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Welcome to the Journal of CIO and Digital Innovation

Welcome to the second issue of the "Journal of CIO and Digital Innovation".

Founded in 2006, the IAC (International Academy of CIO) is a global academic society with co-founders including Japan, USA, Indonesia, Philippines, Switzerland, and Thailand. Current members and alliances include countries in all regions such as USA, China, India, Indonesia, Thailand, Philippines, Korea, Hong Kong, Kazakhstan, Uzbekistan, Macao, Singapore, Taiwan, Vietnam, Italy, Russia, Czech Republic, and Finland. The IAC is registered as an NPO in Japan.

The IAC's initiatives include developing and publishing the annual IAC – Waseda International e-Government rankings now in their fourteenth year, undertaking a Global eGovernance book series with IOS Press in Amsterdam and volumes including "ICT and Aging Society", and "A Decade of eGovernment Rankings", CIO Accreditation for masters' degree CIO and IT executive leadership programs, annual conference, and research projects and partnerships including with APEC.

The Online Journal of CIO and Digital Innovation is a special journal for CIO, e-government, e-governance, and ICT fields. This journal is published with the vision to improve the efficiency of governments and companies by ICT and e-governance. The mission of this journal is to provide valuable insight for CIOs to facilitate efficiency and to help leaders, especially political leaders to have updated knowledge about world e-governance trends by clear data-driven methods.

Within the mission, the journal covers ICT application to major societal issues such as aging society, Smart Cities, and readiness and emergency response for natural disasters; opportunities, challenges and ramifications of rapidly developing technologies such as robotics, autonomous vehicles and artificial intelligence; and major leadership and eGovernance challenges such as capacity building and cyber-security.

The journal is research to practice oriented and has an audience of readers from academia, government and private sector interested in ICT leadership and innovation.

The journal is published annually with a call for papers in spring and posted on the IAC website at: http://www.academy-cio.org/ as well as circulated to IAC related audiences and through participating organizations.

If you have an interest in submitting an article and contributing to the journal please contact editors Luca Buccoliero at luca.buccoliero@unibocconi.it and Elena Bellio at elena.bellio@unibocconi.it.

Luca Buccoliero

Chief Editor

IAC Journal of CIO and Digital Innovation

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FROM "INTERNET + GOVERNMENT SERVICES" TO "INTERNET + SUPERVISION": HOT ISSUES AND MAJOR POLICY OBJECTIVES OF CHINA'S DIGITAL GOVERNANCE CONSTRUCTION

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Within the vocabulary of informatization and smart city construction, "Internet+" was a concept first invented by the Chinese. The concept of "Internet+" was first mooted in 2012 to broad support in China's IT circles. "Internet+" subsequently became the core strategy for internet solutions in many industries and sectors. In the field of digital governance, "Internet+ government services" mainly refers to the use of the internet to provide faster and more convenient e-governance services to a wider population.

In 2016, the Chinese central government officially proposed the concept of "Internet+ government services" for the first time, and regarded it as the main policy goal in building and implementing e-governance. "Internet+ government services" became an important task for all levels of government in their informatization drive, as well as their efforts to build and apply e-governance. There was a need for greater integration of infrastructure, data and processes to promote "Internet+ government services".

As a result, the central government issued a special document in 2018 requesting all levels of government to accelerate the construction of a comprehensive and integrated online service platform. This platform would serve to break down information barriers between different departments and application systems, creating the conditions needed for the implementation of "Internet+ government services".

Even though much progress has been made in building a framework of digital governance – particularly with a focus on "Internet+ government services" – there remain numerous institutional barriers such as entrenched rules and regulations that hinder market development and the realization of public rights in this regard. The central government therefore still faces insurmountable obstacles in its market-oriented optimization reforms of the current environment, as well as its more ambitious efforts to modernize state governance capacity and the overall governance system.

In order to address these issues and expand the implementation and applicability of "Internet+ government services", the central government issued a document in June 2016 regarding the deployment and construction of a nationwide, integrated online government service system. The goal of this system was to achieve collaborative governance and public service provision that transcended administrative levels, regions, systems, departments and operations. The aim was to build a one-stop online platform for businesses and the public (i.e. a unified online platform for all services); create a "single door" system for offline service provision (i.e. allowing the public to approach any government office for any government service); and to ensure that the public would not have to make more than one trip to any government office for any government service.

It is a requirement that by end-2018, no less than 80% of services provided by provincial governments must be available online, and no less than 50% of city and county-level government services must be available online. In addition, the ratio of city and county-level government affairs offices to integrated government service offices must not be below 70%, while more than 50% of government services must fall within the "one stop" category." Finally, materials provided by businesses and the public for the provision of government services must be reduced by at least 30%, and provincial, city and county-level governments must achieve the "one visit" policy goal in 30 highly utilized services.

By end-2019, key areas and frequently utilized services should have fully implemented this "one site, one stop, one visit" policy. Regarding the "one site" policy, no less than 90% of services provided by provincial governments must be available online, and no less than 70% of city and county-level government services must be available online. Additionally, aside from services that require the public to go to a specific location for processing, the integrated government service offices must on the whole, accept all cases that should be accepted, while more than 70% of government services must fall within the "one stop" category." Finally, materials provided by businesses and the public for the provision of government services must be reduced by at least 60%, and provincial, city and county-level governments must achieve the "one visit" policy goal in 100 of highly utilized services.

In order to achieve the goals set out above, the central government has led the construction of an online system that will allow the public to access all national, provincial

and municipal government services with a single login. This system includes access to the website of the Central People's Government of the PRC, government affairs disclosure information, and data sharing information:

1. With the website of the Chinese government as the portal to the Chinese government, the national integrated online government service platform will serve as a channel for the public to access and obtain support for public services across the country. Furthermore, the platform will also contain a unified real-name identification system so that the public can access nationwide services with a single verification on the platform.
2. All government services at every level – except those prohibited by law – are to be included in the online government service platform, so that actions such as enquiries, reporting, feedback and service provision can be done entirely online.
3. A national multi-level, integrated and interconnected data sharing platform will be established to achieve data scheduling across administrative levels, regions, systems, departments and operations. On top of this, the government will also create a data sharing authorization mechanism, improve and enhance the government database, improve data quality, expand areas where shared data is available, and improve service availability of government data.

On top of paying particular attention to the provision of e-government services, from October 2018, the central government has begun considering construction and implementation issues related to the deployment of the internet to strengthen government supervision and enhance supervision effectiveness. Given this trend of large-scale digital governance construction, it is expected that "Internet + supervision" will soon be the next policy slogan and the next hot topic in digital governance construction and implementation once the goals of "Internet+ government services have been realized.

LONELY SENIOR CITIZENS IN INDIA: NEED FOR "HIGH TOUCH" IN THE "HIGH TECH" ERA"

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Loneliness seriously affects physical & mental health of individuals particularly senior citizens- Silver Age persons- across globe.

Not many avenues are left for them in sunset period of life for overcoming this. Rapid deterioration of health manifested by mental disease puts additional burden on family, society. Some time leads elders to commit suicide.

It has been seen abuses to elders are on the rise in certain societies. Stripping them of their wealth & abandoning them, even murdering them are not uncommon.

Break down of joint family system, smaller family size, global employment opportunities, large scale migration from rural to urban areas, inadequate availability of accommodation are some of the factors causing havoc to Silver Age society in many countries.

Many different kind of social welfare measures, support system have been devised / practised in various countries to help this segment. They are mostly economic support in nature. Less on EMOTIONAL SUPPORT.

In this age of disruptive technologies youngsters are too occupied to keep themselves in main stream with little or no time to spare for elders, cannot be blamed.

Longevity is on the rise due to various health improvement related policies & measures creating awareness by the states. Good percentage of elders keep good health for several years beyond retirement.

Vast wealth of knowledge & experience available in this segment remain unused - going waste. Proper mining can turn this segment, mostly considered Liability, into Asset, add to GDP of country & economic growth. Good for commerce.

In the process such engagement will help elders to great extent.

ICT DEVELOPMENTS AND PATIENT EMPOWERMENT IN ITALY

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The evolution of information and communication technologies (ICT) in the healthcare sector has generated an innovative model of "electronic" health, the so-called e-health, based on the use of technologies to support healthcare and administrative processes, both in the management of relationships between healthcare organizations and patients, and in the governance of healthcare systems.

E-Health represents a paradigm of innovation, which involves several disciplines such as clinical informatics, medicine and business administration. In particular, the economic-business approach to e-health emphasizes the need to coherently combine (a) new technologies, (b) clinical and administrative processes and (c) skills and culture of people who operate in the healthcare system.

The key challenge is first and foremost the cultural one in which health professionals - in order to get profit from ICT - must adopt a new perspective, based on the patient's centrality and on the sharing of clinical information and its transparent management [1]. In this way the relationships between healthcare providers and patients are transformed. A particular emphasis is placed on the patient empowerment concept and on the role that ICT play in guaranteeing its fulfillment [2].

