

Disruptive Technologies Global Trends 2025

Prepared by the Nat. Intell. Council to stimulate strategic thinking about the future by identifying key trends, the factors that drive them, where they may be headed, and how they might interact. It uses scenarios to illustrate some of the many ways in which the drivers examined in the study (e.g., globalization, demography, the rise of new powers, the decay of internat. institutions, climate change, and the geopolitics of energy) may interact to generate challenges and opportunities for future decisionmakers. Contents: The Globalizing Economy; The Demographics of Discord; The New Players; Scarcity in the Midst of Plenty?; Growing Potential for Conflict; BRIC's Bust-Up: Will the Internat. System Be Up to the Challenges?; Power-sharing in a Multipolar World. Illus.

World-renowned economist Klaus Schwab, Founder and Executive Chairman of the World Economic Forum, explains that we have an opportunity to shape the fourth industrial revolution, which will fundamentally alter how we live and work. Schwab argues that this revolution is different in scale, scope and complexity from any that have come before.

Characterized by a range of new technologies that are fusing the physical, digital and biological worlds, the developments are affecting all disciplines, economies, industries and governments, and even challenging ideas about what it means to be human. Artificial intelligence is already all around us, from supercomputers, drones and virtual assistants to 3D printing, DNA sequencing, smart thermostats, wearable sensors and microchips smaller than a grain of sand. But this is just the beginning: nanomaterials 200 times stronger than steel and a million times thinner than a strand of hair and the first transplant of a 3D printed liver are already in development. Imagine "smart factories" in which global systems of manufacturing are coordinated virtually, or implantable mobile phones made of biosynthetic materials. The fourth industrial revolution, says Schwab, is more significant, and its ramifications more profound, than in any prior period of human history. He outlines the key technologies driving this revolution and discusses the major impacts expected on government, business, civil society and individuals. Schwab also offers bold ideas on how to harness these changes and shape a better future--one in which technology empowers people rather than replaces them; progress serves society rather than disrupts it; and in which innovators respect moral and ethical boundaries rather than cross them. We all have the opportunity to contribute to developing new frameworks that advance progress.

The Fourth Industrial Revolution revolves around cyber-physical systems and artificial intelligence. Little is certain about this new wave of innovation, which leaves industrialists and educators in the lurch without much guidance on adapting to this new digital landscape. Society must become more agile and place a higher emphasis on lifelong learning to master new technologies in order to stay ahead of the changes and overcome challenges to become more globally competitive. Promoting Inclusive Growth in the Fourth Industrial Revolution is a collection of innovative research that focuses on the role of formal education in preparing students for uncertain futures and for societies that are changing at great speed in terms of their abilities to drive job creation, economic growth, and prosperity for millions in the future. Featuring coverage on a broad range of topics including economics, higher education, and safety and regulation, this book is ideally designed for teachers, managers, entrepreneurs, economists, policymakers, academicians, researchers, students, and professionals in the fields of human resources, organizational design, learning design, information technology, and e-learning.

Our intuition on how the world works could well be wrong. We are surprised when new competitors burst on the scene, or businesses protected by large and deep moats find their defenses easily breached, or vast new markets are conjured from nothing. Trend lines resemble saw-tooth mountain ridges. The world not only feels different. The data tell us it is different. Based on years of research by the directors of the McKinsey Global Institute, *No Ordinary Disruption: The Four Forces Breaking all the Trends* is a timely and important analysis of how we need to reset our intuition as a result of four forces colliding and transforming the global economy: the rise of emerging markets, the accelerating impact of technology on the natural forces of market competition, an aging world population, and accelerating flows of trade, capital and people. Our intuitions formed during a uniquely benign period for the world economy -- often termed the Great Moderation. Asset prices were rising, cost of capital was falling, labour and resources were abundant, and generation after generation was growing up more prosperous than their parents. But the Great Moderation has gone. The cost of capital may rise. The price of everything from grain to steel may become more volatile. The world's labor force could shrink. Individuals, particularly those with low job skills, are at risk of growing up poorer than their parents. What sets *No Ordinary Disruption* apart is depth of analysis combined with lively writing informed by surprising, memorable insights that enable us to quickly grasp the disruptive forces at work. For evidence of the shift to emerging markets, consider the startling fact that, by 2025, a single regional city in China -- Tianjin -- will have a GDP equal to that of the Sweden, of that, in the decades ahead, half of the world's economic growth will come from 440 cities including Kumasi in Ghana or Santa Carina in Brazil that most executives today would be hard-pressed to locate on a map. What we are now seeing is no ordinary disruption but the new facts of business life -- facts that require executives and leaders at all levels to reset their operating assumptions and management intuition.

The world is being transformed physically and politically. Technology is the handmaiden of much of this change. But since the current sweep of global change is transforming the face of warfare, Special Operations Forces (SOF) must adapt to these circumstances. Fortunately, adaptation is in the SOF DNA. This book examines the changes affecting SOF and offers possible solutions to the complexities that are challenging many long-held assumptions. The chapters explore what has changed, what stays the same, and what it all means for U.S. SOF. The authors are a mix of leading experts in technology, business, policy, intelligence, and geopolitics, partnered with experienced special operators who either cowrote the chapters or reviewed them to ensure accuracy and relevance for SOF. Our goal is to provide insights into the changes around us and generate ideas about how SOF can adapt and succeed in the emerging operational

environment.

