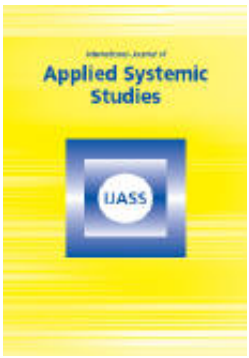

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Managerial self-actualisation in the era of business intelligence

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Abstract: The new technological evolution has influenced the global business with the use and application of business intelligence tools that provide information accuracy and conformity to managerial decisions, leading to organisational efficiency and corporate performance. In the global business environment, there is a need of social awareness for the improvement of the human well-being. Managers need to create a knowledge base with the purpose to understand the needs of the global society. This paper aims to present literature insights, from both philosophical and IT dimension, proposing initial research undertakings that should enhance our understanding of the new managerial self-actualisation era. Thus, it is argued that corporate performance is a well-balanced combination between technological trends and human values based on the self-actualisation continuous managerial decision process.

Keywords: business intelligence; self-actualisation; corporate performance global managers; decision-making; social intelligence; machine intelligence.

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1 Introduction

In an era of information technology (IT), artificial intelligence (AI) and augmented reality (AU) we are sensitised into the philosophical evolution of those who lead the global political and entrepreneurial realities of the 21st century, in essence their managerial self-actualisation (MS) perspectives. Is there, say only during the last 250 years, a significant change in their perspectives given the trends of the global village in terms of proximity, communications, and technological evolution?

In this article we aim to present literature insights of the above, both philosophically and from the IT dimension, and to propose initial research undertakings that should enhance our understanding of the new MS era. In doing so, we shall centre our attention to evolutionary 'leaders' and to well tested academic knowledge. At the same time, we will avoid capitalising on disputable matters or media influences.

Adam Smith is known for two books: *An Inquiry into the Nature and Causes of the Wealth of Nations*, first published in 1776 effectively dealing with a world of impersonal exchange, and *The Theory of Moral Sentiments*, first published in 1770 focusing into issues about personal space [Roberts, (2014), p.2, p.224]. He also points that we should accept that economics is something more important than making money, that in order to make good choices we must understand ourselves and those around us, (pp.12–13) that we do not always act for our self-interest by pointing out that "when our passive feelings

are almost always so sordid and so selfish, how comes it that our active principles should often be so generous and so noble?" (p.24)

We should observe that most of our reactions are imprinted in our cultures and within that reality Smith states that "man naturally desires, not only to be loved but to be lovely" (p.31, p.42), asks the question "what can be added to the happiness of the man who is in health, who is out of debt, and has a clear conscience?" (p.78), demands "live free, fearless and independent, … never come within the circle of ambition, … or bring yourself into comparison" (p.111), that our reflection on our past behaviour could lead to learning, self-knowledge, and a desire to be different in the future (p.57), that passionate pursuit of success can corrode the soul (p.96), that we seek wisdom and virtue (p.115), that tolerance is the great religion of our times (p.124), and "say little, do much" (p.148).

Effectively the above lead us to make the world a better place, to promote self-respect to play an active role in creating civilisation, in "making a difference" (p.168, p.185, p.202).

The paper is structured as follows. Section 2 discuss about the business intelligence (BI) concept and its applications to the firms. Section 3 discusses aspects of BI and its drawbacks whereas in Section 4 outlines a few trends of BI. In Section 5 the outline an aspect about the global manager operating in the global village and Section 6 elaborates on the MS. Section 7 summarises the main parts of the paper to conclude to a main point.

2 BI concept and applications

The ever-changing business environment forces managers to take advantage of every possible tool to supplant their competitors, gain more market share, increase value-added decisions and enhance the firms' profits. By adding the increasingly fast-pace of technology evolution, it was obvious that there would be a time where there would be software which would augment managers' decisions. The amount of data that daily pass through a firm are huge and usually we are unable to process them, elaborate on them and take the appropriate decisions. BI is this exact 'tool' that is needed to satisfy this need. In addition, more and more firms hire chief data officers, as they understand the value of the (big) data as an asset (Lee et al., 2012).