The analysis of the demand for health services expressed by citizens allows us to understand that it is now characterized by some new and distinctive elements, such as:

• the request for new direct access options to authoritative, personalized and immediately usable health information [3];

• the desire to acquire greater control over one's own health condition through direct management of personal data and the various diagnostic and therapeutic options available [4, 5, 6];

• the need of immediate, direct and informal relations with healthcare facilities and professionals [7, 8];

• the willingness to play a more active role in the care process also through the comparison of a personal experience with those of others [9, 10, 11].

These elements allow to define patient empowerment as: "*a process of personal development for which the patient/individual is given knowledge, skills and awareness that allow him/her (in whole or in part) to self-determine when dealing with its health. In this process, health professionals no longer play an authoritarian role but can become, according to the patient's want, facilitators who operate next to or with the patient*" [12].

Satisfying this need of empowerment requires a new strategic approach, which draws inspiration from a careful analysis of the so-called "patient journey", reinterpreted in an experiential marketing logic.

The metaphor of the journey provides the opportunity to analyze, with the patient's eyes, all the assistance provided, identifying any critical issues and area of improvement.

The CERMES Bocconi Research Center shows that technology can effectively support the redesign of this journey, responding to the needs of patients and caregivers. In particular, attention goes to 4 main areas of technological application:

1. Social Media & Gamification;
2. Cognitive Computing;
3. Wearables and implantables;
4. Digital Touchpoints

1. Social Media & Gamification

Some intrinsic characteristics of the web make it ideal for the relationship between the health system and the citizen-patient, but above all, the web, in its "2.0" variations, offers a unique potential for empowering patients who increasingly becomes an active part in the generation of content and in the exchange of experiences, for example through platforms such as Facebook, Twitter, blogs, forums. Furthermore, the development of "gaming" in a serious context as in health allows to transmit messages in a simple and immediate way and to stimulate active and measurable behaviors, embracing emotional aspects and long lasting behaviours, fundamental in a treatment or care process in order to improve health.

2. Cognitive Computing

Today computers can provide timely answers to complex questions, thanks to the ability to analyze and correlate huge amounts of data. This marks a change of direction in research, with a high potential that is perceived by the patient who sees his data analyzed and interpreted according to the latest results of scientific research. The new data processing capabilities also support the development of the so-called precision medicine, seen as an innovative approach to increasingly targeted therapies allowing doctors to define specific treatments for each patient taking into account the individual's environmental and lifestyle differences. It is the result of sharing both from the scientific community and patients. This characteristic makes it completely consistent with the new needs expressed by patients.

3. Wearables, digestibles and implantables:

They represent an evolution of the health offer able to "bring health to the patient". Thanks to sensors and monitors it is possible to collect and store raw data and guarantee interaction by medical staff. They are tools perfectly answering to patients' needs able also to offer a big contribution to healthcare organizations' needs.

4. Digital Touchpoints: App, Chatbot, Virtual Reality

Health apps available for smartphones and tablets, chatbots that allow to reach a patient with an immediate, personalized and secure communication and virtual reality to help patients to better live physical rehabilitation: these are technologies that provide the possibility, on one hand, to monitor parameters or to connect different devices/sensors, on the other hand to access a range of "administrative" services simplifying the relationship between patients and health facilities in the different phases of the patient journey. In fact, digital contact points allow the collection of a multitude of data and information that put the patient in an active position with respect to his or her health condition.

Considering today's increasingly curious, demanding and impatient citizen [13], the healthcare system must be able to adopt the technological tools available in a perspective that really puts the citizen-patient at the center of its activities in order to increase its empowerment.

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DEVELOPMENT OF SMART CITY IN MACAO SAR

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According to the Macao SAR's Five-Year Development Plan (2016-2020), to accelerate the "One Center, One Platform" development, the Macao SAR Government has strived to promote the development of smart city to enhance city management effectiveness and to provide better services for both residents and tourists visiting the city.

In August 2017, the Macao SAR Government and Alibaba Group have entered into a strategic partnership framework agreement under which Alibaba will support Macao's transformation into a smart city by using cloud computing technologies. Under the agreement, the four-year plan is divided into two phases. The first phase runs until June 2019, while the second phase covers the period between July 2019 and June 2021.

The first phase comprises the construction of a cloud computing data center in Macao which will be managed by the government, as well as some big data applications. A pilot cloud computing center has already been set up in September 2018 together with some pilot services. The production cloud computing center is expected to be completed in 2019, supporting big data applications in several key areas such as tourism promotion, transportation management, medical services, and smart governance.

Upon the completion of the cloud computing center in 2019, the Macao SAR Government will (1) speed up the promotion of smart governance: an open data platform will be developed, diversification and expanded use of e-payment services will be promoted, and more license applications and administrative services will be digitized; (2) facilitate smart policing: enhance the monitoring/early warning and overall coordination capabilities for unexpected events; (3) promote smart transportation: optimize bus configuration and coordinate road engineering; (4) use big data analytics to provide scientific support for medical and tourism policies and services.

Aside from the continuous improvement of Macao's technological infrastructure and big data applications, various smart applications will be enhanced in the second phase. Service procedures of government agencies will be optimized. Various government services that may be required at different stages of life such as birth, education, employment, marriage, social security and assistance, pension, etc. will be fully digitized. Citizens will be able to obtain government services through a unified government portal or mobile app using a unified account.

A consultation documentation titled "Macao Smart City Development Strategy and Development of Key Areas" was drafted and a 45-day public consultation was launched in April this year. The document highlights 13 key development areas, including application of big data, transportation and leisure, as well as open government and transparent decision-making. The public consultation was completed in June this year. Based on the data collected in the consultation, the Macao SAR Government is working on finalizing a blueprint for transforming Macao into a smart city.

Furthermore, the Macao SAR Government will promote technological innovation. The Working Committee for the Construction of Guangdong-Hong Kong-Macao Greater Bay Area will be established to strengthen regional cooperation in innovative technology, and to transform Macao into an international innovative city. The government will also carry out preliminary work in deploying 5G network, and to realize tri-networks integration to provide citizens with better mobile services.

MADAGASCAR ADOPTS A LAW ON THE PROTECTION OF PERSONAL DATA

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1. INTRODUCTION

On 9 January 2015, the Republic of Madagascar promulgated the Law No. 2014-038 on the Protection of Personal Data. Since 2008, The French Association of Personal Data Protection Authorities (AFAPDP) has supported the Ministry of Justice of Madagascar in favor of this law. It therefore welcomes this step forward for to the protection of personal data in Madagascar.

2. PRESENTATION OF THE LAW

The adoption of a legal framework for the protection of personal data is a project carried out by the Ministry of Justice of Madagascar for several years, which had to be delayed because of the political instability of recent years. However, the ministry organized a national consultation of ministerial departments, civil society, and the National Human Rights Council of Madagascar and established extensive cooperation with AFAPDP and its members. The joint efforts of the Ministry and its partners led to the adoption of the law of 9 January 2015.

This law marks the beginning of the establishment of a protective legal framework for the citizens and it defines the responsibilities of firms operating in Madagascar. The law recognizes the correlations between technologies and development, and wants to provide a favorable legal environment for business and the establishment of national and foreign firms engaged in processing personal data.

The law also highlights the correlations between technologies and risks for citizens' freedom and provides safeguards to protect the individuals whose data are collected and processed (see Chapter IV of the law).

The law takes up the four pillars of the protection of personal data:

1. The fundamental principles (Chapter II)
2. The rights of individuals (Chapter IV)
3. The independent authority (Chapter V): The Malagasy Commission on Computing and Liberties (CMIL)
4. The penalty system (Chapters V and VII)

The AFAPDP sends its congratulations to Madagascar for the adoption of this law and especially to the General Director for Judicial Affairs, Studies and Reforms at the Ministry of Justice, who has supported the project since the beginning. AFAPDP will remain available to cooperate and share its expertise in the implementation of this law and in particular the installation of the authority for the protection of personal data.

3. OVERVIEW ON THE LAW FOR THE PROTECTION OF PERSONAL DATA IN MADAGASCAR

• Chapter I: General Provisions (Purpose of the Act and Automated Individual Decisions)
• Chapter II: Scope and definitions
• Chapter III: Basic Principles including those for the processing of sensitive data, processing of data relating to offenses and convictions, transfers of data abroad, data collected by electronic certification service providers,
• Chapter IV: Rights of persons (opposition, access and direct or indirect modification in the case of public security treatments, information)
• Chapter V: Independent administrative authority- Pre-processing formalities- Control

- Section 1: Malagasy Commission on Computing and Liberties (Independent administrative authority, composed of 9 elected or appointed members, president and vice-presidents elected by the commission, criteria of independence and internal organization, regulatory power and sanction)
- Section 2: Pre-processing formalities (declaration or register, regulatory act where applicable, simplified declarations and exemptions, notices and authorizations)
- Section 3: Control over the implementation of treatments

• Chapter VI: Delegate for the protection of personal data
• Chapter VII: Sanctions pronounced by the CMIL (5% of the maximum turnover, appeal before the Council of State)
• Chapter VIII: Financial Provisions (CMIL Budget)
• Chapter IX: Transitional and Final Provisions

4. MALAGASY CYBERCRIMINALITY-RELATED LAWS

• Law # 2014-038 on the Protection of Personal Data
• Law # 2014-006 on the fight against cybercrime of 19 June 2014

FOSTERING SMES DIGITAL CAPABILITIES IN SINGAPORE

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Digital innovation is radically changing the nature and structure of products and services across all sectors of the economy. These innovations are transforming and disrupting entire industries, such as retail, transport, and logistics. Harnessing digital capabilities can spawn novel value-creation pathways for firms towards enhancing their profitability and survival. In Singapore, the Report of the Committee on the Future Economy [1] i While a scheme's take-up rate alone is not a good measure of whether it has achieved its objectives, dentified strengthening digital capabilities as a key strategy to transform the economy. Accenture Strategy research noted that 28% of output in mature market economies is digital.[2] In other words, digital technology is key to firm innovation and growth.

