

3.2 Outline of Knowledgeable and Intelligent Artifacts 24

3.2.1 Pair-Hierarchy in Relation to the $S = W$ Scheme 24

3.2.2 Balancing, Sharing, and Integration Issues 25

3.3 Correlation Versus Information Amount in Dualism 27

3.3.1 Three Examples of Correlation at the Lower Level 27

3.3.2 Several Information Amounts at the Upper Level 27

3.4 Summary of Analysis and Pair-Map of Artifacts 29

3.4.1 Numerical Summary and Pair Part at the Upper Level 29

3.4.2 Pair Part (Integration, Sharing) at the Lower Level 31

3.5 Conclusion and Remarks 32

References 33

4 Outline of Nature Versus Artifacts Body 35

4.1 Introduction 35

4.2 Natural Versus Artificial Bodies and What Form They Should Take 37

4.2.1 An Overview of the Individual Pair Map Reduction Method and One-Leaf (Elliptic) Hyperbolic Surface 37

4.2.2 Generalized Pair Map Reduction and Nash’s Zone 39

4.3 Pair Map Reduction of Natural Versus Artificial Bodies 40

4.3.1 The Nash’s Zone Core Hypothesis and Nesting: Enterprise or Society Type 40

4.3.2 The Ideal for Natural Versus Artificial Bodies as Seen Through Science 41

4.4 A Realization Case of Pair Map Microcosm 41

4.4.1 Nesting Ordered Systems and the Trickle-Down Problem 41

4.4.2 Bodies’ Shared Equilibrium and an Example of Win–Win and Sharing 43

4.5 Conclusion and the Future 45

References 45

Part III Economic and Knowledge Engine of Body

5 Virtual GDP Engine of Carnot-Like Type 49

5.1 Introduction 49

5.2 Loop Theory for Post-GDP 50

5.2.1 The “Tailor System” and Loop Theory 50

- 5.2.2 Sustainable “Loop-Conveyor” Theory 51
- 5.3 An Example of Matsui’s Formalization of the Conveyor Loop 53
 - 5.3.1 Loop Conveyor: Examples of the Unloading Versus Loading Sides 53
 - 5.3.2 Examples of Matsui’s Equation for Unloading Versus Loading 54
- 5.4 Win–Win and Sharing, and Benefit-Sharing Issues 54
 - 5.4.1 A Two-Level Optimization Method for Loop Conveyors 54
 - 5.4.2 Win–Win and Sharing and the Carnot Loop 55
- 5.5 Conclusion and Outlook 56
- References 57
- 6 AI-Digital Engine of Economic and Knowledge Type 59**
 - 6.1 Introduction 59
 - 6.2 Cumulative Process View of Artificial Bodies and Matsui’s Equation and M-Equation Method 60
 - 6.2.1 Cumulative Flow Number Process of Artificial Bodies Loop and Elliptical Dynamism Dissection Method 60
 - 6.2.2 Matsui’s Classic Queueing Equation, Flow Number Method and M-Equation Method 62
 - 6.3 Flow Number-Focused Progressive Dynamism and Ellipse Pair-Map Dissection 63
 - 6.3.1 Illustrative Example of “Economy” Versus Reliability Ellipse Intersection Using Progressive Dynamism 63
 - 6.3.2 Example of Application of Matsui’s Equation to an Ellipse Pair-Map Engine 64
 - 6.4 Engine Conversion of Knowledge-Based Artificial Intelligence (AI) Type 65
 - 6.4.1 Example of Virtual Engine with Scheduling Type Examples 65
 - 6.4.2 AI Determinants (Engine Conversion) Using Matsui’s Matrix 66
 - 6.5 Engine Conversion of Knowledge-Based Artificial Intelligence (AI) Type 67
 - References 67

Part IV Ternary/Pair-Map of Nature Versus Artifacts Body

- 7 Sollen and Ternary SW/Pair-Map of Body 71**
 - 7.1 Introduction 71
 - 7.2 Pair-Map Duality and Matching 73
 - 7.2.1 Pair-Map Duality and Mismatching Problems 73