It was not until 1989 that the Gartner Group of Howard Dresner spread the BI term (Shi et al., 2012). BI is said to be "a broad category of applications, technologies and processes for gathering, storing, accessing and analyzing data to help business users make better decisions" (Watson, 2009) and Negash and Gray (2008) shared also the same approach on this concept. Thus, BI does not only act passively by gathering and storing information, but it also has a more active role by accessing and analysing data so that it will give information concerning the following managers' decisions.

The range of BI governance is wide as at the strategic level, the firm's general strategy and goals should lead the BI activities. In addition, at the tactical level, it controls and verifies the timelines of the BI projects and at the operational level, BI governance ensures high quality meta-data concerns (Azvine et al., 2005, 2006; Watson et al., 2004). A firm that takes advantage of BI practices gets numerous benefits that vary according to the impact that it has on local or global community or according to the level of measurement. Such benefits are the time saving for both BI users and external cooperators like suppliers, more information of higher quality than the previous state before the BI use, better decisions and processes according to the needs of each firm and

finally BI underpins the firms' strategic goals. The interest on BI is increasing mainly due to numerous success cases that have obtained remarkable benefits in organisational performance (Kowalczyk et al., 2013) but in order to succeed, managers should be flexible and efficient (Rabuzin and Skvorc, 2016).

3 Aspects of BI

BI applications are used in various heterogeneous sectors (Babu et al., 2019). BI may improve e-commerce and market intelligence as firms in this sector already include data analytics applications and thus the next important step is to be able to extract results from these data and facilitate their decisions. BI also enhances e-governance from the government in each country. Hence, transparency of e-governance policies is also achieved. It also self-improves by advancing science and technology. In addition, one of the most promising facilities of BI is by improving healthcare and public health by solving social affairs like the ageing of the population on earth.

According to Shi et al. (2012) BI is mainly a solution to the firms' needs. One of the most prominent uses of BI in a multinational firm is to get and 'clean up' data from numerous systems so that any error will be excluded. Then by processing the transformed data and setting the appropriate objectives, analyses will be conducted to obtain the best results for the type of decisions that the managers are willing to take. Overall, the processing of the information leads to better understanding both the internal and external environment. But choosing the best BI system is not an easy task. The main factors that should be taken into account for the adoption, utilisation and success of a BI system are the organisational perspectives, the information system perspectives and the users' perspectives (Hwang et al., 2004). However, according to Sharma and Sood (2014) the most important care for BI users should be the data analysis on its own and not the kind of BI system. Also, there is not adequate research from the decision process perspective (Kowalczyk et al., 2013).

Additionally, BI lifecycle consists of five main parts (Larson and Chang, 2016). The first part is the discovery phase in which the firm managers set the questions that want to be answered by the BI system. In the second phase, the design phase, IT department sets up the modelling of the application. At the third phase, development of the model is made so that the model is complete, it can subtract data and extract possible solutions. Deployment is the fourth phase and it is an official phase as the whole project is quite complicated and needs reassessment. The final phase is the value delivery in which the managers verify that the BI systems operates fine, take their decisions according to the BI results and at last give feedback.

80% of the total information is non-numeric data, hidden, unstructured, cannot be extracted from the data warehouses and doubles every three months (Godbole and Roy, 2008; Shi et al., 2012). Consequently, software that will be able to handle and transform unstructured data to manageable data is of high necessity. Also, there are BI tools which aim to transform data traces into usable information. Finally, due to GDPR laws, data governance is the most important objective of firms and real-time analytics and mobile BI has a decreased trend since the previous year (2018) (Baier et al., 2019).

According to Ain et al.'s (2019) survey, there are three main BI theories mainly adopted throughout academia. The first is the DeLone and McLean's (1992, 2003) information systems success model in which six IS success dimensions are suggested.

The second is the technology acceptance model (Davis, 1989) capitalising on the perceived usefulness and on the perceived ease of use. The third most cited theory is the diffusion of innovation (Everett, 1995). According to this framework, innovation adoption is the key to success. Additionally, the most important factors that the firms should take into account when they have adoption, utilisation and success of a BI system are the organisational perspective, the information system perspective and the users' perspective.