However, relative to large firms, small companies are often poorly equipped to take advantage of digital technologies to enhance the way they run their businesses, to serve their customers effectively, and to reach out to new markets. Most small and medium-sized enterprises (SMEs) lack the knowledge resources and are short of people with digital skills. There are also barriers to creating an innovation mind set and for harnessing digital platforms to facilitate and on-board innovation.

In Singapore, 217,900 SMEs make up 99% of the enterprises and contribute to nearly half of the GDP while employing 70% of the workforce.[3] Thus, these enterprises play a significant role in the development of the country's economy. However, SMEs are facing turbulent environments, with local, international and online challenges that cause almost 2 in 3 businesses to fail.

Salient challenges for them include manpower shortage and high production costs.[4] Particularly, SMEs find it difficult to recruit employees as workers are drawn to other employers (e.g., multinationals) that offer higher salaries. Another major challenge for these businesses is that of rising competition. While local competition is already a significant issue (reported by 60% of SMEs), global and online competition has created further challenges. This necessitates that these enterprises lower costs and offer more choices to consumers in order to compete regionally (e.g., in ASEAN) and globally.

In response to these challenges, key strategies for SMEs are to automate business processes and leverage digital options. Streamlining processes reduces manpower requirements and increases SME efficiency and productivity. Business process mapping and re-engineering thus become key steps while investing in technology to automate processes. However, SMEs typically lack skills and capabilities to streamline their processes and exercise digital options. Other than upgrading employee skills to better leverage digital options, SMEs also require a change of organisational culture and tangible tools to help them embrace digital innovation. The change of mind set entails creating and sustaining an innovation and startup-like culture in SMEs to develop a pro-active, rather than reactive response to digital technologies, such as mobile devices and social media. Also, adopting open innovation (i.e., innovation by involving customers and external parties) approaches and crowdfunding opportunities can enable SME's to overcome the resource constraints they face in digitization and expansion.

In this regard, the Singapore government has announced and begun to implement several initiatives. First, the SME 'Go Digital' Programme[5] was announced at Budget 2017 to help SMEs build stronger digital capabilities to seize the opportunities for growth in the digital economy. SMEs Go Digital proposes a structured and inclusive approach towards the adoption of digital technologies by SMEs. Through sectoral Industry Digital Plans, starting with sectors such as retail, food services, wholesale trade, logistics, security, and environmental services, SMEs are provided advice by SME Centres on the appropriate technologies to use as they grow and expand. These include, digital roadmap, consultancy, and project management services. At the same time, IT vendors are

1 https://www.gov.sg/~/media/cfe/downloads/cfe%20report.pdf?la=en

2 https://www.accenture.com/t00010101T000000__w__/br-pt/_acnmedia/PDF-14/Accenture-Strategy-Digital-Disruption-Growth-Multiplier-Brazil.pdf

3 https://www.singstat.gov.sg/~/media/Files/visualising_data/infographics/economy/singapore-economy22032018.pdf

4 https://www.blueoceansys.com.sg/blog/5-challenges-smes-face-in-singapore/

5 https://www.imda.gov.sg/smesgodigital

being offered grants to develop digital solutions proven to deliver productivity gains to SMEs.

Second, the Enterprise Development Grant (EDG)[6] is a financial assistance programme that is intended to assist Singapore companies to upgrade their business, innovate or venture overseas, under three pillars of core capabilities (e.g., strategy, marketing, financial, and human resource management), innovation and productivity (i.e., automation, process redesign, and product development), and market access (e.g., M&A, pilot test, and standards adoption). The grant funds up to 70% of qualifying project costs for SMEs i.e., third party consultancy fees, software and equipment, and incremental internal manpower cost.

Finally, the Productivity Solutions Grant (PSG)[7] and the Market Readiness Assistance (MRA)[8] Grant are newer schemes with specific intents. The PSG supports companies looking to adopt particular productivity solutions or equipment. The grant support for pre-approved solutions under the SMEs Go Digital programme is being streamlined into the PSG. For a start, PSG covers sector-specific solutions including the retail, food, logistics, precision engineering, construction and landscaping industries. Other than sector-specific solutions, PSG also supports adoption of solutions that cut across industries, such as in areas of customer management, data analytics, financial management and inventory tracking. On the other hand, the MRA supports SMEs who wish to take their first step into overseas markets. This includes providing assistance in overseas market setup, finding overseas business partners, and overseas market promotion. Since the areas of support have been pre-specified, the purpose of the PSG and MRA is largely to facilitate ease of adoption.

Overall, the SME landscape in Singapore is complex and diverse[9]. Schemes to help SMEs can be targeted and customized. Also, there is a need to review the objectives, design, and implementation of the schemes regularly based on their take-up rate and achievement of objectives. Over time, the goal is to encourage SMEs to develop their capabilities, and reduce their dependence on government support.

Moving forward, beyond basic automation, additional digital capabilities to utilize artificial intelligence, business analytics, and mobile commerce will need to developed which would better enable SMEs to thrive and innovate in the digital economy.

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[9] https://www.channelnewsasia.com/news/singapore/commentary-government-assistance-smes-business-budget-2018-9950140

DIGITAL NATION & INNOVATIVE ECONOMIC DEVELOPMENT PROGRAM IN TAIWAN

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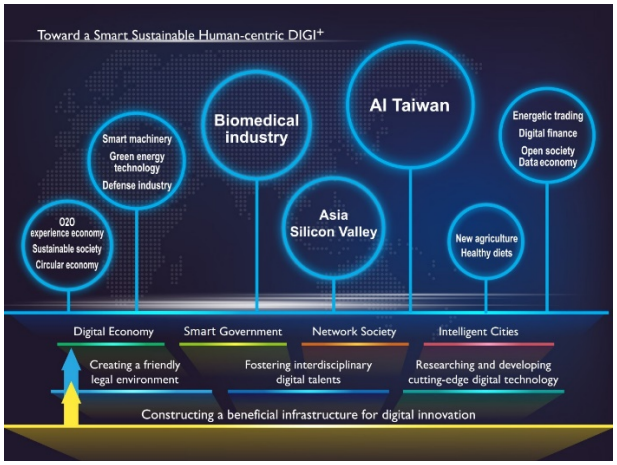
1. NEW DIGITAL TRANSFORMATION INITIATIVES

Aligning with the national policy directory "Digital Nation, Smart Island," Taiwan government has promoted the "Digital Nation & Innovative Economic Development Program (DIGI+) 2017-2025," which is intended to enhance a digital infrastructure, re-construct a service-based digital government, and realize a fair and active internet society with equal digital rights. In addition, innovative cross-boundary digital applications can be initialized with solid digital infrastructures, not only to further drive industry to adopt digital development, but also to promote the smart city concept and bridge the digital divide in rural areas. DIGI+ program includes subordinate key action plans as follows:



2. NEW LEGISLATION ON CYBERSECURITY

Taiwan's Legislative Yuan recently in May 2018 passed the Cybersecurity Management Act, and the effective date will be in January 2019. It can be leveraged to facilitate the completeness of national cyber security regulatory foundations and ensure that the agencies implement cyber security protection measures such as security protection auditing, security information sharing, emergent events report and response.

In addition to government agencies, the Act also requires Providers of Critical Infrastructures to establish and maintain a safe, stable and secure cyber environment. The regulated industries include the sectors of Energy, Water, Information Technology and Telecommunications, Transport and Traffic, Banks and Finance, Emergency Rescue and Hospitals, Central and Local authorities, High Technology Parks. In general, Providers of Critical Infrastructures will need to (a) implement a Cybersecurity Maintenance Plan and (b) notify the central competent authority for its business of any incidents of cybersecurity.

Like many Taiwanese laws, the Cyber Security Act sets out broad principles and leaves many of the key details to regulations issued by the regulator. As of this writing, the Executive Yuan's Department of Cyber Security has drafted six regulations under the Act. Of these, top four are relevant to designated critical infrastructure operators:

1. The Cyber Security Act Enforcement Rules,
2. The Regulations for Classification of Cyber Security Responsibility,
3. The Regulations for Reporting and Responding to Cyber Security Incidents,
4. The Regulations for Inspecting Implementation Status of Special Non-official Agencies' Cyber Security Maintenance Programs,
5. The Regulations for Security Information Sharing, and
6. The Regulations for the awards and punishments for public sectors in terms of Cyber Security.