From the Muslimization of Western Europe to the impact of HIV/AIDS around the planet, from the trials of the coming post-petroleum world to the tactical implications of an ice-free Arctic, the nations of Earth are facing more radical change than ever before in the first quarter of the 21st century. This important government report-from the United States NATIONAL INTELLIGENCE COUNCIL, which has been producing assessments of national security issues for senior U.S. policy makers since 1979-casts a strategic eye at the near future and examines those factors and trends that will most dramatically shape it: the rapidly globalizing economy the growing global middle class the challenges of aging populations migration, urbanization, and ethnic shifts the rising heavyweights: India and China the geopolitics of energy, water, food and climate change the risk of a nuclear arms race in the Middle East terrorism power-sharing in a multipolar world and more. Students of political trends, forward-looking entrepreneurs, and anyone eager for a glimpse into the next decades will find this essential reading.

To support the development of the National Intelligence Council's Global Trends 2025, SRI Consulting Business Intelligence (SRIC-BI) was asked to identify six potentially disruptive civil or dual use technologies that could emerge in the coming fifteen years (2025). A disruptive technology is defined as a technology with the potential to causes a noticeable, even if temporary, degradation or enhancement in one of the elements of US national power (geopolitical, military, economic, or social cohesion). Six civil technologies offer the potential to enhance or degrade US power over the next fifteen years according to National Intelligence Council (NIC) sponsored contractor research. These include biogerontechnology, energy storage technology, biofuels and bio-based chemical technology, clean coal technology, service robotic technology, and information technology devoted to increased connectivity of people and things.

We have entered into an entirely new era, an age of increasingly frequent and intense periods of turbulence in the global economy. Unlike past recessions, today's crises have precipitated a need for businesses to develop a new mindset, one that takes into account intermittent periods of disturbance, allowing them to thrive while under the constant threat of chaos. Chaotics presents a revolutionary set of guidelines designed to help businesses: • detect sources of turbulence • prepare scenarios • predict resulting vulnerabilities and opportunities • develop responses to ensure long-term resilience and success • avoid risk while advancing the interests of the company • build flexibility into the balance sheet • price strategically • adjust products to meet new customer values • and more. Complete with metrics and measurements, Chaotics outlines a powerful new system for managing waves of uncertainty affecting customers, employees, and other stakeholders. In this climate of increased turbulence, no organization can survive with less.

2010 First International Conference on Electrical and Electronics Engineering was held in Wuhan, China December 4-5. Advanced Electrical and Electronics Engineering book contains 72 revised and extended research articles written by prominent researchers participating in the conference. Topics covered include, Power Engineering, Telecommunication, Control engineering, Signal processing, Integrated circuit, Electronic amplifier, Nano-technologies, Circuits and networks, Microelectronics, Analog circuits, Digital circuits, Nonlinear circuits, Mixed-mode circuits, Circuits design, Sensors, CAD tools, DNA computing, Superconductivity circuits. Electrical and Electronics Engineering will offer the state of art of tremendous advances in Electrical and Electronics Engineering and also serve as an excellent reference work for researchers and graduate students working with/on Electrical and Electronics Engineering.

Times are changing and the labor markets are under immense burden from the collective effects of various megatrends. Technological growth and grander incorporation of economies along with global supply chains have been an advantage for several workers armed with high skills and in growing occupations. However, it is a challenge for workers with low or obsolete skills in diminishing zones of employment. Business models that are digitalized hire workers as self-employed instead of standard employees. People seem to be working and living longer, but they experience many job changes and the peril of skills desuetude. Inequalities in both quality of job and earnings have increased in several countries. The depth and pace of digital transformation will probably be shocking. Industrial robots have already stepped in and artificial intelligence is making its advance too. Globalization and technological change predict the great potential for additional developments in labor market performance. But people should be ready for change. A progression of creative annihilation is probably under way, where some chores are either offshored or given to robots. A better world of for jobs cannot be warranted – a lot will be contingent on devising the right policies and institutes in place.

Artificial intelligence (AI) is the latest technological evolution which is transforming the global economy and is a major part of the "Fourth Industrial Revolution." This book covers the meaning, types, subfields and applications of AI, including U.S. governmental policies and regulations, ethical and privacy issues, particularly as they pertain and affect facial recognition programs and the Internet-of Things (IoT). There is a lengthy analysis of bias, AI's effect on the current and future job market, and how AI precipitated fake news. In addition, the text covers basics of intellectual property rights and how AI will transform their protection. The author then moves on to explore international initiatives from the European Union, China's New Generation Development Plan, other regional areas, and international conventions. The book concludes with a discussion of super intelligence and the question and applicability of consciousness in machines. The interdisciplinary scope of the text will appeal to any scholars, students and general readers interested in the effects of AI on our society, particularly in the fields of STS, economics, law and politics.

The first textbook to teach students how to build data analytic solutions on large data sets using cloud-based technologies. This is the first textbook to teach students how to build data analytic solutions on large data sets (specifically in Internet of Things applications) using cloud-based technologies for data storage, transmission and mashup, and AI techniques to analyze this data. This textbook is designed to train college students to master modern cloud computing systems in operating principles, architecture design, machine learning algorithms, programming models and software tools for big data mining, analytics, and cognitive applications. The book will be suitable for use in one-semester computer science or electrical engineering courses on cloud computing, machine learning, cloud programming, cognitive computing, or big data science. The book will also be very useful as a reference for professionals who want to work in cloud computing and data science. Cloud and Cognitive Computing begins with

two introductory chapters on fundamentals of cloud computing, data science, and adaptive computing that lay the foundation for the rest of the book. Subsequent chapters cover topics including cloud architecture, mashup services, virtual machines, Docker containers, mobile clouds, IoT and AI, inter-cloud mashups, and cloud performance and benchmarks, with a focus on Google's Brain Project, DeepMind, and X-Lab programs, IBKai HwangM SyNapse, Bluemix programs, cognitive initiatives, and neurocomputers. The book then covers machine learning algorithms and cloud programming software tools and application development, applying the tools in machine learning, social media, deep learning, and cognitive applications. All cloud systems are illustrated with big data and cognitive application examples.