BI apart from acting as a value delivery tool, it also contributes to separate industries in a variety of ways (Shi et al., 2012). Particularly, in retail trade, BI is quickly evolving being customer oriented. Customers' information (needs, loyalty, etc.) is the centre of the BI tools in this industry. RFID product coding is also used to satisfy BI needs. Hayashi et al. (2010) applied an algorithm which can set consumer groups and can also predict the consumers' needs in every group accurately, because customers have obvious preferences for products in a fully competitive environment.

Shi et al. (2012) also present that the manufacturing industry has a high rate of IT usage. One of its main advantages is that there is a high data-integration rate which helps to extract qualitative results. The financial industry takes advantage of the financial technology innovation by using BI to enhance predictions of customers' behaviour towards loan repayment or needs and to identify possible illegal firm financial reports. Other industries that BI is widely used are healthcare and higher education organisations, telecommunications and supply chain firms.

Ain et al. (2019) have written down all the main challenges that have been found in the bibliography when adopting and implementing a BI system. The main challenges are the low level of system acceptance, the lack of motivation, the fear of losing power over information, the lack of knowledge, system issues, poor communication between the IT department and the BI users and finally the lack of prompt response and knowledge, problems of reporting data and system errors. The motivation that BI users have in order to learn a BI system, influences their intention to adopt or not such a system (Yoon et al., 2017). Additionally, the users' motivation to adopt a BI system is affected by the relative advantage of the system and its limitations, such as the needed skills/resources.

According to Azvine et al. (2006), real-time BI faces two bottle-neck drawbacks. The first is the difficulty in transforming the data to information and the subsequent is the transformation from information to actionable decisions. Also, firms that do not apply BI practices cannot know in advance the results that it would have if it used BI for the completion of a project. It is easier to do so upon using BI and then guess what would be the results if the firm did not apply BI practices. Even when firms incorporate BI systems, there should be a performance evaluation of this use, but there was only a small survey on BI assessment (Hou and Papamichail, 2010).

In order to face this challenge, in the beginning managers used a modified version of the analytic network process from Saaty and Takizawa established in 1986 (Shi et al., 2012). This process estimates the weights of chosen variables and it concludes that the most critical variables are output information accuracy, compliance with the requirements and support of organisational efficiency. Elbashir et al. (2008) used a new measure that was depended on comprehending the characteristics of BI systems in a process-oriented context and Lin et al. (2009) have designed a model to assess the performance of a single BI system. Later on, Yeoh and Koronios (2010) used a few critical success factors which were grouped by organisation (vision, business case, leadership support), process (skilled BI team, management in accordance with firm's strategy) and technology (data,

infrastructure), in order to test the success of the BI application. Moreover, Seng and Chiu (2011) have proposed a benchmark method targeting the users' needs and Brooks et al. (2015) set the context for a BI maturity system in the healthcare sector. Finally, Jahantigh et al. (2016) have set a few performance criteria which were cultural aspects, technical skills, accountability, organisational structure, business environment, practices, resistance to change, power and policy, technology, etc.

4 Trends

BI is continuously evolving and changing, and the following general trends are leading the future of BI (Watson, 2009). Scalability of BI leads to tools that can deal with more data, advanced challenges and multiple users simultaneously without faltering quality of the systems used. Another target is to be able to make BI pervasive to every stakeholder of a firm but there are drawbacks of high importance. Mainly the high cost of applying BI systems and the cost of training as well as the time and complexity that is needed, are crucial for the future of BI applicability.

In the recent past, BI used historical data. Nowadays, more and more BI systems use real-time data. This is not as simple as it may seem, as real-time data can lead to different real-time decisions and consequently to changing incoming data. Real-time data are data that are gathered by operational sources with no latency and are able to complete the transformation data – information – actions – business processes in real-time (Azvine et al., 2006). Thus, the faster the decision by the time that incoming data appear, the best the operational BI system is, as there is need for quick reaction to the variations of the market (Jahantigh et al., 2019). But this flow is interrupted by an expert analyst who operates and verifies the BI system's actions. This manual operation provides a time-lag which nullifies the real-time ability.