SECTION 2 FULL RESEARCH PAPERS

A NOTE ON HYBRID INTELLIGENCE

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ABSTRACT

The focus of this note is Hybrid Intelligence - symbiosis and cooperative interaction between Human Intelligence and Artificial Intelligence in process of solving a wide range of practical tasks. This understanding of intelligence systems is very close to the ideas of founders of cybernetics and could help with solving current problems with Artificial Intelligence, especially with its business applications. Basic problems of such systems as well proposed solutions and application's scenarios have been formulated and discussed in the article.

Keywords— Artificial Intelligence, Hybrid Intelligence, evaluation and monitoring of complex processes, personalization.

1. INTRODUCTION

Many people see the expectations over Artificial Intelligence (AI) are becoming too inflated. Last decades give us exciting results in AI (championships in Chess, Go, Poker, etc.), but real business applications are still limited by photo tuning, low quality chats, danger self-driving cars, and similar things. The question "What is AI?" is becoming actual and discussible once again like in 1960, 1980, 2010…

Autonomous and self-sufficient AI in real business is still a dream. AI will indeed change everything, but not any time soon. Artificial Intelligence applications in real tasks still depends on Humans.

Reverting to 1960-th, we can see that AI fathers-founders discussed AI in different terms: AI as an "amplifier" of human's "Intellectual power" (William Ross Ashby), AI as "Man-computer symbiosis" (Joseph Carl Robnett Licklider), AI as "augmenting human intellect" (Douglas Carl Engelbart), etc., - they thought about hybrid intelligence, not about independent one; about partnership manner, not about opposition.

Thinking in this paradigm, we can present all spectrum of intelligent technologies using two poles: pure Human Intelligence and autonomous Artificial Intelligence (Figure1). We use Human Intelligence tool everywhere and every time over thousands of years; we are doing the first steps only in using Artificial Intelligence in everyday life. Moving from Human Intelligence to Artificial Intelligence is one of the recognizable trend for society (see, for example, Automation of Knowledge Work as disruptive technology № 2 in [14]). This paradigm drives us to re-think main problems of intelligence systems.

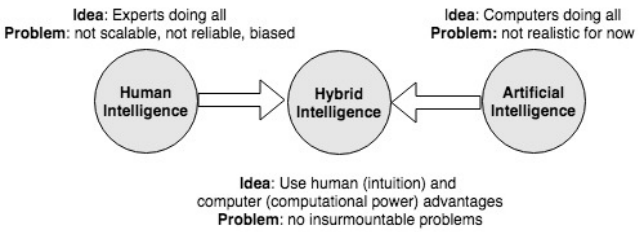

FIGURE 1: SPECTRUM OF INTELLIGENT TECHNOLOGIES.

The goal of this note is to discuss basic problems of Hybrid Intelligence and possible models of usage this approach for everyday life.

The rest of the paper is organized into four sections: the first will summarize related work; the second will formulate and discuss basic problems for Hybrid Intelligence systems; the third will present two scenarios for using this approach; finally, will tackle the debate and outline the future lines of research.

2. BACKGROUND

We can name the last decade as the time of Artificial Intelligence. AI and management, AI and leadership, AI and finance, AI and logistics, AI and creativity, AI and many other areas are the focus of a number of conferences, books, blogs, posts. AI has a wide spectrum of definitions; they cast themselves as a number of technologies that span across a lot of different things and can be described in different ways. This is not good situation for science and engineering. A formal criterion like Turing test has been successfully passed [34], unformal criteria like playing chess or Go have been passed, too. So, we do not understand what AI is; as a result, we can see points like "Artificial intelligence has accrued some very bad reputation over the years" [5] or "Some industry experts believe that the term artificial intelligence is too closely linked to popular culture, causing the general public to have unrealistic fears about artificial intelligence and improbable expectations about how it will change the workplace and life in general" [17], etc. We would not like

to participate in such discussions, without a common criterion like Turing test it is matter of taste. We believe in AI. We see autonomous adaptive self-learning and self-sufficient intelligent systems as a future (the question is how far this future?), but more realistic way to solve intelligent tasks for now is symbiosis of human and computer intelligence.

The idea of intelligent systems as a tool for augmenting human intelligence was first proposed in the 1950-s and 1960-s by cybernetics and early computer pioneers. The term Amplifying intelligence was introduced by William Ross Ashby in his classical work ([2], p. 271). At the end of his fantastic book he wrote: “Intellectual power, like physical power, can be amplified. Let no one say that it cannot be done, for the gene-patterns do it every time they form a brain that grows up to be something better than the gene-pattern could have specified in detail. What is new is that we can now do it synthetically, consciously, deliberately.” ([2], p. 272). The idea of symbiosis of human and computer was formulated by psychologist and computer scientist Joseph Carl Robnett Licklider: “Man-computer symbiosis is an expected development in cooperative interaction between men and electronic computers. It will involve very close coupling between the human and the electronic members of the partnership. The main aims are 1) to let computers facilitate formulative thinking as they now facilitate the solution of formulated problems, and 2) to enable men and computers to cooperate in making decisions and controlling complex situations without inflexible dependence on predetermined programs. In the anticipated symbiotic partnership, men will set the goals, formulate the hypotheses, determine the criteria, and perform the evaluations. Computing machines will do the routinizable work that must be done to prepare the way for insights and decisions in technical and scientific thinking. Preliminary analyses indicate that the symbiotic partnership will perform intellectual operations much more effectively than man alone can perform them.” ([11], p. 4). This idea was specified and studied by Douglas Carl Engelbart: “By "augmenting human intellect" we mean increasing the capability of a man to approach a complex problem situation, to gain comprehension to suit his particular needs, and to derive solutions to problems. Increased capability in this respect is taken to mean a mixture of the following: more-rapid comprehension, better comprehension, the possibility of gaining a useful degree of comprehension in a situation that previously was too complex, speedier solutions, better solutions, and the possibility of finding solutions to problems that before seemed insoluble. And by "complex situations" we include the professional problems of diplomats, executives, social scientists, life scientists, physical scientists, attorneys, designers—whether the problem situation exists for twenty minutes or twenty years. We do not speak of isolated clever tricks that help in particular situations. We refer to a way of life in an integrated domain where hunches, cut-and-try, intangibles, and the human "feel for a situation" usefully co-exist with powerful concepts, streamlined terminology and notation, sophisticated methods, and high-powered electronic aids.” [6].

After this romantic period, we had some tens of years stagnation for human-computer systems. One of the basic problem from our point of view was a huge difference between ways of perception, manipulation of information, reasoning, etc. for a human being and for a computer. Boolean 0/1 logic is natural for computers but very artificial for the people; work with uncertain information is natural for the people, but very complex for computers. How we can organize symbiosis of such two completely different subsystems?

Mathematical tool that is capable to be an interface between human being and computer - fuzzy logic - was introduced by Lotfi Zadeh in [37]. In ([38], p. 200) he wrote “The main applications of the linguistic approach lie in the realm of humanistic systems-especially in the fields of artificial intelligence, linguistics, human decision processes, pattern recognition, psychology, law, medical diagnosis, information retrieval, economics and related areas”. His definition of the humanistic systems is “By a humanistic system we mean a system whose behavior is strongly influenced by human judgement, perception or emotions. Examples of humanistic systems are: economic systems, political systems, legal systems, educational systems, etc. A single individual and his thought processes may also be viewed as a humanistic system” ([38], p. 200). Fuzzy logic allows us to use perception-based descriptions of objects and manipulate them in a human-like reasoning manner in computer models. It is a base for cognitive computing and for Augmented Intelligence as defined by IBM [9] “At IBM, we are guided by the term “augmented intelligence” rather than “artificial intelligence”. It is the critical difference between systems that enhance and scale human expertise rather than those that attempt to replicate all of human intelligence. We focus on building practical AI applications that assist people with well-defined tasks, and in the process, expose a range of generalized AI services on a platform to support a wide range of new applications”. This understanding of human-computer symbiosis is the most similar to ours. The aim of our systems for evaluation and monitoring is “assist people with well-defined tasks” in management of complex processes.

From business perspective these systems are close to “Automation of knowledge work” set of technologies in McKinsey Global Institute terms ([14], p. 41) “These capabilities not only extend computing into new realms …, but also create new relationships between knowledge workers and machines. It is increasingly possible to interact with a machine the way one would with a coworker”. McKinsey estimate potential economic impact across sized applications in 2025 from $5.2 trillion to $6.7 trillion per year ([14], p. 44).

3. BASIC PROBLEMS OF HYBRID INTELLIGENCE SYSTEMS

From scientific point of view Hybrid Intelligence means a new problem definition: how we can organize and optimize the synergy of human and computer intelligence components?

