



“Citizen Centric Focus for Innovative Information Technology” Proceedings of Global Forum 2019, Angers, France 7-8 October

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Abstract: This paper addresses a curious phenomenon occurring in the world of information processing. After only a relatively short period of time in the progression from paper storage to big data, information utility focuses more on individual values than standard approaches to data processing. With environmental dependency and focus on cognitive values of individuals, movement in the industry is centrally located on the individual through artificial intelligence and innovation anchored in use of the Internet.

Paper provides an analysis of perspectives presented by developers and executives responsible for supporting individuals, societies and governments related to processing information as service to citizens.

Keywords: innovation, information technology, social services, service to citizens, artificial intelligence, human cognition

It is noteworthy that the center of the information processing environment is changing from focus strictly on technology to accommodating human factors. This demonstrates movement from a total rational environment to one reflecting non-rational human behavioral elements. At the same time, conflict exists with creation of humanoid bots that emulate human behaviour fixing performance back on rational precepts.

These seemingly contradictory characteristics were made clear in the Global Forum annual event in Angers, France on 8-10 October 2019. At the same time that advanced elements of technology to further sophisticate information processing environments for human benefit, non-rational behavioural elements of the human which have been set aside over this short almost thirty-year period of time emerged as sources of value in how benefits to society could more appropriately result from technologies and their uses.

Each year since 1991, the Global Forum has attracted high-level delegates from the world of politics, from the business community, and from academia for two-day think-tank discussions on latest achievements and ongoing developments in the world of ICT. Influential leaders and prominent speakers come together to share their visions and concerns. They discuss the most recent developments and pose fundamental questions related to the topic of each year's Global Forum.

For 2019, the theme of the Global Forum was, "The Roll out of Digital Transformation." That year's program addressed innovation, simulation and realities in business environments. Naturally, intersection of technologies, markets and issues of wellbeing for humanity was the key element.

As in past Forums, discussions presented forward motion for the information technology industry. Key in this session was attention to the individual as the center of progress. How does the individual act in the transition through technology, its application for social progress, and environments that shape government and industry?

Several themes existed in determining the role for and by the individual.

- Needs of the individual
- Environments in which the individual exists
- Approaches to resolving needs
- resources available to apply to solutions
- Ability of the individual to understand and to learn within the environment.



Needs of the Individual

In today's environment worldwide, individuals are reflecting great uncertainty, both for issues in which they are directly involved, and for those tasks not accommodating their needs. With nearly 7.7 billion inhabitants today, the world is plagued by long and complex conflicts, widespread involuntary migration, violent natural disasters and growing inequalities. Regarding this growing population, "It is very likely that there will be a steady increase in humanitarian needs over the next 15 years." (Steven Lafosse Marin, CEO & Co-founder, UMAN) Much of this population increase will occur in urban centers, as they are more likely to have resources sought by individuals in peril. Financial burden for this expansion is borne by local governments as well as through related tax increases and diminished services due to need for humanitarian sharing in already over-taxed environments.

Current environments are not unique in how individual needs are supported. However, the perspective seems to have favored efficient use of technology rather than in effectiveness. Elements more specific to individuals than to their perceived needs are emerging such that human adaptation is as important as the technology alone claims to provide. Increasing benefits are targeted around the individual rather than the total business environment, and at the same time avoiding harms to the individual require deep understanding of individuals and knowledge about how humans react to needs to adapt to changes from a new focus for product and service development (Ted Hewitt, President, Social Sciences and Humanities Research Council of Canada). Knowledge of human behavior is required to understand impacts and things individuals and societies care about. Focus is needed on supporting fundamental rights of the individual and their families. Artificial intelligence, as an approach to expanding technology application, designed in part to emulate human characteristics of need and performance, often falls into the hands of developers who seek to address whole problem sets rather than needs of specific individuals (Sherif Aziz, Advisor, Strategic Planning, Madayn).