The Internet of Things is a wide-reaching network of devices, and these devices can intercommunicate and collaborate with each other to produce variety of services at any time, any place, and in any way. Maintaining access control, authentication and managing the identity of devices while they interact with other devices, services and people is an important challenge for identity management. The identity management presents significant challenges in the current Internet communication. These challenges are exacerbated in the internet of things by the unbound number of devices and expected limitations in constrained resources. Current identity management solutions are mainly concerned with identities that are used by end users, and services to identify themselves in the networked world. However, these identity management solutions are designed by considering that significant resources are available and applicability of these identity management solutions to the resource constrained internet of things needs a thorough analysis. Technical topics discussed in the book include: Internet of Things; Identity Management; Identity models in Internet of Things; Identity management and trust in the Internet of Things context; Authentication and access control; Identity management for Internet of Things contributes to the area of identity management for ubiquitous devices in the Internet of Things. It initially presents the motivational factors together with the identity management problems in the context of Internet of Things and proposes an identity management framework. Following this, it refers to the major challenges for Identity management and presents different identity management models. This book also presents relationship between identity and trust, different approaches for trust management, authentication and access control. Key milestones identified for Identity management are clustering with hierarchical addressing, trust management, mutual authentication and access control. Identity management for Internet of Things is ideal for personnel in computer/communication industries as well as academic staff and master/research students in wireless communication, computer science, operational research, electrical engineering and telecommunication systems Internet, and cloud computing. Content Preface; 1. Internet of Things Overview; 2. Elements of Internet of Things Security; 3. Identity Management Models; 4. Identity Management and Trust; 5. Identity Establishment; 6. Access Control; 7. Conclusions

The Great Silence explores the multifaceted problem named after the great Italian physicist Enrico Fermi and his legendary 1950 lunchtime question "Where is everybody?" In many respects, Fermi's paradox is the richest and the most challenging problem for the entire field of astrobiology and the Search for ExtraTerrestrial Intelligence (SETI) studies. This book shows how Fermi's paradox is intricately connected with many fields of learning, technology, arts, and even everyday life. It aims to establish the strongest possible version of the problem, to dispel many related confusions, obfuscations, and prejudices, as well as to offer a novel point of entry to the many solutions proposed in existing literature. ?irkovi? argues that any evolutionary worldview cannot avoid resolving the Great Silence problem in one guise or another.

This publication covers global megatrends for the next 20 years and how they will affect the United States. This is the fifth installment in the National Intelligence Council's series aimed at providing a framework for thinking about possible futures and their implications. The report is intended to stimulate strategic thinking about the rapid and vast geopolitical changes characterizing the world today and possible global trajectories during the next 15-20 years by identifying critical trends and potential discontinuities. The authors distinguish between megatrends, those factors that will likely occur under any scenario, and game-changers, critical variables whose trajectories are far less certain. NIC 2012-001. Several innovations are included in Global Trends 2030, including: a review of the four previous Global Trends reports, input from academic and other experts around the world, coverage of disruptive technologies, and a chapter on the potential trajectories for the US role in the international system and the possible the impact on future international relations. Table of Contents: Introduction 1 Megatrends 6 Individual Empowerment 8 Poverty Reduction 8 An Expanding Global Middle Class 8 Education and the Gender Gap 10 Role of Communications Technologies 11 Improving Health 11 A MORE CONFLICTED IDEOLOGICAL LANDSCAPE 12 Diffusion of Power 15 THE RISE AND FALL OF COUNTRIES: NOT THE SAME OLD STORY 17 THE LIMITS OF HARD POWER IN THE WORLD OF 2030 18 Demographic Patterns 20 Widespread Aging 20 Shrinking Number of Youthful Countries 22 A New Age of Migration 23 The World as Urban 26 Growing Food, Water, and Energy Nexus 30 Food, Water, and Climate 30 A Brighter Energy Outlook 34 Game-Changers 38 The Crisis-Prone Global Economy 40 The Plight of the West 40 Crunch Time Too for the Emerging Powers 43 A Multipolar Global Economy: Inherently More Fragile? 46 The Governance Gap 48 Governance Starts at Home: Risks and Opportunities 48 INCREASED FOCUS ON EQUALITY AND OPENNESS 53 NEW GOVERNMENTAL FORMS 54 A New Regional Order? 55 Global Multilateral Cooperation 55 The Potential for Increased Conflict 59 INTRASTATE CONFLICT: CONTINUED DECLINE 59 Interstate Conflict: Chances Rising 61 Wider Scope of Regional Instability 70 The Middle East: At a Tipping Point 70 South Asia: Shocks on the Horizon 75 East Asia: Multiple Strategic Futures 76 Europe: Transforming Itself 78 Sub-Saharan Africa: Turning a Corner by 2030? 79 Latin America: More Prosperous but Inherently Fragile 81 The Impact of New Technologies 83 Information Technologies 83 AUTOMATION AND MANUFACTURING TECHNOLOGIES 87 Resource Technologies 90 Health Technologies 95 The Role of the United States 98 Steady US Role 98 Multiple Potential Scenarios for the United States' Global Role 101 Alternative Worlds 107 Stalled Engines 110 FUSION 116 Gini-out-of-the-Bottle 122 Nonstate World 128 Acknowledgements 134 GT2030 Blog References 137 Audience: Appropriate for anyone, from businesses to banks, government agencies to start-ups, the technology sector to the teaching sector, and more. This publication helps anticipate where the world will be: socially, politically, technologically, and culturally over the next few decades. Keywords: Global Trends 2030 Alternative Worlds, global trends 2030, Global Trends series, National Intelligence Council, global trajectories, global megatrends, geopolitics, geopolitical changes Advancement in sensor technology, smart instrumentation, wireless sensor networks, miniaturization, RFID and information processing is helping towards the realization of Internet of Things (IoT). IoTs are finding applications in various area applications including environmental monitoring, intelligent buildings, smart grids and so on. This book provides design challenges of IoT, theory, various protocols, implementation issues and a few case study. The book will be very useful for postgraduate students and researchers to know from basics to implementation of IoT.