One of the challenges that BI systems will face is the integration of information form fully joined up systems. In order to obtain such a tool, three major prerequisites should be fulfilled (Azvine et al., 2006). These are the adaptive processes, the developed infrastructure so that all data will be available by the time that it is generated and the modelling of different analytic scenarios.

In particular, Babu et al. (2019) admit that year 2019 will have a BI growth, six times larger than the corresponding growth rate of the overall IT market. Additionally, up to 2.72 million jobs needing data science skills were posted in 2020, making it one of the highest-needed roles today (Markow et al., 2017). Moreover, the most remarkable trends in workplace are said to be data quality, data discovery-visualisation and data-driven culture (Baier et al., 2019). As far as data visualisation and data-driven culture are concerned, Sharma and Sood (2014) support that human mathematical intuitions should not be prioritised and data analysis should take this role. However, until that time comes, in order to be able to have the appropriate information available, materialised view is preferred in contrast to the regular view. Furthermore, it is believed that BI will be more automated as machine learning software will be installed, predictions of the outcome of a number of different decisions will be available and all this technology advancement will lead to 'augmented analytics' (Prat, 2019). Finally, an increasing number of firms will become BI-based firms as such systems are a prerequisite for success towards their competitors.

5 Global village and global managers

The rapid growth and evolution of new information and communication technologies is an evident effect of globalisation that has promoted new mega-trends in the global village that are the key drivers for the advancement and the sustainable development. Accelerating technology, climate change and the changes in the production and labour markets have created new challenges in the global community. Following the global mega trends, new opportunities emerged for the business growth as the technological revolution, has provided managers the ability to use multiple methods for company performance.

According to the United Nations Department of Economics, the fast-moving development and advancement of new technologies, namely in information, and communication, as one of the mega-trends (United Nations, General Assembly, Distr. General, 2017) that will affect the global work environment and reinforce a sustainable development. The phenomenon of globalisation is associated with the creation of networks, connections, and borderless information that are related to people, goods and capital (Dreher et al., 2010).

Dreher et al. (2010), define three dimensions of globalisation "economic globalization, characterized by the long distance flows of goods, capital and services as well as information and perceptions that accompany market exchanges; political globalization, characterized by the diffusion of government policies; and social globalization, expressed as the spread of ideas, information, images and people." Namely, social globalisation provides data on information flows and it can be an asset because it has a significance for specific issues. To this extend, Rowley (2007) is referring to the 'data – information – knowledge – wisdom hierarchy', an open network of information that becomes a knowledge asset, which global managers can use to create value for firms (De Mauro et al., 2016).

In fact, according to the new DHL Global Connectedness Index the world ended 2017 more globalised than ever before. Under this complex global environment, technology has become widespread and corporations are becoming increasingly data intensive. Chen et al. (2012), argue that due to this fact, companies are now operating to a 'data-centric business environment' and managers disposing all this big data are having an 'information asset' that is "characterized by such a high volume, velocity and variety to require specific technology and analytical methods for its transformation into value" (De Mauro et al., 2016).

In a business world that is constantly changing because of the technological revolution and evolution, global managers are facing the challenge of how to make better decisions in a borderless business environment. It has been mentioned managerial decisions are supported by new trends and applications that are smoothly integrated in the global village, in such environment in which information abundance and knowledge are advantageous resources.

Moreover, the managerial adaptation to the global changes and mega trends, raise more issues of how to make better decisions considering the global concerns about the engagement of business with the global society (Ghemawat and Altman, 2019). Managerial adaptation in the global environment where multinational corporations are operating, concerns the decision-making process that is related to the strategic change and innovation and the practice to information processing (Sharfman and Dean, 1997). Conforming with Ford and Berrang-Ford (2016), we can identify four traits of adaptation

tracking: consistency, comparability, comprehensiveness and coherency that are more related to the climate change and inventory emissions.