Following the concepts “Intellectual power amplifier” (William Ross Ashby) “Man-computer symbiosis” (Joseph Carl Robnett Licklider), "Augmenting human intellect" (Douglas Carl Engelbart), “Humanistic system” (Lotfi Zadeh) described above, we can present a principle scheme of Hybrid Intelligence like in Figure 2.

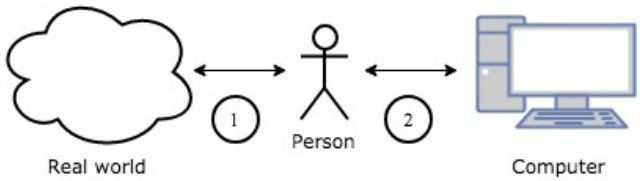

FIGURE 2: A PRINCIPLE SCHEME OF HYBRID INTELLIGENCE.

Note, that for natural sciences (physics, chemistry, etc.) and engineering we will have a classical modelling system if we replace “Person” on “Measuring device” on Figure 2. Principal point is that for a number of processes in social sciences, politics, etc. we do not have such measuring devices, and we can measure the parameters of the processes using evaluations made by experts only.

For this scheme we can formulate the following two basic problems:

- Problem 1 (Perception modelling): How we describe objects from the real world? Can we describe the objects by the most reliable and the most effective for further computing way?
- Problem 2 (Perception-based computing): How we can manipulate with perception-based information (for example, search or generalize)? Can we optimize these calculations?

These problems were studied and solved. Below is a summary of the results.

3.1. Perception modelling

Let’s reformulate the Problem 1 as follows:

Is it possible, taking into account certain features of the man’s perception of objects of the real world and their description, to formulate a rule for selection of the optimum set of values of characteristics on the basis of which these objects may be described? Two optimality criteria are possible:

Criterion 1. We regard as optimum those sets of values through whose use man experiences the minimum uncertainty in describing objects.

Criterion 2. If the object is described by a certain number of experts, then we regard as optimum those sets of values which provide the minimum degree of divergence of the descriptions.

It is shown [19] that we can formulate a method of selecting the optimum set of values of qualitative indications (collection of granules).

Moreover, it is shown [22] that such a method is robust, i.e. the natural small errors that may occur in constructing the membership functions do not have a significant influence on the selection of the optimum set of values. The sets which are optimal according to criteria 1 and 2 coincide.

Following this method, we may describe objects with *minimum possible uncertainty*, i.e. *guarantee optimum operation of the hybrid intelligence systems* from this point of view.

3.2. Perception-based computing

Hybrid intelligence systems assume, at least, the storage of linguistic evaluations of the objects/ processes indicators in the system database. In this connection the following interpretation of problem 2 arises.

Is it possible to define the indices of quality of information retrieval in fuzzy (linguistic) databases and to formulate a rule for the selection of such a set of linguistic values, use of which would provide the maximum indices of quality of information retrieval?

It is shown [23] that it is possible to introduce indices of the quality of information retrieval in fuzzy (linguistic) databases and to formalize them.

It is shown [25] that it is possible to formulate a method of selecting the optimum set of values of qualitative indications (collection of granules) which provides the maximum quality indices of information retrieval.

Moreover, it is shown [23] that such a method is robust, i.e. the natural small errors in the construction of the membership functions do not have a significant effect on the selection of the optimum set of values.

It allows to approve that the offered methods can be used in practical tasks and *to guarantee optimum work* of hybrid intelligence systems.

Based on the results above, we can provide recommendations how we can use similar approach for different type of tasks (information retrieval, pattern recognition, data mining [30] etc. – see Figure 3).

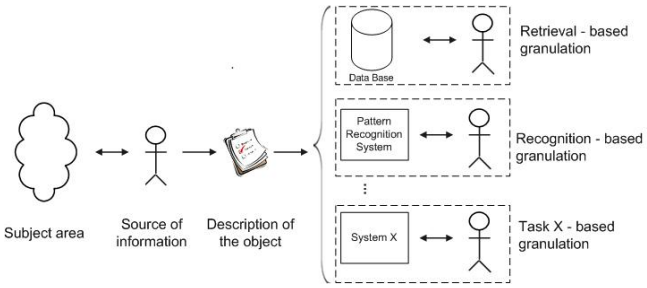

FIGURE 3: TASK-DRIVEN INFORMATION GRANULATION.

In general terms, these recommendations are:

1. Formalize of the quality of the task's solution.
2. Try to find dependence of the quality functional and granulation or use computational techniques for approximation the quality functional.
3. Choose granulation which provide maximum of the quality functional.

These results have theoretical level. Where and how we can use this in practical tasks? Two possible frameworks are presented below.

4. SCENARIOS OF USAGE THE HYBRID INTELLIGENCE APPROACH

For now, we have tested two scenarios of using Hybrid Intelligence: in evaluation and monitoring of complex processes and in personalization of collaboration people with digital world.

4.1. Evaluation and monitoring of complex processes

A big part of "tasks that rely on complex analysis, subtle judgments, and creative problem solving" ([14], p. 41) is evaluation the status and monitoring the progress of processes in business, economy, society, etc. Modeling and control for these processes is very different from physical and technical ones. These processes are unique in the physical sense – a series of independent experiments is not possible; we cannot measure parameters like in physics – "measuring device" is a human being; we do not have adequate models like heat transfer equation – processes are described in natural language or in the form of parametric dependencies, etc. As a result, we can conclude that classical mathematics is not suitable for describing and modeling of socio-economic processes due to huge complexity, uncertainty, vagueness. Only the right mixes of computer intelligence and human intelligence can solve these problems.

From the systems point of view, systems for evaluation and monitoring (SEM) relate to a class of hierarchical fuzzy discrete dynamic systems. The theoretical base for this class of systems is provided by the fuzzy sets theory, discrete mathematics, methods of the analysis of hierarchies, which was developed in works of L.A. Zadeh [37], [38], M.D. Mesarovich et al. [12], T.L. Saaty [31], and others. The analytic hierarchy process (AHP) was developed in the 1980s by Saaty [31]. It is a systematic decision-making method which includes both qualitative and quantitative techniques. It has been widely used in many fields for a long time. J.J. Buckley [4] incorporated the fuzziness into the AHP, called the FAHP. Hierarchical fuzzy systems have attracted considerable attentions in recent years. V. Torra [33] summarized the related recent research work in this domain. Detailed FAHP literature review is also presented in [16].

SEM allow to uniformly process diverse, multi-level, fragmentary, unreliable, and varying in time information about some process. Based on this type of information SEM can perform monitoring of the process' status evolution and work out strategic plans of process development. These capabilities open a broad area of applications in business (for example, [10], [24]), socio-political problems [28], control of bilateral and multilateral agreements [20], healthcare [1], etc.

Theoretical foundations and basic principles development SEM presented in [27].

SEM workflow is presented in Figure 4:

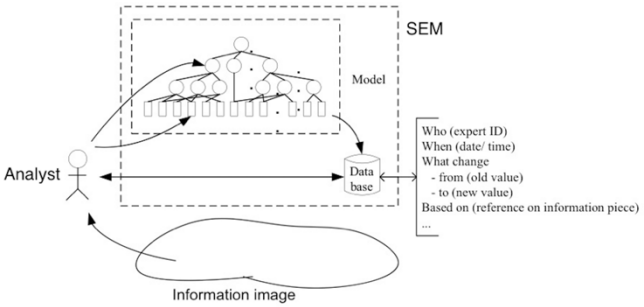

FIGURE 4: SEM WORKFLOW.

SEM allow having the model of the process developing in time. It is supported by the references to all information materials, chosen by the analysts, with general and separate evaluations of the status of the process. Using the time as one of the parameters of the system allows to conduct the retrospective analysis and to build the forecasts of development of the process.

Having set up a SEM, we can solve two types of problems: direct and inverse.

The direct problem is to find all "critical ways" of the process. It means to reveal those elements of the process, the small change of which status may qualitatively change the status of the process as a whole. For big class of aggregation operators, we can calculate degree of criticality for any element of the model; for all aggregation operators we can use universal algorithms (like backtracking algorithms) for calculation of the degree of criticality for any element of the model. That means that we can understand and measure strengths and weaknesses of any element of the current process. This

understanding is a base for developing a strategic plan for control of the process in the optimal way.

The inverse problem is to find elements of the model which must be changed for reaching some given status of the target element of the model. For example, we can understand how we can reach maximal effect for given budget or reach given effect for minimal budget.

Examples of such tasks could be evaluation and increasing of capitalization for startups, increasing an investment's attractiveness for companies and/or regions, increasing sustainability of a business, etc.

We can solve these tasks if and only if we have the model (structure and tuned aggregation functions), actual status of the nodes, i.e. working system for evaluation and monitoring of the process. Comparison analysis of these capabilities with other analytical tools is presented on Figure 5.

4.2. Personalization

Personalization is one of the most visible trend of applications of modern ITC from fashion industry till smart learning [3], [7], [8], [13], [15], [18], [35], [36].