"Global Trends 2025: A Transformed World" is the fourth unclassified report prepared by the National Intelligence Council (NIC) in recent years that takes a long-term view of the future. It offers a fresh look at how key global trends might develop over the next 15 years to influence world events. Our report is not meant to be an exercise in prediction or crystal ball-gazing. Mindful that there are many possible "futures," we offer a range of possibilities and potential discontinuities, as a way of opening our minds to developments we might otherwise miss. (From the NIC website)

This report is intended to stimulate thinking about the rapid and vast geopolitical changes characterizing the world today and possible global trajectories over the next 15 years. As with the NIC's previous Global Trends reports, we do not seek to predict the future, which would be an impossible feat, but instead provide a framework for thinking about possible futures and their implications. In-depth research, detailed modeling and a variety of analytical tools drawn from public, private and academic sources were employed in the production of Global Trends 2030. NIC leadership engaged with experts in nearly 20 countries, from think tanks, banks, government offices and business groups, to solicit reviews of the report.

Disruptive Civil Technologies Six Technologies with Potential Impacts on US Interests Out to 2025 : Biogerontechnology, Energy Storage Materials, Biofuels and Bio-based Chemicals, Clean Coal Technologies, Service Robotics, the Internet of Things

Just as the term design has been going through change, growth and expansion of meaning, and interpretation in practice and education – the same can be said for design research. The traditional boundaries of design are dissolving and connections are being established with other fields at an exponential rate. Based on the proceedings from the IASDR 2017 Conference, Re:Research is an edited collection that showcases a curated selection of 83 papers – just over half of the works presented at the conference. With topics ranging from the introduction of design in the primary education sector to designing information for Artificial Intelligence systems, this book collection demonstrates the diverse perspectives of design and design research. Divided into seven thematic volumes, this collection maps out where the field of design research is now. From Software Engineering to Information Design • Yvette Shen Most academic methodologies are developed from a prescribed methodological process that is limited to a specific area of study. However, the disciplinary landscape in which the knowledge is established is being rapidly reconfigured. Given the vast varieties of practices and knowledge base required from information designers, it is even more crucial for them to look outside of the traditional visual design fields and seek diversities for better research and creation methods. The two disciplines, software engineering and information design, are often perceived as one provides technical solutions to the other. This essay intends to move beyond the common perception, and identify relevant issues in software engineering design that resonate with the information design process. The issues include the multi-component planning approach; the human-oriented agile method; design concepts such as abstraction, decomposition, component modularity, hierarchical relationship and extensibility. The perspectives from software engineering design and information design is examined through units of analysis, terminology explanations and forms of communications. The collective design methods and principles provide a systematic framework to the methodological thinking in information design. The discussion serves the purpose of encouraging more conceptual-based conversations between information design and other disciplines, especially in the fields of science and technology. Designing Information for Artificial Intelligence: Path Recommendation and User Acceptance in a Virtual Space • Jong Myoung Lee, Kyung Hoon Hyun In this study, the authors propose two information layout strategies (informative layout and decisive layout) that influence the user acceptance rate on recommended information. The informative layout is the degree of descriptions in the recommendation process. The decisive layout is the degree of choices in recommendations. Thus, the objective of the paper is to discover how users' acceptance of a recommendation changes when the recommendation is displayed in different degrees of informative and decisive layouts. To this end, we have conducted the following tasks: (1) sophisticated software was created with JavaScript to conduct experiments with users online; (2) experiment subjects (N=247) with various education and demographic levels were recruited; (3) user acceptance rate depending on the information layout strategy was collected; (4) the relationships between information layout strategy and user acceptance of the recommended information were computationally analyzed. The results of the study indicate that the information layout strategy proposed in this research significantly influences user acceptance of the recommended information. Also, this research identified effective combinations of informative and decisive layouts to maximize the user acceptance. The Research on Design Framework for Citizen Science • Zhiyong Fu, Jia Lin, Lu Wang Citizen science is a process in which ordinary citizens contribute to scientific research. How to create citizen science design framework to achieve better awareness, initiative and action is our research focus. This paper will explore citizen science design in the context of smart city, on the basis of activity theory and by means of digital social innovation. "Smart City" concept provides new elements including social communication, collaborative design and innovative community to citizen science. With the rapid development of science and information and communication technologies (ICTs) and with the arrival of Web 2.0, social innovation is endowed with digital factors so as to be evolved to digital social innovation (DSI) which gives various design perspectives on citizen science and also plays an important part in establishing citizen science evaluation model. In this paper, a citizen science design framework consisting of citizen science content model, design model and evaluation model is proposed by discussing related theories, models and citizen science cases. It acts as not only design lead to inspire two citizen science case practices, but also an evaluation term in the view of citizen science. The framework and models developed in this research will hopefully be leveraged and refined to support citizen science design in the future. Finding the Expectations of Smart Home and Designing the Meaningful Technology for Delivering Customers' Satisfaction • Yaliang Chuang, Lin-Lin Chen, Yu-Shan Athena Chen Smart home is becoming a focus in both literature and product development practices. The current study employed a human-centered design approach to understand users' desires and expectations from their living context. Six critical themes were developed via in-deep interviews, field observations and data analysis. They are housed as a supportive friend, atmosphere generator, theme songs for every moment, coordinator and reminder, life memory collector and routine builder for young generations. Those concepts were partially integrated to define the value proposition for the target user group of parents with young children. This guides the design ideation and video prototyping to illustrate the user experiences. Through a focus group discussion, the design concepts were validated with six potential customers. The results also show that the design concept has the potential to motivate children's behaviors, help to build their routine, and has the flexibility to fulfill different needs toward the changes of the family's life cycle. Using Frame Analysis to Organize Designers' Experience on the Cloud • Julija Naskova This paper demonstrates how Goffman's frame analysis is applied in a research on designers' experience with Cloud-based digital tools. At the base of Goffman's structure is the "primary frame" – in this case designers' experience with computer-based digital tools. These tools' transition to the Cloud initiated by business are called "fabrications." Goffman's "structural issues in fabrication" such as "retransformations" and the "nature of recontainment" are also discussed through contemporary examples. These fabrications are used or "keyed" by "active agents" from various design fields. The data collected showed different levels of understanding of Cloud technology and the application of various tools in everyday design practices. Thus, the interviewees were clustered into three groups – designers, developers and artists. Their experiences form the creative, technology and experimental frame derived from keying of the primary frame. Design researchers can selectively borrow elements from frame analysis' complex structure to build an effective user experience narrative. (Un)intended Value Implications of Graphical Representations of Data • Milena Radzikowska, Stan Ruecker The design of meaningful graphical objects to represent collection items must balance the following: amount of useful information that can be communicated through the object's graphical form, meaningful graphical difference between individual items or groups of items, and restraint in form complexity to allow for the simultaneous display of numerous collection items at a small size. How the user interprets difference and sameness and, more importantly, whether the user attaches