Artificial intelligence could also be "our biggest existential threat" in trapping humanity (In Sheryl Kruger Strydom and Moses Strydom, Big Data Governance and Perspectives in Knowledge Management, IGI). One presenter contested this claim credited to Elon Musk, by stating, "AI needs regulating because the big tech companies have got too big for their own good".

Concerns of individuals focus as much on privacy elements in contemporary environments than on more public ones. Current unrest from non authorized opioid use and other health concerns exposes new types of problem targets that require sensitivity at levels not before addressed. Reducing effects of social stigma in personal interactions regarding substance abuse disorders and the professionals with whom they come into contact, requires sensitivity of developers about new environments (Paul Wormeli, Wormeli Consulting).

We have to care about the people and the quality of their life (Eyal Bloch, Co-founder, TOP). This means addressing concerns of the planet, of the environment in which people live and work. More attention to agricultural development reveals a new means for growth, and product and service technologies can contribute. Accordingly, everyone's needs can be met through better managed agriculture. At the same time, priority should be placed on people and not only on profit.

While increased attention is placed on people, more specific are the needs of youth. A high priority is needed to accommodate their increasing roles in society, and in a context of developing employment opportunities within the context of cognitive cites that take advantage of this additional set of individuals already prepared to contribute to the workplace, and in developing solutions for their own benefit. In this way, can improve their self-esteem, life skills (Valérie Champetier, Founder, ThinkandAct), networking capabilities in the context of these new focused environments.

Hypervision was introduced as a new application to view the new work place, specifically by considering the city as it embodies the individual (Sylvain Nacheff, International Business



Development Director, Bouygues France). As an open system it could allow the use of city data in order to develop new applications to meet the needs of the citizen while also meeting the needs of the city's infrastructure. Integrating improvements in vertical systems across the city environment would generate benefits in meeting needs expressed by citizens.

During the past 30 years, urban sprawl has been increasing. The result is a challenge to build smarter, more intelligent cities, cities that satisfy cognitive requirements of its citizens. The process is referred to as serving an environment of what is increasingly considered as nature-based solutions to urban crisis (Ingrid Andersson, Associate Senior Expert, IKED). While solutions to citizen needs are being addressed by a host of new approaches and applications, stewardship for overarching environmental concerns emerge. Challenges specific to governmental leadership include these concerns at the same time new environmental issues emerge as part of expanding support to citizens. Building leadership capacity appears high among critical governance issues.

Building smarter cities involves appropriate artificial intelligence approaches. Important to how this occurs reasonably involves a multi-phased approach. The incremental nature of such transition is necessary if change is to be properly managed. Effective management is particularly important as shifts in demographics are observed, and need for technology to match changes are acknowledged. Three phases are identified to address such management. Beginning with a focus on gaining access to multitudes of available data about citizens and their environments as an intensification phase, interactions between machine and humans increases. This is followed by "autonomous creation" as social consciousness of the role of artificial intelligence in support of human needs results (Namir Anani, President & CEO of Information and Communications Technology Council, Canada). This is the stage where we have to reflect with a social consciousness on how this world will evolve in this environment, and the stage where we really have to look at how to govern that environment.

Environments in which the individual works

A central focus for presenters at the Global Forum was the citizen. In order to address values for the individual citizen it was discussed that the environment in which the citizen lives and operates must also be addressed.

If a single word could be expressed to characterize the environment today, it is acceleration. Since the 1950's virtually everything environmental has been moving at great speed (Stéphane Grumbach, Senior Scientist, INRIA). All aspects of human society, even the physical environment in which citizens live, have undergone change. This presents a serious challenge to the IT products and services that must keep pace with such changes.

As change is experienced, a new era is entered in which massive amounts of data are stored and made available for use in characterizing living and working environments and for determining the human role it influences. The entire world is experiencing enormous amounts of data that influence their lives and their working habits. Need to share all this data presents great challenges to the interacting systems developed to support growth (Sophie Le Pallec, Head of Public Policy, France).