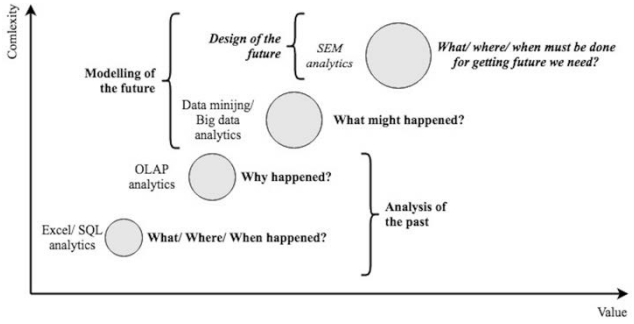

FIGURE 5: SEM ANALYTICAL CAPABILITIES.

Overwhelming majority of such publications are focusing on more deep segmentation, customization of communications, etc. Here we use term "personalization" literally - make the digital world personal for every person.

For reaching this effect we need in interactions with the user for "calculating" his or her own semantic of used words and concepts. These concepts are formulated by the user in natural language, and modelled by fuzzy sets, defined on the universum of the significances of the attributes. After adjustment of user's concepts based on search results, we have "personalized semantics" for all terms which particular person uses for communications with digital sources (for example, "young person" will be different for teenager and for old person; "good restaurant" will be different for people with different income, age, etc.).

General picture of such adaptive semantic layer in information processing is presented on Figure 6.

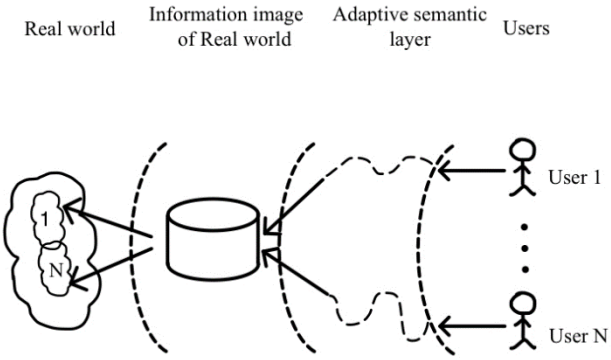

FIGURE 6: ADAPTIVE SEMANTIC LAYER.

General structure of the adaptive semantic layer is presented on Figure 7.

The most important thing here is modification of user's concepts based on interactions with the system (for example with database for information retrieval task).

It is obvious enough that different users (classes of users) can have different formalization of the concepts (different membership functions). For example, concept "expensive" for student and for businessman can be different. How can we make our interface "personalized"? The idea of such modification is presented on Figure 8.

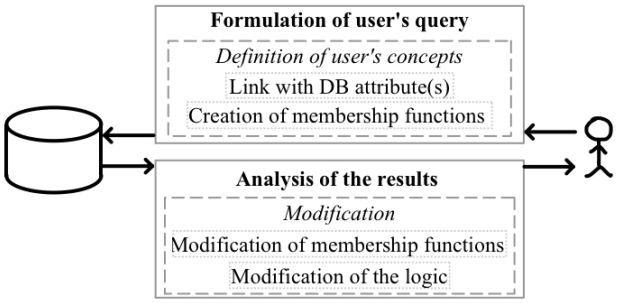

FIGURE 7: THE STRUCTURE OF AN ADAPTIVE SEMANTIC LAYER.

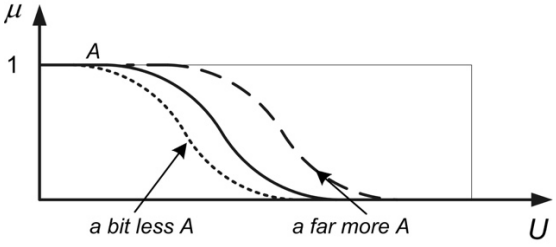

FIGURE 8: ADJUSTMENT OF THE SEMANTIC OF USER'S CONCEPT A.

Here *more*, *less* - directions of modification; *a bit*, *not so far*, *a far*, ... - volume ("power") of the modificatory. This approach is described in [23].

Using a series of successive refinement like “a bit less expensive”, “a far cheaper”, etc. for concept “Cheap”, we can find the membership function which formalize this concept for particular user by the best way. For another user it could be different function. Some theoretical questions like convergence for this type of refinement are still open.

Such personalization of information retrieval and social networks described in [26] and [29] correspondingly.

5. CONCLUDING REMARKS

Self-sufficient autonomous Artificial Intelligence is still a piece of art (Chess, Go, etc.) with unclear business applications in observable future. Many authors say about inflated expectations, hysteria, etc., - actually about the AI’s crisis. Hybrid Intelligence means a practical or pragmatic sense of the intelligence systems, and it is a reality.

The basic fundamental problems of Hybrid Intelligence solved. We can develop robust and optimal Hybrid Intelligence. Several local problems are still open, and we hope to see solutions in the nearest future.

Applications of Hybrid Intelligence for various types of organizations (international, federal, corporate levels) and various types of the problems (non-proliferation of nuclear weapons and materials, security, healthcare, microelectronics) were successfully developed and tested. Vision and understanding for new applications (natural and technological disasters management, smart city/ smart regions/ smart countries, smart learning for education, smart healthcare, personalization and optimization for social networks/ information retrieval/ other interactions of humans with digital world, etc.) are proposed and discussed. We will be happy to see new researchers and new applications in the nearest future.

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A FRAMEWORK FOR THE ASSESSMENT OF ONLINE FASHION RETAILERS: THE FASHION SHOPPER WEB EMPOWERMENT INDEX

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ABSTRACT

The objectives of this paper are:
1. To understand customers' value drivers in the on-line fashion shopping experience with regard to the perceived empowerment;
2. To analyze the key factors of an efficient web strategy in the fashion e- retailing context;
3. To build an index for measuring the degree of empowerment provided by online fashion retailers;
4. To provide a rank of a sample of on-line fashion retailers based on their ability to offer high levels of empowerment to fashion web shoppers.
The adopted methodology is based on an extensive literature review, an online survey distributed to a sample of web shoppers, the definition of an index based on a set of indicators weighted according to the survey results and the evaluation of a sample of website

Keywords— On-line retailers, on-line fashion shopping, customers, purchase experience.

1. LITERATURE REVIEW

a. On-line fashion retailers

The globalization process and the extraordinary growth in the use of Internet is changing retail industry, especially fashion retail, and is creating new growth opportunities for firms [1]. In the actual changing retail environment, online channels are becoming increasingly important [2-5]. In addition, mobiles, tablets and social media are powering the opportunities for traditional retailers to go online [6, 7].

b. On-line purchase experience

The concept of customer experience is valid, and even more relevant, in the online retail context [8]. Novak, Hoffman, and Yung [9] define online customer experience as the "cognitive state experienced during navigation". Online customer experience is the cumulative outcome of different components of the website company's offer [10] and is important to deeply understand what are these elements and how significant their role is in shaping the experience.

When consumers make a purchase online they do not have perfect information about product quality because they cannot touch, smell or feel the product [11]. In particular, when we talk about fashion products, it can be more critical to present and sell on websites if compared to other types of products, because these are products/articles that need to be experienced, and their quality can only be fully determined after purchase [12, 13]. Thanks to the recent predominance of internet retailing, information available on web sites has become a strategic element to determine whether a company will success or fail in the electronic commerce [14].

c. Tools for web site benchmarking

Several papers have been published on web site quality evaluation methodology [15-20]. Many of these publications offer frameworks containing groups of quality dimensions that are similar to the SERVQUAL (Service Quality) model proposed by Parasuraman [21]. Also some publications have proposed evaluation methodologies for specific web sites such as e-government web sites [22, 23] hotel web sites [24], online library web sites [25, 26], and health care web sites [15, 27, 28]. Kuo [29] presented a new point of view by integrating quality function deployment aspects into web site quality assessment methodology. In a number of publications, quantitative methods for Web site quality evaluation are used. Statistical methods are the most widely used assessment tool [18, 20, 30, 31].

2. OBJECTIVES AND METHODOLOGY

The baseline research hypothesis is that the information and services provided by online fashion retailers via the web
are capable of enhancing shoppers' empowerment in two key dimensions: information held by customers and control of the purchase process with respect to his/her needs.
Starting from literature review, some features of the websites were selected to develop an indicator of customer web empowerment. This indicator, named F-SWEI (Fashion Shopper Web Empowerment Index), is made of the aggregation of seven weighted components.

F-SWEI was used to assess the websites of two categories of fashion e-retailers operating in Italy: pure players and private clubs; the aim was to assess the current state of maturity of their web strategy for an increase of customers' empowerment.

F-SWEI is a multidimensional indicator, composed of a series of 7 web experience elements (sub-indicators) based on the review of the scientific literature according to their role in improving customer empowerment and weighted using the results of our survey addressed to online shoppers.

The index sub components, their references from literature and the main features are shown in table 1

In order to assess the relevance of the subindicators, an online survey was delivered to a sample of 204 autonomous and collaborative Italian respondents who declared themselves to buy fashion online. The survey was aimed to collect the relevance that respondents perceive for each element of the subindicators by using a 1-7 Likert scale. The process allowed to rank the subindicators by determining their relative weights in improving the on line fashion shopper web empowerment.