Then, is evident that managerial conceptualisation is a key factor for the strategic decision-making process, where adaptability to the general trends of the global society is required. Furthermore, the support of data sources and technological information in a consistent and transparent approach is a practical intelligent tool that global managers are using and adapting in their decision process according to the traits of adaptation tracking for all aspects of social changes.

The technological support of BI to the managerial decision-making process for global manager, is essential to the extent that they gather and transform global data to information or knowledge. Information quality is also essential for global managerial decision because it reduce uncertainty to every available alternative (Wieder and Ossimitz, 2015). We argue that information quality alone standing is not the strongest predictor of quality of decision making while it cannot be combined with a strong managerial skill that will transform information quality to valuable knowledge.

To this extend, global managerial decision is not only a matter of analytical intelligence that can be supported with BI technological trends and applications, or even creative intelligence to find innovative solutions. Moreover, a most practical approach is the relation with the 'individual tacit knowledge' that is needed for global manager to develop his decision-making process (Harvey et al., 2009).

Under this perspective, global managers need to include social intelligence (SI) that according to socio/cultural IQ (Harvey et al., 2009) is referring to the "extent to which one is socialized adequately in a society, an organization or a group." SI is associated with the whole understanding of the societal needs and realities from a global manager's knowledge, and is referred as follows [Harvey et al., (2009), p.361].

Cultural IQ is derived from a global manager's intercultural awareness and can be evaluated by examining the manager's awareness of:

- The material aspects of a culture (i.e., technology, economic development, available level of standard-of-living) of a society.
- The social institutions found in a culture – educational, political and religious.
- The aesthetic values in a culture.
- The official and unofficial languages used in the culture.
- The cultural beliefs or philosophy within the culture as to the role/value of 'man' in the society.

We argue that SI is part of global managers reaction to be considered within their decision-making process. In fact, this is a reaction that is imprinted in our cultures and that is persisting during the last 250 years, coming from the reality of Smith till to our days.

SI is an evidence of managerial cognitive reality in accordance with the knowledge of the global social needs like Smith defended in his *Theory of Moral Sentiments* for "making good choices" and "not always act for our self-interest" (pp.12–13) as "economics is something more important than making money." By this meaning, the SI reality has an important impact on the quality decision and as said Smith "making a difference" (p.168, p.185, p.202) because by acting so managers right decisions will engage business to make the world a better place.

6 BI and managerial SI, towards a MS

We have mentioned that the global village provides managers with technological trends and thus managers can take advantage from the BI practices by gaining information (De Mauro et al., 2016; Chen et al., 2012). Therefore, companies succeed in technological evolution by developing 'information asset' in their decision-making process and have a benefit in their organisational performance (Kowalczyk et al., 2013). Additionally, we postulated that SI is a global managerial concern that is implicated in the decision making. The capability to interconnect SI cognitive practices with BI analytical practices, provide global managers with competitive skills for the improvement of their decision making.

Practically, 'information asset' would better enable managers to perform their dual endeavour to gain profitability and to engage better with society. To this regard the question rises whether global managers make better decisions responding to stakeholders' needs establishing a well trusted environment. According to the 2018 Edelman Trust Barometer, shareholders still trust companies and most people feel that "CEOs should take the lead on change rather than waiting for government to impose it" (Ghemawat and Altman, 2019). Global management requires technological development and social awareness. The strategic significance of 'information asset' in global managerial decisions is very important to every corporation as it is associated to the ability to take the right decisions that will increase corporate financial and organisational performance (Guarda et al., 2018). Information quality also matters because it reduces uncertainty for managerial decision when supports any alternative decision and predicts the consequences for every decision. Information quality is essential when it comes to ensure data transparency and data trust from BI applications.

BI application tools and SI applications are needed to lead managerial decisions that are not based on the self-interest but on a common interest leading to a right path for a better world. To this extend, academics are focusing on the human values and sustainability arguing that self-actualisation is the underpinning of human values, leading to serenity, and to the highest form of human welfare (Maslow, 1970, as cited in Murtaza, 2011). There are also discussing that values and technological environment are linked (Norgaard, 1995, as cited in Murtaza, 2011). Under this view, we achieve a life balance between corporate performance and societal welfare.