hierarchical value to the emergent categories, may play a significant role in determining whether that user focuses attention on one set of data over another, on one set of processes over another, and ultimately, on one set of tasks over another. This paper examines the significant consequences for the understanding of the user resulting from representation of data, files and other objects in a human–computer interface (HCI), and proposes that new approaches may be indicated, given the growing complexity of what is being represented and how what is represented can be used.

Mapping Communication Design through the Web • Giulia De Rossi, Paolo Ciuccarelli Design is by nature an interdisciplinary, dynamic and fluid discipline. To define what design is has proved to be a very difficult – if not impossible and meaningless – exercise, making also the understanding of the evolution of both the design discipline and practice a complex challenge. A rapidly changing technological landscape increases the breadth of design both in geographical terms and by extending to new domains, merging with different and new disciplines. Communication Design especially, being closer to the information and the media spheres, is the most sensitive and receptive design area. Communication Design finds online a fertile ground for its growth and developments, thus the online environment and the Web especially can be explored, dug and mapped as mirrors of that evolution. The aim of our research is to map through the Web the complexity of the intersections between design as a discipline and design as a field of practice. Our exploration and representation of the online design territory covered four online environments: Behance, Wikipedia, Google and the websites of the top 100 design universities. The study has been conducted by using digital, statistical and visualization methods. This exploration seeks neither to confirm theories nor predict the future, rather, it wants to make explicit and observable what Communication Design has become today. It aims to screenshot the state of the art, the emerging paths, in order to understand where and how it is going to develop. The attempt is to make design as a complex phenomenon visible, through the construction of a set of maps and representations for professors, students and associations. These representations are tools to trigger reflections on the discipline and the profession, bringing a contribution to the experimental research in this field.

A Content Analysis of Wired Magazine and Self-Tracking Devices • Serefraz Akyaman Living in a modern society is becoming more complex, so in order to keep up with, a person should accomplish various kinds of task at once. Daily life requirements, obligations and the capacity of human memory lead us to collect and control our behaviors, bodies and lives through self-tracking devices. Aim of this paper analysis of emerging digitalized self-tracking trend through content analysis of Wired Magazine. Wired Magazine, both in printed and online, monthly, publish technology-related articles how emerging technologies affect culture, the economy and politics. It reaches more than 30 million people each month through wired.com, digital edition. Since the term “quantified self” emerged for the first time in Wired Magazine, for this reason Wired Magazine is one of the most important sources to be used for content analysis. This present study carries out a content analysis of all the issues until December 2016 through “self-tracking” and two other related terms: “quantified self” and “lifelogging.” The usage period and popularity of these terms and, the relation network with the main topics and the subtopics are examined. As a result, it is possible to define Wired Magazine as a medium in which industry–academia and users come together and, feed each other reciprocally. Wired Magazine has contributed significantly and continues to contribute to the development of the digitalized self-tracking trend in terms of its content.

Interaction Design and Use Innovation for Interactive Products • Geehyuck Jeong, James Self Product use innovation is a means to facilitate the design-driven innovation approach. We explore how the mode-of-use concept may apply to state-of-the-art product interactions to enhance user experience and provide opportunities for design-driven innovation within the interactive product space. To achieve this we apply taxonomy of interactions to classify interaction styles as along the two dimensions explanatory or exploratory and discrete or composite. Adopting the research through design approach two interactive mood lamps were developed and expressed as high-fidelity prototypes. These were then used as stimuli to evaluate the influence of interaction style on product experience. Results indicated the touch-free magic interaction style, an interaction providing explorative and composite modes of interaction, was initially considered more innovative in terms of use. However, participants also expressed negative emotions related to dissatisfaction and embarrassment toward the touch-free magic interaction due to an inability to intuitively understand the use functions. Implications for the application of use innovation within the interactive product context are finally discussed.