- 7.2.2 Body Universal Law of Nature Versus Artifact Bodies 74
- 7.3 Nature Versus Artifact Bodies and Formulation 75
 - 7.3.1 Ideal Form and CSPS Model 75
 - 7.3.2 Formulation of Nature Versus Artifact Bodies 77
- 7.4 Physical Body Duality (Dualism) and Mismatching 78
 - 7.4.1 Physical Body Cycle and Pair-Map Expansion 78
 - 7.4.2 Economic Efficiency Versus Reliability in Physical Body 80
- 7.5 Pair Maps and Black Holes 81
 - 7.5.1 Artifact Body Wave Motion Equation and Conical Surfaces 81
 - 7.5.2 Artificial Black Holes Versus Chameleon’s Criteria 82
- 7.6 Conclusion and Outlook 82
- References 83
- 8 DX-Like Ternary/Pair-Map Microcosm 85**
 - 8.1 Introduction 85
 - 8.2 Outline of Realization and Managerial Body 87
 - 8.2.1 Pair-Hierarchy, Ternary Body, and Eco-entropy Scheme 87
 - 8.2.2 Typical Cases of Ternary SW/Pair-Map 88
 - 8.3 Ternary Realization Problem of Enterprise Case 88
 - 8.3.1 Enterprise Case of Ternary SW 88
 - 8.3.2 Realization Problem and Eigenvalue 90
 - 8.4 Information and Energy Cases 92
 - 8.4.1 Information Case of Ternary SW 92
 - 8.4.2 Energy Case of Ternary SW 92
 - 8.5 Further Consideration on Ternary SW/Pair-Map 93
 - 8.5.1 A Geometric View of Ternary SW/Pair-Map 93
 - 8.5.2 An Additional Consideration on Eco-entropy 93
 - 8.6 Conclusions and Nano-DX Remark 94
 - References 95

Part V Management Body Approach to Realization

- 9 Humanized Robot of Digital Transformation Type 99**
 - 9.1 Introduction 100
 - 9.2 Development of a Humanized Enterprise Robot 100
 - 9.2.1 A New Clock Type Management System 100
 - 9.2.2 A Method and Time Management System 101
 - 9.3 Managerial Formulation Based on Matsui’s Matrix Method 101
 - 9.3.1 Matsui’s IDTC-BG Formulization 101
 - 9.3.2 Digital Transformation (DX) Issues on Pair Map 103
 - 9.4 Matsui’s IDTC-BG and Its Management 104
 - 9.4.1 Objective Formulation of IDTC-BG Type 104

- 9.4.2 A Management Information Logic and Flow 106
- 9.5 Conclusions 107
- References 107
- 10 Digital-Like Scheme of Human Body Type 109**
 - 10.1 Introduction 109
 - 10.2 Sein of Nature Versus Artifacts Body and Sandwich 110
 - 10.2.1 Scheme of H (Heart) = W (Waist) = L (Lung) Type ... 110
 - 10.2.2 Microcosm Pair-Map and Nash’s Zone 111
 - 10.3 Circadian Clock and Pair-Map 112
 - 10.3.1 Clock System and Wave Equation 112
 - 10.3.2 Progressive Equation and day Cycle 112
 - 10.4 One-Leaf Hyperboloid and Body Core 113
 - 10.4.1 Chameleon’s Integration Versus Sharing Core 113
 - 10.4.2 Humanized Body System at Nash’s Zone (Core) 114
 - 10.5 Conclusions 115
 - References 115

Part VI Towards New Body and Its Discipline

- 11 Nano × Intangible Body with Relativity 119**
 - 11.1 Introduction 120
 - 11.2 An Outline of Individual/body Science 121
 - 11.2.1 Introductory Theory to Body Science 121
 - 11.2.2 Representative Type of Artificial Bodies 122
 - 11.3 Outline of Nano × Intangible Body 123
 - 11.3.1 Pair-Hierarchy of Nature Versus Artifacts Body 123
 - 11.3.2 Tangible Versus Intangible View: Therblig Versus Gene 124
 - 11.4 Pair-Map × Moving Management 125
 - 11.4.1 Matsui’s Pair-Map and Moving Microcosm 125
 - 11.4.2 Moving: X(Brake) + D(Workload) - (Rotate) → Z(Cycle) 127
 - 11.5 A Book Summary and Remarks Toward a New Discipline 128
 - References 129
- 12 e-Management: Managerial Self-driving 131**
 - 12.1 Introduction 131
 - 12.2 “Copernicus View” Artifacts Body Science and Moving e-Management Method 132
 - 12.2.1 The Types of “Copernicus View” Artifacts Bodies and the Corporate Robot Problem 132
 - 12.2.2 The Core Part of Pair-Hierarchy Artifacts Body and the Autonomous Driving Scheme 133
 - 12.3 Autonomous Driving Frame and Ellipse Pair-Map Method 134

- 12.3.1 Pair Matrix Display: Acceleration (Revenue) Versus Brake (Costs) Technology 134
- 12.3.2 Engine (Economy) Versus Steering Wheel (Reliability) Technology 135
- 12.4 Frame Utilization Method of Elliptical Deformed Pair-Map 136
 - 12.4.1 Static Management Type: Examples of Convenience Store Robots 136
 - 12.4.2 Moving e-Management Type: Examples of Automobile Robots 137
- 12.5 Conclusion and Next Steps 138
- References 138

- Appendix: Body-Managing Method: Accounting Versus Clock Dynamism 141**
- Index 151**

Part I
Introductory Nature Versus Artifacts
Theory