TABLE 1: THE FSWEI INDEX SUB COMPONENTS

F-SWEI INDEX SUB COMPONENTS AND LITERATURE	MAIN ASSESSED FEATURES
F-SWEI 1 WEB DESIGN [32-37]	• Accessibility: Italian language option and usability of the content; • Structure: design of the webpage, layout, sitemap, hyperlinks both to website areas or to corporate website; • Attractiveness: graphical elements, music, animation, and others
F-SWEI 2 PRODUCT DISPLAY [32-34, 37, 38]	• Zoom feature, catwalk, many pictures available, pictures differentiated by colors, and rotation effects to view a fashion garment from various angles; • "Refine by" function that allows consumer to filter products (e.g. by price, by brand, by product category, by size, by color, by material).
F-SWEI 3 PRODUCT INFORMATION (Szymanski D. and Hise R. 2000; Burke R. 2002; Srinivasan S., Anderson R. et al. 2002; Tarafdar M. and Zhang J. 2005; McCormick H. and C. 2012)	• Information about fabrics, dimensions and usability of the products; • Availability of a detailed size guide; • Instruction on how to wash properly an item; • Warranty information; • Product stock information.
F-SWEI 4 CUSTOMIZATION (Srinivasan S., Anderson R. et al. 2002; Tarafdar M. and Zhang J. 2005; Steenkamp J. and Geyskens I. 2006; Kim J., Kim M. et al. 2007; Lin H. 2007)	• Augmented reality tools, • Product suggestion based on previous purchases information; • Outfits advices; • Offer a "wishing list"
F-SWEI 5 PURCHASING PROCESS [34-39]	• Different payment methods (e.g. payment by credit card, PayPal, cash upon delivery); • Tracking options for shipments; • Free delivery promotions; • Free return and time extension for exercising the right of return.
F-SWEI 6 COMPANY-CUSTOMER INTERACTION (Kim J., Kim M. et al. 2007; Lin H. 2007)	• FAQ service on generic issues (such as payment, shipping, return); • Online chat presence; • Evidence of a telephone channel for generic advice and information; • Presence of a generic emails address for problems and complaints.
F-SWEI 7 WEB 2.0 TOOLS [32, 33, 36, 40]	• Presence of the website on different social networks (e.g. Facebook, Instagram, Flicker); • Availability of hyperlinks in the webpage directed to fashion blogs; • Possibility for customers to evaluate both products and website surfing experience through online procedures; • A mobile strategy or the presence of an official app or a mobile simplified version of the website.

By weighting the subindicators, F-SWEI was calculated as follows:

F-SWEI= 12,99%F-SWEI 1 +15,54% F-SWEI 2+15,8% F-SWEI 3+13% F-SWEI4 +16,07% F-SWEI 5+ 13,26% F-SWEI6 +13,34% F-SWEI7

3. MAIN RESULTS

The F-SWEI indicator was used in January 2016 to evaluate a sample of fashion websites that comply with all the following criteria:

• E-retailers Business-to-Consumers;
• Non store retailers: pure players and private clubs
• Selling fashion products including clothing, accessories, shoes, bags for women, men and kids (from the list were removed websites focusing only on a specific category such as selling sportswear, wedding dresses, shirts etc.);
• Displayed in Italian language;
• Sold on the Italian market.

Considering the above requirements, the index was calculated for 32 websites and table 2 and 3 show the final ranking (scores are expressed out of 100):

TABLE 2: PURE PLAYER WEBSITES SAMPLE F-SWEI RANKING (SCORES OUT OF 100)

PURE PLAYER	F-SWEI
Zalando (www.zalando.it)	82,6
Theoutnet (www.theoutnet.com)	79,1
Mr Porter (www.mrporter.com)	70,9
Yoox (www.yoox.com)	69,8
Asos (www.asos.com)	69,8
Shopbop (www.shopbop.com)	68,0
Net-a-Porter (www.net-a-porter.com)	66,3
Mytheresa (www.mytheresa.com)	65,1
Zappos (www.zappos.com)	64,5
La Redoute (www.laredoute.it)	64,0
Bluefly (www.bluefly.com)	58,7
Letmeoutlet (www.letmeoutlet.com)	56,4
Spence (www.spence.it)	54,7
Modnique (www.modnique.com)	54,1
Fashiongriffe (www.fashiongriffe.com)	52,9
Fashionis (www.fashionis.com)	51,7
Storytalia (www.storytalia.com)	51,7
Luxyuu (www.luxyuu.net)	50,6
Pricy (www.pricy.it)	49,4

TABLE 3: PRIVATE CLUB WEBSITES SAMPLE F-SWEI RANKING (SCORES OUT OF 100)

PRIVATE CLUB	F-SWEI
Venteprivee (www.it.vente-privee.com)	63,2
Gilt (www.gilt.com)	63,2
Ideel (www.ideel.com)	57,9
Privalia (www.it.privalia.com)	57,9
Amazon Buyvip (www.it.buyvip.com)	55,3
Più Style (www.piùstyle.com)	53,9
Rue La La La (www.ruelala.com)	53,9
Myhabit (www.myhabit.com)	51,3
Saldi Privati (www.saldiprivati.com)	51,3
Private Outlet (www.privateoutlet.it)	50,0
Showroomprive (www.showroomprive.it)	50,0
Secret Sales (www.secretsales.com)	48,7
Cocosa (www.cocosa.co.uk)	38,2

4. CONCLUSIONS AND MANAGERIAL IMPLICATIONS

On average, pure players show a higher ability to create empowerment through their websites, while some private clubs still show a limited orientation to empowerment. Both in pure players and private clubs the highest scores are registered in F-SWEI3 (product information), which shows and excellent quality, and in F-SWEI 2 (product display) and F-SWEI 6 (company-customer interaction), whose quality could still be improved.
The most critical subindicators for the pure players are F-SWEI 1 (web design) and FSWEI 5 (purchasing process), while in private clubs the most neglected items are linked to F-SWEI 4 (customization), despite the close relationship which would be expected from these players.

The websites' analysis using the "customer 2.0" perspective shows a certain degree of immaturity that leads to confirm that there are still wide ranges of improvement in the Italian e-commerce context.

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RUSSIAN DIGITAL ECONOMY PROGRAM

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ABSTRACT

The main implementation stages of digital economy development program in the Russian Federation are presented. The goals and objectives of the program, the main directions of its implementation and the links to other initiatives related to digital transformation of industries in Russia are described.

Keywords — digital economy, digital transformation, Russian Digital Economy Program, governance system,

1. INTRODUCTION

The beginning of the new millennium is characterized by a special focus on the development and use of information and communication technologies (ICT), which are generally considered to be one of the main drivers of progress and socio-economic development. Following the adoption of the principles and action plan for the development of the information society at the World Summit of the Information Society, many countries have moved to the development of the digital economy – an economic activity based on the development and use of digital technologies.

The Russian Federation did not stand aside and on December 1, 2016, the President of the Russian Federation suggested "launching a large-scale system program for developing the economy of a new technological generation, the so-called digital economy" in his annual Message to the Federal Assembly [1].

2. RUSSIAN DIGITAL ECONOMY PROGRAM – DESIGN AND GOVERNANCE

In accordance with the order of the President, the Government of the Russian Federation, together with the Administration of the President of the Russian Federation, was to develop and approve a digital economy program by June 1, 2017. At the same time, work on the program was to be carried out by representatives of all stakeholders – government, business, and academia. The coordinator of the work was identified by the Ministry of Communications and Mass Media of Russian Federation, which in mid-March 2017 formed an inter-agency working group (IWG) including 9 subgroups along the main program components to develop the Digital Economy program:

1. Regulation of the digital economy.
2. Research and development.
3. Human resources and education.
4. Digital infrastructure.
5. Information security.
6. Digital government.
7. Digital healthcare.
8. Smart city.
9. Digital economy development governance.

The subgroups structured the draft program around a matrix of goals, objectives, milestones and indicators with a planning horizon until the end of 2024.

In mid-March 2017, the Ministry of Communications and Mass Media of Russian Federation signed an agreement with the World Bank on the provision of advisory services on a digital economy program development. At the end of May 2017, the World Bank submitted a report "Developing a Common Approach to the Development of the Digital Economy Program Taking into Account International Experience". The results of this report were massively used in the course of the elaboration of the Russian Digital Economy Program.