Study of the Implementability of Tactile Feedback While Operating Touch Panel Device: From Two Directions of Efficacy and Feasibility • Jien Wakasugi, Masayoshi Kubo In a few years, the number of apparatuses with touch panel displays like smartphones will increase. People who are visually impaired, hearing impaired and disabled can use tactile feedback for receiving incoming communications. However, opportunities for tactile feedback applications are limited. Our hypotheses follow: as there are haptics patterns suitable for use cases, we will design haptics samples of tactile feedback and inspect their effectiveness. This study focuses on haptics patterns showing a relationship between the user’s impression and various use situations. Previous studies have been insufficient, so our target subjects inspected a limited number of objects. This study consists of two inspections: • We collected various haptics patterns that users had defined and analyzed the first inspection. For the next inspection, we manufactured a smartphone prototype. We matched the impression of eight haptics patterns types that we got from the subjects in the first analysis with different situations and tested various replies. Tests were repeated and recorded for various situations. As different haptics vibrations were added to e-mails, we inspected whether subjects could distinguish a difference in their meanings. Thus, we added different haptics patterns that corresponded to various situations. We concluded the hypothesis was effective for subjects. We could inspect the hypotheses in relation to subjects’ impressions of the haptics pattern. • Additionally, we obtained different results between elders and youths. Consequently, we suggested design guidelines for the new tactile feedback of the smartphone application. We suspect that haptics will be possible for a variety of interactive designs.

Sensory Reflection toward Product Design Ideation • Pratiksha Prabhakar, Heekyoung Jung, Vittoria Daiello As humans’ information processing abilities, have become more and more disconnected from their senses due to an increasing quantity of abstract information, so have design processes. There is a demand for designers to include human sensation as part of engaging product forms and experiences. This qualitative case study explores the role of senses and their potential use in design ideation. A literature review of related theoretical and pragmatic perspectives and a survey of 15–20 product examples that provide unique sensory experiences are analyzed and sorted through four sensory design strategies: Sensory Augmentation, Conversion, Transition and Isolation. Using the four strategies as core concepts, a Sensory Reflective Framework with a mindful focus on sensory appreciation and translation is proposed to support designers’ ideation in creating unique product forms and experiences. The paper reports the process and findings of a sensory ideation workshop which was conducted based on the framework, and further discusses the development and implications of the framework in supporting designers’ sensory ideation.

To support the development of the National Intelligence Council's Global Trends 2025, SRI Consulting Business Intelligence (SRIC-BI) was asked to identify six potentially disruptive civil or dual use technologies that could emerge in the coming fifteen years (2025). A disruptive technology is defined as a technology with the potential to causes a noticeable-even if temporary- degradation or enhancement in one of the elements of US national power (geopolitical, military, economic, or social cohesion). The six disruptive technologies were identified through a process carried out by technology analysts from SRIC-BI's headquarters in Menlo Park, California, and its European office in Croydon, England.

In the telecom world, services have usually been conceived with a specific mindset. This mindset has defined the traditional characteristics of these services; services distinguished by their linkage with the access network, tight control over service use (e.g., authentication, billing), lack of deep personalization capabilities (mass services only) and reliance on standardization to achieve end-to-end interoperability between all the actors of the value chain (e.g., operators, platform manufacturers, device manufactures). This book offers insights into this complex but exciting world of telecommunications characterized by constant evolution, and approaches it from technology as well as business

perspectives. The book is appropriately structured in three parts: (a) an overview of the state-of-the-art in fixed/mobile NGN and standardization activities; (b) an analysis of the competitive landscape between operators, device manufactures and OTT providers, emphasizing why network operators are challenged on their home turf; and (c) opportunities for business modeling and innovative telecom service offers.

This edition of Global Trends revolves around a core argument about how the changing nature of power is increasing stress both within countries and between countries, and bearing on vexing transnational issues. The main section lays out the key trends, explores their implications, and offers up three scenarios to help readers imagine how different choices and developments could play out in very different ways over the next several decades. Two annexes lay out more detail. The first lays out five-year forecasts for each region of the world. The second provides more context on the key global trends in train.

The purpose of this book is to help you with the development and implementation of a successful End-to-End Supply Chain Management - Strategy: optimising your processes from manufacturer to retailer. This book answers four questions: - How to develop an end-to-end supply chain - strategy? - How to create the necessary supply chain infrastructure? - How to make collaboration work between the partners in the network? - How to plan and manage the supply chain flows? It will enable you to: - Systematically improve your sales productivity in the retail stores; - Enhance the operational / qualitative performance of your processes and those of your partners in the supply chain; - More effectively balance the trade-off Time v Costs. This book provides you with: - A Supply Chain System - Model: a framework to develop your End-to-End Supply Chain; - 10 Strategic Building Blocks which can be used as a toolkit; - 50 Lessons Learned based on experiences from practice; - A strategic roadmap: to plan, organise, lead and control your supply chain. The 2nd edition (in hardcover and color) has many new cases, toolboxes and a new chapter on process management. In addition, more attention is given to topics like procurement, demand planning, omnichanneling and supply chain-design, -planning and -execution. For whom has this book been written? This book is useful for thinkers and practitioners! For everyone who wants to learn more about supply chain management and the development and implementation of an end-to-end supply chain strategy. This book is also available as paperback in black and white with the title Supply Chain Management, 2nd edition.

Offers a one-stop reference on the application of advanced modeling and simulation (M&S) in cyber physical systems (CPS) engineering This book provides the state-of-the-art in methods and technologies that aim to elaborate on the modeling and simulation support to cyber physical systems (CPS) engineering across many sectors such as healthcare, smart grid, or smart home. It presents a compilation of simulation-based methods, technologies, and approaches that encourage the reader to incorporate simulation technologies in their CPS engineering endeavors, supporting management of complexity challenges in such endeavors. Complexity Challenges in Cyber Physical Systems: Using Modeling and Simulation (M&S) to Support Intelligence, Adaptation and Autonomy is laid out in four sections. The first section provides an overview of complexities associated with the application of M&S to CPS Engineering. It discusses M&S in the context of autonomous systems involvement within the North Atlantic Treaty Organization (NATO). The second section provides a more detailed description of the challenges in applying modeling to the operation, risk and design of holistic CPS. The third section delves in details of simulation support to CPS engineering followed by the engineering practices to incorporate the cyber element to build resilient CPS sociotechnical systems. Finally, the fourth section presents a research agenda for handling complexity in application of M&S for CPS engineering. In addition, this text: Introduces a unifying framework for hierarchical co-simulations of cyber physical systems (CPS) Provides understanding of the cycle of macro-level behavior dynamically arising from spatiotemporal interactions between parts at the micro-level Describes a simulation platform for characterizing resilience of CPS Complexity Challenges in Cyber Physical Systems has been written for researchers, practitioners, lecturers, and graduate students in computer engineering who want to learn all about M&S support to addressing complexity in CPS and its applications in today's and tomorrow's world.