At the center of challenges in processing enormous amounts of data lies the domain of artificial intelligence. Big data has proven to be instrumental to develop and test powerful algorithms designed to understand and interpret large amounts of data. At the same time, it threatens two important elements in the process. One is that competition is replaced by single source solutions based on unique methods of investigation. Another is a potential exposure of privacy information. An opposite perspective to levels of competition is that through open source availability, more individualistic and innovative approaches can be supported (Koffi Fabrice Djossou, Regional Director, Gilat Telecom).

Level of competition is itself an important element considered by presenters at the Global Forum. Competition rules more widely favorable to innovation strategies for mining big data



are pursued (Jenny Romelsjö, Antitrust: E-commerce and Data Economy, European Commission). Reference was made to the European Commission report on "Competition policy for the digital era". Essentially, an alternative to monopolistic platform models is a multi-platform model that could in a sense compete with others. Unfortunately, competition in this way often equates to fragmentation, silos, where all the benefits of data concentration are lost and digital transformation for some players could even generate a lack of productivity.

An alert is appropriate that some businesses remain reluctant to sharing data, as if data were the domain considered privately held. Data are too often regarded as internal assets, serving a basis for competitive strength. In an environment more suitable to contemporary approaches to processing big data, systems "must be able not only to speak to each other but also to understand each other." Thus, it is important to ensure that data are produced in structured formats in order to facilitate the production and aggregation of large amounts of it. And it is to the benefit of those companies who retool products and who reorganize internally to accommodate the needs of the community served rather than of a Board of Directors, or even the science behind the technologies within their milieu. In this way, the public sector becomes the platform.

A significant approach to grouping sets of data in an environment open and available to those who choose to develop intelligence from them is found in the Copernicus system for the European Commission. According to one presenter, Copernicus amasses large amounts of data obtained from environmental satellites. On-site measuring instruments are available to produce a comprehensive view of the state of our planet (Aurélie Beaupel, Digital Independent Expert, France). The convenience of this system is that it is organized by themes, including, soil, oceans, emergency treatment, atmosphere, security, and climate change.

Different elements characterize issues relative to digital support for global environments. One involves the capacity to model the ecosystem in a way that forecasts 10-30 years. Within that environment should be technological solutions that anticipate and solve discovered problems. Also to be considered are the negative side-effects from technological solutions, the unanticipated elements that follow incomplete design. Finally, one must expect that any useful model would result in a self-controlling environment, one that provides its own solutions as problems evolve.

Within these forward looking models several components would be found. We know of them as digital services, or the factors that connect end-users with models which help them understand their respective environments. They include access devices, a network, data repositories (including virtual storage such as "clouds"), and applications to give functional meaning to data processing (Caroline Vateau, Director, Business Unit Digital Responsible, Neutreo).

The operating environment for civilians and IT developers does not function by itself. Government has a stake in the process. Following a regulatory framework, government provides both support and oversight, respecting a legal framework and understanding needs of industry and citizen users. Influential to a regulatory environment are innovative ideas for improvement. In this sense, regulation follows innovation, but innovation can happen without regulation (Kaiser Naseem, Digital Transformation Professional and International Development Banker). "Innovation is undertaken by entrepreneurs, and entrepreneurs do not wait for the environment to be conducive. They innovate and regulations follow."

It might be pointed out that a considerable experience base supporting both regulatory development and degree of business expertise support this relationship of dependence. Both environments have been in place for decades to provide linkage between the past and present to assure both effectiveness and efficiency. One new element recently intruding into



a stable partnership between regulations and development is found in what is known as cyberspace. This new technological element has matured to a point where innovative use has gotten far beyond the regulatory environment to accommodate. New rules should be welcomed, but carefully implemented, to address new geopolitical borders (Alessandro Guardino, CEO, STAG, Italy).