Under another aspect, self-actualisation is the meaning of individuation, shall not be confused with self-interest, as it that 'describes definition of self' during the path of 'becoming' and it has been developed in the theory of Goldestein in 1963 (Whitehead, 2017). We refer to the initial concept of this theory that we associate with global managers SI knowledge that should acquire as they are part of the whole ecosystem. By this meaning, each organism lives in a world, and as Goldstein explains that world is "by no means something definite and static but is continuously forming commensurably with the development of the organism and its activity" [Whitehead, (2017), p.85]. To this extend self-actualisation is associated with the business organism operating in a continuous changing global environment. Self-actualisation "is the only drive motivating an organism" (Whitehead, 2017).

Self-actualisation is the realisation of full potential need for development, leading at higher levels of wisdom that we also find in the 5th level of human needs in Maslow (1943) pyramid and describes the potential of humans to be better within a society (Aruma and Melvins, 2017). Roberts (2014) is referring to the values of wisdom and

virtue that Adam Smith mentioned in *The Theory of Moral Sentiments*, that was first published in 1770 and till today academics and practitioners are evoking for the advancement of human life.

SI is a form of wisdom, a cognitive motivation on managerial decision process (Ardelt, 2004; Baltes, 1993, as cited in Murtaza, 2011). Academics discussed that cognitive structures, control the decision-making process as regard to the way of thinking and evaluating (Sharfman and Dean, 1997). Therefore, the decision-making process is supported by BI tools that provide managers with the knowledge of widespread information. In addition, the cognitive structure is identified and supported by the SI socio/cultural understanding that is necessary for the decision-making process. Global managers need both BI tools and SI understanding for the improvement of their decision making in the interest of business and society.

Usually, MS and or managerial individuation is a way of SI, in the meaning of SI or social identity as it has been described in Tajfel theory (Tajfel, 1972; Avolio et al., 2004) where "individuals identify with the group, feel pride in belonging, and see membership in the group as an important aspect of their identity" and the "individual's knowledge that he belongs to certain social groups together with some emotional and value significance to him [her] of this group membership" [Tajfel, (1972) p.1972, p.292; Avolio et al., (2004), p.292].

We argue that not all technological applications can be appropriate for all business contexts and global managers must take also in consideration complementary human soft skills and resources. Therefore, we assume that augmented corporate performance is a well-balanced combination between augmented technology and human values based on the self-actualisation continuous managerial decision process.

7 Conclusions and further research

The technological revolution has created new challenges to the global village, facilitating the communication and the information widespread in the socio-economic environments. Global business is more than ever complex and demanding looking to find the balance between humans and machines in the work environment. Therefore, the global village need to place barriers between human decision making, digital assistants, artificial agents and other promising technological support systems.

Living with machines and deciding for the sustainability in the global ecosystem is a challenging process that global managers will certainly face soon. To achieve at a well-balanced ecosystem, global managers should need to shift from BI to machine intelligence (MI) and rely on the machine decision making to reduce uncertainty. Global business will then follow the future path towards AI that BI has initially introduced corporations in the world of technological intelligence (Meenakshi, 2017). How difficult will be the transition to the path of the AI whereas estimated by 2021, the digital assistants will digital assistants will exceed humans? This will be a new era where "assistant cannot meaningfully produce expressive speech acts, and thus, be sincere" (Porra et al., 2019).

Global managers will need more adaptation to this new revolutionary business context where BI tools will not be anymore the essential tool that will support managerial decision, as it will be replaced in a very short-term by MI. How dangerous must be this new global reality? Academics come up with basic questions about human feelings, like

love, happiness and the desire to care about others (Porra et al., 2019; Roberts, 2014) that with the coming of the new MI world this will result to convey our lives in technocratic surround, totally absent from human sentiment and probably to the expiration of humanity? (Porra et al., 2019).

Global managers, better global citizens of our era and before venturing AI or BI or IT, will need to first embrace the concept of self-actualisation including smile, create, care, dream, dare, avoid dogmas, be sceptical of media, and so on. Otherwise, the possibility of entering the 21st century slavery will be ante portas.

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