Distributed and Cloud Computing: From Parallel Processing to the Internet of Things offers complete coverage of modern distributed computing technology including clusters, the grid, service-oriented architecture, massively parallel processors, peer-to-peer networking, and cloud computing. It is the first modern, up-to-date distributed systems textbook; it explains how to create high-performance, scalable, reliable systems, exposing the design principles, architecture, and innovative applications of parallel, distributed, and cloud computing systems. Topics covered by this book include: facilitating management, debugging, migration, and disaster recovery through virtualization; clustered systems for research or ecommerce applications; designing systems as web services; and social networking systems using peer-to-peer computing. The principles of cloud computing are discussed using examples from open-source and commercial applications, along with case studies from the leading distributed computing vendors such as Amazon, Microsoft, and Google. Each chapter includes exercises and further reading, with lecture slides and more available online. This book will be ideal for students taking a distributed systems or distributed computing class, as well as for professional system designers and engineers looking for a reference to the latest distributed technologies including cloud, P2P and grid computing. Complete coverage of modern distributed computing technology including clusters, the grid, service-oriented architecture, massively parallel processors, peer-to-peer networking, and cloud computing Includes case studies from the leading distributed computing vendors: Amazon, Microsoft, Google, and more Explains how to use virtualization to facilitate management, debugging, migration, and disaster recovery Designed for undergraduate or graduate students taking a distributed systems course—each chapter includes exercises and further reading, with lecture slides and more available online

This title explains strategies and techniques to guide IT managers as they implement cutting edge solutions for their business needs. Based on practical experience and real-life models, the author covers key principles and processes for the introduction of new technologies, and examines how to establish an appropriate standard of security and control, particularly in the context of the COBIT(r)5 framework and affiliated standards.

The purpose of this book is to help you with the development and implementation of a successful End-to-End Supply Chain Management - Strategy: optimising your processes from manufacturer to retailer. This book answers four questions: - How to develop an end-to-end supply chain - strategy? - How to create the necessary supply chain infrastructure? - How to make collaboration work between the partners in the network? - How to plan and manage the supply chain flows? It will enable you to: - Systematically improve your sales productivity in the retail stores; - Enhance the operational / qualitative performance of your processes and those of your partners in the supply chain; - More effectively balance the trade-off Time v Costs. This book provides you with: - A Supply Chain System - Model: a framework to develop your End-to-End Supply Chain; - 10 Strategic Building Blocks which can be used as a toolkit; - 50 Lessons Learned based on experiences from practice; - A strategic roadmap: to plan, organise, lead and control your supply chain. The 2nd edition has many new cases, toolboxes and a new chapter on process management. In addition, more attention is given to topics like procurement, demand planning, omnichanneling and supply chain-

design, -planning and -execution. For whom has this book been written? This book is useful for thinkers and practitioners! For everyone who wants to learn more about supply chain management and the development and implementation of an end-to-end supply chain strategy.

This book provides readers with a thorough understanding of various research areas within the field of data science. The book introduces readers to various techniques for data acquisition, extraction, and cleaning, data summarizing and modeling, data analysis and communication techniques, data science tools, deep learning, and various data science applications. Researchers can extract and conclude various future ideas and topics that could result in potential publications or thesis. Furthermore, this book contributes to Data Scientists' preparation and to enhancing their knowledge of the field. The book provides a rich collection of manuscripts in highly regarded data science topics, edited by professors with long experience in the field of data science.

Introduces various techniques, methods, and algorithms adopted by Data Science experts Provides a detailed explanation of data science perceptions, reinforced by practical examples Presents a road map of future trends suitable for innovative data science research and practice

Technological innovations are key causal agents of surprise and disruption. In the recent past, the United States military has encountered unexpected challenges in the battlefield due in part to the adversary's incorporation of technologies not traditionally associated with weaponry. Recognizing the need to broaden the scope of current technology forecasting efforts, the Office of the Director, Defense Research and Engineering (DDR&E) and the Defense Intelligence Agency (DIA) tasked the Committee for Forecasting Future Disruptive Technologies with providing guidance and insight on how to build a persistent forecasting system to predict, analyze, and reduce the impact of the most dramatically disruptive technologies. The first of two reports, this volume analyzes existing forecasting methods and processes. It then outlines the necessary characteristics of a comprehensive forecasting system that integrates data from diverse sources to identify potentially game-changing technological innovations and facilitates informed decision making by policymakers. The committee's goal was to help the reader understand current forecasting methodologies, the nature of disruptive technologies and the characteristics of a persistent forecasting system for disruptive technology. Persistent Forecasting of Disruptive Technologies is a useful text for the Department of Defense, Homeland Security, the Intelligence community and other defense agencies across the nation.