Thus, environment can refer to the development space occupied by regulators and IT professionals. It also includes civic and national environments in which these experts operate. Following rules promulgated by the United Nations, Sustainable Development Goals were developed. According to the United Nations website, "The Sustainable Development Goals are the blueprint to achieve a better and more sustainable future for all. They address the global challenges we face, including those related to poverty, inequality, climate change, environmental degradation, peace and justice. The 17 Goals are all interconnected, and in order to leave no one behind, it is important that we achieve them all by 2030."

One idea to get the most value from United Nation SDGs is to benefit from understanding what the rules under these goals mean and how development progresses under them. Monitoring these rules through use of in natural language provided by semantic models provides a uniformly structured basis in order to connect related databases (Philippe Denis, Executive Denis & Partners Consulting, France). In this manner, cognitive intelligence becomes a valuable basis for understanding needs.

Concern for the local environment continues to occupy attention. The nature of silos of information repositories has traditionally disturbed citizens and officials who have interests across the broad spectrum of city business. One approach to dealing with the silo arrangement is through centralizing all information for city and citizen interacting business is through what is referred to as data lakes (Gwendal Azous, Axians Consulting, France).

In today's environment that includes a broader environment than the city, involving interactions connecting cities and principalities in multiple countries, stakeholders take advantage of the supporting cyberspace of the Internet. Through this technological element, processing data advances through virtual storage to share new capabilities among the elements apart from physical world to support nation states environments. Issues of regulating both access and content take on new challenges. From previous digital worlds, boundaries might not be as clear as was the case for the "old economy." Predominant among problems that are emerging from this more encompassing environment is need to consider opposition between data access needs and protection of investments and privacy. However, some care is needed to understand liabilities along with gains, a complete digital world, with no alternative means to interact and transact could cause denial of constantly evolving vulnerabilities and sustainability issues. Approaches such as the General Data Privacy Regulations provide some standard means to address need for compatibility. Accommodation is also seen as a hindrance against effective growth.

While simulation, as another approach to improved technological applications, may be explored favorably, it requires behavioral skills in dedicated secure environments by reproducing real situations to improve knowledge (Jean-Claude Granry, ICMASim, Angers, France).

If we consider rapid growth in new challenges from increasing citizens needs, along with affects of climate change, the environment is making severe timing demands. As one presenter pointed out, we are running out of time (David Rousseau, Professor in Data Sciences, University of Angers).



Approaches for addressing needs

Developing sensitivity toward needs of citizens, especially considering the environments in which they find themselves, Global Forum concerns also address the means by which solutions could be developed. Past infrastructure including both platform and application have provided great value in how technology supported needs in the past. However, new thinking and consideration of wider social norms suggest new approaches for means to different ends.

A broad spectrum for artificial intelligence solutions were presented by speakers. The Social Sciences and Humanities Research Council of Canada (SSHRC) has been mobilizing research to help inform how that future will be created. Recently, SSHRC identified sixteen future global challenges that could have a major impact on Canada, for example, in the next decade. These challenges come from media relations, democratic support, labor force participation, among other issues.

One challenge comes from transportation needs and concern for travel safety. Electric vehicles are seen as the modern and environmentally-friendly medium of the future. But despite recent embrace of this technology, it's far from new. In fact, electric vehicles first hit the market in the mid-19th century. Transformation of the world's practices to conform to contemporary needs, especially as data experiences a major change from analog to digital, has been in development for several decades. The transition offers great challenge to social scientists, but even to philosophers who think about needs while anticipating future results. Another environmental theme maturing in challenges to information processing encompasses the notion of cyberspace. Within this technological perspective, people, Internet-of-Things, and AI all become main element players. Together the elements can help improve identification and authentication of both people and things. What do we know as people? Is AI creating a new image of what constitutes people (Nagaaki Ohyama, Tokyo Institute of Technology)? Efficiency and convenience of governmental services for residents are key. Is there a conflict between the two? Consider debates over ID cards. What do they really identify?