Almost simultaneously with the beginning of work on the analysis of the international experience in the field of digital economy, in late March 2017, the World Bank took the initiative to develop a methodology for assessing the level of digital economy development in a particular country (Digital Economy Country Assessment, DECA), to test this methodology in Russia and prepare a country report. With

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the help of Russian experts representing the Institute of the Information Society, Lomonosov Moscow State University (Faculty of Computational Mathematics and Cybernetics, National Center for Digital Economy), Plekhanov Russian University of Economics, Kazan (Volga Region) Federal University, Central Economics and Mathematics Institute ща the Russian Academy of Sciences, Federal Bureau of Medical and Social Expertise, Financial University under the Government of the Russian Federation, from April to

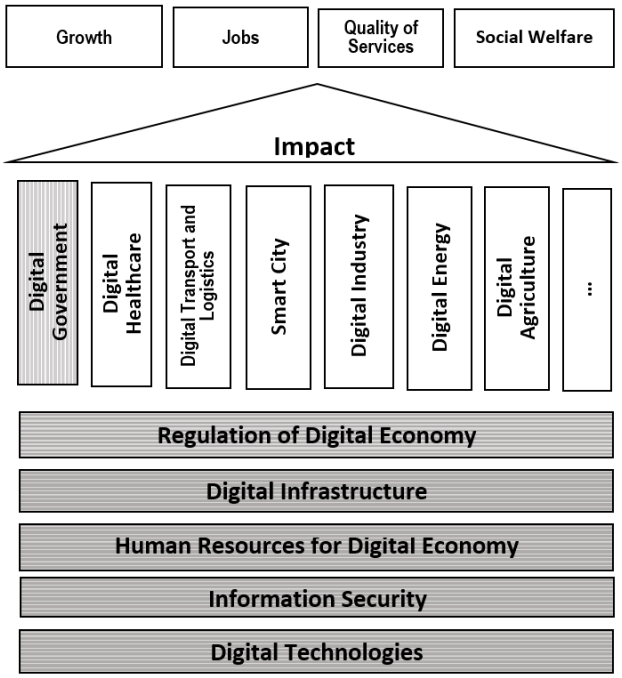

FIGURE 1: FRAMEWORK OF THE RUSSIAN DIGITAL ECONOMY PROGRAM

October 2017, an expanded system of indicators was formed for assessing the current situation in the area of digital

economy development in the country and prepared a report "Digital Economy Country Assessment for Russia" (DECA Russia) [2]. This report has a status of a World Bank product prepared in collaboration with the Institute of the Information Society.

The Digital Economy Program of the Russian Federation (further on referred to as Digital Economy Program) developed by the IWG, taking into account international experience, was approved at a meeting of the Presidential Council for Strategic Development and Priority Projects on July 5, 2017 and then approved by Government decree No. 1632 of July 28, 2017 [3].

For a number of reasons, only five components of nine mentioned above made the frame of the first version of the approved program. They all were aimed at creating conditions for the development of the digital economy: regulations, human resources and education, research competencies and technological groundwork, information infrastructure, information security (see Figure 1).

At the same time, the Government of the Russian Federation created a new governance model for the Digital Economy Program implementation, which was significantly different from the traditional methods of managing state programs. Government Resolution No. 969 of August 15, 2017 established a Subcommittee on the Digital Economy of the Government Commission on the Use of IT to Improve the Quality of Life and Business Conditions as a tool to manage the implementation of the Digital Economy Program. The first deputy head of the Government Office of the Russian Federation Maxim Akimov was appointed head of the Subcommittee.

At the meeting of the Subcommittee, the centers of competence and the leaders of the working groups for each five components of the program were identified:

1. "Regulation of Digital Economy": competence center – Skolkovo Foundation; WG leader – R. Ibragimov (MTS).
2. "Human resources for Digital Economy": center of competence – Agency for Strategic Initiatives; WG leader – B. Nuraliev (1C).
3. "Formation of Research Competencies and Technological Groundwork": competence centers – Rostech State Corporation and Rosatom State Corporation; WG leader – A. Povalko (Russian Venture Company).
4. "Digital Infrastructure": competence center – Rostelecom PJSC; WG leader – A. Serebryanikova (Megaphone).
5. "Information Security": competence center – Sberbank PJSC; WG leader – N. Kasperskaya (InfoWatch).

The functions of the program project office were assigned to the Analytical Center under the Government of the Russian Federation [4].

From the very beginning, the development of the digital economy of Russia was conceived as versatile and open to all interested participants, therefore the creation of the autonomous non-profit organization "Digital Economy" by 16 leading companies and development institutions [5] was a unique element of the governance system of the Digital Economy Program.

The main task of the Digital Economy NPO is the coordination of activities between the business community, scientific and educational organizations, other communities and government bodies, including through the established competence centers and WGs enlisted above. To this end, in March 2018, the Government of the Russian Federation joined the founders the Digital Economy NPO, and the Presidential Aide A. Belousov headed its supervisory board.

3. RUSSIAN DIGITAL ECONOMY PROGRAM – ACTION PLANS

The next stage in the development of the Digital Economy Program was the preparation of action plans for the five approved components (areas). This work started immediately after the approval of the program. In autumn 2017, the competence centers organized a dialogue with stakeholders and formed proposals for each of the areas. In turn, the working groups consisting of the most authoritative representatives of the government, business, and academia

verified the proposals of the competence centers, after which they were coordinated by the relevant federal executive bodies and approved in late 2017 - early 2018 as plans of activities in all areas of the program, covering more than 1,000 actions [6].

More than 1,000 experts from leading companies and scientific organizations in Russia, representatives of 15 government authorities were involved in the development of action plans.

4. RUSSIAN DIGITAL ECONOMY PROGRAM – REBOOT

A new stage of development of the digital economy in the Russian Federation is associated with the new electoral cycle and is starting from the Presidential Decree of May 2018 [7], which defined the goals and target indicators of the country's socio-economic development until 2024. Development of 12 national projects (programs) began, one of which was supposed to be the national program "Digital Economy of the Russian Federation." In accordance with the Decree, by 2024, the domestic costs of the development of the digital economy from all sources (by share in the gross domestic product of the country) should increase no less than three times (compared to 2017); a stable and secure information and telecommunications infrastructure for high-speed transmission, processing and storage of large amounts of data should be created, accessible to all organizations and households; government authorities, local governments and organizations should primarily use domestic software.

The development of the national program was led by the transformed Ministry of Digital Development, Communications and Mass Communications of the Russian Federation, which took as its basis the approved Digital Economy Program and action plans. The Ministry of Economic Development of the Russian Federation and representatives of other stakeholders took part in the preparation of the draft national program.

In September 2018, the program "Digital Economy of the Russian Federation" moved to the level of national scale – the government approved the passport of the program, consisting of 6 federal projects [8]. In addition to the previously approved areas, the program was supplemented by the federal project "Digital Public Administration", some of the activities within the areas were specified and enlarged.

To date, the national program "Digital Economy of the Russian Federation" includes the following federal projects:

1. Regulation of the Digital Environment (Head – Deputy Minister of Economic Development of the Russian Federation S. Shipov).
2. Digital Infrastructure (Head – Deputy Minister of Digital Development, Communications and Mass Communications of the Russian Federation O. Ivanov).
3. Human Resources for Digital Economy (Head – Deputy Minister of Economic Development of the Russian Federation I. Torosov).
4. Information Security (Head – Deputy Minister of Digital Development, Communications and Mass Communications of the Russian Federation A. Sokolov).
5. Digital Technologies (Head – Deputy Minister of Digital Development, Communications and Mass Communications of the Russian Federation E. Kislyakov).
6. Digital Government (Head – Deputy Minister of Digital Development, Communications and Mass Communications of the Russian Federation M. Parshin).

The Deputy Prime Minister M. Akimov was appointed the curator of the national program "Digital Economy of the Russian Federation". Minister of Digital Development, Communications and Mass Communications of the Russian Federation K. Noskov became the head of the program. At the same time, the basic governance system of the digital economy development has not undergone significant changes. As before, the formation and implementation of federal projects activities takes place with the participation of key stakeholders coordinated by the Digital Economy NPO. To this end, in October 2018, a working group on digital public administration was formed (headed by O. Fomichev, Renova Holding Rus) [5], which took an active part in the verification of the relevant federal project activities.

The spending of the budget for the national program is planned in the amount of about 1.08 trillion rubles, and it is assumed that extra-budgetary funding will be even more than government spending [8].

Along with this, the development and use of digital technologies in individual industries was included in other national projects and departmental programs. Thus, the Ministry of Health of Russian Federation within the framework of the national project "Healthcare" will implement the federal project "Digital Healthcare" [9], the Ministry of Construction of Russian Federation approved the departmental project of digitalization of the municipal economy "Smart City", the Ministry of Industry and Trade of Russian Federation prepared the agency project "Digital Industry", the Ministry of Energy of Russian Federation is developing an agency Digital Energy project, etc.

5. RUSSIAN DIGITAL ECONOMY PROGRAM – WAY FORWARD

The past two years have been characterized by a large number of diverse initiatives in the development of the digital economy; the main strategic planning documents have been prepared, a system for managing the development of the digital economy has been developed, and the state budget for 2019-2021 has committed appropriate funds.

One of the management tools should be a system for monitoring the development of the digital economy in the Russian Federation, which will allow not only assessing the current state of affairs (see, for example, the latest World Bank report [11]), but also making informed decisions on the impact on digital transformation processes at the national level.

Now the most crucial stage of the development of the digital economy in the Russian Federation has come – the transition from plans to their implementation. And the main challenge for this implementation will be the coordination and harmonization of numerous initiatives at federal, regional and municipal levels.

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