This book explores the opportunities and challenges of the sharing economy and innovative transportation technologies with regard to urban mobility. Written by government experts, social scientists, technologists and city planners from North America, Europe and Australia, the papers in this book address the impacts of demographic, societal and economic trends and the fundamental changes arising from the increasing automation and connectivity of vehicles, smart communication technologies, multimodal transit services, and urban design. The book is based on the Disrupting Mobility Summit held in Cambridge, MA (USA) in November 2015, organized by the City Science Initiative at MIT Media Lab, the Transportation Sustainability Research Center at the University of California at Berkeley, the LSE Cities at the London School of Economics and Politics and the Innovation Center for Mobility and Societal Change in Berlin.

The Global Innovation Index 2020 provides detailed metrics about the innovation performance of 131 countries and economies around the world. Its 80 indicators explore a broad vision of innovation, including political environment, education, infrastructure and business sophistication. The 2020 edition sheds light on the state of innovation financing by investigating the evolution of financing mechanisms for entrepreneurs and other innovators, and by pointing to progress and remaining challenges – including in the context of the economic slowdown induced by the coronavirus disease (COVID-19) crisis.

Management in the Age of Digital Business Complexity focuses on how the digital age is changing management and vastly speeding up complexity dynamics. The recent coevolution of technologies has dramatically changed in just a few years how people and firms learn, communicate, and behave. Consequently, the process of how firms coevolve and the speed at which they coevolve has been dramatically changed in the digital age, and managerial methods are lagging way behind. Combining his own expertise with that of a number of specialist and international co-authors, McKelvey conveys how companies that fall behind digitally can quickly be driven out of business. The book has been created for academics seeking to upgrade management thinking into the modern digital age and vastly improve the change capabilities of firms facing digital-oriented competition.

An increase in global access to goods and knowledge is transforming world-class science and technology (S&T) by bringing it within the capability of an unprecedented number of global parties who must compete for resources, markets, and talent. In particular, globalization has facilitated the success of formal S&T plans in many developing countries, where traditional limitations can now be overcome through the accumulation and global trade of a wide variety of goods, skills, and knowledge. As a result, centers for technological research and development (R&D) are now globally dispersed, setting the stage for greater uncertainty in the political, economic, and security arenas. These changes will have a potentially enormous impact for the U.S. national security policy, which for the past half century was premised on U.S. economic and technological dominance. As the U.S. monopoly on talent and innovation wanes, arms export regulations and restrictions on visas for foreign S&T workers are becoming less useful as security strategies. The acute level of S&T competition among leading countries in the world today suggests that countries that fail to exploit new technologies or that lose the capability for proprietary use of their own new technologies will find their existing industries uncompetitive or obsolete. The increased access to information has transformed the 1950s' paradigm of "control and isolation" of information for innovation control into the current one of "engagement and partnerships" between innovators for innovation creation. Current and future strategies for S&T development need to be considered in light of these new realities. This book analyzes the S&T strategies of Japan, Brazil, Russia, India, China, and Singapore (JBRICS), six countries that have either undergone or are undergoing remarkable growth in their S&T capabilities for the purpose of identifying unique national features and how they are utilized in the evolving global S&T environment.

A professor of medicine reveals how technology like wireless internet, individual data, and personal genomics can be used to save lives. This volume contains fourteen articles split across four parts, exploring the debate around the topics of fintech, AI, blockchain, and cryptocurrency. Featuring a cast of global contributors, this is an unmissable volume exploring the most current research on digital innovation in the financial and business worlds.

"This 800-page premier book on energy focuses on energy sources, utilizations, legislations and sustainability as it relates to a state, a province, or a country, or a community within a state. This book presents various kinds of energy sources, ways to convert energy for end use, better use of energy towards conservation and energy- and environmental-sustainability. As a very proper model-state the authors chose the State of Illinois which has the largest overall fossil energy reserves, including the largest strippable bituminous coal reserves; the largest user of nuclear energy in USA and has also been investing in all kinds of renewable energies including wind energy, solar energy, biofuels, geothermal energy, and various energy storage options. In the authors' opinion, State of Illinois is a pioneer in legislations for proper development and use of all kinds of energy. Their motivation to do this project was to educate the public (including students, energy

engineers and planners, as well as state- and country-wide policy makers) about all aspects of energy. In this book, the authors present various energy sources, conversions technologies, and conservation possibilities. In every case, the authors have presented various options available for a country, for a state, or for a community to achieve its goal of energy sufficiency, clean environment and as a result, sustainability. Variety of schemes related to each energy source and its related conversion technologies are presented and sustainability of renewable energy sources is discussed. All the possible energy sources including coal, natural gas, petroleum, nuclear, solar, wind, biofuels and geothermal energy are presented in this book, as well as energy storage options. The authors have also presented various ways of dealing with carbon dioxide, which is produced from fossil fuels combustion, including its collection, transportation, storage and sequestration. The energy storage systems presented in this book will facilitate reliable and full integration of renewable power to the grid."--

"The ongoing COVID-19 pandemic marks the most significant, singular global disruption since World War II, with health, economic, political, and security implications that will ripple for years to come." -Global Trends 2040 (2021) Global Trends 2040-A More Contested World (2021), released by the US National Intelligence Council, is the latest report in its series of reports starting in 1997 about megatrends and the world's future. This report, strongly influenced by the COVID-19 pandemic, paints a bleak picture of the future and describes a contested, fragmented and turbulent world. It specifically discusses the four main trends that will shape tomorrow's world: - Demographics-by 2040, 1.4 billion people will be added mostly in Africa and South Asia. - Economics-increased government debt and concentrated economic power will escalate problems for the poor and middleclass. - Climate-a hotter world will increase water, food, and health insecurity. - Technology-the emergence of new technologies could both solve and cause problems for human life. Students of trends, policymakers, entrepreneurs, academics, journalists and anyone eager for a glimpse into the next decades, will find this report, with colored graphs, essential reading.

[Copyright: 450bd0b5aabac50c99550912f44cdaa1](#)