More effective and efficient transactions, no matter the connections, involve another solution found in blockchain technology - the new Internet of value. Through AI and other technologies, blockchain, or tomorrow's quantum computing, allows transactions to be made seamlessly (Joëlle Durieux, General Director, Réseau Thématique French Tech). Along with other advances, new applications of science require enhanced democratic awareness and political and moral reflection to be shared and passed on to others for future generations (Alan Shark, Public Technologies Institute, USA). Advances in science are accompanied by ongoing research projects employing hyper-heuristics, blockchain, data mining and neural networks, quantum computing etc. to assess how these new technologies could help address new logistic challenges, and in particular humanitarian logistic challenges.

Overlaying these advances Artificial Intelligence appears as theory and development of advanced computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages. With a beginning stage of machine learning, users are now driven by big data models to support the work of machines. Through resulting machine intelligence, with advanced networking, users are trained to build ad-hoc models to learn from custom data. The subsequent phenomenon of machine consciousness presents cognitive self-learning. As an element of a new approach to improving human conditions, AI is enabled by a confluence of big data. Humans are challenged by impacts on future of jobs. We are seeing shifting trade dynamics, not only due to political inflictions but because trade is no longer governed by products and services, but also by the amount of data that is been transferred across communication networks.



After many years of development, Artificial Intelligence seems to be coming of age. It is a technological area with the highest impact on geopolitics and national security. A direct influence on balance of power between countries, AI represents both a challenge and an opportunity for governments worldwide sharing responsibility for citizen service. Searching data in data lakes of the past will not support future requirements and can reduce rate of progress otherwise supported (Walid El Abed, Global Data Excellence, Switzerland).

Value to citizens ranks high among perspectives of industry leaders for developing new uses for technologies, and indeed, the manner by which technology has value. At the end of much anticipation one can suggest a goal of automating human life, itself. Even more advanced ideas suggest that technology can even create life, at least in how human life is understood. That implies behavior of humans. What began as organ replacement can now be visualized as organ substitution. All this requires better understanding of organs specifically, apart from how the organs function to support human life.

Great interest is expressed in how organ functioning can be modeled. Machine learning can detect anomalies in organs to help design correction or replacement (Simon Boisserpe, Atlanpole, France). Augmenting organ function now seems real through the use of technology imbedded in fabrics. Technology worn on the body can alert the medical community to anomalies and then to correct problems or to improve performance of the human.

Merging of fashion and technology is a hot topic (Nitya Karmakar, Professor, Australian Catholic University). At the same time advancement can be made toward improving human function, challenges such as privacy, security, technical standardization, social control, political manipulation result. This suggests an absence of governance and new questions of ethics. How can information so privately held be protected for the sake of personal identity without ethical standards? Protecting personal data presents a broad concern for the uninformed public, and thus for governments responsible for protecting personal data.

And, how does this feed into concerns for cyberattacks, or cyber use of personal data to influence perception of outcomes from human behavior? Certainly, an argument can be made for needing increasingly trustworthy frameworks for ecosystems in secure environments. Alternatives to traditional regulation could occur through market-based instruments, self-regulation and co-regulation approaches. Governance should be a process of evolving policies with oversight of secure innovative technology implementation.

Emerging from the concept of Internet of Things, many new applications are appearing. From controlling domestic conveniences in the home to industries providing these services, a common set of objectives in managing use seems to apply. 1) Enable real time decision making across silos of services. 2) Optimize infrastructure points and equipment from a single platform to increase performance and cost effectiveness. 3) Simulate with expert software tools value scenarios through multiple variables (Olivier Sala, ENGIE Digital, France). At a community level, neighborhoods can be transformed through simulation to empower citizens as they seek improved services and effective communication with authorities (Thomas Mackenzie, Items International and Eric Legale, Issy Media, Issy-les-Moulineaux).

Sustainable local communities is a recurring theme for innovative technology. Growth in support can lead to misuse of power as real change causes movement of resources and capabilities. While this issue appears on the global scene with government leaders, it is also found locally where change is experienced at the individual level. Making people more accountable is a very important part of real change (Sylvie Albert, University of Winnipeg).

Available resources

Innovation, one of the main focuses during the Global Forum, is seen as a means to apply improved technological approaches to benefit humanity. It comes in different forms: new products, service enhancement, new processes, even new packaging. At the same time new



technologies can bring about radical changes in all aspects of life. They affect the way we live, work and spend time. Innovative technologies can serve societal goals. At the same time they can cause some people to be left behind, triggering a resurgence of populism, nationalism and protectionism, which today threaten growth prospects and disproportionately harm low-income households.

Careful regulation of innovation, can improve the human condition through measurement of success while accommodating effects of change. Even though many innovative applications don't just disruptive through gradual displacement, entire industries can be reshaped (Michael Stankosky, George Washington University, USA).

Cognition of the individual

Throughout discussions during the Global Forum 2019, the idea that human cognition represents an important, if overlooked, element in applications of technology focusing on improvement. For example, targets of smart cities, in which the city's values are addressed, are more aligned to value in making citizens smarter. That means appealing to supporting cognitive strengths of the individual.

Of particular significance is the fact that today, half of the world's population is under thirty years of age. Younger people are making decisions in today's environments, implying that needs are refocused on characterizations from youth rather than concern for social stability. Opportunity for change is emphasized, and more tools to accommodate change are appearing in technological solutions for growth.

A subtle value becomes more pronounced as difference is understood between what constitutes a smart city versus a cognitive city. Then the comparison is transmuted to individuals who comprise cities - governments and society. Impacts against cities are increasingly seen through need to protect humans in order to support cities. Teaching technological skills in order to address social or emotional skills - empathy, leadership, creativity and personal fragility are involved. Concern for failure is not as significant an issue as in the past. The challenge seen is that emotional skills at the individual level are much more difficult to automate. "If those factors are not taken into consideration, a new technology will fail to find users, reward its investors, or deliver potential for social value." At the same time, adapting to new technologies is more difficult for older generations of citizens. Rigid concepts suitable to older generations do not serve well the need for a new focus on individuals.

Nature based systems become an increasing focus as solutions to social problems move increasingly in the direction of cognitive awareness. Need to attend to physical, mental and social well-being of citizens is consistent with the new goal of supporting human cognition. A healthy corridor for innovative and flexible nature based systems integrates a large number of micro community-driven design processes can be demonstrated. In this way, the many dimensions of citizen well-being in relation to energy, water, food, nature, mobility, participation, behavioral change, digital democracy, social cohesion and the solidarity economy are considered.

"Knowing the customer" seems a focus that has a paradoxical twist. If all the individual characteristics of individuals are known, how would value be found in a "personal life" (Gwendaëlle Carfantan, Setur, France)? With the refocus on individual values and discrete concern for difference, the question of ethical standards emerges. In referring to Einstein's concern for deterioration of ethical standards from the mechanization and depersonalization of our lives, common values in today's focus on the individual should be considered. Perhaps this is not a concern. If the relationship between humans and nature is to be considered, do we not find a good source for innovation? Social innovation goes with technological innovation. People and organization they form learn from nature (Jeremy Millard, Danish Technological Institute).



Finally!

It seems clear from the ideas practiced today by leaders in the IT community that a new perspective is appearing, and not remotely as on the horizon. It is occurring today. But, it isn't a shift in regard to technology products and services for the community. It comes more as an integration of an important element too often overlooked in the past due to urgency in developing cost-effective and competitively favorable solutions. Within processing environments that led us to our present concern for processing data, the individual citizen occupies a key role. Both developers and regulators are taking notice.

Dependence on Artificial Intelligence can easily lead the public to thinking that algorithms have become the sovereign element in determining what is or is not valuable for public conception. As Yuval Harari claims, authority could shift from fixed laws to personal algorithm determinations, just as divine authority made room for human determinism (Yuval Harari, 12 Lessons for the 21st Century, Penguin Random House, 2018)